



# **408SS – Rock Creek Sanitary Trunk Line Upsizing - Phase 1 Bid Booklet**

March 2021

Project Number: 408SS  
Bidding and General Requirements, Contract Forms,  
Project Special Provisions and Plans

---

**Owner**  
City of Sherwood  
Engineering Department  
22950 SW Pine Street  
Sherwood, OR 97140  
(503) 925-2309

## TABLE OF CONTENTS

### Volume 1 of 2 – Contract Documents

#### Division One – Bidding Requirements

- Invitation to Bid
- Bidder's Checklist
- Bid Statement
- Bid Schedule
- First-Tier Subcontractor Disclosure Form
- Bid Bond
- Certification of Non-collusion
- Certification of Compliance with ORS 279C.840 (Prevailing Wages)
- Certification of Asbestos Abatement
- Certification of Non-Discrimination
- Customer Service Acknowledgment
- Prequalification Acknowledgment
- Bidder Responsibility Form
- Bid Addenda (Sample)

#### Division Two – Contract Forms

- Contract Agreement
- Contract Agreement – Exhibit A (Standard Contract Provisions)
- Contract Agreement – Exhibit B (Certification of Employee Drug Testing Program)
- Contract Agreement – Exhibit C (Certification of Compliance with Oregon Tax Laws)
- Contract Agreement – Exhibit D (Certification of Registration with Contractors Board)
- Contract Agreement – Exhibit E (Certification of Workers' Compensation Coverage)
- Performance Bond
- Payment Bond
- Power of Attorney
- State of Oregon Statutory Public Works Bond
- Certificate of Liability Insurance
- Certificate of Worker's Compensation Insurance
- Notice of Intent to Award (Sample)
- Notice of Award (Sample)
- Notice of Award to BOLI (Sample)
- Notice to Proceed (Sample)

#### Division Three – General Requirements

- BOLI Wage Rates (Cover Sheet Only)
- General Requirements

#### Division Four – Technical Specifications

- Table of Contents
- Special Provisions
- General Conditions and Standard Specifications

#### Division Five – Supplementary Information

- Geotechnical Data Report
- Cultural Resource Investigations Survey

**City of Sherwood**

408SS – Rock Creek Sanitary Trunk Line Upsizing - Phase 1

Table of Contents

---

State of Oregon Archaeological Excavation Permit, #AP-2702  
US Army Core of Engineers NWP-2013-128-1 Authorization, #20200226  
Department of State Lands - Removal/Fill Permit, #62459-RF  
Department of State Lands Wetland Concurrence  
401 Water Quality Certification, #2013-128-1  
Clean Water Services - Services Provider Letter, #20-000667  
Clean Water Services - Storm Water Connection Permit Authorization  
1200-CN Stormwater Discharge Permit  
Washington County Right-of-Way Utility Permit, #202016  
Tualatin River National Wildlife Refuge Special Use Permit, #TRNWR\_2020\_005

**Volume 2 of 2 – Contract Drawings**

408SS – Rock Creek Sanitary Trunk Line Upsizing - Phase 1 – Contract Drawings

# **Division One**

## **Bidding Requirements**

**INVITATION TO BID**  
**City of Sherwood**  
**408SS – Rock Creek Sanitary Trunk Line Upsizing Phase 1**

Sealed bids for furnishing all materials, equipment, labor, and services for the construction of the **408SS – Rock Creek Sanitary Trunk Line Upsizing Phase 1** for the City of Sherwood will be received at City of Sherwood, Engineering Department, 22560 SW Pine Street, Sherwood, Oregon 97140 (Attn: Bob Galati, P.E., Project Manager) until the **Bid Closing at 2:00 PM (PDT) on Thursday, April 15<sup>th</sup>, 2021**. Please title the envelope Rock Creek Sanitary Trunk Line Upsizing Project – Phase 1. Bids will then be publicly opened and read aloud after **2:00 PM (PDT)** at the Sherwood City Hall Community Room, 22560 SW Pine Street, Sherwood, Oregon. This project is subject to a pre-qualification process and only General Contractors pre-qualified bids will be accepted. No bids will be accepted after the **BID CLOSING** time.

First-Tier Subcontractor Disclosure forms must be received at the above mentioned location and date no later than **4:00 PM (PDT)**. Proposals without a completed First-Tier Subcontractor Disclosure form submitted will be considered non-responsive.

Bidders must be **pre-qualified** in accordance with the laws of the State of Oregon (ORS 279C.430) to construct street and utility capital improvements. Letters of pre-qualification (approval letter only) from the Oregon Department of Transportation (ODOT), Washington County Department of Land Use & Transportation, or any local municipality with a population equal to or greater than 18,000 persons is acceptable to the City. Proof of valid pre-qualification must be submitted to the City **by Tuesday, April 12<sup>th</sup>, 2021 at 5:00 PM (PDT)** for the Bidder to retain appeal rights. Only bids from pre-qualified Bidders will be opened.

A **MANDATORY PRE-BID MEETING** will be held at the project site 15028 SW Century Drive at intersection with Tualatin-Sherwood Road on **Thursday, April 1st at 2:00 PM (PDT)**. A bidder's failure to attend the pre-bid meeting shall cause any bid submitted by that bidder to be deemed non-responsive and will be returned unopened.

**Project Description**

The Work to be done under this Contract consists of the construction of the following items:

1. Installation of 24-inch diameter PVC sewer pipe (1097 LF).
2. Installation of casing pipe for SW Tualatin-Sherwood Rd crossing via trenchless installation method (147 LF).
3. Installation of 12-inch diameter PVC sewer pipe via open cut and sliplining (103 LF).
4. Installation of 8-inch diameter PVC sewer pipe via open cut (20 LF).
5. Installation of 48-inch diameter manholes (4).
6. Installation of 60-inch diameter manholes (3).
7. Other miscellaneous items necessary for completion of work as shown on the plans.
8. Engineer's Estimate \$1.4M - \$1.7M.

The Bidding Documents will be available on Wednesday, March 24<sup>th</sup>, 2021 at 8:00 AM (PDT) for free download on the City's website, [www.sherwoodoregon.gov](http://www.sherwoodoregon.gov), on the Business and Development pull-down menu tab.

Other locations Bidding Documents may be examined:

- DJC Plan Center (Electronic only), 503-224-0624, Email: [plancenter@djcoregon.com](mailto:plancenter@djcoregon.com)
- Oregon Contractors Plan Center, 5468 SE International Way, Milwaukie, OR 97222

**City of Sherwood**

408SS – Rock Creek Sanitary Trunk Line Upsizing Phase 1  
Division One – Bidding Requirements

---

- Builders Exchange of Washington, 2607 Wetmore Ave., Everett, WA 98201
- H2Bid, [info@H2bid.com](mailto:info@H2bid.com)

Parties downloading Bidding Documents from the City's website can request to be included on the official Planholders list by sending an email to [engineering@sherwoodoregon.gov](mailto:engineering@sherwoodoregon.gov). Bidders are not required to be on Planholders list to submit a Bid for this project.

Addenda, clarifications and Notices will be posted online on the City's website. Potential Bidders are responsible for checking the website on a daily basis. Each addendum must be signed and submitted with the Bid to be considered a responsive bid offer. The City is not responsible for failure of bidders to receive notifications of changes or corrections made by the City and posted as stated above.

All questions or requests for clarification must be emailed **by April 8<sup>th</sup>, 5:00 PM (PDT)**, seven (7) days prior to bid opening to receive responses. All final responses will be posted on the City's website no later than **four (4) days** prior to Bid Opening. Bid Addenda shall not be issued less than 72 hours before the Closing unless the addendum also extends the closing.

This is a local public works capital improvement project subject to BOLI prevailing wages ORS 279C.800 to ORS 279C.870.

Bids shall be accompanied by a certified check, cashier's check or bid bond payable to the City of Sherwood in an amount equal to ten percent (10%) of the amount bid. **The city may award the contract to the lowest responsive bidder of either the Base Bid or Bid Alternate at its discretion.**

The City of Sherwood may reject a bid that does not comply with prescribed public contracting procedures and requirements, including the requirement to demonstrate the bidder's responsibility under ORS 279C.375(3)(b), and that the City may reject for good cause, all bids after finding that doing so is in the public interest. City reserves the right to waive minor informalities in any bid.

For more information regarding this project, contact Bob Galati, P.E., at 503-925-2303 or by e-mail at [galatib@sherwoodoregon.gov](mailto:galatib@sherwoodoregon.gov)

PUBLISH: Portland Daily Journal of Commerce, Wednesday, March 24<sup>th</sup> and Friday, 26<sup>th</sup>, 2021.

## **BIDDER'S CHECKLIST**

### **408SS – ROCK CREEK SANITARY TRUNK LINE UPSIZING PHASE 1**

- Bid Statement Including signed signature page
- Bid Schedule
- First Tier Subcontractor Disclosure Form
- Bid Bond
- Certification of Non-Collusion
- Certification of Compliance with ORS 279C.840
- Certification of Asbestos Abatement
- Certification of Non-Discrimination
- Customer Service Acknowledgment
- Prequalification Acknowledgement
- Bidder Responsibility Form
- All Applicable Addenda

## BID STATEMENT

The undersigned Bidder declares:

That Bidder has carefully examined and incorporates in this Bid, by this reference all documents included in the Bid Booklet of Contract Documents and Specifications for this job, which includes but is not limited to the Plans, Standard Specifications and Standard Drawings, Supplemental Specifications and Special Provisions, Addenda, Bid Schedule, Prevailing Wage Rates, Contract form, Bond forms, and Conditions of the Contract for:

### **408SS – Rock Creek Sanitary Trunk Line Upsizing Phase 1**

That Bidder has made an examination of the site of the proposed work and has made such investigations as are necessary to determine the character of the material and the conditions to be encountered, independently of the indication on the plans; and that if the Proposal is accepted, Bidder will contract with the City of Sherwood as provided in the Contract form, will to the extent of this bid, provide the necessary machinery, tools, apparatus, and other means of construction, and will furnish all material and labor as specified, or called for by the Plans or as necessary to complete the work in the manner specified and in accordance with the requirements of the Engineer.

The undersigned has checked carefully all the bid schedule figures, and understands that the City will not be responsible for any errors or omissions on the part of the undersigned in making this bid.

That Bidder has carefully studied all reports of explorations and tests of subsurface conditions at or contiguous to the site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the site which have been identified in the Solicitation Documents. Bidder acknowledges that such reports and drawings are not Contract Documents and may not be complete for Bidder's purposes. Bidder acknowledges that City and Architect/Engineer do not assume responsibility for the accuracy or completeness of information and data shown or indicated in the Bidding Documents with respect to Underground Facilities at or contiguous to the site.

That Bidder has obtained and carefully studied (or assumes responsibility for having done so) all additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and underground facilities) at or contiguous to the site which may affect cost, progress, or performance of the work and which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.

That Bidder does not consider that any additional examinations, investigations, explorations, tests, studies or data are necessary for the determination of this Bid for performance furnishing of the work in accordance with the times, price and other terms and conditions of the Contract Documents.

Bidder has given Architect/Engineer written notice of all conflicts, errors, ambiguities or discrepancies that Bidder has discovered in the Contract Documents and the written resolution thereof by Architect/Engineer is acceptable to Bidder, and the Contract Documents are generally sufficient to and convey understanding of all terms and conditions for performing and furnishing the work for which this Bid is submitted.



The undersigned also agrees that Bidder will order all material and equipment included under this contract and will commence work within ten (10) days after receipt of Notice to Proceed and that Bidder will complete the work in all respects after commencement and will have the project completed by the date specified in the special provisions and that Bidder will pay as liquidated damages to the City for any delay, the sum of **Two Thousand and No/100 Dollars (\$2,000.00)** per day for each Calendar Day required beyond that period.

Accompanying this proposal is a Certified Check, Cashier's Check, or Bidder's Bond

from \_\_\_\_\_ of \_\_\_\_\_  
(Name of Surety) (City/State)

in the amount of \_\_\_\_\_ dollars

(\$ \_\_\_\_\_), being 10% of the amount bid according to the conditions of the Call for Bids and Specifications.

If this proposal should be accepted by the City and the undersigned should fail to executed a satisfactory contract and bond within ten (10) days from the date of notification, then the City may, as stated in the specifications, determine that the undersigned has abandoned the contract and thereupon this proposal shall be null and void, and the certified check, cashier's check or Bidder's bond accompanying this proposal shall be forfeited to and become the property of the City. Otherwise, the certified check, cashier's check or Bidder's bond accompanying this proposal shall be returned to the undersigned.

The full name and residence of all parties and persons interested in this bid as principals are as follows:

NAME

RESIDENCE

\_\_\_\_\_  
\_\_\_\_\_

The name and business address of the surety company which will furnish the required performance and payments bonds is

\_\_\_\_\_  
(Name of Surety Company) (Number and Street Address) (City / State / Zip)

All General and Specialty Construction Contractors must have a valid Certificate of Registration with the Construction Contractors Board/State Landscape Contractors Board in order to submit a Bid or offer to undertake any Construction Work in the State of Oregon (ORS 701.026/ORS 671.530).

**REGISTRATION NO.** \_\_\_\_\_ **EXPIRATION DATE** \_\_\_\_\_

The undersigned Bidder has heretofore completed the following work of a similar nature to that contemplated.

JOB	LOCATION	DATE

The undersigned Bidder acknowledges that the amount of damages City might suffer by reason of a failure to complete the project by the Completion Date noted above would be difficult or impossible to compute, and therefore agrees that the stipulated amount of liquidated damages set forth above for such delay is a fair and reasonable measure of damages, and therefore Bidder agrees that it will not contest such sum as being other than a true measure of damages in the event of a failure to complete the project by the stipulated Completion Date. Bidder hereby declares and agrees:

- (1) that this is a local public works project subject to the state prevailing rates of wage under ORS 279C.800 to 279C.870, no bid will be considered without statement by the bidder that the bidder will comply with ORS 279C.838 or 279C.840;
- (2) that Bidder is \_\_\_\_\_ is not \_\_\_\_\_ a Resident of Oregon Bidder, as defined by ORS 279A.120. "Resident Bidder" means a Bidder that has paid unemployment taxes or income taxes in this state during the 12-calendar months immediately preceding submission of the bid, has a business address in this state, and has stated in the bid whether the Bidder is a "Resident Bidder;"
- (3) that City of Sherwood may reject a bid that does not comply with prescribed public contracting procedures and requirements, including the requirement to demonstrate the bidder's responsibility under ORS 279C.375(3)(b), and the City of Sherwood may reject for good cause all bids after finding that doing so is in the public interest;
- (4) that no Bid will be considered unless the Bidder is registered with the Construction Contractors Board as required by OAR 137-049-230.
- (5) that where asbestos abatement is required the abatement shall be done by Department of Environmental Quality licensed contractor (ORS 468A.720) and the abatement shall be performed in conformity with DEQ and OSHA regulations and other standards related to work place safety;
- (6) that Bidder shall comply with and cause its subcontractors to comply with all applicable provisions of federal, state and local statutes, ordinances, rules and regulations;
- (7) that Bidder shall comply with pre-qualification conditions in accordance with the laws of the State of Oregon (ORS 279C.430) as follows:
  - a. Pre-qualification is required and forms must be filed two (2) days prior to the Bid Opening date for the Bidder to retain bidding rights.
  - b. Required forms: Proof of pre-qualification acceptance by either the State of Oregon Department of Transportation (ODOT), Washington County Department of

Transportation, or any local major municipality is acceptable to the City. Bidders may mail (address on cover sheet), fax (503-625-0629) or e-mail ([engineering@sherwoodoregon.gov](mailto:engineering@sherwoodoregon.gov)) proof of pre-qualification to the City, to the attention of the City Engineer.

- (8) that each Bidder must provide certification of non-discrimination in obtaining required subcontractors in accordance with ORS 279A.110(4).
- (9) that Bidder must also possess either a Metro license or a City of Sherwood business license at the time of construction.
- (10) that all principal individuals in your organization assigned to the project (superintendent, project manager, and/or lead on-site contact) shall be listed on the Bidder Responsibility Form submitted to the City. Any personnel changes during the Project must be preceded by the submittal of the new individual's experience, and written acceptance by the City, as required on the Bidder Responsibility Form.

This bid is incomplete and shall not be considered unless there is attached hereto a signed and dated complete original of each of the following: Bid Statement, Bid Schedule, First-Tier Subcontractor Disclosure Form, a Certified Check, Cashier's Check or Bid Bond, Certification of Non-collusion, Certification of Compliance with ORS 279C.840, Certification of Asbestos Abatement, Certification of Non-Discrimination, Customer Service Acknowledgement, Prequalification Acknowledgment, Bidder Responsibility Form and all applicable Addenda.

Submitted By:  
Name of Bidder: \_\_\_\_\_  
Signature of  
Authorized Agent: \_\_\_\_\_  
Title: \_\_\_\_\_  
Business Address of  
Bidder: \_\_\_\_\_  
Phone Number: \_\_\_\_\_  
Date: \_\_\_\_\_

**BID SCHEDULE**  
**408SS –ROCK CREEK SANITARY TRUNK LINE UPSIZING PHASE 1**

In accordance with the provisions of the Oregon Standard Specifications for Construction, 2008 Edition as modified by these bid documents, the undersigned Bidder submits the following Bid Schedule with the understanding that City reserves the right to increase, decrease, or completely eliminate quantities as set forth in 00120.20. Also, the Bidder offers to do the work, whether quantities area changed (increased or decreased) in accordance with 00195.20, or not changed, at the unit rate price stated in the following Bid Schedule:

Item No.	Spec Section	Description	Unit	Quantity	Unit Price	Unit Total Cost
<b>Chapter 10 - General Requirements</b>						
1		(S-16) Mobilization, Bonds, Insurance and Demobilization.	1	LS		
2		(S-17) Temporary Traffic Control	1	LS		
3		(S-18) Construction Fencing, Barricades and Signage	1	LS		
4		(S-20) General Utility Locating, Potholing & Conflicts	1	LS		
5		(S-21) Clearing & Grubbing and Topsoil Preservation	1	LS		
6		(S-22) Construction Staking	1	LS		
7		(S-23) Final Site Restoration & Clean-Up	1	LS		
<b>Chapter 11 - Environmental Protection</b>						
8		(S-24) Tree Protection and Removal	1	LS		
9		(S-25) Temporary Erosion and Sediment Control BMPs				
		A. Sediment Fencing	3375	LF		
		B. Compost Filter Berm	1950	LF		
		C. Type 4 & 5 Inlet Protection	13	EA		
10		(S-26) Miscellaneous Erosion Control	1	LS		
11		(S-27) Creek Isolation and Bypass Piping	1	LS		
<b>Chapter 12 - Trench Excavation and Backfill</b>						

**BID SCHEDULE  
 408SS –ROCK CREEK SANITARY TRUNK LINE UPSIZING PHASE 1**

In accordance with the provisions of the Oregon Standard Specifications for Construction, 2008 Edition as modified by these bid documents, the undersigned Bidder submits the following Bid Schedule with the understanding that City reserves the right to increase, decrease, or completely eliminate quantities as set forth in 00120.20. Also, the Bidder offers to do the work, whether quantities area changed (increased or decreased) in accordance with 00195.20, or not changed, at the unit rate price stated in the following Bid Schedule:

Item No.	Spec Section	Description	Unit	Quantity	Unit Price	Unit Total Cost
12		(S-28) Trench Excavation and Class A Backfill (15-20 Feet, 24-Inch Dia.)	69	LF		
13		(S-28) Trench Excavation and Class A Backfill (>20 Feet, 24-Inch Dia.)	175	LF		
14		(S-28) Trench Excavation and Class A Backfill (>10 Feet, 8-Inch Dia.)	20	LF		
15		(S-29) Trench Excavation and Class A Backfill w/ Subgrade Stabilization (<10 Feet, 24-Inch Dia.)	325	LF		
16		(S-29) Trench Excavation and Class A Backfill w/ Subgrade Stabilization (10-15 Feet, 24-Inch Dia.)	125	LF		
17		(S-29) Trench Excavation and Class A Backfill w/ Subgrade Stabilization (>15 Feet, 24-Inch Dia.)	256	LF		
18		(S-29) Trench Excavation and Class A Backfill w/ Subgrade Stabilization (>15 Feet, 12-Inch Dia.)	20	LF		
19		(S-31) Foundation Stabilization Crushed Rock	300	TON		
20		(S-32) Foundation Stabilization Geotextile Fabric	726	LF		
21		(S-33) Rock/Boulder Excavation	40	CY		
22		(S-35) Trench Dam	3	EA		

**BID SCHEDULE  
 408SS –ROCK CREEK SANITARY TRUNK LINE UPSIZING PHASE 1**

In accordance with the provisions of the Oregon Standard Specifications for Construction, 2008 Edition as modified by these bid documents, the undersigned Bidder submits the following Bid Schedule with the understanding that City reserves the right to increase, decrease, or completely eliminate quantities as set forth in 00120.20. Also, the Bidder offers to do the work, whether quantities area changed (increased or decreased) in accordance with 00195.20, or not changed, at the unit rate price stated in the following Bid Schedule:

Item No.	Spec Section	Description	Unit	Quantity	Unit Price	Unit Total Cost
23		(S-36) Trench Compaction Testing	1	LS		
24		(S-38) Dewatering	1	LS		
		A. Additional Dewatering Weell (Contingency)	1	EA		
<b>Chapter 13 - Manholes and Catch Basins</b>						
25		(S-39) Standard Manholes (48-Inch)	3	EA		
26		(S-39) Standard Manholes (60-Inch)	2	EA		
27		(S-40) Inside Drop Manholes (48-Inch w/ Bowl)	1	EA		
28		(S-40) Inside Drop Manholes (60-Inch w/ Bowl)	1	EA		
29		(S-41) Watertight MH Frames and Covers	7	EA		
<b>Chapter 14 - Pipe and Fittings</b>						
30		(S-42) 24-Inch Sanitary Sewer, ASTM F679 PVC (SDR 35)	1097	LF		
31		(S-43) 12-Inch Sanitary Sewer, ASTM D3034 PVC (SDR 26)	103	LF		
32		(S-43) 8-Inch Sanitary Sewer, ASTM D3034 PVC (SDR 35)	21	LF		
33		(S-44) Connection to Existing Sewer	3	EA		
34		(S-45) Inspection of Sewers	1	LS		
<b>Chapter 15 - Street Restoration</b>						
35		(S-46) Temporary Access Roads	3500	SY		
<b>Chapter 16 – Landscape Restoration</b>						

**BID SCHEDULE  
 408SS –ROCK CREEK SANITARY TRUNK LINE UPSIZING PHASE 1**

In accordance with the provisions of the Oregon Standard Specifications for Construction, 2008 Edition as modified by these bid documents, the undersigned Bidder submits the following Bid Schedule with the understanding that City reserves the right to increase, decrease, or completely eliminate quantities as set forth in 00120.20. Also, the Bidder offers to do the work, whether quantities area changed (increased or decreased) in accordance with 00195.20, or not changed, at the unit rate price stated in the following Bid Schedule:

Item No.	Spec Section	Description	Unit	Quantity	Unit Price	Unit Total Cost
36		(S-47) Site Restoration & Planting	1	LS		
		A. Zone A (PEM Wetland)	1	LS		
		B. Zone B (PSS/PFO Wetland)	1	LS		
		C. Zone C (Stormwater Swale)	1	LS		
		D. Zone D (Forested Upland)	1	LS		
		E. Zone E (Upland)	1	LS		
		F. Planting Guarantee & Temp Irrigation System	1	LS		
		G. Invasive Species Removal	5200	SY		
<b>Special Specifications</b>						
37		(S-48) Remove and Dispose of Existing Manholes	3	EA		
38		(S-49) Abandon Existing 18-Inch Sanitary Sewer Mainline	1010	LF		
39		(S-50) Bypass Pumping	1	LS		
40		(S-51) Launching Shaft Installation	1	LS		
41		(S-51) Receiving Shaft Installation	1	LS		
42		(S-52) Trenchless Crossing Installation	147	LF		
		A. Obstruction Removal	3	EA		
43		(S-53) 12-Inch Slipling Installation	83	LF		
44		(S-54) Existing Outfall Restoration	1	LS		
<b>TOTAL BASE BID</b>						

**The city may award the contract to the lowest responsive bidder of the Base Bid.**

**BASE BID WRITTEN IN WORDS:**

\_\_\_\_\_ **DOLLARS AND** \_\_\_\_\_ **CENTS**

In the event of discrepancy, the amount in words shall dictate.

\_\_\_\_\_  
Signature of Authorized Agent

\_\_\_\_\_  
Company Name

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Date

---

---



**FIRST-TIER SUBCONTRACTOR DISCLOSURE FORM**  
 (OAR 137-049-0360)

**Bids which are submitted by Bid Closing, but for which a required disclosure submittal has not been made by the specified Disclosure Deadline, are not responsive and shall not be considered for Contract award.**

**PROJECT NAME: 408SS - Rock Creek Sanitary Trunk Line Upsizing Phase 1**

**BID CLOSING:** Date: **April 15<sup>th</sup>, 2021** Time: **2:00 PM**  
**FIRST-TIER DISCLOSURE** Date: **April 15<sup>th</sup>, 2021** Time: **4:00 PM**

Deliver Form To (Agency): City of Sherwood

Designated Recipient (Person): Bob Galati P.E. Phone #: 503-925-2309  
 Agency's Address: City of Sherwood, City Hall  
 22560 SW Pine Street  
 Sherwood, OR 97140

**INSTRUCTIONS:**

The contracting agency will insert "N/A" above if the contract value is not anticipated to exceed \$100,000. Otherwise this form must be submitted either with the bid or within two (2) working hours after the advertised bid closing date and time; but no later than the DISCLOSURE DEADLINE stated above.

Unless otherwise stated in the solicitation, this document shall not be submitted by facsimile. It is the responsibility of bidders to submit this disclosure form and any additional sheets, with the bid number and project name clearly marked, at the location indicated by the specified disclosure deadline. See "Instructions to Bidders".

List below the Name, Category of Work and Dollar Value for each first-tier subcontractor that would be furnishing labor, or labor and material, for which disclosure is required. Enter the word "NONE" if there are no first-tier subcontractors subject to disclosure. ATTACH ADDITIONAL SHEETS IF NECESSARY.

**BIDDER DISCLOSURE:**

	SUBCONTRACTOR NAME	CATEGORY OF WORK	DOLLAR VALUE
1			
2			
3			
4			
5			

**City of Sherwood**

408SS - Rock Creek Sanitary Trunk Line Upsizing Phase 1

Division One - Bidding Requirements

---

The above listed first-tier subcontractor(s) are providing labor, or labor and material, with a Dollar Value equal to or greater than:

- a) 5% of the total Contract Price, but at least \$15,000. [If the Dollar Value is less than \$15,000 do not list the subcontractor above] or;
- b) \$350,000 regardless of the percentage of the total Contract Price.

Form Submitted By (Bidder Name): \_\_\_\_\_

Contact Name: \_\_\_\_\_ Phone #: \_\_\_\_\_

**BID BOND**

We, \_\_\_\_\_, as "Principal,"  
(Name of Principal)

and \_\_\_\_\_, an \_\_\_\_\_ Corporation,  
(Name of Surety)

authorized to transact Surety business in Oregon, as "Surety," hereby jointly and severally bind ourselves, our respective heirs, executors, administrators, successors and assigns to pay unto the City of Sherwood ("Obligee") the sum of (\$ \_\_\_\_\_)

\_\_\_\_\_ dollars.

WHEREAS, the condition of the obligation of this bond is that Principal has submitted its proposal or bid to an agency of the Obligee in response to Obligee's procurement document for the project identified as:

**408SS – Rock Creek Sanitary Trunk Line Upsizing Phase 1**

which proposal or bid is made a part of this bond by reference, and Principal is required to furnish bid security in an amount equal to ten (10%) percent of the total amount of the bid pursuant to the procurement document and ORS 279C.365(5) for competitive bidding or 279C.400(5) for competitive proposals.

NOW, THEREFORE, if the proposal or bid submitted by Principal is accepted, and if a contract pursuant to the proposal or bid is awarded to Principal, and if Principal enters into and executes such contract within the time specified in the procurement document and executes and delivers to Obligee its good and sufficient performance and payment bonds required by Obligee, as well as any required proof of insurance, within the time fixed by Obligee, then this obligation shall be void; otherwise, it shall remain in full force and effect.

IN WITNESS WHEREOF, we have caused this instrument to be executed and sealed by our duly authorized legal representatives this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

**PRINCIPAL:** \_\_\_\_\_ **SURETY:** \_\_\_\_\_

By \_\_\_\_\_  
Signature

BY ATTORNEY-IN-FACT:

\_\_\_\_\_  
Official Capacity

\_\_\_\_\_  
Name

Attest: \_\_\_\_\_  
Corporation Secretary

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Address

\_\_\_\_\_  
City State Zip

\_\_\_\_\_  
Phone Fax

**CERTIFICATION OF NON-COLLUSION**

**PROJECT NAME: 408SS – ROCK CREEK SANITARY TRUNK LINE UPSIZING PHASE 1**

**TO: CITY OF SHERWOOD, A MUNICIPAL CORPORATION OF THE STATE OF OREGON**

**STATE OF OREGON            )  
  ) SS  
COUNTY OF WASHINGTON)**

\_\_\_\_\_ **(Bidder's Firm Name)**

I, the undersigned, as [circle one]:

- sole owner
- a partner
- officer of the foregoing corporation
- agent of the above bidder

being first duly sworn on oath, depose and say:

That the attached bid has been arrived at by the bidder, independently, and has been submitted without collusion with, and without any agreement, understanding or planned course of action with, any other contractor, bidder, or vendor on materials, supplies, equipment or services, described in the invitation to bid, designed to limit independent bidding or competition.

The contents of the bid herein presented and made have not been communicated by the bidder or (his) (their) or (its) employees or agents to any person not an employee or agent of the bidder or its surety on any bond furnished with the bid, and will not be communicated to any such person prior to the official opening of the bid.

I have fully informed myself regarding the accuracy of the foregoing statements, and the same are made by me based on my personal information.

I have read and understood the Bid Booklet and the Specifications for the attached Bid.

Signature \_\_\_\_\_

Title \_\_\_\_\_

Subscribed and sworn before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_

My commission expires: \_\_\_\_\_

\_\_\_\_\_  
Notary Public for Oregon

**CERTIFICATION OF COMPLIANCE WITH ORS 279C.840  
(PREVAILING WAGES)**

FOR

**Project Name: 408SS - Rock Creek Sanitary Trunk Line Upsizing Phase 1**

The undersigned confirms that the provisions of ORS 279C.840 shall be complied with for personnel working on this project.

A copy of the Prevailing Wage Rates is available on-line at the Bureau of Labor and Industries website at:

<https://www.oregon.gov/boli/employers/Pages/prevailing-wage.aspx>

When a contractor or subcontractor is a party to a statewide collective bargaining agreement in effect with any labor organization, the rate of wages provided for in such agreement shall be considered to be the prevailing rate of wage to be paid to the workers on this project.

Date \_\_\_\_\_

Signature of Bidder \_\_\_\_\_

Title \_\_\_\_\_

Business Name \_\_\_\_\_

## CERTIFICATION OF ASBESTOS ABATEMENT

FOR

**Project Name: 408SS - Rock Creek Sanitary Trunk Line Upsizing Phase 1**

The undersigned confirms that if asbestos abatement is required the abatement shall be done by Department of Environmental Quality licensed contractor (ORS 468A.720) and the abatement shall be performed in conformity with DEQ and OSHA regulations and other standards related to work place safety.

Date: \_\_\_\_\_

Signature of Bidder: \_\_\_\_\_

Title: \_\_\_\_\_

Business Name: \_\_\_\_\_

**CERTIFICATION OF NON-DISCRIMINATION  
[ORS 279A.110(4) & OAR 137-049-0440(3)]**

FOR

**Project Name: 408SS – Rock Creek Sanitary Trunk Line Upsizing Phase 1**

The undersigned certifies that it has not discriminated against minority, women or emerging small business enterprises in the obtaining of subcontracts for this project and shall not discriminate against minority, women or emerging small business enterprises in awarding of subcontracts for this project.

Date \_\_\_\_\_

Signature of Bidder \_\_\_\_\_

Title \_\_\_\_\_

Business Name \_\_\_\_\_

## CUSTOMER SERVICE ACKNOWLEDGMENT

FOR

**Project Name: 408SS – Rock Creek Sanitary Trunk Line Upsizing Phase 1**

Bid Closing: Date: \_\_\_\_\_ Time: \_\_\_\_\_ AM\_\_ PM\_\_

Note: This form is part of the inquiry concerning bidder responsibility and must be submitted with the other proposal forms.

Bidder, by his/her signature below, hereby signifies that s/he has read and understands the construction specifications, including but not limited to the following sections of ODOT Standard Specifications for Construction 2018, relating to customer service. These sections include, but are not limited to, the sections listed below:

- Section 00160, Source of Materials
- Section 00180.40, Limitation of Operations
- Section 00225, Work Zone Traffic Control

Bidder further acknowledges that s/he understands their terms, fully acknowledges their importance to successful completion of the project, and agrees to be bound thereby if awarded this contract. Bidder further assures the City that, if awarded this contract, s/he will promptly, efficiently and courteously carry out his/her responsibilities under the aforementioned specifications.

\_\_\_\_\_  
Signature of Bidder

\_\_\_\_\_  
Title

\_\_\_\_\_  
Name of Firm

\_\_\_\_\_  
Date



**PREQUALIFICATION ACKNOWLEDGMENT**

FOR

**Project Name: 408SS – Rock Creek Sanitary Trunk Line Upsizing Phase 1**

The undersigned confirms that the Bidder has complied with pre-qualification conditions in accordance with the laws of the State of Oregon (ORS 279C.430) by submitting proof of pre-qualification acceptance two (2) days prior to the Bid Opening date by submitting pre-qualification acceptance by either the State of Oregon Department of Transportation (ODOT), Washington County Department of Transportation, or any local municipality with a population equal to or greater than 18,000 persons.

Date: \_\_\_\_\_

Signature of Bidder: \_\_\_\_\_

Title: \_\_\_\_\_

Business Name: \_\_\_\_\_

## BIDDER RESPONSIBILITY FORM

FOR

**Project Name: 408SS – Rock Creek Sanitary Trunk Line Upsizing Phase 1**

All information shall be typed or printed legibly.

Note: Information provided in this form is part of the inquiry concerning bidder responsibility, and this form must be submitted with the other proposal forms.

### Part A

Submitted by: \_\_\_\_\_  
Signature Date

Name (print): \_\_\_\_\_

Name of Firm: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Phone: \_\_\_\_\_

Fax: \_\_\_\_\_

1. How many years has your organization done business as a General Contractor under the present business name? \_\_\_\_\_

How many years under (a) different name(s)? \_\_\_\_\_

List different names, if any, and dates of operation:

\_\_\_\_\_  
\_\_\_\_\_

2. How many years has your organization been in business under its present business name?

\_\_\_\_\_

How many years under (a) different name(s)? \_\_\_\_\_

List different names, if any, and dates of operation:

\_\_\_\_\_  
\_\_\_\_\_

**Part B** – Complete the appropriate Portion Below

1. Bidder is an **INDIVIDUAL**:

Name of individual \_\_\_\_\_

Doing Business as \_\_\_\_\_

2. Bidder is a **CORPORATION**:

Name of Corporation as registered with the state of Oregon:

\_\_\_\_\_

Date of Incorporation: \_\_\_\_\_ State of Incorporation: \_\_\_\_\_

Name of President \_\_\_\_\_

Name of Secretary \_\_\_\_\_

Name of Treasurer \_\_\_\_\_

Name of Manager \_\_\_\_\_

3. Bidder is a **LIMITED PARTNERSHIP**:

Name of Limited Partnership as registered with the state of Oregon:

\_\_\_\_\_

Name of persons or parties composing the Limited Partnership (indicate whether an individual or corporation):

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4. Bidder is a **GENERAL PARTNERSHIP**:

Name of General Partnership as registered with the state of Oregon:

\_\_\_\_\_

Name of persons or parties composing the General Partnership (indicate whether an individual or corporation):

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

5. Bidder is a **JOINT VENTURE**:

Name of Joint Venture as registered with the state of Oregon:

\_\_\_\_\_

Name of persons or parties composing the Joint Venture (indicate whether an individual or corporation):

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Part C**

1. What percent of the work do you normally perform with you own forces? \_\_\_\_\_

List Trades directly employed by you:

\_\_\_\_\_  
\_\_\_\_\_

2. List the Construction Equipment you own or lease long-term:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. Have you ever failed to complete any work awarded to you? \_\_\_\_\_  
(Answer yes or no)

If so, indicate when, where, and why.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. A. Have you ever defaulted on a contract? \_\_\_\_\_ If so, indicate when, where and why.  
(Answer yes or no)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

B. What result: Lawsuit? Judgment? Arbitration? Settled? Other?  
*Circle the one that most applies*

If other, explain: \_\_\_\_\_

\_\_\_\_\_

C. Are there currently any unpaid judgments against the business or any of its principals?

\_\_\_\_\_

(Answer yes or no)

If so, describe: \_\_\_\_\_

\_\_\_\_\_

5. Has any Officer or Partner of your organization ever been an Officer or Partner of another Organization that failed to complete a construction contract? \_\_\_\_\_

(Answer yes or no)

If so, describe circumstances below:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

6. List major construction projects your organization currently has under contract as the general contractor:

Project name \_\_\_\_\_

City / Contact Name & phone #: \_\_\_\_\_

Architect/Engineer: \_\_\_\_\_

Contract Amount / Contract Date: \_\_\_\_\_

% Complete / Schedule Complete: \_\_\_\_\_

Project name \_\_\_\_\_

City / Contact Name & phone #: \_\_\_\_\_

Architect/Engineer: \_\_\_\_\_

Contract Amount / Contract Date: \_\_\_\_\_

% Complete / Schedule Complete: \_\_\_\_\_

Project name \_\_\_\_\_

City / Contact Name & phone #: \_\_\_\_\_

Architect/Engineer: \_\_\_\_\_

Contract Amount / Contract Date: \_\_\_\_\_

% Complete / Schedule Complete: \_\_\_\_\_

**Add additional sheets listing projects as required**

7. List major construction projects, similar to the one being bid, that your organization completed in the past 5 years as the general contractor if not shown on the State of Oregon Department of Administrative Services' Contractor's Prequalification Application:

Project name \_\_\_\_\_  
City / Contact Name & phone #: \_\_\_\_\_  
Architect/Engineer: \_\_\_\_\_  
Contract Amount / Date Awarded: \_\_\_\_\_  
Percent Completed with own forces: \_\_\_\_\_

Project name \_\_\_\_\_  
City / Contact Name & phone #: \_\_\_\_\_  
Architect/Engineer: \_\_\_\_\_  
Contract Amount / Date Awarded: \_\_\_\_\_  
Percent Completed with own forces: \_\_\_\_\_

Project name \_\_\_\_\_  
City / Contact Name & phone #: \_\_\_\_\_  
Architect/Engineer: \_\_\_\_\_  
Contract Amount / Date Awarded: \_\_\_\_\_  
Percent Completed with own forces: \_\_\_\_\_

***Add additional sheets listing projects as required***

8. List the construction experience of the principal individuals in your Organization; which ones will be assigned to this project (including the percentage of their time to be assigned to this project):
- Individual's Name \_\_\_\_\_  
Construction experience - years: \_\_\_\_\_  
Present position & years with organization: \_\_\_\_\_  
Percentage of individual's time to be assigned to project: \_\_\_\_\_

Individual's Name \_\_\_\_\_

Construction experience - years: \_\_\_\_\_

Present position & years with organization: \_\_\_\_\_

Percentage of individual's time to be assigned to project: \_\_\_\_\_

Individual's Name \_\_\_\_\_

Construction experience - years: \_\_\_\_\_

Present position & years with organization: \_\_\_\_\_

Percentage of individual's time to be assigned to project: \_\_\_\_\_

A. Have any of the principal individuals in your Organization been convicted under state or federal statutes of embezzlement, theft, forgery, bribery, falsification or destruction of records, or receiving stolen property? \_\_\_\_\_ If so, describe circumstances below:

*(Answer yes or no)*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

B. Have any of the principal individuals in your Organization been the subject to a civil judgment for fraud? \_\_\_\_\_ If so, describe circumstances below:

*(Answer yes or no)*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

9. Bank References:

_____	_____
_____	_____
_____	_____

10. Trade References:

_____	_____
_____	_____
_____	_____

11. List names of Bonding and Insurance Companies, name and address of agents, and maximum bonding capacity.

---

---

---

What portion remains on this Bonding Capacity at the time of submittal of the Bid?

---

12. The bidder agrees to furnish, upon request by the City, within 5-days after the Bid Opening, a current Statement of Financial Conditions, including Contractor's latest regular dated financial statement or balance sheet which must contain the following items:

- Current assets: (cash, joint venture accounts, accounts receivable, notes receivable, accrued interest on notes, deposits, and materials and prepaid expenses), net fixed assets and other assets.
- Current liabilities: (Accounts payable, notes payable, accrued interest on notes, provisions for income taxes, advances received from owners, accrued salaries accrued payroll taxes), other liabilities, and capital (capital stock, authorized and outstanding shares per values, earned surplus).

Date of statement or balance sheet: \_\_\_\_\_

Name of firm preparing statement: \_\_\_\_\_

By: \_\_\_\_\_

**Bidder's Initials:** \_\_\_\_\_

**Bid Closing: Date:** \_\_\_\_\_ **Time:** \_\_\_\_\_ **AM** \_\_\_\_ **PM** \_\_\_\_





**408SS – Rock Creek Sanitary Trunk Line Upsizing Phase 1**

DATE

**BID ADDENDUM NO. 1**

Addition/Change to the Contract Documents

The work provided for in this addendum shall become a part of the drawings and specifications for this project.

- 1.
- 2.

This ADDENDUM shall be signed and attached to the Bidder's Proposal and shall subsequently become part of the Contract Documents.

Company Name	
Contractor Name	
Contractor Signature	
Date	

**Division Two**  
**Contract Forms**

**PUBLIC IMPROVEMENT CONTRACT FOR USE WITH  
OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION**

**BETWEEN:** The City of Sherwood,  
an Oregon Municipal Corporation

**AND:** (Contractor):

**JOB NO.:** 408SS

**PROJECT:** Rock Creek Sanitary Trunk Line Upsizing Phase 1

**RECITALS**

Contractor was the successful Bidder for the contract construction of the improvement (“Project”) described in this Public Improvement Contract for use with Oregon Standard Specifications for Construction and Clean Water Services Design & Construction Standards (R&O 19-5 as amended by R&O 19-22) as supplemented by the City. (this “Document”)

**AGREEMENT TERMS AND CONDITIONS**

1. **The Contract.** The Contract between the City and Contractor (the “Contract”) includes this Document and its exhibits, the 2018 Oregon Standard Specifications for Construction issued by the Oregon Department of Transportation (ODOT) and Design & Construction Standards (R&O 19-5 as amended by R&O 19-22), as issued by Clean Water Services, together with all of the documents and materials included in the definition of the “Contract” under the 2021 ODOT Standard Specifications for Construction, as modified by the Technical Specifications and project Special Provisions. In addition, the Contract between the City and Contractor shall be deemed to incorporate all reports, records, laws, rules and orders referenced in the Contract Documents.

This Document also includes and incorporates the following exhibits:

Exhibit A – CITY OF SHERWOOD – STANDARD CONTRACT PROVISIONS  
Exhibit B – Certification of Bidder/Contractor Employee Drug Testing Program  
Exhibit C – Certification of Compliance with Oregon Tax Law  
Exhibit D – Certification of Registration with Contractors Board  
Exhibit E – Certification of Workers’ Compensation Coverage

2. **Definitions.** Unless otherwise specifically defined in this Document, all capitalized terms which are not proper nouns shall have the meanings assigned thereto in the specifications.
3. **Work to be Performed.** Contractor agrees to furnish, as the “Work” all services, labor, materials and equipment which are described as the Contractor’s responsibility in the plans and specifications, or as reasonably inferred therefrom, as the same may be modified in accordance with the Contract, and to construct the improvement described therein (the Project), all according to the provisions of the Contract. All parts of the Work are the sole responsibility of Contractor.

4. **Time of Commencement and Completion.** Time is of the Essence of the Contract. The time in which Contractor shall commence, prosecute and complete the Work is described in the specifications, as modified by any Addenda or subsequent Contract Change Order.
5. **Contract Sum.** The Contract sum is \$ \_\_\_\_\_ and consists of unit prices bid by Contractor multiplied by estimated quantities, together with lump sum amounts for portions of the Work, as described on the Contractor's Bid attached hereto. Unless the Contract states otherwise, the actual sum payable to Contractor for the Work shall be based on lump sum amounts and actual quantities, as modified by Change Orders and adjustments made in accordance with the specifications. Payment will be made as provided in the specifications.
6. **Indemnification.** Contractor's duty to indemnify is described in Section 00170.72 of the General Conditions in ODOT's 2021 Standard Specifications, as modified by the Special Provisions. Contractor's indemnity obligations survive acceptance of the Work and completion of the Contract.
7. **Insurance.** Contractor shall maintain in force for the duration of this contract the insurance coverages specified below and in specification Section 00170.70(a). Each policy required by these provisions shall be written as a primary policy, not contributing with or in excess of any coverage which City may carry. In accordance with the Special Provisions, a copy of each policy or a Certificate of Insurance satisfactory to City shall be delivered to City prior to commencement of the Work. Unless otherwise specified, each policy shall be written on an "occurrence" form with an admitted insurance carrier licensed to do business in the state of Oregon and shall contain an endorsement entitling City to not less than 30 days prior written notice of any material change, nonrenewal or cancellation. In the event the statutory limit of liability of a public body for claims arising out of a single accident or occurrence is increased above the combined single limit coverage requirements specified below, City shall have the right to require Contractor to increase the Contractor's coverages by the amount of the statutory limit increase for such claims and to increase the aggregate coverage by an amount that is twice as large as the statutory increase. The adequacy of all insurance required by these provisions shall be subject to approval by City's Risk Manager. Unless otherwise allowed by City, Contractor shall require all subcontractors to carry insurance at least equal to that required under this section. Failure to maintain any insurance coverage required by this contract shall be cause for immediate termination of this Contract by City.
  - 7.1 **Commercial General Liability.** Contractor shall maintain a broad form Commercial General Liability Insurance policy with coverage of not less than \$1,000,000 combined single limit per occurrence, with an annual aggregate of not less than \$2,000,000.00, for bodily injury, personal injury or property damage. Such policy shall contain a contractual liability endorsement to cover Contractor's indemnification obligations under the Contract and products/completed operations liability. The policy shall also contain an endorsement naming City and others as appropriate as an additional insured, in a form satisfactory to City, and expressly providing that the interest of City shall not be affected by Contractor's breach of policy provisions. The policy shall be endorsed to state that the general aggregate limit of liability shall apply separately to the Contract.
  - 7.2 **Commercial Automobile Liability.** Contractor shall maintain a Commercial Automobile Liability Insurance policy with coverage of not less than \$1,000,000.00 combined single limit per occurrence, with an annual aggregate limit of not less than \$1,000,000.00, for bodily injury, personal injury or property damage. The coverage

shall include both hired and non-owned auto liability. The policy shall also contain an endorsement naming City and others as appropriate as an additional insured, in a form satisfactory to City, and expressly providing that the interest of City shall not be affected by Contractor's breach of policy provisions.

**7.3 Workers' Compensation Insurance.** All employers, including the Contractor and its Subcontractors, if any, that employ subject workers who are performing Work or providing labor or materials under the Contract in the State of Oregon shall comply with ORS 656.017 and provide the required Workers' Compensation Coverage, unless such employers are exempt under ORS 656.126. The Contractor shall ensure that each of its Subcontractors complies with these requirements. Contractor shall provide City with such further assurances as City may require from time to time that Contractor is in compliance with these Workers' Compensation coverage requirements and the Workers' Compensation law. The Contractor shall ensure that its insurance carrier files a Guaranty Contract with the Oregon Workers' Compensation Division before performing any Work.

**8. Performance, Payment and Maintenance Bonds.** Prior to the commencement of the Work, Contractor shall provide good and sufficient Performance Bond and Payment Bond approved by the City, each in an amount equal to the 100% of the Contract sum, for the faithful performance of the Work in all respects and indemnifying City for any claims or liens for labor, work, equipment or material provided by others in the performance of the Work. The amount of the Performance Bond and Payment Bond shall be increased whenever the Contract Sum is increased for any reason.

At the conclusion of the Construction and prior to Final Acceptance of the Work by the City, the Contractor shall provide a 10% Maintenance Bond for a period of **two (2) years** from the date of Final Acceptance by the City. A surety licensed to do business as a surety in the state of Oregon shall provide the Maintenance Bond.

The acceptance by the Contractor of Final Payment shall be and shall operate as a release to the City of all claims and all liability to the Contract other than claims in stated amounts as may be specifically excepted by the Contractor in writing prior to the request for final payment for all things done or furnished in connection with this work and for every act and neglect of the City and its agents and others relating to or arising out of this work. However, any payment, final or otherwise, or any acceptance, shall not release the Contractor or its sureties from any obligations under the Contract Documents or the Performance and Payment Bonds or diminish the Agency's rights under the Guaranty Provisions.

In addition to and not in lieu of any other warranties required under the Contract make all necessary repairs and replacements to remedy, in a manner satisfactory to the Engineer and at no cost to the Agency, any and all defects, breaks, or failures of the Work occurring during the specified warranty period due to faulty or inadequate materials or workmanship. Repair damage or disturbance to other improvements under within, or adjacent to the Work, whether or not caused by settling, washing, or slipping, when such damage or disturbance is caused, in whole or in part, from activities of the Contractor in performing his duties and obligations under this Contract when such defects or damage occur within the warranty period. The two-year maintenance period required shall, with relation to such required repair, be extended one year from the date of completion of such repair or to the end of the original two-year maintenance period, whichever comes later.

If Contractor, after written notice, fails within ten days to proceed to comply with the terms of this section, Agency may have the defects corrected, and Contractor and Contractor's Surety

shall be liable for all expense incurred. In case of an emergency where, in the opinion of the Engineer, delay would cause serious loss or damage, repairs may be made without notice being given to the Contractor with the Contractor or surety paying the cost of repairs. Failure of the Engineer to act in case of an emergency shall not relieve Contractor or Surety from liability and payment of all such costs.

9. **Termination and Compensation.** City may terminate this contract or suspend the Work at any time as provided in the specifications.
10. **Performance for Goods and Services.** In performance of the Work, Contractor shall prefer materials that have been manufactured or produced in the state of Oregon, if price, fitness, availability and quality are otherwise equal.
11. **Non-Resident Contractor.** If Contractor is not a resident bidder as defined in ORS 279A.120, and the contract price exceeds \$10,000, the Contractor must report to the Department of Revenue, on the department's form, the total contract price, terms of payment, length of contract and such other information as the department may require before the Contractor may receive final payment under the Contract. The Contractor must provide copies of all forms filed with the Department to the City to receive final payment.
12. **Laws and Ordinances.** In addition to those laws, rules and ordinances specifically identified in this Contract, Contractor shall comply with and require its Subcontractors to comply with all applicable provisions of Federal, State and local statutes, ordinances, orders, rules and regulations.
13. **Default and Willful Violation.** If the Contractor willfully violates any of the provisions of the Sherwood Code, or any of the provisions of law governing public contracts, or if Contractor knowingly files false affidavits of compliance required under the Contract, Contractor shall waive for a period of one year any right to bid upon any public improvement project let by City. If Contractor or any of Contractor's Subcontractors violates any such provisions or files any such false affidavits of compliance, or in the event Contractor otherwise fails to perform any of its obligations under this Contract, time and quality of performance being of the essence, City may, at its option, terminate this Contract upon written notice to Contractor. In the event of a termination of this Contract or a subcontract under these provisions, Contractor or the Subcontractor, if applicable, shall forfeit all rights under this Contract or the subcontract, as the case may be. The City's claim for damages under paragraph 15 and any other relief available to City resulting from the Contractor's breach shall survive a termination of the Contract.
14. **Liquidated Damages.** In the event the Work is not completed within the Contract Time as specified in Bid Statement, or as may be extended in accordance with the Contract's terms, Contractor will pay to City, or City may withhold from any payment due Contractor, Liquidated Damages as specified in the specifications. The parties believe that due to the costs of bringing an action and the difficulty of establishing the exact amount of damages City will incur, it would be inconvenient and infeasible for City to bring an action for the actual damages it will incur because of Contractor's failure to complete the Work within the Contract Time. In order to compensate City for the damages City will suffer because of a delay, the amount City would be damaged for every Calendar Day completion is delayed is **\$2,000.00 per Calendar Day**. The parties agree that the sum set as Liquidated Damages is reasonably related to City's anticipated damages per Calendar Day after the Completion Date that the Work is not completed. Contractor agrees that any liquidated damages imposed under the Contract is the best estimate of the City's damages and is not a penalty. Contractor will not

contest such sum as being other than the best measure of damages in the event liquidated damages become payable under these provisions.

15. **Notices.** Any written notices permitted or required by this Contract shall be deemed given when personally delivered, or five days after deposit in the United States mail, postage fully prepaid, certified, return receipt requested, addressed to the representatives of the parties as set forth below or when delivered by electronically confirmed facsimile transmission to the FAX address and attention of the representatives of the parties set for below:

Contractor: \_\_\_\_\_, Project Superintendent

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

City: City Engineer, City of Sherwood

or such other address as either party may provide to the other by notice given in accordance with this provision.

16. **Contract Documents/Interpretation.** Where possible, all parts of the Contract shall be interpreted in a manner that avoids conflict between the various documents and their provisions. In the event that any provision of this Document conflicts with any provision of the specifications, the provision that is most detailed shall prevail. In the event that any other component part of the Contract conflicts with any provision of any other component part, the precedence of documents shall be as set forth in the Special Provisions.
17. **Governing Law, Jurisdiction and Venue.** This Contract shall be governed by and interpreted in accordance with the laws of the State of Oregon, without respect to conflict of laws principles. Notwithstanding any contrary provisions in the Contract Documents, any litigation arising out of or relating to this Contract shall be tried to a court without a jury. Any claim or action must be brought in the Circuit Court of Washington County, Oregon. If a claim or action must be brought in a federal forum, then it shall be brought and conducted solely and exclusively within the United States District Court for the District of Oregon. In no event shall this paragraph be construed as a waiver by the City of any form of defense or immunity, whether sovereign immunity, governmental immunity or otherwise, from any claim or from the jurisdiction of any court. Contractor by execution of the Contract hereby consents to the personal jurisdiction of the courts referenced in this paragraph.
18. **Dispute Resolution.** Disputes will be resolved in accordance with Section 00199 of the General Conditions in ODOT's 2018 Standard Specifications as modified in the Supplemental Specifications and project Special Provisions.

In any litigation, the entire text of any order or permit issued by a governmental or regulatory authority, as well as any documents referenced or incorporated therein by reference, shall be admissible for the purpose of Contract interpretation.

The Contract shall not be construed against either party regardless of which party drafted it. Other than as modified by the Contract, the applicable rules of contract construction and evidence shall apply.

19. **Payment of Costs, Expenses and Attorney's Fees.** Notwithstanding any language to the contrary in the Contract Documents, each party is responsible for all of its own costs and fees, including expert fees and attorney fees. This includes any costs and fees incurred in any trial and in any appeal.
20. **No Third Party Beneficiaries.** The parties to this Contract do not intend to confer on any third party any rights under this Contract. All Subcontractors are third parties.
21. **Survival.** Any obligation arising under the Contract which is not, or cannot be performed or paid prior to the expiration or termination of the Contract, including, but not limited to, all provisions concerning the quality of the Work, warranties and obligations for payment, indemnification, and reimbursement, shall survive termination or expiration of the Contract.
22. **Integration; Amendment.** The Contract includes the entire agreement between the parties as of its date of execution and shall not be modified or amended, except as expressly provided in the Contract.
23. **Effective Date.** The effective date of the Contract shall be the latest date of signature by the parties.
24. **Prompt Payment.** The Contractor shall:
  - (a) Make payment promptly, as due, to all persons supplying to the contractor labor or material for the performance of the work provided for in the Contract.
  - (b) Pay all contributions or amounts due the Industrial Accident Fund from the contractor or subcontractor incurred in the performance of the Contract.
  - (c) Not permit any lien or claim to be filed or prosecuted against the state or a county, school district, municipality, municipal corporation or subdivision thereof, on account of any labor or material furnished.
  - (d) Pay to the Department of Revenue all sums withheld from employees under ORS 316.167.
25. **Drug Testing.**
  - (a) The Contractor shall demonstrate that an employee drug testing program is in place at the time of submitting its bid, and that such program will be maintained throughout the Contract period, including any extensions. The failure of Contractor to have, or to maintain such a drug testing program is grounds for rejection of a bid or immediate termination of this Contract.
  - (b) The City of Sherwood shall not be liable, either directly or indirectly, in any dispute arising out of the substance or procedure of Contractor's drug testing program. Nothing in this drug testing provision shall be construed as requiring Contractor to violate any legal, including constitutional, rights of any employee, including but not limited, to selection of which employees to test and the manner of such testing. The City shall not be liable for Contractor's negligence in establishing or implementing, failure to establish or implement a drug testing program, or for any damage or injury caused by Contractor's employees acting under the influence of drugs while performing work covered by this Contract. These are Contractor's sole responsibilities and nothing in this provision is intended to create any third



party beneficiary rights against the City.

26. **Demolition Contracts to Require Material Salvage.** On demolition projects, the Contractor is required to salvage or recycle construction and demolition debris, if feasible and cost-effective.
27. **Landscape Maintenance Projects to Require Composting or Mulching.** On Landscape Maintenance Projects, the Contractor is required to compost or mulch yard waste material at an approved site; if feasible and cost-effective.
28. **Conditions Concerning Payment of Claims by Public Officers to Person Furnishing Labor of Services when Contractor Neglects or Refuses to Make Prompt Payment.** If the Contractor fails, neglects or refuses to make prompt payment of any claim for labor or services furnished to the Contractor or a subcontractor by any person in connection with this Contract as the claim becomes due, the City may pay such claim to the person furnishing the labor or services and charge the amount of the payment against funds due or to become due to the Contractor by reason of the Contract.
29. **Conditions Concerning Neglect or Refusal to Make Prompt Payment of Claim by Contractor or First-Tier Subcontractor to Persons Furnishing Labor or Materials.** If the Contractor or a first-tier subcontractor fails, neglects or refuses to make payment to a person furnishing labor or materials in connection with this contract within 30 days after receipt of payment from the City or the Contractor, the Contractor or first-tier subcontractor shall owe the person the amount due plus interest charges commencing at the end of the 10-day period that payment is due under ORS 279C.580(4) and ending upon final payment, unless payment is subject to a good faith dispute as defined in ORS 279C.580. See additional text in ORS 279C.515(2).
30. **Complaints Concerning Contractor or Subcontractor Neglect or Refusal to Make Payment to Persons Furnishing Labor or Material.** If the Contractor or a subcontractor fails, neglects or refuses to make payment to a person furnishing labor or materials in connection with the public improvement contract, the person may file a complaint with the Construction Contractors Board, unless payment is subject to a good faith dispute as defined in ORS 279C.580.
31. **Condition Concerning Hours of Labor.** A person may not be employed for more than 10 hours in any one day, or 40 hours in any one week, except in cases of necessity, emergency or when the public policy absolutely requires it, and in such cases, except in cases of contracts for personal services as defined in ORS 279C.100, the employee shall be paid at least time and a half pay:
  - (a) For all overtime in excess of eight hours in any one day or 40 hours in any one week when the work week is five consecutive days, Monday through Friday; or
  - (b) For all overtime in excess of 10 hours in any one day or 40 hours in any one week when the work week is four consecutive days, Monday through Friday; and
  - (c) For all work performed on Saturday and on any legal holiday specified in ORS 279C.540.
32. **Condition Concerning Payment for Medical Care.** The Contractor and all subcontractors, as applicable, shall promptly, as due, make payment to any person, co-partnership, association or corporation furnishing medical, surgical and hospital care services or other

needed care and attention, incident to sickness or injury, to the employees of the Contractor or subcontractor, as applicable, of all sums that the Contractor or subcontractor, as applicable, agrees to pay for the services and all moneys and sums that the Contractor or subcontractor, as applicable, collected or deducted from the wages of employees under any law, contract or agreement for the purpose of providing or paying for the services.

33. **Condition Concerning Payment for Providing Workers' Compensation.** All subject employers working under the Contract are either employers that will comply with ORS 656.017 or employers that are exempt under ORS 656.126.
34. **Retainage.** The amount to be retained from progress payments will be 2.5% of the value of the Work accomplished as noted in Section 00195.50(b) of the specifications, and will be retained in one of the forms specified in Section 00195.50(c) of the specifications.
33. **Contractor Claims. Notice of Claim.** Claims on public works bonds and payment bonds shall be submitted in writing and follow the procedures established by ORS 279C.600 and ORS 279C.605.
34. **Certified Statements Regarding Payment of Prevailing Rates of Wage; Retainage.**  
(1) The contractor or the contractor's surety and every subcontractor or the subcontractor's surety shall file certified statements with the public agency in writing, on a form prescribed by the Commissioner of the Bureau of Labor and Industries, certifying:
- (a) The hourly rate of wage paid each worker whom the contractor or the subcontractor has employed upon the public works; and
  - (b) That no worker employed upon the public works has been paid less than the prevailing rate of wage or less than the minimum hourly rate of wage specified in the contract.

The certified statement shall be in accordance with ORS 279C.845.

**CITY OF SHERWOOD**

**CONTRACTOR**

By: \_\_\_\_\_  
Joseph Gall ICMA-CM, City Manager

By: \_\_\_\_\_  
(signature)

\_\_\_\_\_  
(print name)

\_\_\_\_\_  
(print name)

Date: \_\_\_\_\_

Date: \_\_\_\_\_

Approved as to form: \_\_\_\_\_  
Josh Soper, City Attorney

Exhibit A

**CITY OF SHERWOOD – STANDARD CONTRACT PROVISIONS**

1. **Notice in Writing to Employees who Work on a Public Contract.** An employer must give notice in writing to employees who work on a public contract, either at the time of hire or before commencement of work on the contract, or by posting a notice in a location frequented by employees, of the number of hours per day and days per week that the employees may be required to work.
2. **Provisions concerning environmental and natural resources laws; remedies.**  
The contractor shall adhere to all federal, state and local agencies (Oregon State of Environmental Quality, Clean Water Services, Washington County and City of Sherwood) that have enacted ordinances, rules or regulations dealing with the prevention of environmental pollution and the preservation of natural resources that affect the performance of the contract. See additional text in ORS 279C.525.
3. **Known Environmental Conditions.** See project plans and specifications for description of any known environmental conditions, if any. The contractor shall apply best management practices as pertaining to sediment and erosion control to insure that sediments do not leave the project site. See additional text in ORS 279C.525.
4. **Contractor's Relations with Subcontractors.** The Contractor shall include in each subcontract (for property or services entered into by the contractor and a first-tier subcontractor, including a material supplier, for the purpose of performing a construction contract):
  - (a) A payment clause that obligates the contractor to pay the first-tier subcontractor for satisfactory performance under its subcontract within 10 days out of such amounts as are paid to the contractor by the contracting agency under the contract.
  - (b) An interest penalty clause that obligates the contractor, if payment is not made within 30 days after receipt of payment from the contracting agency, to pay to the first-tier subcontractor an interest penalty on amounts due in the case of each payment not made in accordance with the payment clause included in the subcontract under paragraph (a) of this section. See additional text in ORS 279C.580.

The contractor shall include in each of the contractor's subcontracts, for the purpose of performance of such contract condition, a provision requiring the first-tier subcontractor to include a payment clause and an interest penalty clause conforming to the standards of subsections 4(a) & 4(b) above in each of the first-tier subcontractor's subcontracts and to require each of the first-tier subcontractor's subcontractors to include such clauses in their subcontracts with each lower-tier subcontractor or supplier.

5. **State Minimum Wage in Contracts.** All workers must be paid not less than the specified minimum hourly rate of wage in accordance with ORS 279C.838 and 279C.840.
6. **Prevailing Minimum Wage when Both State and Federal Minimum Wages are Applicable.** If a public works project is subject both to ORS 279C.800 to 279C.870 and to the Davis-Bacon Act, every contract and subcontract must provide that workers on the public works must be

paid not less than the higher of the applicable state or federal prevailing rate of wage.

7. **Contract Bond Filed with Construction Contractor’s Board.** Contractor shall have a public works bond filed with the Construction Contractors Board before starting work on the project, unless exempt under ORS 279C.836 (4), (7), (8) or (9).
8. **Subcontract Bond Filed with Construction Contractor’s Board.** Every subcontract shall have a public works bond filed with the Construction Contractors Board before starting work on the project, unless exempt under ORS 279C.836 (4), (7), (8) or (9).
9. **Provide the Liability of the Public Agency for Unpaid Minimum Wages.** The contractor and any subcontractor must comply with ORS 279C.840.
10. **Failure to Provide Prevailing Minimum Wage.** Prevailing rates of wage are referenced in the specifications for the contract for public works as required under ORS 279C.830 (1)(a), and workers on the public works must be paid not less than the higher of the applicable state or federal prevailing rate of wage as required under ORS 279C.830 (1)(d).
11. **Statement of Compliance.** Before any payment is made to Contractor, Contractor shall file with City a statement, under oath, that it has complied with all provisions of State law governing contractors on a public contract and that it has complied with the provisions of the Sherwood Code governing fair employment practices. In addition, Contractor shall file with City a sworn statement by each of its subcontractors to the same effect.

Exhibit B

**CERTIFICATION OF BIDDER/CONTRACTOR EMPLOYEE DRUG TESTING PROGRAM  
ORS 279C.505(2)**

BIDDER'S NAME: \_\_\_\_\_

ORS 279C.505(2) provides that every public improvement contract contain a condition that the contractor shall demonstrate that an employee drug testing program is in place. The City's award of the contract (the "Contract") for which this certificate is required is conditioned, in part, upon the bidder's demonstration of compliance with the provisions of ORS 279C.505. If the bidder named above (the "Bidder") is awarded the Contract, this certificate shall become a part of, and shall constitute a continuing representation and warranty under, the Contract.

To induce the City of Sherwood to award the Contract to the Bidder, the undersigned, as the duly authorized representative of the Bidder, hereby represents and warrants, on behalf of the Bidder:

- 1) That Bidder has and enforces, and at all times during the term of the Contract will have and enforce, a written employee drug testing policy that, at a minimum:
  - a) Requires pre-employment drug testing;
  - b) Requires drug testing of an employee when the Bidder has reasonable cause to believe the employee is under the influence of drugs;
  - c) Requires compliance with the Oregon Department of Transportation Commercial Driver's License drug testing regulations.
- 2) A copy of the Bidder's current written employee drug testing policy will be available for inspection by the City at any time upon the City's request.
- 3) The Bidder/Contractor understands and agrees that its representations and warranties herein will become a continuing part of the Contract and that breach of any of the foregoing will be sufficient grounds for disbarment under ORS 279B.130.

The City of Sherwood shall not be liable, directly or indirectly, in any dispute arising out of the substance or procedure of Contractor's drug testing program. Nothing in this drug testing provision shall be construed as requiring Contractor to violate any legal, including constitutional, rights of any employee, including but not limited to, selection of which employees to test and the manner of such testing. The City shall not be liable for Contractor's negligence in establishing or implementing, failure to establish or implement a drug testing policy, or for any damage or injury caused by Contractor's employees acting under the influence of drugs while performing work covered by this Contract. These are Bidder/Contractor's sole responsibilities.

In Witness Whereof, the Bidder has caused this document to be executed by its duly authorized representative on the date shown below.

Signature: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Exhibit C

**CERTIFICATION OF COMPLIANCE WITH OREGON TAX LAWS**

The Contractor, for the purposes of this contract, hereby certifies that to the best of his/her knowledge that he/she is in compliance with all tax laws stated in ORS 305.385.

Dated \_\_\_\_\_ 20\_\_

\_\_\_\_\_  
Contractor's Signature

Exhibit D

**CERTIFICATION OF REGISTRATION WITH  
THE CONSTRUCTION CONTRACTORS BOARD**

The Contractor, for the purposes of this contract, hereby certifies that he/she and all subcontractors performing work described in ORS 701-005(2) (i.e., construction work) are registered with the Construction Contractors Board in accordance with ORS 701.035 to ORS 701.091.

Dated \_\_\_\_\_ 20\_\_

\_\_\_\_\_  
Contractor's Signature

CCB # \_\_\_\_\_

Exhibit E

**CERTIFICATION OF WORKERS' COMPENSATION COVERAGE**

The Contractor, for the purposes of this contract, hereby certifies that it is currently providing Oregon Workers' Compensation coverage for all its employees and will maintain coverage throughout the course of the project through one of the following methods:

1.  "Carrier-insured Employer" (State Accident insurance Fund Corp. or other authorized insurer)  
  
Insurance Company Name \_\_\_\_\_  
  
ID/Policy Number \_\_\_\_\_
2.  "Self Insured Employer" (Certified by the Workers' Compensation Division)  
  
ID number as assigned by  
the Work' Compensation Division \_\_\_\_\_
3.  I am an independent contractor and will perform all work under this contract without the assistance of others.

In the event of cancellation or change in the information above, Contractor certifies that it will immediately notify the Department of said cancellation or change and will obtain alternate coverage.

Dated \_\_\_\_\_ 20\_\_

\_\_\_\_\_  
Contractor's Signature

REMINDER ADDITIONAL INFORMATION NEEDED

Has your insurance carrier filed with Oregon Workers' Compensation Division a guaranty contract as proof of coverage for your employees working in Oregon?

For filing information, contact the Workers' Compensation Division at Labor, 350 Winter St. NE, P.O. Box 14480, Salem, OR 97309-0405; Phone (503) 947-7585.



### PERFORMANCE BOND

Bond No. \_\_\_\_\_

Project Name: **408SS – Rock Creek Sanitary Trunk Line Upsizing Phase 1**

_____ (Surety #1)	Bond Amount No. 1: \$ _____
_____ (Surety #2)*	Bond Amount No. 2: * \$ _____
<i>* If using multiple sureties</i>	Total Penal Sum of Bond: \$ _____

We, \_\_\_\_\_ as Principal, and the above identified Surety(ies), authorized to transact surety business in Oregon, as Surety, hereby jointly and severally bind ourselves, our respective heirs, executors, administrators, successors and assigns firmly by these presents to pay unto the City of Sherwood the sum of (Total Penal Sum of Bond)

\_\_\_\_\_ (Provided, that we the Sureties bind ourselves in such sum “jointly and severally” as well as “severally” only for the purpose of allowing a joint action or actions against any or all of us, and for all other purposes each Surety binds itself, jointly and severally with the Principal, for the payment of such sum only as is set forth opposite the name of such Surety), and

WHEREAS, the Principal has entered into a contract with the City of Sherwood, the Plans, Specifications, terms and conditions of which are contained in the above-referenced Solicitation;

WHEREAS, the terms and conditions of the contract, together with applicable Plans, Standard specifications and Standard Drawings, Supplemental Specifications and Special Provisions, Addenda, Bid Schedule, Prevailing Wage Rates are made a part of this Performance Bond by reference, whether or not attached to the contract (all hereafter called “Contract”); and

WHEREAS, the Principal has agreed to perform the Contract in accordance with the terms, conditions, requirements, Plans and Specifications, and all authorized modifications of the Contract which increase the amount of the Work, the amount of the Contract, or constitute an authorized extension of the time for performance, notice of any such modifications hereby being waived by the Surety;

NOW, THEREFORE, THE CONDITION OF THIS BOND IS SUCH that if the Principal herein shall faithfully and truly observe and comply with the terms, conditions and provisions of the Contract, in all respects, and shall well and truly and fully do and perform all matters and things undertaken by Contractor to be performed under the Contract, upon the terms set forth therein, and within the time prescribed therein, or as extended as provided in the Contract, with or without notice to the Sureties, and shall indemnify and save harmless the City of Sherwood, and the

\_\_\_\_\_ (name of institution and any other Owner agency), and members thereof, its officers, employees and agents, against any direct or indirect damages or claim of every kind and description that shall be suffered or claimed to be suffered in connection with or arising out of the performance of the Contract by the Principal or its subcontractors, and shall in all respects perform said contract according to law, then this obligation is to be void; otherwise, it shall remain in full force and effect.

Nonpayment of the bond premium will not invalidate this bond nor shall the City of Sherwood, or the above-referenced agency(ies), be obligated for the payment of any premiums.

This bond is given and received under authority of ORS Chapter 279C, the provisions of which hereby are incorporated into this bond and made a part hereof.

IN WITNESS WHEREOF, WE HAVE CAUSED THIS INSTRUMENT TO BE EXECUTED AND SEALED BY OUR DULY AUTHORIZED LEGAL REPRESENTATIVES.

Dated this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

**PRINCIPAL:** \_\_\_\_\_

By \_\_\_\_\_  
Signature

\_\_\_\_\_  
Official Capacity

Attest: \_\_\_\_\_  
Corporation Secretary

**SURETY:** \_\_\_\_\_

*[Add signatures for each surety if using multiple bonds]*

**BY ATTORNEY-IN-FACT:**

*[Power-of-Attorney must accompany each surety bond]*

\_\_\_\_\_  
Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Address

\_\_\_\_\_  
City State Zip

\_\_\_\_\_  
Phone Fax

### PAYMENT BOND

Bond No. \_\_\_\_\_  
Solicitation \_\_\_\_\_  
Project Name **408SS – Rock Creek Sanitary Trunk Line Upsizing Phase 1**

_____ (Surety #1)	Bond Amount No. 1:	\$ _____
_____ (Surety #2)*	Bond Amount No. 2:*	\$ _____
	* If using multiple sureties	Total Penal Sum of Bond:\$ _____

KNOW ALL MEN BY THESE PRESENTS: That, WHEREAS, the City of Sherwood, on \_\_\_\_\_, has awarded to \_\_\_\_\_, hereinafter designated as "Principal", a Contract for construction of the Rock Creek Sanitary Trunk Line Upsizing Phase 1, the terms and provisions of which contract are incorporated herein by reference, and;

WHEREAS, said Principal is required to furnish a bond in connection with this said Contract, providing that if said Principal, or any of his or its subcontractors, shall fail to pay for any materials, provisions, provender or other supplies or teams used in, upon, for, or about the performance of the work contracted to be done, or any other work or labor done thereon of any kind, the Surety of this body will pay the same to extend hereinafter set forth;

NOW, THEREFORE, we the Principal and \_\_\_\_\_, as Surety, are held and firmly bound unto the City of Sherwood, in the penal sum of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_), lawful money of the United States, being one hundred percent (100%) of the Contract amount for the payment of which sum well and truly to be made, we bond ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

NOW, THEREFORE, if the above bounden Principal or any of his subcontractor shall promptly make payment to all persons supplying labor and material or amounts due in the prosecution of the work provided for in said Contract, and any and all duly authorized modifications of said Contract that may hereafter be made, then this obligation shall be void; otherwise, this obligation shall remain in full force and virtue; and if the bounden Principal or any of his subcontractors fails to promptly pay any of the persons or amounts due with respect to work or labor performed by any such claimant, the Surety will pay for the same, in an amount not exceeding the sum specified in this bond, and also in case suit brought upon this bond, a reasonable attorney's fee, be fixed by the court; and this bond shall insure to the benefit of any persons so as to give a right of action to such persons or their assigns in any suit brought upon this bond.

The bond shall insure to the benefit of any all persons, companies and corporations entitle to file claims, so as to give a right of action to them or their assigns in any suit brought upon this bond.

And the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract, or to the work to be performed thereunder, or the Specifications accompanying the same shall in any wise affect its obligations on this bond; and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract, or to the work or to the Specifications.

IN WITNESS WHEREOF, the above bounden parties have executed this instrument under their seals this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Nonpayment of the bond premium will not invalidate this bond nor shall the City of Sherwood, or the above-referenced agency(ies), be obligated for the payment of any premiums.

This bond is given and received under authority of ORS Chapter 279C, the provisions of which hereby are incorporated into this bond and made a part hereof.

IN WITNESS WHEREOF, WE HAVE CAUSED THIS INSTRUMENT TO BE EXECUTED AND SEALED BY OUR DULY AUTHORIZED LEGAL REPRESENTATIVES:

Dated this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

**PRINCIPAL:** \_\_\_\_\_  
By \_\_\_\_\_  
Signature  
\_\_\_\_\_  
Official Capacity  
Attest: \_\_\_\_\_  
Corporation Secretary

**SURETY:** \_\_\_\_\_  
*[Add signatures for each if using multiple bonds]*

**BY ATTORNEY-IN-FACT:**  
*[Power-of-Attorney must accompany each bond]*

\_\_\_\_\_  
Name  
\_\_\_\_\_  
Signature  
\_\_\_\_\_  
Address  
\_\_\_\_\_  
City                      State                      Zip  
\_\_\_\_\_  
Phone                      Fax



**STATE OF OREGON**  
**STATUTORY PUBLIC WORKS BOND**

Surety bond #: \_\_\_\_\_ CCB # (if applicable): \_\_\_\_\_

We, \_\_\_\_\_, as principal, and \_\_\_\_\_, a corporation qualified and authorized to do business in the State of Oregon, as surety, are held and firmly bound unto the State of Oregon for the use and benefit of the Oregon Bureau of Labor and Industries (BOLI) in the sum of thirty thousand dollars (\$30,000) lawful money of the United States of America to be paid as provided in ORS chapter 279C, as amended by Oregon Laws 2005, chapter 360, for which payment well and truly to be made, we bind ourselves, our heirs, personal representatives, successors and assigns, jointly and severally, firmly by this agreement.

WHEREAS, the above-named principal wishes to be eligible to work on public works project(s) subject to the provisions of ORS chapter 279C, as amended by Oregon Laws 2005, chapter 360, and is, therefore, required to obtain and file a statutory public works bond in the penal sum of \$30,000 with good and sufficient surety as required pursuant to the provisions of section 2, chapter 360, Oregon Laws 2005, conditioned as herein set forth.

NOW, THEREFORE, the conditions of the foregoing obligations are that if said principal with regard to all work done by the principal as a contractor or subcontractor on public works project(s), shall pay all claims ordered by BOLI against the principal to workers performing labor upon public works projects for unpaid wages determined to be due, in accordance with ORS chapter 279C, as amended by Oregon Laws 2005, chapter 360, and OAR Chapter 839, then this obligation shall be void; otherwise to remain in full force and effect.

This bond is for the exclusive purpose of payment of wage claims ordered by BOLI to workers performing labor upon public works projects in accordance with ORS chapter 279C, as amended by Oregon Laws 2005, chapter 360.

This bond shall be one continuing obligation, and the liability of the surety for the aggregate of any and all claims which may arise hereunder shall in no event exceed the amount of the penalty of this bond.

This bond shall become effective on the date it is executed by both the principal and surety and shall continuously remain in effect until depleted by claims paid under ORS chapter 279C, as amended by Oregon Laws 2005, chapter 360, unless the surety sooner cancels the bond. This bond may be cancelled by the surety and the surety be relieved of further liability for work performed on contracts entered after cancellation by giving 30 days' written notice to the principal, the Construction Contractors Board, and BOLI. Cancellation shall not limit the responsibility of the surety for the payment of claims ordered by BOLI relating to work performed during the work period of a contract entered into before cancellation of this bond.

IN WITNESS WHEREOF, the principal and surety execute this agreement. The surety fully authorizes its representatives in the State of Oregon to enter into this obligation.

SIGNED, SEALED AND DATED this \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_\_

Surety by:

Principal by:

\_\_\_\_\_  
*Company Name* (Seal)

\_\_\_\_\_  
*Name*

\_\_\_\_\_  
*Signature*

\_\_\_\_\_  
*Signature*

\_\_\_\_\_  
*Title (e.g. Attorney-in-Fact)*

\_\_\_\_\_  
*Title*

\_\_\_\_\_  
*Address*

\_\_\_\_\_  
*Address*

\_\_\_\_\_  
*City State Zip*

\_\_\_\_\_  
*City State Zip*

**SEND BOND TO: Construction Contractors Board  
PO Box 14140  
Salem, OR 97309-5052  
Telephone: (503) 378-4621**



Home of the Tualatin River National Wildlife Refuge

City of Sherwood  
22560 SW Pine St.  
Sherwood, OR 97140  
Tel 503-625-5522  
Fax 503-625-5524  
www.sherwoodoregon.gov

**Mayor**  
Keith Mays

**Council President**  
Tim Rosener

**Councilors**  
Sean Garland  
Kim Young  
Renee Brouse  
Russell Griffin  
Doug Scott

**City Manager**  
Joseph Gall, ICMA-CM



2009 Top Ten Selection



2007 18<sup>th</sup> Best Place to Live



(Date)

Re: **Notice of Intent to Award**

**408SS – Rock Creek Sanitary Trunk Line Upsizing Phase 1 Construction Services**

Dear Proposer:

This is the Notice of Intent to Award required to be posted on the City's Website pursuant to OAR 137-049-395(1).

The City of Sherwood received (X) bids for work associated with the **Rock Creek Sanitary Trunk Line Upsizing Phase 1**. The bids were opened at the Sherwood City Hall on April 15<sup>th</sup>, 2021, 2:00 PM (PDT). The lowest Responsive Bidder was (lowest responsive bidder name).

City staff will recommend award of the contract for the **Rock Creek Sanitary Trunk Line Upsizing Phase 1** to (lowest responsive bidder name).

If you wish to protest the City's Intent to Award, you must do so within seven (7) calendar days after the date of the issuance of this notice. The protest must follow the process set forth in OAR 137-049-450(4). Any protest not so complying, will not be considered by the City. Protests must be directed to:

Bob Galati, P.E.  
City of Sherwood – Engineering Department  
22560 SW Pine St  
Sherwood, OR 97140

If you have any questions, please contact Bob Galati, P.E. at (503) 925-2303 or [galatib@sherwoodoregon.gov](mailto:galatib@sherwoodoregon.gov)



Home of the Tualatin River National Wildlife Refuge

Community Development Division  
Engineering Department  
22560 SW Pine St.  
Sherwood, OR 97140  
503-925-2309

---

## NOTICE TO PROCEED

**PROJECT NAME:** Rock Creek Sanitary Trunk Line Upsizing Phase 1  
**DATE:** (Date)  
**PROJECT NO.:** 408SS  
**COUNCIL RESOLUTION:** 2019-023  
**C.O.S. PROJECT MANAGER:** Bob Galati, P.E., City Engineer

**TO:** (Contractor)  
Attn: (contractor contact)

**ADDRESS:** (contractor address)

**PHONE/EMAIL:** (contractor phone # – contractor email)

**CONTRACT:** City of Sherwood and Contractor

### Rock Creek Sanitary Trunk Line Upsizing Phase 1

You are hereby notified that the Contract for the aforementioned project has been properly executed. Work may begin pending submittal of the Performance Bond, Payment Bond, Proof of Liability Insurance, Oregon Workers Compensation Certificate of Insurance and a copy of your Statutory Public Works Bond sent to the State of Oregon.

In accordance with the Contract Agreement, all Contract Work shall be completed by the completion date described in the Bid Booklet on or before (completion date) which is (number) calendar days from the day after issuance of this Notice to Proceed.

CITY OF SHERWOOD

---

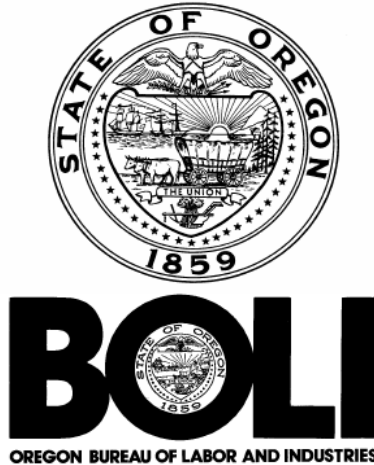
Bob Galati, P.E.  
Project Manager

# **Division Three**

## **General Requirements**



**PREVAILING WAGE RATES**  
**FOR**  
**PUBLIC WORKS CONTRACTS IN OREGON**



**BOLI PREVAILING WAGE RATES (PWR)**

This Project is subject to Oregon Bureau of Labor and Industry – Prevailing Wage Rates for Public Works Projects in Oregon, effective January 1, 2021.

This publication is available on the web at:  
<https://www.oregon.gov/boli/employers/Pages/prevailing-wage.aspx>

This is a local project. No Federal Funds are being used on this project. Therefore the project is not subject to the Davis-Bacon Act (40 U.S.C. 3141 et seq.).

## **GENERAL REQUIREMENTS**

### **STANDARD SPECIFICATION**

The Design & Construction Standards (R&O 19-5 as amended by R&O 19-22), as issued by Clean Water Services, as amended herein, these Special Provisions, the Advertisement of Bids, the Accepted Proposal, the Agreement, the Special Provision, Specifications, the Plans, the Standard Details appended hereto, and all addenda issued prior to the execution of the agreement and all modifications thereto comprise the Contract documents or the contract.

### **CONSTRUCTION CONTRACTORS BOARD**

The contractor must:

- (a) Have a public works bond filed with the Construction Contractors Board before starting work on the project, unless exempt under ORS 279C.836 (4), (7), (8) or (9).
- (b) Require, in every subcontract, that the subcontractor have a public works bond filed with the Construction Contractors Board before starting work on the project, unless exempt under ORS 279C.836 (4), (7), (8) or (9).

# **Division Four**

## **Special Provisions**

SEALS PAGE  
FOR  
408SS – ROCK CREEK SANITARY TRUNK LINE UPSIZING – PHASE 1  
FOR  
CITY OF SHERWOOD, OREGON



RENEWS 12-31-2021

TECHNICAL SPECIFICATIONS  
FOR  
408SS – ROCK CREEK SANITARY TRUNK LINE UPSIZING – PHASE 1  
FOR  
CITY OF SHERWOOD, OREGON

TABLE OF CONTENTS

SPECIAL PROVISIONS

Chapter 10 GENERAL REQUIREMENTS

- 10.1 Scope
- 10.2 Site Safety and Maintenance
- 10.3 Mobilization
- 10.4 Protection of Property
- 10.5 Site Conditions and Responsibilities
- 10.6 Progress of Construction
- 10.7 Preservation, Restoration and Clean Up
- 10.8 Measurement and Payment

Chapter 11 ENVIRONMENTAL PROTECTION REQUIREMENTS

- 11.1 Scope
- 11.2 General Requirements
- 11.3 Erosion and Sediment Control
- 11.4 Protection of Native Vegetation
- 11.5 Protection of Fish and Wildlife
- 11.6 Site Restoration
- 11.7 Suspension of Work
- 11.8 Historical and Archaeological Areas
- 11.9 Measurement and Payment

Chapter 12 TRENCH EXCAVATION AND BACKFILL

- 12.1 Scope
- 12.2 Definitions
- 12.3 Materials
- 12.4 Construction
- 12.5 Measurement

Chapter 13 MANHOLES AND CATCH BASINS

- 13.1 Scope
- 13.2 Manhole Materials
- 13.3 Manhole Construction
- 13.4 Catch Basin & Inlets
- 13.5 Testing

13.6 Measurement and Payment

Chapter 14 PIPE AND FITTINGS

- 14.1 Scope
- 14.2 Pipe Materials
- 14.3 Proof Tests
- 14.4 Construction
- 14.5 Precautions
- 14.6 Acceptance Tests
- 14.7 Measurement and Payment

Chapter 15 STREET RESTORATION

- 15.1 Scope
- 15.2 Materials
- 15.3 Construction
- 15.4 Measurement and Payment

Chapter 16 LANDSCAPE RESTORATION

- 16.1 Scope
- 16.2 Materials
- 16.3 Construction
- 16.4 Maintenance
- 16.5 Sensitive Area Sign Installation
- 16.6 Existing Fencing
- 16.7 Measurement and Payment
- 16.8 Vegetated Corridor Signage

Chapter 17 SIDE SEWERS

- 17.1 Scope
- 17.2 Materials
- 17.3 Construction
- 17.4 Payment

Chapter 19 SEWER REHABILITATION

- 19.1 Scope
- 19.2 Sewer Line Cleaning
- 19.3 Root Removal
- 19.4 Sewer Flow Control
- 19.5 Television Inspection
- 19.6 Sliplinig Pipe
- 19.7 Replacement System Measurement and Payment

## SPECIAL PROVISIONS

S-1 NOT USED

S-2 NOT USED

S-3 CONTRACTOR SUBMITTALS

The Contractor shall be required to make the following submittals. Direct submittals from suppliers shall not be allowed. Three hard copy sets of each submittal or an electronic copy shall be required. Submittals shall consist of three types: (1) information for record, (2) information for Engineer review/approval, and (3) operation and maintenance information. The following listing shall be considered the minimum and may be expanded during the course of the work at the direction of City of Sherwood (City):

- Copy of all licenses and permits (refer to S-4)
- Project schedule (refer to S-5)
- Site-Specific Safety and Health Plan Certification (refer to S-7)
- Emergency response with company call-out list (refer to S-9)
- Contractor agreements with property owners (refer to S-10)
- Emergency Spill Response Plan (refer to S-11)
- Staging Area and Access Plan (refer to S-12)
- Traffic control plan (refer to S-17)
- Staking cut sheets (refer to S-22)
- Manufacturer/Supplier Certificates for products, where applicable
- Aggregate materials with current Proctor (within 2 months)
- Creek Isolation Plan (refer to S-27)
- Trench Shoring Plan (refer to S-37)
- Dewatering Plan (refer to S-38)
- Bypass pumping plan (refer to S-50)
- Shaft Excavation Support Plan (refer to S-51)
- Trenchless Crossing Installation Plan (refer to S-52)

The Contractor shall be responsible for the accuracy and completeness of the information contained in each submittal and shall ensure that the material, equipment, or method of work shall be as described in the submittal. The Contractor shall verify that all features of all products conform to the specified requirements. Submittal documents shall be clearly edited to indicate only those items, models, or series of equipment that are being submitted for review. All extraneous materials shall be crossed out or otherwise obliterated. The Contractor shall ensure that there is no conflict with other submittals and notify the Engineer in each case where its submittal may affect the work of another contractor or the City.

The Contractor shall coordinate submittals with the work so that work will not be delayed. It shall coordinate and schedule different categories of submittals, so that one will not be delayed for lack

of coordination with another. No extension of time will be allowed because of failure to schedule submittals properly. The Contractor shall not proceed with work related to a submittal until the submittal process is complete. This requires that submittals for review and comment shall be returned to the Contractor stamped "No Exceptions Taken" or "Make Corrections Noted." The Contractor shall certify on each submittal document that it has reviewed the submittal, verified field conditions, and complied with the Contract documents.

Review of Contract drawings, methods of work, or information regarding materials or equipment the Contractor proposes to provide, shall not relieve the Contractor of its responsibility for errors therein and shall not be regarded as an assumption of risks or liability by the Engineer or the City, or by any officer or employee thereof, and the Contractor shall have no claim under the Contract on account of the failure, or partial failure, of the method of work, material, or equipment so reviewed. A mark of "No Exceptions Taken" or "Make Corrections Noted" shall mean that the City has no objection to the Contractor, upon its own responsibility, using the plan or method of work proposed, or providing the materials or equipment proposed.

#### S-4 PERMITS

The Contractor is to keep fully informed of all local ordinances, as well as state and federal laws, that in any manner affect the work specified herein. At all times the Contractor shall comply with said ordinances, laws, and regulations, and protect and indemnify the City, the Engineer, Property Owners, and their officers and agents against any claim or liability arising from or based on the violation of such laws, ordinances, or regulations. The City has applied for and obtained many of the required permits for this project, however additional permits may need to be obtained by the Contractor. A description of the various permits obtained by The City and included as supplemental information are as follows:

- State of Oregon Archaeological Excavation Permit, #AP-2702 - City has obtained the permit on behalf of the contractor. Contractor is responsible for following the conditions of the permit.
- DSL/CORPS removal/fill permit - City has obtained the permit on behalf of the contractor. Contractor is responsible for following the conditions of the permit.
- DSL Wetland Concurrence - City has obtained the permit on behalf of the contractor. Contractor is responsible for following the conditions of the permit.
- DEQ Nationwide 401 Water Quality Certification Approval - City has obtained the permit on behalf of the contractor. Contractor is responsible for following the conditions of the permit.
- Clean Water Services Service Provider Letter - City has obtained the permit on behalf of the contractor. Contractor is responsible for following the conditions of the permit.



- Clean Water Services Storm Water Connection Permit Authorization - City has obtained the permit on behalf of the contractor. Contractor is responsible for following the conditions of the permit.
- DEQ 1200-CN Erosion Control Permit - City has obtained the permit on behalf of the contractor. Contractor is responsible for following the conditions of the permit.
- Washington County Utility Right-of-Way Permit - Work and temporary access within SW Tualatin-Sherwood Road: City has obtained the permit on behalf of the Contractor. Contractor shall provide all necessary bonds and insurance information required for final issuance of permit. Contractor may submit change requests to Washington County at their option, but shall otherwise be responsible for following the conditions of the permit.
- Special Use Permit from Tualatin River National Wildlife Refuge (TRNWR) - City has obtained the permit on behalf of the contractor. Contractor is responsible for following the conditions of the permit.

If the Contractor elects to use means and methods for staging and access other than those included in the Contract Drawings or perform earthwork beyond that shown on the drawings (e.g., removal or fill), the Contractor shall apply for and obtain any necessary permits for that work.

The Contractor shall comply with all permit requirements and have copies of permits on site at all times. The Contractor shall have copies of the construction drawings, general conditions and standard specifications on site at all times. Willful violation of permit conditions and applicable laws exposes the offending contractor and other violators to criminal and civil sanctions. City reserves the right to suspend work to determine damage and the nature and scope of necessary site restoration and maintenance.

Costs associated with the requirements of this section are considered incidental to construction and no additional compensation shall be due to the Contractor.

#### S-5 PROJECT SCHEDULE AND CITY NOTIFICATION

Prior to beginning construction work, the Contractor shall submit a project work schedule to the City for approval. The schedule shall include the dates and duration for the Work and shall be sufficiently detailed to enable the City to verify the Contractor is providing adequate planning and resources to complete the project in addition verify that the Contractor is providing adequate notice (minimum of 48 hours and maximum of 72 hours) to property owners where access may be required on their properties for the work. Contractor shall provide 30-day notice to PGE for all work near the PGE transmission lines. **No work on private property or interruption of service shall be allowed without prior notice noted above.**

**All work within the extents of the Rock Creek Ordinary High Water Mark shall be performed only during the permitted in-water work period from July 15<sup>th</sup> to September 30<sup>th</sup> per general conditions**

**chapter 11.5.1. Work will be allowable within identified wetlands of the Tualatin River outside of the in-water work period described above.**

If it is evident that the project schedule has deviated or will deviate from the approved schedule by more than 1 week (5 working days), the Contractor shall advise the City and prepare a revised project schedule for submittal by the following construction progress meeting. Regardless, project schedule shall be updated bi-weekly and take into account the current status of the project.

Costs associated with the requirements of this section are considered incidental to construction and no additional compensation shall be due to the Contractor.

**S-6 PRE-CONSTRUCTION MEETING AND WEEKLY PROJECT MEETINGS**

The Contractor shall attend a pre-construction meeting held at the City's Administration Building and attended by City and Contractor personnel a minimum of one (1) week prior to initiating construction activities.. The pre- construction meeting shall discuss logistics for accessing the site, minimizing disturbance within sensitive areas, and general coordination.

The Contractor's project manager and/or site superintendent shall attend weekly project status meetings at the Site or as arranged in advance. The Contractor and the City shall establish the progress meeting schedule at the Pre-Construction meeting.

Costs associated with the requirements of this section are considered incidental to construction and no additional compensation shall be due to the Contractor.

**S-7 SAFETY**

The Contractor shall perform all operations in strict accordance with all applicable standards and requirements established by, but not limited to, Oregon Revised Statutes (ORS); Oregon Administrative Rules (OAR); Oregon occupational safety and health regulations; Department of Labor and Industries; ODOT; the federal and state Departments of Labor, Occupational Safety and Health Act (OSHA); 29 Code of Federal Regulations (CFR) Part 1910 (Occupational Safety and Health Standards) and Part 1926 (Safety and Health Regulations for Construction); and all other applicable federal, state, county, and local laws, ordinances, and codes.

The Contractor shall conduct its operations and perform all work safely, perform all work necessary to ensure the safety of its personnel and others, and shall be solely and completely responsible for safety and the conditions on the job site, including the safety of all persons and property. This requirement shall commence after mobilization and apply continuously and not be limited to normal working hours. The Contractor shall adhere to the requirements of this section and Chapter 6 of the General Conditions. See General Conditions, Chapter 6, Section 6.3 for more details related to confined space entry requirements, which will be necessary for work performed inside manholes. Contractor shall submit the Site-Specific Safety Plan Certification, provided in the Contract Documents, which confirms they have created and will maintain a Site-Specific Safety Plan.

Costs associated with the requirements of this section are considered incidental to construction and no additional compensation shall be due to the Contractor.

#### S-8 WORK HOURS

Contractor shall comply with the hours of operation established by Washington County Ordinance 745, Chapter 8.24 Noise Control. Noise-producing work is restricted to between 7 p.m. and 7 a.m. Monday through Saturday. This includes, but is not limited to, warming up equipment, parking on site with vehicles running, sounding vehicle horns, and using signaling devices. Work on Saturday will be allowed only per prior City approval. Contractor shall provide City at least one week notice of intent to work on an upcoming Saturday. No work is allowed on Sundays or legal holidays. Work outside of these times must comply with all noise restrictions.

City inspection for Contractor's work is restricted to 8:00 am through 5:00 pm Monday through Friday. Any work outside the City's inspection hours must be viewable on the next business day or the work shall be considered incomplete.

#### S-9 EMERGENCY RESPONSE

Prior to beginning any work, the Contractor shall provide the City with a list identifying all key personnel associated with this project and their responsibilities. The Contractor shall provide the City with a list of contact numbers for those employees responsible for responding to after-hours call-outs (24 hours per day, 7 days per week) associated with the Contractor's work. The Contractor shall have personnel available to respond to emergency situations within 2 hours of receiving notice from the City.

If the Contractor fails to provide timely response or corrective action, the City may provide response or corrective action without further notice to the Contractor or the Contractor's surety and deduct all cost thereof from any payments due or coming due the Contractor. The City shall not be required to act in any situation and nothing shall relieve the Contractor of duties to prevent, correct, or respond to problems related to the work.

Costs associated with the requirements of this section are considered incidental to construction and no additional compensation shall be due to the Contractor.

#### S-10 EASEMENTS

The City has negotiated the necessary easements to perform work outside the public right-of-way. Contractor shall confine construction operations to the temporary easement, with the exception of work within the public right-of-way or on City property as shown on the construction plans and delineated in the field with orange construction fencing. Copies of all Project easement documents have been provided in the Contract Documents.

The easement information contained in the contract documents also may contain a list of Easement Conditions specific to each property easement. The Easement Conditions represent the conditions under which the easement grantor agreed to convey the easement to the City.

Contractor shall be obligated to meet all conditions and/or restrictions set forth in the easement documents that are relative to the work. Generally, contractor shall be required to restore all areas of the properties disturbed by construction activities to a condition equal to or better than the pre-construction condition immediately after work is complete, unless stipulated otherwise in the Easement Conditions.

If the Contractor performs activities outside the limits shown on the construction plans, acts with willful negligence, or otherwise impacts property features, outside the easement limits, they shall be responsible for restoration of that property to a condition better than or equivalent to the pre-construction condition and be responsible for obtaining any necessary permits required for said work (this would include District, City, Washington County, State, and/or Federal permits). The Contractor is responsible for all costs relating to obtaining the permits for said work including all costs for labor materials, or equipment associated with restoration at no additional cost to the City.

Costs associated with the requirements of this section are considered incidental to construction and no additional compensation shall be due to the Contractor.

#### S-11 HAZARDOUS, TOXIC, AND WASTE MATERIAL HANDLING

Petroleum products, chemicals, fresh cement, sandblasted material and chipped paint, wood treated with leachable preservatives or other deleterious waste materials shall not be allowed to enter waters of the state. Contractor shall submit an Emergency Spill Response Plan and a Pollution Control Plan that identifies specific hazardous material containment measures for equipment to be used within 150 feet of Water Quality Sensitive Areas, see General Conditions Chapter 11. Measures for pollution prevention may include machinery refueling which shall occur at least 150 feet from waters of the state and confined in a designated area to prevent spillage into waters of the state, performing frequent checks of all equipment for fuel and fluid leaks, and keeping a spill kit on site during construction. Project-related spills into waters of the state or onto land with a potential to enter waters of the state shall be reported to the Oregon Emergency Response System (OERS) at 1-800-452-0311.

#### S-12 STAGING AREA AND ACCESS PLAN

The Contractor may establish agreements with private property owners to secure additional work, storage, or staging areas. Any agreement relative to staging, storage, access, or construction activities executed between the Contractor and any private property owner shall be in writing with all conditions pertaining to usage and restoration clearly defined. The City requests that all agreements contain language clearly excluding the City as a party to the agreement(s). A signed copy shall be provided to the City prior to any construction activities occurring on private property. Any cost associated with the Contractor's usage of private property shall be considered incidental to the project and borne by the Contractor at no cost to the City.

Continuous, unobstructed, safe, and adequate pedestrian and vehicular access shall be provided to fire hydrants, commercial and industrial establishments, private residences, churches, schools,

parking lots, service stations, motels, fire and police stations, and hospitals. Continuous emergency vehicle access shall be provided through work areas in public roadways. Plan and perform the construction work so that all adjacent businesses have access at all times. Maintain clear communication and scheduling with the business owners at all times.

Submit a Staging Area and Access Plan to the City prior to conducting the Work. The Staging Area and Access Plan shall highlight all areas that will be used by the Contractor, types of equipment used, locations of bypass pumps and discharge piping, methods for securing equipment, including all equipment used for bypass pumping operations, the vehicular route for access, specifically, paths of ingress and egress, and duration of impact. The Staging Area and Access Plan shall adhere to all requirements listed in these Contract Documents. Markups of the Drawings are acceptable.

Costs associated with the requirements of this section are considered incidental to construction and no additional compensation shall be due to the Contractor.

### S-13 PROTECTION AND RESTORATION OF CONSTRUCTION ZONE WITHIN PRIVATE AND PUBLIC PROPERTY

Any equipment on private or public property shall be isolated from residents and the public by the use of secure temporary chain-link or orange construction fencing or other approved barrier. Secure temporary barriers shall be considered incidental to construction and no extra compensation shall be due the Contractor. The Contractor shall protect all designated trees (within drip line), lawns and planted areas within the limits of the work or the public ROW.

Before entering wetlands or working within 150 feet of a water body, on private or public property, power wash all heavy equipment, vehicles and power tools, allow them to fully dry, and inspect them for fluid leaks, and to make certain no plants, soil, or other organic material are adhering to the surface. Ensure imported material (wood, logs, tackifier, rock, soil or other organic or inorganic materials) are free of free of noxious weeds, non-native vegetative debris, soil/mud and nontoxic to aquatic and terrestrial animals, soil microorganisms, and vegetation. At City direction, use standard tools to clean mud and vegetative debris from equipment that is moving to a new location on a large site and where movement of weeds may be a concern.

Restoration of all private structures or existing public improvements shall be to a condition of equal or better condition than that assessed in the pre-construction survey. The Contractor shall take pre-construction photographs to document the existing condition of any planned access routes and submit them to the City prior to executing the work. Equal or better condition shall be defined as matching the original dimensions, function, materials, and craftsmanship of the structure. If portions of the existing structure can be salvaged, all building materials shall be properly stored and transported so as to retain the same condition upon restoration. All materials that cannot be salvaged from the original structure shall be replaced, if possible, in kind with new materials. The Contractor shall coordinate with the City/Engineer to develop a suitable alternative that is acceptable to the owner of the private structure.

All disturbed pavement (e.g., excavation for manholes or bypass operations, cracked pavement as a result of heavy equipment, etc.) shall be restored to match existing thicknesses and conditions. The edges of the disturbed area shall be saw cut and finished to match the existing pavement.

All temporary ground disturbances shall be returned to original ground contours at project completion in accordance with General Conditions and Standard Specifications Chapter 10.7.

Contractor shall manage his access routes and construction work footprint such to minimize impact to existing vegetation and pavement.

Costs associated with the requirements of this section are considered incidental to construction and no additional compensation shall be due to the Contractor.

#### S-14 ANTICIPATED GENERAL PROJECT SEQUENCING

The anticipated Project sequencing described is meant as a guide to assist the contractor to understand the scope of the Project. Contractor shall be responsible for completing the project in a systematic manner so that a minimum of inconvenience to the public results in the progression of the work.

- Install project information signs, barricades and other signage
- Install Construction and Sediment Control Fence around construction and staging area
- Clear and Grub Work Area
- Construct Sanitary Sewer from Sta 1+51 to Sta 7+66
- Re-grade slope to the South of SW Tualatin-Sherwood Road
- Install well points
- Install Rock Creek isolation structures and bypass piping (during the permitted in-water work period, See S-5)
- Construct trenchless launch and receiving shafts
- Install casing under SW Tualatin-Sherwood Road
- Construct Sanitary Sewer from Sta 7+66 to Sta 11+80
- Construct Sanitary Sewer from Sta A1+00 to Sta A1+21
- Test and prepare line to receive sewage
- Install Sanitary Bypass from CWS MH 823846 to CWS MH 829081
- Construct Sanitary Sewer from Sta 1+00 to Sta 1+51 (Connect to CWS MH 829081)
- Construct Sanitary Sewer from Sta 11+80 to Sta 11+97 (Connect to CWS MH 398NSAN)
- Abandon existing 18" concrete Sewer from CWS MH 398NSAN to CWS MH 401NSAN
- Install Sanitary Bypass from CWS MH 401NSAN to SSMH 4
- Construct 12" Sanitary Sewer from Sta A1+21 to Sta A2+18
- Rechannelize Existing MH 401NSAN
- Test and place line in service, remove bypass pumping
- Remove Existing CWS MH 806192 and connect 8" Sanitary Sewer to SSMH 3
- Remove or abandon existing infrastructure as noted on plans
- Restore site per restoration and planting plan, including removal of construction and erosion control fencing and clean- up

- Remove project information signs, barricades and other signage

#### S-15 WATER SUPPLY

The Contractor shall be responsible for providing all water necessary for the project. This may include dust control, moisture for fill material, clean and flushing lines. The Contractor shall not use residential water services without prior written agreement from property owner(s). Provide a copy of any agreement to City prior to utilizing any residential water service.

Costs associated with the requirements of this section are considered incidental to construction and no additional compensation shall be due the Contractor.

#### S-16 MOBILIZATION

Contractor shall comply with all requirements of the General Conditions and Standard Specifications Chapter 10.3.

Payment for all work associated with this section shall be on a percentage basis in accordance with the General Conditions and Standard Specifications Chapter 10.8 and as stated in the Schedule of Bid Prices under Item 1 (S-16) Mobilization.

#### S-17 TRAFFIC CONTROL PLAN AND TRAFFIC CONTROL WORK

Prior to any work, the Contractor shall submit and receive approval of a traffic control plan from the respective jurisdiction for construction access onto and off of SW Tualatin-Sherwood Road and SW Century Drive. Traffic control plan shall meet the standards of the current edition of the *Manual of Uniform Traffic Control Devices for Streets and Highways, and Oregon Temporary Traffic Control Handbook*. A copy of the approved traffic control plans shall be available at the work area at all times. The Contractor shall comply with all permit conditions and have a copy on site at all times.

The Contractor shall be responsible for the procurement, erection, and maintenance of all traffic control signs and devices. The Contractor shall also provide all signage and flagging personnel as required. Flagging personnel shall possess current flagger certifications meeting Washington County requirements.

Traffic control devices shall meet the standards of the current edition of the *Manual of Uniform Traffic Control Devices for Streets and Highways*, U.S. Department of Transportation, and *Oregon Temporary Traffic Control Handbook*. All traffic control devices shall be continuously maintained, including nights and weekends.

The Contractor shall maintain access to private residences and driveways at all times. It is incumbent upon the Contractor to provide timely notification to individual property owners regarding impending, temporary interruptions to residence and/or driveway access by private vehicles. Contractor shall maintain the access route in a reasonable manner by preventing dust, potholing, or wash boarding. Access for school vehicles, mail services, emergency vehicles, and

police and fire vehicles shall be continuously maintained. Failure of the Contractor to abide by access requirements shall be cause for work stoppage until effective access is reestablished.

The Contractor shall notify emergency services, public transportation, and all affected utilities and local agencies about the operations so as to properly coordinate and expedite the work in such a manner as to cause the least amount of conflict and interference between the work and operations of other agencies. The Contractor shall notify school authorities at least 2 weeks in advance of any construction that will interfere with access to schools or affect school bus routes and schedules.

The Contractor shall conduct operations to minimize interference with authorized work of utility companies or other agencies in such streets or parking areas. The Contractor shall keep fire hydrants on or adjacent to work accessible to firefighting equipment.

The Contractor shall be responsible for providing adequate safeguards, safety devices, protective equipment, and any other needed actions to protect pedestrian traffic in connection with the performance of the work covered by the Contract. The Contractor shall perform any measures or actions that the Engineer may deem necessary to protect pedestrian traffic and shall be responsible for the provision and expense of this protection.

Payment for all work associated with this section shall be measured on a lump sum basis as stated in the Schedule of Bid Prices under Item 2 (S-17) Traffic Control. Payment shall constitute full compensation for all labor, equipment, materials, development and preparation of all traffic control plans, road closure permit applications, and traffic control work.

Payment shall include, but not be limited to, all work necessary to prepare, submit, and gain approval for traffic control plans and/or any additional road closure applications from Washington County or the City of Sherwood. Payment shall also include, but not be limited to, all work necessary to implement and maintain traffic control, including signage, traffic control devices, and flaggers. Fees associated with road closures shall be the responsibility of the Contractor. Costs associated with property owner notification, maintenance of continuous access, and all other miscellaneous logistical tasks necessary to comply with the requirements of this section shall be considered incidental to construction and no additional compensation shall be due the Contractor.

#### S-18 CONSTRUCTION FENCING, BARRICADES AND SIGNING

Prior to construction, Contractor shall procure and erect orange construction fencing around impact areas as delineated on the plans to protect sensitive areas from unnecessary impact. Fencing shall be 48-inches in height, highly visible and enclose the entire work area. Contractor shall procure and erect all necessary barricades and signing necessary to properly direct construction traffic and prevent unwanted trespass through adjoining properties. Contractor is responsible for maintaining the fence, barricades and signs throughout the project.

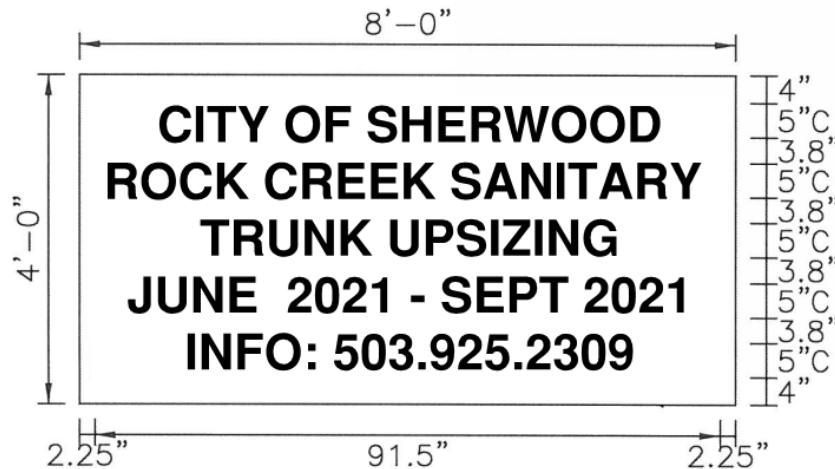
Payment for all work associated with this section shall be on a lump sum basis as stated in the Schedule of Bid Prices under Item 3 (S-18) Construction Fencing, Barricades and Signing. The lump



sum payment shall constitute full compensation for all labor, equipment and materials needed to comply with the requirements of this section.

#### S-19 CITY PROJECT INFORMATION SIGNS

Contractor shall install three (3) 4 ft. x 8 ft. Project information signs at Project locations identified by the City. The City shall be responsible for determining sign content, sign content to be similar to:



Contractor shall erect signs per "Project Sign Detail" included in the construction plans. Signs shall be placed upon a stable, moveable platform. Contractor shall maintain signs for construction duration and remove and dispose of signs within ten days (10) after the end of major field construction activities (not Project closeout).

Costs associated with the requirements of this section are considered incidental to construction and no additional compensation shall be due to the Contractor.

#### S-20 GENERAL UTILITY LOCATING, POTHOLING, & CONFLICTS

Contractor shall comply with all requirements of the General Conditions and Standard Specifications Chapter 10.5.

Contractor shall be responsible for prompt notification to City and the appropriate utility agencies of any known utility conflicts. Contractor shall be responsible for the scheduling, and coordination of the construction activities necessary to support the resolution of any utility conflicts with the appropriate utility agency. City shall not incur any financial responsibility for any construction delays related to the relocation of any utilities not appropriately located by Contractor.

Payment for all work associated with this section shall be on a lump sum basis as stated in the Schedule of Bid Prices under Item 4 (S-20) General Utility Locating & Potholing. The lump sum payment shall constitute full compensation for all coordination with utility owners, labor,

materials, and equipment necessary to establish utility locations and depths per the requirements of this section.

#### S-21 CLEARING & GRUBBING AND TOPSOIL PRESERVATION

Vegetation within the work area is not currently maintained and has become overgrown making access difficult. Contractor shall be responsible for clearing and grubbing the work area to allow for access prior to beginning work. Clearing and grubbing shall include the removal and disposal of any trees less than 6-inch diameter measured four feet from the ground, snags, logs, brush, stumps, shrubs, any other vegetation and rubbish from the work area. Contractor shall be mindful of vegetation designated to remain along with fences and other structures which may cross the work area. It is the intent that the Contractor minimize the impact to existing vegetation to the extent possible. Any damage resulting from the contractor's operation or neglect shall be repaired or replaced by the Contractor. Removal of shrubs, trees, and other vegetation outside the work area shall be replaced at the Contractor's expense.

Topsoil shall be stripped to a minimum depth of 12-inches from existing grade within the extents of construction disturbance prior to start of construction activities. Topsoil shall be stockpiled onsite for later use during final site restoration. At the contractor's option, native top soil may be disposed of and an approved imported topsoil installed as part of the final site restoration.

The limits of the work area to be cleared and grubbed shall be clearly marked in the field by stakes, flags, tree markings or other suitable methods. Trees to be left standing and uninjured shall be designated by special markings that are conducive to preventing injury to the tree and shall be placed on the trunk approximately 6 feet above the ground surface.

All materials cleared and grubbed from the designated area shall be properly disposed of. Burning of debris shall NOT be allowed. The contractor is responsible for complying with all local rules and regulations and the payment of any and all fees that may result from disposal locations away from the project site.

Payment for all work associated with this section shall be on a lump sum basis as stated in the Schedule of Bid Prices under Item 5 (S-21) Clearing & Grubbing and Topsoil Preservation. Payment shall represent full compensation for all labor, equipment, and materials necessary to meet the requirements of this section.

#### S-22 CONSTRUCTION STAKING

Contractor shall be responsible for all project layout based upon the plans. A CAD file will be made available to the contractor for use in construction staking by a surveyor at the contractors request and expense. Contractor shall maintain proper equipment on-site as necessary to ensure horizontal and vertical control and proper location of improvements. Contractor is solely responsible for all layout of the work. No additional stakeout will be provided except at the expense of the Contractor.

At a minimum staking shall include:

- 1-hub at center of all structures
- 2-offset hubs with tack and lath for each structure
  - All laths shall be marked with line station, offset distance, invert cut or fills, rim information, and slope where applicable
- Surface information at every 25-ft station on centerline, with cuts computed.
- Clearing Limits (see Clearing Specification)
- Fencing, both sediment control and construction fencing
- Tree protection
- Staging areas
- Trenchless Crossing (See Trenchless Crossing Specification)
  - Location of Launching and Receiving pits
  - Line and grade of guide rails
  - Settlement monitoring
  - Monitor line and grade of casing and carrier pipe

Cut sheets shall be made available to the City a minimum of 24 hours prior to construction of the improvements. Cut sheets shall include STA as referenced on the plans, horizontal and vertical distances from hubs, slopes and design grades.

Payment for all work associated with this section shall be on a lump sum basis as stated in the Schedule of Bid Prices under Item 6 (S-22) Construction Staking. Payment shall represent full compensation for all labor, equipment, and materials necessary to meet the requirements of this section. No separate or additional payment will be made for preparing survey documents including but not limited to office time, preparing, and checking survey notes. Costs incurred caused by survey errors will be at the Contractor's expense. These costs may include price adjustments for repair, removal, or replacement of deficient products, and over-run of materials.

#### S-23 FINAL SITE RESTORATION AND CLEAN-UP

Contractor shall comply with all requirements of the General Conditions and Standard Specifications Chapter 10.7.

Payment for all work associated with this section shall be on a lump sum basis as stated in the Schedule of Bid Prices under Item 7 (S-23) Final Site Restoration & Clean-up. Payment shall represent full compensation for all labor, equipment, and materials necessary to meet the requirements of this section.

#### S-24 TREE PROTECTION AND REMOVAL

Trees not scheduled for removal that are located in close proximity to the work area shall be protected per the General Conditions and Standard Specifications Chapter 11.4. Trees shall be

protected with highly visible construction fencing installed at dripline as identified on the construction plans to avoid incidental scarring, compaction of root zone, or other damage by equipment. In the event limbs require removal to facilitate Contractor's activities, they shall be trimmed by mechanical means in a manner approved by City arborist and in accordance with acceptable arborist practices. Under no circumstances shall Contractor intentionally break off limbs with excavation equipment. Contractor shall be required to notify City prior to the removal of any limbs on all significant ornamental or landscape trees.

Trees requiring removal to facilitate construction activities have been identified on the construction plans for this Project. The City has made a reasonable effort to identify the quantity and diameter of trees requiring removal, but cannot guarantee the accuracy of such information. Actual field conditions may vary from those shown on the construction plans. Contractor shall obtain approval from the Engineer prior to removing any trees not identified to be removed on the plans, and work associated with additional tree removal will be considered incidental. Removal of trees shall include removal and disposal of all tree related materials including root mass.

Payment for the removal of trees less than 6-inch diameter measured four feet from the ground, shrubs, brush, and other vegetation to facilitate construction is covered under other bid items.

Payment for all work associated with this section shall be measured on a lump sum basis as stated in the Schedule of Bid Prices under Item 8 (S-24) Tree Protection and Removal. Payment shall represent full compensation for all labor, equipment, and materials necessary to protect, or remove and dispose of the trees indicated on the construction plans and meet the requirements of this section.

#### S-25 TEMPORARY EROSION AND SEDIMENT CONTROL BMPS

Contractor shall comply with all requirements of the General Conditions and Standard Specifications Chapter 11 and the plans and details for installation, maintenance and removal of erosion and sediment control BMPs. Payment for furnishing, installing and maintaining erosion and sediment control BMPs shall be per General and Standard Specifications Chapter 11.9 and as follows:

- A. Payment for all work associated with furnishing, installing and maintaining sediment fencing shall be on a linear foot basis in accordance with the General Conditions and Standard Specifications Chapter 11.9 and as stated in the Schedule of Bid Prices under Item 9 (S-25) Temporary Erosion and Sediment Control BMPs.
- B. Payment for all work associated with furnishing, installing and maintaining compost filter berm shall be on a linear foot basis in accordance with the General Conditions and Standard Specifications Chapter 11.9 and as stated in the Schedule of Bid Prices under Item 9 (S-25) Temporary Erosion and Sediment Control BMPs.
- C. Payment for all work associated with furnishing, installing and maintaining Type 4 & 5 inlet protection shall be on a per each basis in accordance with the General Conditions

and Standard Specifications Chapter 11.9 and as stated in the Schedule of Bid Prices under Item 9 (S-25) Temporary Erosion and Sediment Control BMPs.

#### S-26 MISCELLANEOUS EROSION CONTROL

Contractor shall comply with all requirements of the General Conditions and Standard Specifications Chapter 11 and the plans and details for installation, maintenance, and removal of erosion control measures. The erosion control and sediment prevention measures shown on the plans reflect the minimum required erosion control. Additional measures may be required and are the responsibility of the contractor to provide in order to prevent sediment laden storm water from entering natural areas, the storm system and bodies of water.

Contractor shall have a dedicated erosion control inspector at the site daily to inspect and immediately install or repair erosion control deficiencies. The contractor supplied erosion control inspector shall keep a daily log and submit a copy of that log to the City weekly.

Payment for all work associated with this section, including removal of all erosion control measures shall be on a lump sum basis in accordance with City General Conditions and Standard Specifications Chapter 11.9 and as stated in the Schedule of Bid Prices under Item 10 (S-26) Miscellaneous Erosion Control.

#### S-27 CREEK ISOLATION AND BYPASS PIPING

Creek isolation shall consist of the design, furnishing, installation, operation, maintenance, and removal of a diversion system(s) to achieve completion of all work performed under this Contract without damage to adjacent improvements, existing landscaping, water courses, and natural vegetation. Contractor shall be responsible for any fees imposed by the Department of Water Resources. Contractor shall comply with all requirements of City General Conditions and Standard Specifications Chapter 11.5.3.

Contractor shall bypass or divert stream flow so as to prevent entry or collection of water in excavations and areas under construction. Any surface water diversion shall be maintained 24 hours a day for the entire length of the work. Contractor shall divert stream water around the work area so as not to cause injury to public or private property, or to cause a nuisance or a menace to the public and to meet all water quality and permit requirements.

Excavations shall be kept free of water during excavation, installation of pipe, placement of gravel bedding materials, placement and setting of manholes, and prior to the acceptance of any portion of the work. The stream diversion system shall be designed using accepted and professional methods consistent with best modern practices. The diversion system may include isolation structure/cofferdam, piping, and other equipment and labor related to this section to perform the function of diverting creek flows.

Design, installation and maintenance of the diversion system shall be entirely Contractor's responsibility. During times of the year, ground water may be at the surface of the existing ground. One week prior to diverting, submit to City, the method, installation, and details of the engineered diversion system. A professional engineer licensed in the State of Oregon must stamp the engineered diversion system design and submittal.

Acceptance of the method, installation, and operation and maintenance details submitted by Contractor shall not in any way be considered to relieve Contractor from full responsibility for errors therein. Nor shall it relieve Contractor from the responsibility for adequate design and performance of the system in controlling the water level or for control of the hydrostatic pressures. Contractor shall be solely responsible for proper design, installation, operation and maintenance of all components of the diversion system for this Contract.

Contractor shall be responsible for any and all permits and fees associated with the diversion system and shall comply with water disposal requirements of all authorities having jurisdiction. Contractor shall be responsible for meeting requirements of all regulating agencies for quantity, frequency, quality, clarity, and location of diversion water discharge. The City retains the authority to temporarily halt or modify the diversion system to prevent excessive turbidity or damage to natural resources.

Contractor shall be responsible for monitoring the discharge of the diversion operation. Turbidity monitoring shall be conducted and recorded at two-hour intervals each day during daylight hours when in-water work is being conducted. Properly calibrated turbidimeters are required at locations specified on the DEQ issued 401WQC, unless another monitoring method is proposed and authorized by DEQ, see supplemental information for DEQ issued 401WQC for mandatory reporting requirements and additional information regarding turbidity thresholds for compliance. If Contractor suspects, or while monitoring, determines that sediment laden water is leaving the project area, Contractor shall notify the City immediately and modify BMPs as required to maintain compliance with the 401WQC.

Contractor shall be responsible for preserving natural habitat within the extents of the Rock Creek Ordinary High Water Mark and shall repair any damage to the sensitive area that may result from installation, maintenance and operation of the diversion system. Upon authorization from City, Contractor shall remove from the site all diversion system elements. Contractor shall assume ownership and responsibility for the disposal of all diversion pumps, pipes, and other assorted system hardware.

The Contractor shall salvage all fish and other aquatic species within the section of creek to be isolated in accordance with all permitting agency requirements. Contractor shall provide a fish salvage report to the US Army Corps of Engineers within 60 days of completing fish salvage operations per Nationwide Permit 12 Enclosure 3 contained in Supplementary Information. The Contractor shall be required to schedule and coordinate all work with the fish salvage operation.

Payment for all work associated with this section shall be paid on a lump sum basis as stated in the Schedule of Bid Prices under Item 11 (S-27) Creek Isolation and Bypass Piping. Payment shall be in accordance with City General Conditions and Standard Specifications, Chapter 11.9.6.

#### S-28 TRENCH EXCAVATION AND CLASS A BACKFILL MATERIAL

Trench backfill shall be the class indicated on the plans. Where Class A backfill is designated, native materials from trench spoils shall be utilized with a preference to retain the organic peat materials on site. The Contractor shall make every reasonable attempt to utilize the peat soils and return them in the order which they were excavated. For instance the top layer of excavated material shall be separated from the rest of the excavated material and put back on top when the trench is back filled.

Payment for all work associated with this section shall be on a linear foot basis as stated in the Schedule of Bid Prices under Item 12, 13 & 14 (S-28) Trench Excavation and Class A Backfill. Payment shall be in accordance with City General Conditions and Standard Specifications, Chapter 12.5.

#### S-29 TRENCH EXCAVATION AND CLASS A BACKFILL W/ SUBGRADE STABILIZATION

Trench backfill shall be the class indicated on the plans. Where Class A backfill is designated, native materials from trench spoils shall be utilized with a preference to retain the organic peat materials on site. The Contractor shall make every reasonable attempt to utilize the peat soils and return them in the order which they were excavated. The top layer of excavated material shall separate from the rest of the excavated material and put back on top when the trench is backfilled.

Subgrade stabilization shall include excavation for additional bedding material and fabric as indicated in the typical details.

Payment for all work associated with this section shall be on a linear foot basis as stated in the Schedule of Bid Prices under Item 15, 16, 17 & 18 (S-29) Trench Excavation and Class A Backfill w/ subgrade stabilization. Payment shall be in accordance with City General Conditions and Standard Specifications, Chapter 12.5.

#### S-30 PIPE BEDDING MATERIAL

Pursuant to Section 12.3.3 of Chapter 12 of the General Conditions, Pipe bedding material shall be ¾"-0 crushed rock.

Costs associated with the requirements of this section are considered incidental to construction and no additional compensation shall be due to the Contractor.

#### S-31 FOUNDATION STABILIZATION CRUSHED ROCK

Contractor shall comply with all requirements of City General Conditions and Standard Specifications Chapter 12.

Payment for all work associated with this section shall be on a per ton basis in accordance with City General Conditions and Standard Specifications Chapter 12.5 and as stated in the Schedule of Bid Prices under Item 19 (S-31) Foundation Stabilization Crushed Rock.

#### S-32 FOUNDATION STABILIZATION GEOTEXTILE FABRIC

Contractor shall comply with all requirements of City General Conditions and Standard Specifications Chapter 12.

Fabric shall be high-strength woven reinforcement fabric (Mirafi RS280i or approved equal) satisfying the following requirements:

- Woven type consisting of high strength polypropylene fibers
- Tensile Modulus at 2% strain: minimum 30,000 lbs/ft
- Apparent opening size: minimum 40 U.S. Standard Sieve
- Flow rate: minimum 70 gal/min/ft<sup>2</sup>

Payment for all work associated with this section shall be on a linear foot basis in accordance with City General Conditions and Standard Specifications Chapter 12.5 and as stated in the Schedule of Bid Prices under Item 20 (S-32) Foundation Stabilization Geotextile Fabric.

#### S-33 ROCK EXCAVATION

Contractor shall comply with all requirements of City General Conditions and Standard Specifications Chapter 12.

Rock Excavation for trenchless launch and receiving shafts shall be paid for as measured, up to a maximum of 14 inches greater than the contractor proposed extents of launch and receiving shaft dimensions. Boulders that do not interrupt the installation of the shaft shoring system or do not meet the rock excavation definition or requirements of City General Conditions and Standard Specifications Chapter 12 do not qualify as rock excavation. Obstruction removal to facilitate trenchless crossing is covered under other special provisions.

Rock Excavation for pipeline trenches shall be paid for as measured, up to a maximum of 14 inches greater than the contractor proposed extents of trench shoring system. Boulders that do not interrupt the installation of the trench shoring system or do not meet the rock excavation definition or requirements of City General Conditions and Standard Specifications Chapter 12 do not qualify as rock excavation.

Payment for all work associated with this section shall be on a cubic yard basis for in accordance with City General Conditions and Standard Specifications Chapter 12.5 and as stated in the Schedule of Bid Prices under Item 21 (S-33) Rock Excavation.



#### S-34 NOT USED

#### S-35 TRENCH DAM

Contractor shall install Bentonite trench dams in the pipe trench at the locations shown on the plans. The trench dams shall be two feet thick parallel to the pipe, extending from one foot below the bottom of the trench to two feet above the top of pipe. The trench dams shall be keyed into each side of the trench wall to minimum depth of 18 inches, perpendicular to the pipe.

Payment for all work associated with this section shall be on a per each basis as stated in the Schedule of Bid Prices under Item 22 (S-35) Trench Dam.

#### S-36 TRENCH COMPACTION TESTING

Compaction requirements shall be per City General Conditions and Standard Specifications Chapter 12.4 unless superseded. The site shall be returned to its original condition and elevation, or to final grading as shown in contract drawings, at the conclusion of the project, requiring compaction and testing to avoid settlement (this includes areas with native backfill). Compaction in Native backfill areas shall be 90% of relative compaction using a T99 test, Compaction in Granular backfill areas shall be 95% of relative compaction using a T99 test.

Initial testing locations shall be at the rate of one for each 100 linear feet of trench line with at least one test between each two successive structures. Test locations shall be at the sole discretion of City field personnel and may include manhole excavation areas. For each test failing to meet compaction standards, City shall require two additional locations along the trench line to be tested until compliance with compaction standards has been sufficiently demonstrated. City, at its sole discretion, may authorize less frequent testing.

Contractor shall be responsible for the scheduling and payment for all compaction testing. Testing company shall be capable of field observation, density testing of trench backfill, and have an accredited testing laboratory. Testing company shall provide City a current (within two months) Proctor test for backfill being used on the Project prior to performing trench compaction tests. Contractor shall notify City a minimum of 48 hours prior to scheduled compaction testing to allow City to observe testing protocol and select testing locations. Failure to provide sufficient notice (min 24-hour notice) to City for observation and test location marking shall, at City's sole discretion, be grounds for retesting at no cost to City.

Payment for all work associated with this section shall be paid on a lump sum basis as stated in the Schedule of Bid Prices under Item 23 (S-36) Trench Compaction Testing. Payment shall constitute full compensation for all labor, equipment, and materials necessary to meet the requirements of this section.

#### S-37 SHORING AND SHEETING

Contractor shall comply with all requirements of City General Conditions and Standard Specifications Chapter 12 for shoring and sheeting. The shoring and trench protection shall be of

the Contractor's design and responsibility. The trench shoring and sheeting plan shall be submitted to the City by the Contractor at the time of the Preconstruction Conference.

Receipt and review of the plan by the City does not guarantee compliance with all applicable local, state and federal safety codes and shall not relieve the Contractor and the structural engineer of any responsibility or liability. The Contractor is solely responsible for the safety of personnel, equipment and property that the shoring and trench protection system is intended to protect.

Costs associated with the requirements of this section are considered incidental to construction and no additional compensation shall be due to the Contractor.

#### S-38 DEWATERING

Dewatering shall consist of the design, furnishing, installation, operation, maintenance, and removal of a dewatering system(s) to achieve completion of all work performed under this Contract without damage to adjacent improvements, existing landscaping, water courses, and natural vegetation. Contractor shall be responsible for any fees imposed by the Department of Water Resources. Contractor shall comply with all requirements of City General Conditions and Standard Specifications Chapter 11.5.3.

Contractor shall furnish, install, operate, and remove any and all additional machinery, appliances, and equipment necessary to keep excavation free from water during construction. Contractor shall dewater and dispose of the water so as not to cause injury to public or private property, or to cause a nuisance or a menace to the public and to meet all water quality and permit requirements.

The control of groundwater shall be such that softening of the bottom of excavations, or formation of "quick" conditions or "boils" during excavation shall be prevented. Dewatering systems shall be designed and operated to prevent the removal of natural soils.

Contractor shall control surface runoff so as to prevent entry or collection of water in excavations and areas under construction. This may require the installation and removal of swales and diversion berms to reroute or prevent the free flow of surface water through the construction site. Any surface water diversion shall be maintained 24 hours a day for the entire length of the Work. The release of water through the construction site will not be allowed.

Excavations shall be kept free of water during excavation, installation of pipe, placement of gravel bedding materials, placement and setting of manholes, and prior to the acceptance of any portion of the work. Contractor shall design an engineered dewatering system using accepted and professional methods consistent with the best modern practice. The minimum requirements for the dewatering system are shown in the Contract Drawings. In addition to these requirements, the Contractor's designed dewatering system may include additional deep wells, wellpoints, sumps, diversions, cofferdam, swales, check dams, and other equipment, appurtenances, and related earthwork necessary to perform the function.

Design, installation, operation and maintenance of the dewatering system shall be entirely Contractor's responsibility. During times of the year, ground water may be near the surface of the existing ground. Two weeks prior to dewatering, submit to City, the method, installation, and details of the engineered dewatering system. A professional engineer or registered geologist licensed in the State of Oregon must stamp the engineered dewatering system design and submittal.

Site Conditions: The geotechnical exploration and testing results are presented in the Geotechnical Data Report (GDR). The Contractor shall make its own interpretations, deductions and conclusions as to the nature of the materials to be excavated, the difficulties of making and maintaining the required excavation, and the difficulties of doing any other work affected by geotechnical conditions, and shall accept full responsibility thereof. For the purposes of bidding the Work and planning means and methods for dewatering, Contractor shall assume that boulders, some having a volume of up to 1 cubic yard or more, will be encountered for the dewatering system installation.

Acceptance of the method, installation, and operation and maintenance details submitted by Contractor shall not in any way be considered to relieve Contractor from full responsibility for errors therein. Nor shall it relieve Contractor from the responsibility for adequate design and performance of the system in controlling the water level in the excavated areas or for control of the hydrostatic pressures. Contractor shall be solely responsible for proper design, installation, operation, maintenance, any modification and failure of any component of the dewatering system for this Contract.

Contractor shall be responsible for any and all permits and fees associated with the dewatering system and shall comply with water disposal requirements of all authorities having jurisdiction.

Contractor may discharge clean groundwater to surface waters subject to the limitations and water quality requirements of all applicable law and permits. Sediment laden water must first be satisfactorily treated. No water from any construction site may be discharged directly to an unpermitted storm water system, or to any other conveyance system leading directly to a water of the state.

Contractor shall be responsible for meeting requirements of all regulating agencies for quantity, frequency, quality, clarity, and location of discharge for dewatering activities. Contractor shall provide, operate and maintain sedimentation filter bags at a minimum or settling tanks, such as Baker Tanks as needed to adequately treat collected water. The number of bags or tanks shall provide 100% redundant settling capacity of collected flows. Settle and/or filter all dewatering and supplemental system flow collected through Contractor designed and provided settling systems in order to meet Water Quality Standards prior to discharging to an approved discharge point. Secondary containment around the filter bags shall be installed to prevent any sediment laden water from entering Rock Creek. The secondary containment shall consist of sediment control fence and biobags or wattles. The City retains the authority to temporarily halt or modify the dewatering system to prevent excessive turbidity or damage to natural resources.

Contractor shall be responsible for monitoring the discharge of the dewatering operation. If Contractor suspects, or while monitoring, determines that sediment laden water is leaving the project area, Contractor shall notify the City immediately and provide for additional storage and/or treatment of contaminated water prior to discharge.

Contractor shall be responsible for and repair any damage to work in place and the excavation that may result from its maintenance and operation of the dewatering system. Upon authorization from City, Contractor shall remove from the site all dewatering system elements. Contractor shall assume ownership and responsibility for the disposal of all dewatering pumps, pipes, and other assorted system hardware. Remove and abandon all wells in accordance with all laws and regulations of the State of Oregon. Contractor is responsible for all decommissioning fees.

The cost for repairs, materials replacement, cleanup, treatment costs, or fines resulting from overflow caused by Contractor's dewatering practices shall be incurred by Contractor and shall be considered incidental work.

Payment for all work associated with this section shall be paid on a lump sum basis as stated in the Schedule of Bid Prices under Item 24 (S-38) Dewatering. Payment shall include all treatment costs, equipment, tools, materials, labor, and supervision required for installing, operating and maintaining the dewatering system and the discharge of settled water in accordance with City General Conditions and Standard Specifications, Chapter 11.9.6.

In the case that additional dewatering well(s) are required to facilitate installation of the sewerline, trenchless launch or receiving shafts, a bid item has been included for the additional cost of dewatering well installation on a per each basis under Item 24-A (S-38) Additional Dewatering Well (Contingency). Written authorization required from City for additional dewatering wells.

#### S-39 STANDARD MANHOLES

Contractor shall comply with all requirements of City General Conditions and Standard Specifications Chapter 13 and standard details.

Payment for all work associated with this section shall be on a per each basis as stated in the Schedule of Bid Prices under Item 25 & 26 (S-39) Standard Manholes. Payment shall be in accordance with City General Conditions and Standard Specifications, Chapter 13.6 with the following exceptions: unit cost shall include all depths of manholes and connections of new pipe to manholes. No additional payment will be made for manhole at depth in excess of 8 feet or for connections of new sanitary mainlines.

#### S-40 INSIDE DROP MANHOLES

Contractor shall comply with all requirements of City General Conditions and Standard Specifications Chapter 13 and standard details.

Payment for all work associated with this section shall be on a per each basis as stated in the Schedule of Bid Prices under Item 27 and 28 (S-40) Inside Drop Manholes. Payment shall be in accordance with City General Conditions and Standard Specifications, Chapter 13.6 with the following exceptions: unit cost shall include all depths of manholes and connections of new pipe to manholes. No additional payment will be made for manhole a depth in excess of 8 feet or for connections of new sanitary mainlines.

#### S-41 WATERTIGHT MH FRAMES AND COVERS

Watertight manhole frame and covers shall be constructed of a non-metallic fiber-reinforced polymer containing a minimum of 45% fiber reinforcement with a thermoset resin matrix. The frame and cover shall be capable of meeting H-20 and H-25 traffic loading requirements, be suitable for use in sanitary sewer environments, and be resistant to ultraviolet degradation. The frame shall have a 22-inch clear opening and include double urethane integrated gaskets between the contact surfaces on the frame and cover. Frames shall have four 5/8-inch bolt holes evenly spaced to bolt the frame onto the manhole.

##### *Composite manhole frame and covers*

Composite manhole frame and covers shall be Series 2400 with Titus TwistLIFT Lock, manufactured by GMI Composite, Inc., Muskegon, MI, or approved equal. One Titus Handle shall be provided for every (8) manhole frame and cover sets.

##### *Anchor Bolts*

Anchor bolts, nuts, and washers for bolting manhole frames to the concrete manhole components shall utilize Type 316 stainless steel (or better). Bolts shall be anchored with HILTI Injectable mortar, Hilti Inc., or approved equal. Expansion anchor bolts are not allowed.

##### *Sealant*

Sealant shall be a premium-grade, high performance, moisture cured one part polyurethane elastomer designed for horizontal joints and submerged conditions. Sealant shall be Sikaflex 1A or approved equal.

##### *Manhole Frame and Cover Installation*

The Contractor shall drill through the grade ring and into the top of the manhole a minimum of 3" and anchor into the top of the manhole base or flat top cover.

Apply a continuous band of 3-inch wide by 1/4-inch thick sealant between the composite frame and topmost concrete grade ring or manhole. Bolt frame onto the top of manhole or grade ring using epoxy anchors. Anchors shall be installed in accordance with the recommendations of the anchor system manufacturer, including maximum hole diameter and minimum embedment. After installation of the new manhole frame to the existing concrete manhole, cut anchor bolts flush with their respective nuts and cover all metal components with 3/4-inch thick (minimum) butyl rubber sealant a minimum of 1-inch all around the anchor nut.

The City requires watertight manhole frame and cover to be installed on all manholes located within the floodplain.

Contractor shall comply with all requirements of City General Conditions and Standard Specifications Chapter 13.3.11.

Payment for all work associated with installation of this section shall be on a per each basis as stated in the Schedule of Bid Prices under Item 29 (S-41) Watertight MH Frame and Covers. Payment shall represent full compensation for all labor, equipment, and materials necessary to meet the requirements of this section.

#### S-42 SANITARY SEWER, ASTM F679 PVC

Contractor shall comply with all requirements of City General Conditions and Standard Specifications Chapter 14.

Payment for all work associated with this section shall be on a linear foot basis in accordance with City General Conditions and Standard Specifications Chapter 14.7 and as stated in the Schedule of Bid Prices under Item 30 (S-42) Sanitary Sewer, ASTM F679 PVC.

#### S-43 SANITARY SEWER, ASTM D3034 PVC

Contractor shall comply with all requirements of City General Conditions and Standard Specifications Chapter 14.

Payment for all work associated with this section shall be on a per linear foot basis in accordance with City General Conditions and Standard Specifications Chapter 14.7 and as stated in the Schedule of Bid Prices under Item 31 and 32 (S-43) Sanitary Sewer, ASTM D3034 PVC.

#### S-44 CONNECTION TO EXISTING SEWER

Contractor shall comply with all requirements of City General Conditions and Standard Specifications Chapter 13.3.12 for connections to existing manholes.

Prior to construction, Contractor shall pothole existing pipe to verify pipe material, location and outside diameter prior to ordering connection materials. Contractor is responsible for ordering correct connection fitting. Any cost for, or delays in the schedule due to ordering the incorrect fitting or failure to order in a timely manner shall be borne solely by the Contractor. Contractor shall connect to the existing sewer line as detailed on the plans.

Payment for all work associated with this section shall be on a per each basis as stated in the Schedule of Bid Prices under Item 33 (S-44) Connection to Existing Sewer. Payment shall represent full compensation for all labor, equipment, and materials necessary to meet the requirements of this section.

#### S-45 INSPECTION OF SEWERS

This Special Specification supersedes *Section 14.6.5, Television Inspection*, of the General Conditions.

Upon completion of all construction and acceptance of testing, the Contractor shall be qualified or shall have a qualified independent company specializing in video inspections video inspect the system. All pipes shall be thoroughly flushed immediately prior to the video inspection. A 1- inch target ball shall be placed in front of the camera. A copy of the video recording and a written TV Inspection Report on a form approved by the City shall be supplied to the City. The video recording shall be recorded on color and on an electronic format approved by the City. Video recording activities shall be witnessed by the City. All problems discovered during the video inspection shall be noted on the video recording and written report. The contractor will be required to correct all deficiencies at no expense to the City.

Payment for all work associated with this section shall be paid on a lump sum basis as stated in the Schedule of Bid Prices under Item 34 (S-45) Inspection of Sewers. Payment shall represent full compensation for all labor, equipment, cleaning, testing, video inspection, and materials necessary to meet the requirements of this section.

#### S-46 TEMPORARY ACCESS ROADS

Contractor shall install temporary construction access roads consisting of a geotextile fabric over the native soil and 8" of 3"-4" clean pit run rock where required to facilitate sanitary sewer install. Temporary access roads are meant to provide a stable surface for construction traffic in areas where the existing soil may not be dry enough or stable enough to support construction traffic. Contractor shall notify and coordinate with the City Engineer for inspection of poor soils and to verify quantity and limits of temporary access roads. Installation and payment for any temporary access roads shall only be provided when directed by the engineer. Upon completion of construction in the area where a temporary construction road may be required, the road shall be removed in its entirety including all rock and fabric. Materials from temporary access roads may be re-used for temporary access roads elsewhere in the project. All materials used to construct the temporary access roads shall be removed and hauled from the site at the conclusion of the project. No remnant materials will be allowed to remain on-site.

Payment for all work associated with this section shall be paid on a square yard basis as stated in the Schedule of Bid Prices under Item 35 (S-46) Temporary Access Roads. Payment shall constitute full compensation for all labor, equipment, and materials necessary to install, maintain and remove the temporary access roads.

#### S-47 SITE RESTORATION AND PLANTING

Prior to October 1<sup>st</sup>, the project site must be cleaned up, restored and prepped for wet weather. Restoration shall include tilling of all disturbed areas a minimum of 1 foot deep to amend any compaction during construction. After de-compaction, stockpiled topsoil shall be spread across

the disturbed area at a minimum depth of 12 inches, the site shall be restored to pre-construction grades, and the site planted and seeded per the contract drawings. Planting and seeding operations shall comply with all requirements of City General Conditions and Standard Specifications Chapter 16. Seeding and mulching shall take place by September 1<sup>st</sup> to allow time for the seed to germinate and provide adequate cover to protect the site for wet weather.

The contractor shall be responsible for a two-year plant establishment and maintenance period. Installed plants that fail to meet the acceptance criteria per Clean Water Services Design & Construction Standards Appendix A – Planting Requirements shall be replaced during the two-year plant establishment and maintenance period. Contractor shall install temporary irrigation system as required to achieve two-year plant establishment period, see contract drawings for temporary irrigation details and water sources.

Removal of invasive non-native species shall be completed by hand in all areas marked on the contract drawings. Replanting is required in any cleared areas larger than 25 square feet that lie outside of the construction disturbance extents. Prominent invasive species for removal include Himalayan blackberry (*Rubus armeniacus*) and English Ivy (*Hedera helix*), see Wetland Delineation report of the supplemental information for relative and absolute coverage percentages within the areas denoted for invasive species removal.

- A. Payment for all work associated with preparation, restoration and seeding within Zone A (PEM Wetland) in accordance with the General Conditions and Standard Specifications Chapter 16 shall be paid on a lump sum basis as stated in the Schedule of Bid Prices under Item 36A (S-47) Site Restoration & Planting. Payment shall constitute full compensation for all labor, equipment, and materials necessary to meet the specification.
- B. Payment for all work associated with preparation, restoration, seeding and planting within Zone B (PSS/PFO Wetland) in accordance with the General Conditions and Standard Specifications Chapter 16 shall be paid on a lump sum basis as stated in the Schedule of Bid Prices under Item 36B (S-47) Site Restoration & Planting. Payment shall constitute full compensation for all labor, equipment, and materials necessary to meet the specification.
- C. Payment for all work associated with preparation, restoration, seeding and planting within Zone C (Stormwater Swale) in accordance with the General Conditions and Standard Specifications Chapter 16 shall be paid on a lump sum basis as stated in the Schedule of Bid Prices under Item 36C (S-47) Site Restoration & Planting. Payment shall constitute full compensation for all labor, equipment, and materials necessary to meet the specification.



- D. Payment for all work associated with preparation, restoration, seeding and planting within Zone D (Forested Upland) in accordance with the General Conditions and Standard Specifications Chapter 16 shall be paid on a lump sum basis as stated in the Schedule of Bid Prices under Item 36D (S-47) Site Restoration & Planting. Payment shall constitute full compensation for all labor, equipment, and materials necessary to meet the specification.
- E. Payment for all work associated with preparation, restoration, and seeding within Zone E (Upland) in accordance with the General Conditions and Standard Specifications Chapter 16 shall be paid on a lump sum basis as stated in the Schedule of Bid Prices under Item 36E (S-47) Site Restoration & Planting. Payment shall constitute full compensation for all labor, equipment, and materials necessary to meet the specification.
- F. Payment for all work associated with the plant establishment period including installation and removal of temporary dewatering system, maintenance of plantings and replanting as required in accordance with the General Conditions and Standard Specifications Chapter 16 shall be paid on a lump sum basis as stated in the Schedule of Bid Prices under Item 36F (S-47) Site Restoration & Planting. Payment shall constitute full compensation for all labor, equipment, and materials necessary to meet the specification.
- G. Payment for all work associated with the removal of invasive non-native species, and associated replanting of native species per the contract drawings and in accordance with the General Conditions and Standard Specifications Chapter 16 shall be paid on a square yard basis as stated in the Schedule of Bid Prices under Item 36G (S-47) Site Restoration & Planting. Payment shall constitute full compensation for all labor, equipment, and materials necessary to meet the specification.

#### S-48 REMOVE AND DISPOSE OF EXISTING MANHOLES

Where identified on the construction plans, existing sanitary sewer manholes shall be removed in their entirety or abandoned in place with construction progress and properly disposed of. Pipe ends connecting to the manhole shall be permanently capped with a 4-foot concrete plug. Material shall be disposed of in such a manner as to meet all the requirements of the local, state, and federal regulations regarding health, safety, the environment, and public welfare. No materials shall be left on the Project, in embankments, fills or trenches. Proper disposal of all existing lateral piping and associated drop structure materials to be considered incidental to existing manhole removal.

The bottom three feet of the void created from removing the manhole shall be backfilled with bentonite. The remaining voids created from removal of existing sanitary sewer manholes shall be backfilled with native spoils from trench work and compacted as specified in general conditions chapter 12.

Payment for all work associated with this section shall be paid on a per each basis as stated in the Schedule of Bid Prices under Item 37 (S-48) Remove and Dispose of Existing Sanitary Manhole. Payment shall constitute full compensation for all labor, equipment, and materials necessary to meet the specification.

#### S-49 ABANDON EXISTING 18-INCH SANITARY SEWER MAINLINE

Where indicated on plans, Contractor shall abandon existing sewer line segments and fill with controlled low strength material (CLSM). Contractor shall install stable concrete grout plugs at each end of line se to be filled line segments. Grout or concrete plugs shall extend into the pipe a minimum length of 2 feet.

Payment for all work associated with this section shall be paid on a linear foot basis per the nominal diameter of the existing pipe. Payment shall be as stated in the Schedule of Bid Prices under Item 38 (S-49) Abandon Existing 18-Inch Sanitary Sewer Mainline. Payment shall represent full compensation for all labor, equipment, and materials necessary to fill line segments indicated on the construction plans and meet the requirements of this section.

#### S-50 BYPASS PUMPING

This project provides reconstruction of active sanitary trunklines. Bypass pumping will be necessary to maintain sanitary sewer service during construction and isolate line segments under construction. The Contractor shall submit a bypass pumping plan(s) to the City for approval. Bypassing plan will need to be approved by the City prior to installation of equipment or to initiating of any pumping. The bypass pumping plan must contain, at a minimum, the following information:

- A plan view of the diversion facilities on a site map, including location of pumps, suction and discharge manholes, and layout of discharge piping (may be included as part of the Staging Area Plan)
- Spill Containment for both sewerage and fueling.
- Pump types, sizes, capacities, fuel capacity, and placement, for both primary and standby pumps
- Diversion pipe size and type
- Design calculations proving the adequacy of the system and selected equipment, including system curves
- Power supplies, including standby power source
- Method of damming the flow
- Pumping strategy, including float levels and staffing plan with names and telephone numbers of the attendants
- Odor control plan
- Noise control plan
- Traffic control plan for bypass piping

Bypass pipe for uplands and roadways shall be watertight HDPE pipe with quick-connect couplings or a City-approved equal. In areas where the bypass pipe is located in wetland or other sensitive areas, continuous fused-joint HDPE pipe is required. Quick-connect couplings may be approved by the engineer in wetland or other sensitive areas if secondary containment is provided to capture leaks or spills at the joints. Prior to being put into service, all bypass pipe shall be hydrostatically tested to a pressure of 50 psi or twice the maximum operating pressure, whichever is greater.

The Contractor shall supply a pumping system of appropriate capacity to manage and convey all existing flow conditions, plus additional flows that may occur either during or following wet-weather events.

Flow Range Table	
Scenario	Flow (gpm) – 18” Pipe
5-Year Peak Wet-Weather	3200
Average Summer Flow	800
Anticipated Peak Flow during Construction	1600

The Contractor shall maintain a backup pump(s) of equal capacity and configured such that the backup pump(s) operates automatically in the event of a failure of the primary system and initiates an autodialer call-out to the Contractor upon startup. The pump system shall include noise attenuation rated at 59 dB at 7 meters while operating at full load.

The Contractor shall set up pumps as far away from residential dwellings and businesses as the site conditions allow to minimize disturbance to property owners and to avoid relocation due to property owner complaints. Individual private sewer laterals must be bypassed at all times. No interruption or loss of sewer service will be allowed at any time.

The Contractor shall provide continuous (24-hours, 7-days per week) monitoring by a designated pump tender during all pumping operations. The pump tender shall have demonstrable ability and knowledge of the pumping system to maintain continuous operation and make repairs and/or pump replacement if required. Overnight bypass pumping operations shall be configured in a manner so that the backup pump operates automatically in the event of a failure of the primary system and initiates an autodialer. An emergency spill kit shall be on site at all times. The Contractor shall immediately contact City on-call emergency personnel at 503-681-3600 and the City’s project inspector if the Contractor experiences a sewer spill or believes that an unexpected circumstance may lead to a pumping system failure and subsequent spill. A spill containment pad is required for all gasoline or diesel-powered pumps or generators.

In the event of a sanitary sewer overflow or sewer backup resulting from any construction activity, including but not limited to a failure of the bypass pumping system or damage to an existing sewer, the costs of all fines imposed by the Oregon Department of Environmental Quality (DEQ) or other regulatory agencies, cleanup, repair to damaged public and personal property, inconvenience expenses, and any additional direct or indirect expenses shall be the sole responsibility of the Contractor.

All bypass pumping shall meet the requirements of this section and General Conditions, Chapter 19, Sections 19.4.2 through 19.4.4.

Payment for all work associated with this section shall be on a lump sum basis as stated in the Schedule of Bid Prices under Item 39 (S-50) Bypass Pumping. Payment shall represent full compensation for all labor, equipment, and materials necessary to perform the requirements of this section.

#### S-51 SHAFT EXCAVATION SUPPORT

Add the following to the end of the section 12.4.10 of the General Conditions and Standard Specifications for the excavation support of the launching and receiving shafts to be used for the SW Tualatin-Sherwood Road trenchless crossing:

A. Site Conditions: Geological and hydro-geological conditions are presented in the Geotechnical Data Report (GDR). The Contractor shall make its own interpretations, deductions and conclusions as to the nature of the materials to be excavated, the difficulties of making and maintaining the required excavation, and the difficulties of doing any other work affected by geotechnical conditions, and shall accept full responsibility thereof. For the purposes of bidding the Work and planning means and methods for the excavation support systems, Contractor shall assume the following:

1. Boulders will be present and may require additional effort to remove and install shaft excavation support systems.
2. Groundwater and other sources of water will be present in the excavations.

B. Design Criteria:

1. The Contractor shall have sole responsibility for sizing the shaft excavations required for launching and receiving shafts within the section of the sanitary sewer to be constructed by trenchless construction methods, subject to any limitations due to existing utilities and other site constraints indicated on the Plans. The size of the excavations shall provide adequate space for the Contractor's selected methods of construction.
2. The Contractor shall design the excavation support system in accordance with OR-OSHA, the Oregon State Labor Code and other applicable codes and safety requirements. The standards of design referred to in the Labor Code shall be those of OR-OSHA. Design each member or support element to support the maximum loads that can occur during construction with appropriate safety factors.
3. Locate and size shaft excavations to minimize conflicts with and damage to existing utilities. Select excavation and support methods and design the

support system to control ground movements and protect any adjacent facilities and utilities from damage. Relocate utilities that conflict with shaft and connecting pipeline excavations, as approved by the City.

4. Design shaft excavation support system with full face contacts and supports to the sides of excavation to prevent movement and weakening in adjacent soils, to withstand lateral earth pressures, highway embankment loads, groundwater loads, bottom heave, equipment loads, applicable traffic and construction loads, thrust block reactions, and other surcharge loads, and to allow safe installation of the trenchless casing and pipeline construction without excessive movement or settlement of the ground surface, and to prevent damage to adjacent structures, roads, utilities and other improvements.
5. Design break out framing and suitable launching seals, ground improvement and/or ground treatment provisions to maintain excavation support and to prevent groundwater inflow or loss of ground when breaking out of or into shaft excavations.
6. Provide a groundwater control system for each shaft in accordance with Special Provision S-38.
7. Acceptable excavation support methods include the use of structural steel wales and struts, liner plates, soldier piles and lagging, trench boxes, and slide rail.
8. The geotechnical exploration results for the subsurface soil and groundwater conditions at the site are presented in Geotechnical Data Report (GDR). The Contractor shall make its own interpretations, deductions and conclusions as to the nature of the materials to be excavated, the loading conditions for design of temporary shoring systems, the difficulties of making and maintaining the required excavations, and the difficulties of doing any other work affected by geotechnical conditions, and shall accept full responsibility thereof.

C. Qualifications:

Excavation support systems shall be designed by a Civil or Structural Engineer registered in Oregon who has a minimum of five years experience in the design of earth retaining structures.

D. Submittals:

Provide a shaft excavation support plan including the following.

1. Name, qualifications, and resume of person responsible for excavation support system design.
2. A site plan for each shaft excavation, drawn to scale, indicating the staging area limits, shaft dimensions, site access provisions, site development details, traffic control details, fencing limits and gate locations, and the locations of cranes, trailers, support facilities, spoil handling and loading, and other plant and equipment. Include layout within the launching shaft and receiving shaft including details such as excavation support penetrations, thrust block, jacking frame, and main jacks. Also include shaft site drainage and groundwater control measures including details for measures to control, treating, handling and disposing of surface water runoff, groundwater, and construction water removed from the shaft and trenchless crossing excavations.
3. Shop drawings and design calculations for each shaft excavation indicating arrangement of supports, sizes, construction methods and equipment, support installation procedures, and construction sequence for proposed support system(s). Indicate description, sizes, shapes, and material specifications for all support elements. Calculations shall include estimates of likely deflections or deformations of the support system and maximum tolerable values. Calculations for launching shaft shall also apply the anticipated jacking loads to the thrust restraint system, and indicate resulting stresses and deflections applied to the shaft. The drawings and calculations shall be prepared and signed by a Civil or Structural Engineer registered in Oregon.
4. Break-in/Breakout plans indicating support installed to maintain support and stability of the shaft excavation when breaking out of launching shaft and when breaking into receiving shafts. Provide details of launching seals at shaft excavation shoring where required.
5. Quality control plan that describes materials testing requirements, certifications, and excavation monitoring provisions.
6. A Deflection and Settlement Control Plan to protect existing facilities, utilities, structures, roadways and embankment, newly installed pipeline, and other improvements from damage due to horizontal deflection and vertical settlement resulting from excavation and support. Include specific methods and procedures to be used to minimize ground movement. Include procedures for monitoring of surface movement and settlement, ground control procedures, grouting plans, and specific procedures for monitoring existing facilities for damage. Include layout of settlement monitoring points and monitoring provisions beyond what is already required by the Contract Documents.

7. Plan addressing materials handling, stockpiling, and disposal for excavated materials.
8. Plans indicating shoring removal, shaft backfill, and site restoration details.

E. Quality Control:

1. Tolerances:
  - a. Location of the excavation supports is within 3 inches of that shown on the working drawings.
  - b. No portion of the excavation support system element shall conflict with the limits of the permanent facilities as indicated on the Drawings.
  - c. Verticality of sheet piles is within 1.5 percent of the total height of the wall.

F. Materials:

1. Materials for excavation support systems may be new or used, provided they are sound and free from strength-impairing defects.
2. Contractor's Professional Engineer shall specify materials and products appropriate to their design. Such materials and products shall be compatible with the construction specified in the Contract Documents.

G. Shaft Excavation and Support:

Size and locate shafts and their work areas, so as to minimize interference with vehicular and pedestrian traffic. Provide traffic control in accordance with accepted submittals.

Before beginning construction at any location, adequately protect existing utilities, structures, trees, shrubs, and other existing facilities. Relocate any existing utilities, as necessary, and in accordance with utility owner's requirements. Design excavation support systems to minimize deformations and ground movements that could damage adjacent utilities. The repair of or compensation for damage to existing facilities shall be at no cost to the City.

Commence with shaft excavations only after submittals have been reviewed and approved. Conduct all shaft construction work, including excavation, shoring, temporary facilities, materials storage, and construction traffic within any construction easements established for the project. All work shall be performed in accordance with applicable permits.

Construct fencing with locked gates, lights, and signs around the shaft excavations as necessary to control vehicular and pedestrian traffic and to provide for public safety. Maintain access to properties, driveways, and for fire trucks as indicated on the Plans.

Perform shaft excavations using hand excavation equipment, backhoes, clam shells, or other mechanical excavation equipment. Dispose of excavated materials properly in accordance with the applicable requirements. Install dewatering systems specified in Special Provision S-38 at the launch and receiving shafts to prevent groundwater inflow and flowing soils into the shafts.

The excavation support systems shall be installed to the lines and elevations shown on the approved submittals. No component of the support system shall infringe on the minimum dimensions of any permanent structure shown on the Plans.

Support ground immediately following excavation. Do not proceed with excavation to the next level until bracing has been installed and tightly blocked or shimmed to provide proper support of the excavation. All supports shall be installed tight against the excavation to provide positive support and any voids between the support system and the excavation shall be filled promptly with sand to minimize ground movements.

Control the impact and vibration from the excavation support installation to prevent damages to existing surface features, facilities, completed work, or adjacent property.

If caving or sloughing of soils occurs, or if adjacent pavements, utilities and facilities become damaged from the shaft excavation, Contractor shall immediately stop work and fill the voids created by caving or sloughing. Prior to continuing excavation, modify means and methods to prevent further damage to adjacent pavement or infrastructure.

Contractor shall be responsible for the replacement or restoration of damaged pavement, pavement base rock, utilities, and other facilities caused by not adequately supported shaft excavations.

Install excavation monitoring provisions as indicated on the accepted submittals. Monitor performance of excavation support system for both horizontal and vertical deflections daily during excavation, and at intervals not to exceed seven days following the completion of excavation work. If monitoring data indicates that deflections may exceed estimated values, increase frequency of monitoring as required by the Engineer. If settlement or deflections of supports indicate that the support system requires modification to prevent excessive movements, redesign and resubmit revised shop drawings and calculations at no additional cost to the City. Monitor overhead clearance envelope in vicinity of power lines.

#### H. Removal of Support System:



All excavation support elements, including sheeting, wales, struts, and shores that can be safely removed shall be removed from the excavation prior to restoration. Sheeting, shoring, and bracing shall be left in place only if approved by the Owner's Representative.

Remove excavation support in a manner that will maintain support and prevent movement of adjacent soils as excavation is backfilled. Do not remove excavation support until support can be removed without damage to existing surface features, facilities, completed work, or adjacent property.

All voids created by the removal of the support system shall be immediately filled with crushed rocks or CLSM as approved by the Engineer. The support system removed from the excavation shall remain the property of the Contractor and shall be removed from the site. Restore surface as specified in S- 52 Refuge and PGE Property Restoration.

Payment for all work associated with this section shall be on a lump sum basis, including removal of boulders up to 28-inch diameter, as stated in the Schedule of Bid Prices under Item 40 (S-51) Launching Shaft Installation, Item 41 (S-51) Receiving Shaft Installation. Payment shall represent full compensation for preparing and submitting shoring designs, furnishing and installing and removing shoring systems, shaft excavation and backfill, shaft excavation monitoring, handling and disposal of excavated materials, fencing, groundwater and surface water handling and disposal, and all other incidental work to develop, operate, and maintain the excavation site during construction

## S-52 TRENCHLESS CROSSING INSTALLATION

The work specified in this section includes requirements for installing a casing and a carrier pipe using trenchless methods for a sanitary sewer line crossing SW Tualatin-Sherwood Road. Allowable trenchless methods include auger boring with steerable head and pipe ramming. The casing is required to be installed to protect the pipeline beneath SW Tualatin-Sherwood Road. Contractor is solely responsible for means and methods selected for the trenchless casing installation.

### A. Definitions:

1. Auger Boring: Auger boring is a technique that involves installing a casing by jacking it into ground from a launching shaft, while simultaneously excavating the face of the ground with an auger inside the casing.
2. Backfill Sand: Installation of sand to completely fill the annular space between the carrier pipe and casing.
3. Boulder: Rock having a maximum orthogonal dimension greater than 12 inches and an unconfined compressive strength of up to 60,000 pounds per square inch.

4. Carrier Pipe: Service pipeline placed within the Casing.
5. Casing Pipe: Steel pipe installed to support the ground within which the Carrier Pipe is later placed.
6. Casing Spacers: Fabricated components for positioning the carrier pipe inside the casing. Commonly contains wheels or skids to aid in the carrier pipe placement and positioning.
7. Caving: The removal of soil or material located beyond or outside of the Casing (Casing outside diameter) by the excavation equipment resulting in a void or zone of lower density soil that has the potential to collapse and cause settlement or heave.
8. Cobble: Rock having a maximum orthogonal dimension between 3 and 12 inches and an unconfined compressive strength of up to 60,000 pounds per square inch.
9. Contact grouting: injecting grout to fill the annular void outside the jacked casing pipe.
10. Dewatering: Any system of wells and pumps used for the express purpose of lowering the groundwater below a required elevation or removing groundwater from an excavation.
11. Flowing Ground: Material that advances like a viscous fluid into the heading when left unsupported. In trenchless installations below the groundwater table, when seepage develops at the working face, raveling or running ground is transformed into flowing ground. Flowing ground differs from running ground in that it invades the tunnel not only from above and from the sides, but also through the bottom. If the flow is not arrested, it continues until the tunnel is completely filled. Silt, sand, and gravel below the groundwater table without significant cohesion will exhibit flowing ground behavior.
12. Lost Ground: Loss or removal of material in excess of that replaced by the Casing including ground that runs, flows, pipes with groundwater inflows, and raveling creating voids or softened or loosened ground outside of the Casing. Lost Ground also includes volume change associated with stress change and convergence.
13. Lubrication: A bentonite slurry or polymer mixture injected to reduce friction between the Casing and the in-situ soil during the operations.
14. Obstruction: See article R of this special provisions section.

15. Overcut: Determined as the difference between the maximum diameter created by the cutting shoe or overcut band and the outer diameter of the Casing divided by two.
16. Pipe Ramming: Pipe ramming is a method of inserting a steel casing through the ground by means of ramming using a pneumatic hammer.
17. Raveling Ground: Soil or rock which gradually breaks up into chunks, flakes, or angular fragments when left unsupported. For a material to be raveling, it must be moderately coherent and friable, or discontinuous. Materials exhibiting this behavior include fine moist sand; sands and gravels with clay binder; stiff, fissured clays; friable (weak) rocks; and jointed rocks.
18. Running Ground: Soil which will invade the tunnel until a stable slope is formed at the face when left unsupported. Stand-up time is zero or nearly zero. Running ground consists of dry, granular materials such as clean, medium to coarse sands and gravels above the groundwater level.

B. Reference Documents and Standards:

1. Reference documents and standards:
  - a. American Association of State Highway and Transportation Officials (AASHTO) LRFD Bridge Design Specifications, 6th Edition
  - b. American Society for Testing and Materials (ASTM): A36 – Standard Specification for Carbon Structural Steel
  - c. American Welding Society (AWS): D1.1 – Structural Welding Code

C. System Requirements: Trenchless casing installation equipment shall be capable of developing sufficient torque and/or thrust to advance the casing over the design length indicated on the Plans, and be compatible with the subsurface conditions. In addition, the following design criteria shall be followed:

1. Casing shall be steel pipe and installed as shown on the Drawings. Welded steel pipe or steel pipe with Permalok joints are acceptable casing materials.
2. The casing shall have a minimum diameter as shown on the drawings and has been selected to allow for personnel access for boulder removal. Contractor shall upsize casing as necessary based on the means and methods for the casing installation. Contractor can upsize the casing as necessary based on selected means and methods while also considering ability to maintain line and grade to meet carrier pipe installation tolerances and to improve access for removing obstructions as necessary.

3. Casing thickness has been sized for anticipated earth pressures and live loads (road surcharge loads). Contractor is responsible for increasing the thickness for installation loads as necessary based on the Contractor's means and methods.
4. Size wall thickness such that jacking and/or ramming loads do not exceed 50% of the yield stress of the casing.
5. Casing shall be constructed to prevent any leakage from the casing throughout its length under the highway embankment.
6. The design grade of the carrier pipe for the gravity flow sanitary sewer is indicated on the Drawings.
7. Provide copies of all required permits that are not provided by the Owner prior to beginning work.
8. Advance each casing segment forward in such a way as to provide complete and adequate ground support at all times.
9. Control settlement and heave above the casing to less than one (1) inch at the ground surface.
10. Develop a uniform distribution of the thrust and/or ramming forces around the circumference of the casing.
11. Maintain a minimum factor of safety of 2.0 between the casing compressive strength and the maximum thrust and/or ramming forces imparted by the jacking equipment and/or ramming hammer operating at 100% capacity.
12. Make provisions to deliver lubricant through a port located behind the casing cutting shoe.
13. The thrust block shall be constructed perpendicular to the proposed casing alignment and shall be designed to withstand the maximum jacking pressure to be used, with a factor of safety of at least 2.0, without excessive deflection or displacement.
14. Install dewatering systems consisting of wells and other means at the launch and receiving shafts to prevent groundwater inflow and flowing soils into the shafts (see S-38 Dewatering special provision for shaft dewatering)
15. Utilize means and methods to support the tunnel face and to prevent soil running or flowing into the casing. Where a soil plug is utilized, the plug shall be designed to allow material to enter the casing as the casing is advanced.

The plug shall not advance with the casing as the casing is advanced into the ground.

16. Design a casing spacer system that fully supports the carrier pipe, protects the pipe from flotation, movement, and damage during backfill placement; and allows for installation of the carrier pipe in accordance with specified tolerances. Design casing spacers and spacing to support the weight of the carrier pipeline filled with water.
17. Backfill Sand: The annular space between the carrier pipe and the casing shall be backfilled with sand.

D. Site Conditions: Geological and hydro-geological conditions are presented in the Geotechnical Data Report (GDR). The Contractor shall make its own interpretations, deductions and conclusions as to the nature of the materials to be excavated, the difficulties of making and maintaining the required excavation, and the difficulties of doing any other work affected by geotechnical conditions, and shall accept full responsibility thereof. For the purposes of bidding the Work and planning means and methods for waterline trench excavation and excavation support, Contractor shall assume the following:

1. The Contractor shall anticipate encountering boulders along the trenchless alignment that will need to be considered in the selection and operation of the tunneling equipment.
2. Groundwater and other sources of water will be present in the excavations. The presence or absence of groundwater shall not be considered a differing site condition.

E. Qualifications: Provide resumes, a description of relevant experience, and contact information for Owners or Engineers that can verify the specified qualifications for each of the following entities and key individuals. Upon approval, Contractor shall not substitute or replace any entity or individual without express written approval from the Engineer.

The Contractor responsible for the trenchless casing installation shall have a minimum of five (5) years history and experience in trenchless casing installation and pipeline construction, and shall have constructed and satisfactorily completed a minimum of three (3) projects of similar (or greater) size and scope in similar ground conditions within 5-years of awarding this Project.

Provide a full-time superintendent and one or more operating engineers who are experienced with the pipe installation method and the equipment the Contractor will use. The Superintendent and Operating Engineer shall have successfully completed a

minimum of five (5) projects of similar length and diameter using the proposed method. At least one shall have been installed in the past year.

Use certified welders qualified to AWS Section D1.1 Section 4 for the position, process, and pipe diameter on the job.

The surveyor for line-and-grade control and surface heave shall be a licensed Surveyor registered in the state of Oregon with prior experience in similar Work and a minimum of three years of experience in underground construction.

- F. Tolerances: The casing shall be installed to allow the carrier pipe for the sanitary sewer to conform to the design grade and elevations as shown on the drawings while maintaining the required minimum clearance between the casing and the carrier pipe. The carrier pipe shall maintain a constant grade to maintain gravity flow with no bellies or sags in the profile. The carrier pipe shall be installed to within 6 inches of line.
- G. Submittals: Provide a Trenchless Crossing Installation Plan to demonstrate that the proposed personnel, equipment, materials, procedures, and designs are in accordance with the requirements of the Contract. Review by the Engineer shall not be construed as relieving the Contractor of its responsibilities under this Contract. Details in the Trenchless Crossing Installation Plan shall include the following:

The Contractor shall submit qualification documents as specified above. Submit the qualifications within 7 days after receiving NTP. The other submittals listed below will not be accepted for review until the qualifications have been approved. No trenchless casing installation works shall be performed nor materials or equipment procured prior to approval of the qualifications.

- 1. The Contractor shall submit the necessary certifications and design drawings for the steel casing to include, as a minimum the following items:
  - a. Certification: Provide certified copies from the pipe manufacturer that the pipe conforms to the requirements of the specification.
  - b. Drawings and details showing pipe dimensions, wall thickness, location of grout ports, grout port and plug details as applicable for each type of steel pipe.
  - c. Details related to field welding of steel casing. Include shop drawing, welders' license, and welding schedule.
  - d. Casing pipe shall be clearly marked with the manufacturer's name, manufacturer's job number, customer name, OD, wall thickness, and weight per foot.
  - e. Verification that steel casing can withstand jacking loads.

2. The Contractor shall submit a work plan to include, as a minimum, the following items:
  - a. A detailed description of the selected trenchless method, equipment and procedures to be utilized in completing the work, launching and receiving shaft locations, casing pipe details, and traffic control provisions. Include manufacturer's literature describing in detail the trenchless method to be used including machine type, spoil removal system, guidance and steering system, and provisions for injecting pipe lubricants. Provide shop drawings that include configuration of soil cutting shoe on lead casing and overcut. Provide shop drawings that include geometry, grade of materials, and dimensions of the jacking system, including all steel framing, welds, bolts, braces, hydraulic jacking equipment, lubricant equipment, and controls. Dimension drawings to scale and show the spatial relation of the complete fabrication with respect to the casing and launching shaft and profile.
  - b. For pipe ramming method, include anticipated required hammer operating pressure, air volume requirements, and anticipated hammer strokes per minute for operating capacities of 25%, 50%, 75% and 100% of maximum operating capacity. Provide an estimate of the maximum ramming force expected to complete the casing installation and verify that the installation equipment has sufficient energy to complete the drive shown on the drawings. Provide details of hammer-casing connection to optimize driving energy transfer and to prevent damages to the casing pipe.
  - c. A description of the guidance, alignment control, and steering systems. Provide manufacturer's literature, drawings showing set up and support provisions, and other details for the systems. Confirm that these systems can achieve the required pipeline line and grade within the specified tolerances.
  - d. Description of methods and capabilities for controlling ground conditions and preventing loss of ground at the tunnel heading during launch, during tunnel excavation, and during reception.
  - e. Provide an estimate of the maximum jacking force expected to complete the drive and verify that the installation equipment has sufficient energy to complete the drives shown on the drawings.
  - f. Details of lubrication system and pipe lubricants to be used including manufacturer's literature.

- g. Contact grouting procedures including equipment to be used, injection pressures, and cut off requirements.
  - h. Provide shop drawings showing details on the preparation and placement of the shaft invert, and details of the wall seal that include details on how the wall seal will be secured to the shaft wall to provide sealed ingress and egress points for the casing. Provide shop drawings showing the equipment layout in the launch shaft.
  - i. Details of mucking system, soil disposal methods, and soil disposal location.
  - j. A detailed groundwater control and discharge provision for water originating through the shaft shoring system and for water originating from inside the casing.
  - k. Details of lighting, electrical, and ventilation systems when personnel must enter the casing.
  - l. A safety plan for trenchless operations.
  - m. Manufacturer's warranties, certificates of compliance, and guarantees that all materials incorporated into the work meet or exceed the requirements of the Plans and Specifications.
  - n. Provide a planned schedule for the work. Include a narrative describing the critical path; planned work sequence, durations, and advance rates; and planned work hours, number of shifts per day, number of days worked per week, crew size and make-up.
  - o. Best management practices to prevent environmental and erosion impacts from machine breakdown, leaking, and construction activities.
3. Prepare a detailed contingency plan that outlines contingency procedures to be employed in the event of the following:
- a. Obstruction or impediment encountered.
  - b. Means and methods to maintain specified line and grade tolerances should casing steering be insufficient to meet the specified requirements.
  - c. Forces to advance the casing exceed the system thrust and/or ramming force capacity.



- d. Out of tolerance ground movement and settlement.
  - e. Additional dewatering efforts at highway median and other locations along casing alignment to prevent groundwater inflow and flowing soils into casing, and at shaft locations when groundwater inflows exceeding dewatering system capability or flowing soils into shafts.
  - f. Best management practices to correct and remediate environmental and erosion impacts from machine breakdown, leaking, and construction activities.
  - g. Instable tunnel heading condition, over-excavation and/or running/flowing ground.
  - h. Equipment breakdowns.
  - i. Contaminated soil is encountered during the mucking operations to clean out the casing.
4. The Contractor shall submit:
- a. Design calculations demonstrating that the proposed casing pipe is capable of supporting the maximum stresses to be imposed on the pipe during installation and subsequent applications. The calculations shall take into account maximum ground and hydrostatic loads, ramming and jacking forces, live loads due to traffic, and any other loads that may be reasonably anticipated. All loads shall be shown and described.
  - b. Design calculations which demonstrate that the trenchless installation method will not damage the shaft excavation support system and that the excavation support system has adequate strength to handle anticipated jacking loads.
5. The Contractor shall submit a carrier pipe installation plan describing the proposed installation procedures and methods for installing the carrier pipe inside the casing.
- a. Describe methods, procedures, and equipment for installing carrier pipe inside the casing to the line and grade shown on the plans, and methods for backfilling the annular space between the carrier pipe and the casing with backfill sand. Include details of bulkheads at each end of casing to contain sand and prevent groundwater from entering the casing.

- b. Casing backfill sand materials data, and other requested information.
  - c. Shop drawings and manufacturers literature for casing spacers to be utilized.
6. The Contractor shall submit the following on each day that measurements are made:
- a. Survey notes, auger boring or pipe ramming records, and shift reports indicating thrust force, rate of advance, line and grade deviation, roll, inclination, steering adjustments, volume of lubricant injected, muck quantities removed and other pertinent information. Submit reports the following day after each shift worked.
  - b. For Pipe ramming operation, record additional information of hammer strokes per minute and hammer operating capacity in cubic feet per minute.
  - c. Quality assurance reports for each casing pipe indicating wall thickness, outside diameter, length of opposite sides, end squareness of each end, straightness, materials testing data, welding procedures, and certifications from the manufacturer indicating that each casing pipe section complies with the specified requirements. All welding procedures shall be either pre-qualified in accordance with ANSI/AWS D 1.1 for full penetration welds, or qualified by testing, as required.
7. Trenchless Casing Installation Equipment: The trenchless installation machine shall be manufactured by a company that specializes in the design and fabrication of this type of equipment. The machine shall satisfy all of the following general requirements:
- a. The machine shall be capable of advancing through the geologic conditions described in the Geotechnical Data Report including boulders and variable ground behaviors.
  - b. The leading section of the casing pipe shall be equipped with a cutting shoe. Excavation shall occur within the casing and not in advance of the heading.
  - c. Soil removal system shall be capable of being operated in a manner which will prevent loss of ground during installation

- d. The machine shall have the ability to maintain the Contractor designed soil plug length in the casing. It shall also have the ability to adjust plug length as dictated by soil or groundwater movement through the casing.
- e. The machine shall have the ability to maintain line and grade within the specified tolerances during the casing installation.
- f. A pipe lubrication injection system shall be provided to inject pipe lubricants continuously as the pipe is advanced to minimize the jacking and/or ramming forces.
- g. Amount of overcut shall be compatible with the soil conditions, stiffness characteristics of the casing pipe, and joint system at the designed maximum jacking and ramming loads. The overcut of the machine shall not exceed the outside diameter of the casing by more than 1-1/2 inches.
- h. For pipe ramming operation, the hammer-casing connection shall be selected to optimize driving energy transfer and to prevent damages to the casing pipe.

#### H. Casing Pipe

- 1. Steel Casing: Pipe shall conform to the requirements of ASTM A36, ASTM A515, grade 60 or ASTM A572, grade 42.
  - a. Steel casing shall have minimum yield strength of 35,000 psi, and a minimum tensile strength of 60,000 psi.
  - b. Steel casing shall have a minimum thickness of 0.5-inch and be upsized as necessary for Contractor means and methods.
  - c. Steel casing shall be completed with grout ports.
- 2. Casing Section Joints
  - a. Joints are to be butt-welded in the field. Where butt-welded, prepare each end of the casing for butt-welding by providing a 1/4-inch by 45-degree chamfer on the outside edges.
  - b. Permalok joints shall be mechanical press fit type T-7 or approved equal.

- c. Permalok connectors shall be full penetration butt-welded square to the ends of pipe sections, or profiled directly on the finished sections, at the discretion of the manufacturer.

3. Grout Ports

- a. Steel casing shall be furnished with 2-inch minimum diameter grout ports, using Schedule 40 pipe (ASTM A53) with threaded plugs.
- b. Locate ports near the crown and at both sides halfway up between the invert and spring line as shown on the Drawings.
- c. Provide one set of 3 grout ports per casing section or 10 feet on center whichever results in a close spacing as shown on the Drawings.

- I. Lubricant: Lubricant shall conform to NSF/ANSI Standard 61.
- J. Carrier Pipe: See Plans and these special specifications for requirements of the carrier pipe.
- K. Casing Spacers: Utilize casing spacers that fully supports the carrier pipe, restrains the carrier pipe from rotating during installation in casing; maintains the grade of the sanitary sewer within specified tolerances; protects the pipes from flotation, movement, and damage during backfill placement; and allows for installation of the carrier pipes in accordance with specified tolerances over the lengths shown on the Plans. Casing spacers must be able to support the combined weight of the carrier pipe filled with water.

Spacers shall be a minimum of 12 inches wide and shall be constructed of heat-fused plastic coated galvanized steel with a built up PVC or EPDM rubber lining. Spacers shall be multi-segmented to attach firmly around the pipeline. Spacers shall be fabricated for a centered and restrained configuration of the carrier pipe. Spacer runners shall be made of glass reinforced polymer. Spacer risers shall be sized to provide for clearance of the carrier pipe bell couplings or retainer glands with not more than 1-1/2 inches of clearance from the top skids to the inside top of the casing. Each casing spacer shall have a minimum of four (4) spacer riser and runner assemblies with a minimum of two (2) risers on top and two (2) risers on the bottom. At least one (1) casing spacer shall be installed at each carrier pipe joint. Additional casing spacers shall be installed such that the spacer spacing does not exceed eight (8) feet unless closer spacing is recommended by the casing spacer manufacturer. Insulators shall be sized to fit and attach to the carrier pipe material including any identified special coatings without damage. Casing spacers shall be M-12 Series, as manufactured by Calpico, Inc., CSC-12 Series as manufactured by CCI Pipeline Systems, or approved equal.

L. Casing Backfill Sand: Furnish sand for filling the annular space between the carrier pipe and the casing pipe. See Chapter 19.6.3.3.

M. Contact Grouting Equipment:

1. Equipment for mixing and injecting contact grout shall be adequate to satisfactorily mix and agitate the grout and force it into the ports, as required, in a continuous flow at the desired pressure.
2. Two pressure gauges shall be provided, one at the grout pump and one at the collar of each port being grouted. The accuracy of the gauges shall be periodically checked with a calibrated pressure gauge.
3. Suitable stop valves shall be provided at the collar of each port for use in maintaining pressure as required, until the grout has set.
4. The grouting equipment shall be provided with a meter to determine the volume of grout injected. The meter shall be calibrated in cubic feet to the nearest one-tenth of a cubic foot.
5. The grouting equipment shall be maintained in satisfactory operating condition throughout the course of the work to ensure continuous and efficient performance during grouting operations.

N. Operations: Trenchless casing installation shall not begin until the following have items have been completed:

1. All required submittals have been provided and accepted.
2. Launching and receiving shaft excavations and support systems have been completed in accordance with accepted submittals and the requirements S-51 Shaft Excavation Support.
3. Dewatering systems have been installed and groundwater level has been drawn down to prevent groundwater inflow and flowing soils into the pits.
4. Pre-construction surveys have been completed and the results submitted.

Comply with all Permit requirements, environmental protection requirements and hours of operation regulations of the local jurisdiction. Install all BMP's to prevent environmental or erosion impacts including spillage and oil leakage containment systems at the Launch Shaft and maintaining on-site oil absorbing materials, straw wattles and/or biobags for spill removal.

Conduct all operations such that trucks and other vehicles do not create a dust or noise nuisance in the streets and adjacent properties. Promptly clean up, remove, and

dispose of any spoil spillage. Provide traffic control in accordance with accepted submittals.

Excavate within the easements and right-of-way to the lines and grades indicated on the Drawings.

- O. Casing Handling and Welding: Utilize a sling or other appropriate means to lift and protect the steel casing during handling. Permalok connections shall be examined at time of shipment and shall be free of injurious defects or that section shall be rejected and repaired prior to shipping

Connect the casing pipe using Permalok casing or continuous butt-welded joints capable of developing the strength of the pipe. For pipe ramming, the Permalok joints shall be pushed together and tack-welded all the way around prior to the ramming operation.

- P. Auger Boring Operation: Prior to starting auger boring operations, survey the location and orientation of the guide rails to ensure they are on the proper line and grade and check to see that they are properly supported. Set the guide rails in the launching shaft carefully and check to ensure correctness of the alignment, grade, and stability. Guide rails shall be securely anchored to prevent movement or shifting during the work.

Casing sections shall be jacked into position following the design line and grade of the pipeline without damaging the casing pipe. In the event a section of casing is damaged during installation, the pipe shall be removed and replaced. Other methods of repairing the damaged pipe may be used, subject to approval by the Engineer.

Provide a lubrication system, and inject pipe lubricants through injection ports as necessary, to minimize pipe friction. Pipe lubricants shall be injected continuously as the pipe is advanced. The volume injected shall not be less than that required to fill the annular void space outside the pipe. Inject greater volumes as required to minimize jacking forces.

The auger boring machine shall be operated so as to control both surface heave and loss of ground during auger boring. Control the advance rate and monitor the volume of material excavated and adjust advance rate, as required, to avoid loss of ground, over excavation, and surface heave. The Contractor shall be responsible for monitoring and recording any movements associated with auger boring and making any necessary changes in construction methods to avoid loss of ground, over excavation, and surface heave.

If surface settlement or heave exceeds the limits specified, stop advancing the casing pipe and develop a plan to control the surface deformation. Submit the plan to the Engineer for review and do not proceed without the Engineer's approval of the plan.

The Contractor shall repair any damage caused by surface settlement or heave immediately, at no additional cost to the City.

Within 3 days of completing the pipe jacking installation, contact-grout the annular space outside the casing.

Q. Pipe Ramming Operations:

Prior to starting pipe ramming operations, survey the location and orientation of the guide rails to ensure they are on the proper line and grade and check to see that they are properly supported. Set the guide rails in the launch shaft carefully and check to ensure correctness of the alignment, grade, and stability. Guide rails shall be securely anchored to prevent movement or shifting during the work.

Each casing section shall be rammed forward as the excavation progresses in such a way to provide complete and adequate ground support at all times without damaging the casing pipe. In the event a section of casing is damaged during installation, the pipe shall be removed and replaced. Other methods of repairing the damaged pipe may be used, subject to approval by the Engineer.

A hammer frame shall be positioned to develop a uniform distribution of ramming forces around the periphery of the pipe, and should be aligned and remain aligned with the casing during pipe ramming. If out of alignment, stop pipe ram and properly align the hammer to apply force directly into the casing.

Provide maximal energy transfer to advance the casing. Adjust the hammer-casing connection through provisions of connection pieces, modifications to existing pieces and their alignment, and static compressive thrust through the hammer-casing connection to achieve maximal hammer- casing energy transfer efficiency.

Provide a lubrication system, and inject pipe lubricants through injection ports as necessary, to minimize pipe friction. Pipe lubricants shall be injected continuously as the pipe is advanced. The volume injected shall not be less than that required to fill the annular void space outside the pipe. Inject greater volumes as required to minimize ramming forces.

Operate equipment so as to control both surface heave and loss of ground during pipe ramming. Control the advance rate and monitor the volume of material excavated and adjust advance rate, as required, to avoid loss of ground, over excavation, and surface heave. The Contractor shall be responsible for monitoring and recording any movements associated with pipe ramming and making any necessary changes in construction methods to avoid loss of ground, over excavation, and surface heave.

If spoils are removed from the casing during the drive, maintain a plug of soil in the casing with sufficient length to prevent uncontrolled groundwater and/or soil inflow as

necessary. This plug shall not be removed until the casing is completely in place unless approved by the Engineer.

If surface settlement or heave exceeds the limits specified, stop advancing the casing pipe and develop a plan to control the surface deformation. Submit the plan to the Engineer for review and do not proceed without the Engineer's approval of the plan. The Contractor shall repair any damage caused by surface settlement or heave immediately, at no additional cost to the Department.

R. Obstructions:

If the trenchless operations should encounter an object or condition that impedes the forward progress of the trenchless equipment and casing pipe, notify the Engineer immediately.

Submit a plan to correct the condition, and remove, clear, or otherwise make it possible for the trenchless equipment and casing pipe to advance past any and all objects or obstructions that impede forward progress of the casing.

Upon written notification of the Engineer, immediately proceed with removal of the object or obstruction by means of accessing the front of the casing pipe from within the casing and breaking or removing the obstruction using hand equipment or by other approved methods, as submitted by the Contractor.

The Contractor will receive compensation for removal of obstructions which consist of boulders, wood, or other man made or naturally occurring features larger than 33 percent of the outer diameter of the cutting shoe which cannot be broken up by the cutting tools with diligent effort and that are partially or wholly within the cross-sectional area of the bore.

Payment for removal of obstructions will be based on the unit price bid for obstruction removal provided in the bid form and includes all work required to advance up to 5 feet from initial verification of encountering an obstruction. Multiple obstructions encountered within the 5 feet represent a single obstruction removal event and will be paid as one obstruction removal bid item. However, any removal process that does not allow direct inspection of the nature and position of the obstruction will not be considered for payment.

The Contractor will receive no additional compensation for removing, clearing, or otherwise making it possible to advance past objects consisting of boulders, wood, or other man made or naturally occurring features with maximum lateral dimensions less than 33 percent of the outer diameter of the cutting shoe.

S. Settlement Monitoring:



Prior to casing installation, install surface settlement control points as shown on the Drawings, or as approved by the City. Within roadway surface, install traffic rated steel monuments with access cover to protect installed settlement control points. Use steel of sufficient strength to withstand HS-20 traffic loading. Conduct initial survey for each settlement control point prior to the start of casing installation, and conduct subsequent survey for each settlement control point a minimum of once daily. The settlement survey shall be conducted to a horizontal accuracy of 0.10 feet and elevation accuracy of 0.01 feet. The survey results shall be submitted to the City daily.

Protect and maintain instruments throughout the duration of monitoring. Provide protective barriers around instruments in construction areas.

T. Spoil Transport and Disposal:

Transport and dispose of all excavated materials properly away from the construction site in accordance with all applicable requirements. Only use the disposal sites identified in the accepted submittals for muck disposal.

U. Control of Line and Grade:

The City will establish the benchmarks indicated on the Plans. The Contractor is responsible to verify these benchmarks at the beginning prior to start of construction and report any errors or discrepancies to the Engineer.

After confirming that all established benchmarks are correct, use these benchmarks to furnish and maintain all reference lines and grades for the trenchless installation. The Contractor shall use these lines and grades to establish the location of the pipe using the submitted and approved guidance system. Submit to the Engineer copies of field notes used to establish all lines and grades and allow the Engineer to check laser set up prior to beginning each trenchless drive. Provide access for the Engineer to perform survey checks of laser and line-and-grade of casing on a daily basis during operations. The Contractor is fully responsible for the accuracy of the work and the correction of it, as required.

Monitor the line and grade, at least once in every 20 feet of installation length and report the results to the Engineer. Stop work if the line or grade has, or is expected to, prevent the installation of the carrier pipe to the design line and grade. Submit a proposed solution to the Engineer. Do not resume work until the corrective measures are approved.

Where the casing installation will prevent the installation of the carrier pipe to the specified tolerances, correct the installation, including, if necessary, redesign of the pipe or structures. All corrective work shall be performed as approved by the Engineer at no additional cost to the City.

V. Carrier Pipe Installation:

Install carrier pipes in accordance with specified tolerances and approved submittals. Remove all loose soil and foreign material from casing. Provide casing spacers, strapping, blocking, guide rails, rollers, bulkheads, or other approved devices as required to prevent rotation, flotation, movement, or damage to the carrier pipe during installation and backfill sand placement.

W. Leakage Testing:

Leakage testing of the carrier pipe shall be performed between each manhole. Testing shall be performed prior to the filling of the annular space between the casing and carrier pipelines with backfill sand. Perform leakage testing in accordance with the general conditions.

X. Casing Backfill Sand:

After the installation of the carrier pipe and leakage testing, the space inside the casing outside the carrier pipe shall be filled with clean and dry backfill sand.

Furnish the necessary materials, equipment, hoses, valves, and fittings for the backfilling operation. Construct a minimum 12-inch thick non-shrink grout bulkhead at each end of the casing to facilitate the backfilling operation, contain the backfill sand, and prevent groundwater from entering the casing.

Backfill sand shall be blown into the casing through a pipe or hose. Use appropriate materials to avoid damage to carrier pipe during backfilling. The backfill sand shall completely fill all voids between the carrier pipe and the casing.

Payment for all work associated with this section shall be on a linear foot basis as stated in the Schedule of Bid Prices under Item 42 (S-52) Trenchless Crossing Installation. The work shall include full compensation for all excavation, controlling alignment and grade, casing and carrier pipe materials, lubricants, disposal of excavated materials and slurry, dewatering, casing pipe contact grouting, installation of the carrier pipe, casing spacers, carrier pipe connections, leakage testing and repair, backfill sand placement, carrier pipe bulkheads, and all other work necessary for the installation of the casing pipe and carrier pipes between manholes. In the case that an obstruction is encountered that stops forward progress of the Casing, a bid item has been included on a lump sum basis for the removal of the obstruction under Item 43-A (S-52). The lump sum payment shall represent full compensation for preparing and submitting plan to remove, clear, or otherwise make it possible to advance past the obstruction, work required to access the front of the casing, work required to remove or break up the obstruction, handling and disposal of obstruction, groundwater control and handling and disposal, and all other work necessary to gain access to the front of the casing and to remove the obstruction. . Each obstruction removal event includes all work required to advance up to 5 feet from initial verification of encountering an

obstruction. Multiple obstructions encountered within the 5 feet represent a single obstruction removal event and will be paid as one obstruction removal bid item.

#### S-53 12-INCH SLIPLINING INSTALLATION

Contractor shall comply with all requirements of city general conditions and standard specifications Chapter 19.

payment for all work associated with this section shall be on a linear foot basis as stated in the schedule of bid prices under item 43 (S-53) 12-inch sliplining installation. The work shall include full compensation for installation of the carrier pipe, pipe support spacers, carrier pipe manhole connections, MH 401NSAN channelizing, testing, annular space backfilling, carrier pipe bulkheads, and all other work necessary for the installation of the carrier pipe between manholes.

#### S-54 EXISTING OUTFALL RESTORATION

Contractor shall comply with all requirements of City General Conditions and Standard Specifications Chapter 14.

Payment for all work associated with this section shall be on a lump sum basis in accordance with City General Conditions and Standard Specifications Chapter 14.7 and as stated in the schedule of bid prices under Item 44 (S-54) Existing Outfall Restoration. The work shall include full compensation for removal of existing storm pipe, final grading, riprap geotextile installation, and riprap placement, and all other work necessary for the restoration of the existing stormwater outfall.

END OF SECTION

**CHAPTER 10**  
**GENERAL REQUIREMENTS**

PART 10

10.1 SCOPE

This Chapter covers the Work necessary for and relating to site maintenance, site conditions and responsibilities, mobilization, progress of construction, protection of property, restoration and cleanup. This Chapter applies generally to and shall be performed by Contractor throughout the term of this Contract.

10.2 SITE SAFETY AND MAINTENANCE

10.2.1 Traffic Maintenance and Safety

Contractor shall comply with all rules and regulations of state and local authorities having jurisdiction regarding the closure of public streets and highways to public traffic. No public road shall be closed to the public except by express written permission of the public agency responsible for the road and applicable fire and police departments. Contractor shall conduct its operations so as to ensure the least possible obstruction to traffic and normal commercial pursuits. Contractor shall comply with all conditions of the applicable road cut permit. Contractor shall submit a traffic plan, if required, for approval by the jurisdiction having authority for the road before beginning construction. No trenching activities within the affected roadway may begin until City receives a copy of the approved road cut permit and traffic control plan.

Contractor shall provide and be responsible at all times for all flaggers, signs and other traffic control devices needed for the project. Contractor shall erect and maintain all barricades, guards, standard construction signs, warning signs, detour signs and the like as necessary to warn and protect the public at all times from injury or damage as a result of the work operations on highways, roads or streets affected by such operations. Once the devices are no longer needed, Contractor shall remove them immediately from the work site.

Upon failure to immediately provide the necessary flaggers or to provide, erect, maintain and remove barricades, lights and standard signs when so ordered, City may, without further notice to Contractor or Contractor's surety, do so and deduct all the costs thereof from any payments due or coming due to Contractor. Nothing contained in this Section shall, however, require that City act in any situation or relieve Contractor of its duties hereunder.

### 10.3 MOBILIZATION

Mobilization consists of pre-construction expenses. These expenses include the cost of preparatory work and operations performed by Contractor such as the cost to move personnel and equipment onto the job site, and the cost of premiums paid on bonds and insurance for the project.

### 10.4 PROTECTION OF PROPERTY

Contractor shall protect stored materials, cultivated trees and crops, landscaping, and other items located adjacent to or in the vicinity of the Project. Property owners affected by the construction shall be notified by Contractor at least 48 hours in advance of the time construction begins. During construction, no person shall be without access to his or her residence or place of business for a period exceeding eight hours, unless Contractor has made special arrangements and obtained consent in writing from the affected persons.

Contractor shall maintain postal service facilities in accordance with the requirements of the U.S. Postal Service. Mailboxes may be moved to temporary locations as designated by the U.S. Postal Service. At the completion of the Work in each area, Contractor shall return them to their original locations and in a condition satisfactory to the U.S. Postal Service.

### 10.5 SITE CONDITIONS AND RESPONSIBILITIES

#### 10.5.1 Profile Elevations

Existing ground profiles were determined from field surveys, which are available for inspection by Contractor at the office of City or upon request.

#### 10.5.2 Underground Utilities

Construction plans provided by City depict existing utilities and structures; discrepancies and/or omissions may exist. Except as otherwise indicated in the Contract, City assumes no responsibility for the accuracy or completeness of this depiction.

#### 10.5.3 Utility Interference Discovered Prior to Construction

Contractor shall perform the following tasks that concern locating utilities prior to commencing excavation work:

- A. Contractor shall contact the Oregon Utility Notification Center to have all utilities within the construction area located in the field;
- B. Contractor shall expose and determine the depth of any utility that could interfere with the improvements; and

C. Contractor shall notify City of all utilities that would directly conflict with the pipeline or improvement.

City shall be responsible for the cost of moving utilities that directly conflict with the pipeline or improvement if the tasks above are completed. The cost of any delay in Contractor's work schedule caused by a utility relocation performed under this Section shall be borne by Contractor.

#### 10.5.4 Utilities Interference Discovered During Construction

If the construction plans indicate that a utility may interfere with the proposed project improvements, Contractor fails to comply with Section 10.5.3, and the utility directly conflicts with the pipeline or improvement, Contractor shall be responsible for the cost of relocating the utility.

The cost of any delay in Contractor's work schedule caused by a utility conflict and relocation performed under this Section shall be borne by Contractor.

#### 10.5.5 Non-conflicting Utilities

Contractor shall be responsible for the cost of working around all utilities that do not directly conflict with the pipeline or improvement, regardless of whether the utility was known to Contractor prior to commencing the excavation work. The foregoing notwithstanding, if such a utility runs within the excavation trench for more than forty feet and substantially interferes with the excavation work, City shall assume responsibility for the additional cost incurred by Contractor in working around the utility.

#### 10.5.6 Sewer Laterals

In the event a sanitary sewer lateral that is connected to an existing structure or pipeline is discovered during the performance of the Work and the lateral is not shown on the plans, Contractor shall notify City and Contractor shall reconnect the lateral to the public line. City shall be responsible for the cost of reconnecting the lateral.

#### 10.5.7 Contractor's Responsibility for Utility Properties and Service

In areas where Contractor's operations are adjacent to or near a utility and any damage to such utility might result in considerable expense, loss, or inconvenience, the Contractor shall suspend work until all arrangements necessary for the protection of the utility have been made by Contractor.

Contractor shall notify the Oregon Utility Notification Center (503-232-1987) at least 48 hours in advance of commencing any excavation work. Before exposing any utility, Contractor shall obtain permission from the utility having jurisdiction

and the utility service provider shall be allowed by Contractor to oversee the operation. Should service of any utility be interrupted due to Contractor's operation, Contractor shall notify the utility service provider and the City immediately. Contractor shall cooperate fully with the authority having jurisdiction in restoring the service as promptly as possible. All costs and damage incurred shall be borne by Contractor.

Utility	Responsible Service Provider	Phone Number
Gas	Northwest Natural Gas	503-226-4211, ext. 212
Water	City of Sherwood	503-265-5722
Sewer	City of Sherwood	503-265-5722
Power	Portland General Electric	503-643-5454, ext. 313
Telephone	QWest	503-246-6699
Telephone	Verizon	800-483-1000

10.5.8 Interfering Structures

Contractor shall protect all existing structures from damage. When existing structures must be removed or are damaged due to construction operations, Contractor shall restore such structures to their original condition. Contractor shall remove and replace small miscellaneous structures such as fences, mailboxes and signposts. Replacement condition shall be as good or better than the original condition.

Contractor shall provide and maintain temporary fences as directed by City to keep pets and livestock out of construction areas. The cost of providing and maintaining temporary fences shall be considered incidental and included in the Contract Price. Temporary fencing shall be installed before starting trench excavation in any area. Livestock shall not be cut off from access to water for more than 8 hours. All temporary fencing shall be removed by Contractor and existing fences restored to their original condition or better before final acceptance of the project.

All poles and wires of whatever nature shall be protected from damage by Contractor. If interfering power poles, telephone poles, guy wires or anchors are encountered by Contractor, Contractor shall notify the affected utility a minimum of 48 hours in advance of construction operations to permit the necessary arrangements with the affected utility for protection or relocation of the interfering structure. All costs related to such protection or relocation shall be borne by Contractor.

When any existing structures or facilities that are intended to remain in place are damaged by Contractor, Contractor shall promptly repair or replace the damaged structure or facility at no additional cost to City.

#### 10.5.9 Field Relocation

If during the progress of construction, Contractor encounters an obstruction other than utilities that affect the placement of the sewer line or improvement, and requires a revision to the Project design, Contractor shall notify City before continuing construction. City shall review the obstruction and make design changes if necessary. The cost of waiting or downtime during field revisions shall be borne by Contractor without additional cost to City if City completes redesign or resolves the conflict within 4 working hours of receiving notice of the obstruction. Unforeseen obstructions encountered as a result of relocations shall not be subjects for claims for additional compensation or time by Contractor to any greater extent than would have been the case had the obstructions been encountered along the original location.

#### 10.5.10 Easements and Permits

Easements will be obtained by City to allow Contractor to work on private property. Copies of the easements are available from City for inspection by Contractor. Contractor shall confine its operations within the construction and permanent easement limits and street right-of-way limits and shall comply in all respects with the terms and conditions of all easements. Any damage to private property, either inside or outside of the aforementioned limits, shall be the responsibility of Contractor.

It is anticipated that all the required easements and permits will be obtained before construction begins. However, should the procurement of any easement or permit be delayed, Contractor shall schedule its Work in such a way that its operations are confined to areas where easements or permits have been obtained or are not required, until such time that the easements or permits have been secured. Contractor shall not be entitled to additional compensation due to delays from the lack of signed easements but shall be entitled to time extensions.

Before final payment will be authorized, Contractor shall be required to furnish City with written releases from property owners where side agreements have been made by Contractor with the property owner or where Contractor's operations have not been kept within the construction right-of-way obtained by City.

Contractor shall obtain all other permits and licenses, and pay any fees connected therewith, having to do with the construction operations.

#### 10.5.11 Land Monuments

Contractor shall be responsible for the preservation or replacement of all existing federal, state, county, city and private land monuments, unless the monuments are within ten feet of the trench center line. City shall reference and flag the land



monuments that are in the construction area. Contractor shall conduct its operation to avoid disturbance of these land monuments.

When such monuments are not within this specified distance and are disturbed or destroyed due to Contractor's operations, Contractor shall be responsible for the cost of replacement of all such disturbed monuments before final payment is made. Contractor or City, at Contractor's expense, shall retain a registered land surveyor to restore said monuments, using methods and materials consistent with recognized surveying practices and with recording laws.

## 10.6 PROGRESS OF CONSTRUCTION

Contractor will furnish construction staking to establish lines and grades as determined necessary for all Work under the contract. Contractor shall make all reasonable effort to preserve all stakes and marks. Stakes and marks removed or destroyed shall be replaced by Contractor at Contractor's expense. No Work shall be done without the proper line and grade stakes and information provided by City.

Construction shall proceed in a systematic manner that will result in a minimum of inconvenience to the public. Therefore, Contractor shall limit its operations to a small length of work area per crew.

Cleanup of all construction debris, excess excavation and excess materials and complete restoration of all fences, mailboxes, ditches, culverts, signposts and similar items shall be completed immediately following the final backfill of the trench, or before if so directed by City.

## 10.7 PRESERVATION, RESTORATION AND CLEANUP

### 10.7.1 Site Restoration and Cleanup

Contractor shall keep the premises clean and orderly at all times during the Work and leave the project free of rubbish or excess materials of any kind upon completion of the Work.

During construction, Contractor shall stockpile the excavated trench materials so as to cause the least damage to adjacent lawns, grassed areas, gardens, shrubbery, trees or fences, regardless of the ownership of the areas. All excavated materials shall be removed from the areas, and the surfaces shall be left in a condition equivalent to or better than the original condition and free from all rocks, gravel, boulders or other foreign material. Contractor shall restore topsoil areas as specified in the chapter entitled TRENCH EXCAVATION AND BACKFILL. All existing drainage ditches and culverts shall be reopened and graded and original drainage restored. All damaged irrigation and house drainage pipe, drain tiles, and culverts shall be repaired or replaced. Such repair or replacement shall be considered

incidental to the construction, and the cost thereof shall be borne by Contractor and included in other items.

At the conclusion of construction activities, the contractor shall rake and drag all disturbed areas, leave the same free from rocks, gravel, clay, organic materials, or any other foreign material. All disturbed areas shall be ripped a minimum of 24-inches deep, tilled, then stockpiled native topsoil placed to a minimum depth of 12-inches, and prepare the surface in all respects for seeding and planting. At the contractor's option, an approved imported topsoil may be installed as part of the final site restoration. The finished surface shall conform to the original surface and shall be free-draining and free from holes, rough spots or other surface features detrimental to a seeded area.

All areas disturbed by Contractor's operations inside dedicated rights-of-way or easements shall be fertilized and reseeded or replanted in accordance with applicable portions of Chapter 16, "LANDSCAPE RESTORATION" and the drawings. Areas outside of the easements or rights-of-way that are disturbed by Contractor's operations shall be graded and reseeded at Contractor's expense in a method acceptable to the property owner. Contractor shall obtain a written release from all such property owners before Final Payment on this Contract.

#### 10.7.2 Preservation of Irrigation and Drainage Ditches

Contractor shall arrange its schedule so that construction will not interfere with the irrigation of cultivated lands or pastures. Contractor shall construct, at its own expense, such temporary irrigation ditches, turnouts and miscellaneous structures as are necessary to avoid interference with irrigation and as are acceptable to the owner of the land, which shall permit the land to be irrigated by others during construction.

Following the backfill of the trenches, Contractor shall restore all irrigation and drainage ditches destroyed, damaged or otherwise modified during construction to a condition equivalent, in the opinion of City, to the condition of the ditch before construction. Ditches so reconstructed shall be built in their original locations.

### 10.8 MEASUREMENT AND PAYMENT

#### 10.8.1 Mobilization

Payment for mobilization shall be based on a lump sum. The lump sum shall be paid as follows:

- When 5 percent of the total original contract amount is earned from other bid items, 50 percent of the contract amount for mobilization will be paid.

- When 10 percent of the total original contract amount is earned from other bid items, the remaining 50 percent of the contract amount for mobilization will be paid.
- Mobilization shall not exceed 5 percent of the total original contract amount.

END OF CHAPTER

## CHAPTER 11

### ENVIRONMENTAL PROTECTION REQUIREMENTS

#### PART 11

##### 11.1 SCOPE

This section covers the work necessary to comply with federal, state, and local environmental protection requirements.

##### 11.2 GENERAL REQUIREMENTS

Contractor shall properly install, operate, maintain and remove any works as provided in this section or City approved plan to protect the environment during construction of the project.

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

Contractor shall meet with the City on-site prior to moving equipment on-site or beginning any work to ensure that all parties understand the locations of or potential impacts to Sensitive Areas or species and the measures that shall be taken to protect them. Sensitive areas includes both Water Quality Sensitive Areas (WQSA) and Vegetative Corridors as defined by Clean Water Services' Design and Construction Standards and shall be marked by the Contractor, per the plans, prior to initiation of any project activities.

Contractor shall submit an Emergency Spill Response Plan and a Pollution Control Plan that identifies specific hazardous material containment measures for equipment to be used within 150 feet of WQSAs. These submittals may be combined as long as all the criteria are met.

Contractor shall locate areas for non-workshift storage of equipment and vehicles, other than track-mounted vehicles and cranes, outside WQSAs. Contractor shall locate areas for storing fuels and other potentially hazardous materials and areas for refueling and servicing construction equipment and vehicles outside WQSA. If staging areas are within 150 feet of any waters of the state, full containment of potential contaminants shall be provided to prevent soil and water contamination. Throughout construction, Contractor shall clean, inspect and record maintenance on all construction equipment. Upon discovery of identified leaks, construction equipment shall be removed from site until repairs can be made.

Contractors shall maintain on-site containment measures adequate to prevent pollutants or construction and demolition materials, such as waste spoils, petroleum products, concrete

cured less than 24 hours, concrete cure water, silt, welding slag and grindings, concrete saw cutting by-products and sandblasting abrasives, from entering any WQSA. Contractor shall contain project related spills immediately and then contact City. Spills that enter waters of the state, or onto land with a potential to enter waters of the state shall be reported to the Oregon Emergency Response System at 800-452-0311.

Nothing in this section shall relieve Contractor from the obligation to obtain and comply with the regulations or permits of any federal, state, or local authority.

### 11.3 EROSION AND SEDIMENT CONTROL

Contractor shall be responsible for complying with the Oregon Department of Environmental Quality (DEQ) and City/Clean Water Services adopted rules regarding erosion control best management practices (BMPs) during construction, and more specifically defined as the provisions of OAR 340-41-455 Section (3) and the District's Resolution and Order 07-20 or any updates.

Contractor shall take all measures necessary to control erosion and prevent silt from leaving the construction area during the construction and maintenance period.

Contractor shall inspect all erosion control facilities daily during construction and immediately repair all damage. For the project duration, Contractor shall have a person on the project site qualified to maintain erosion control measures and, if required, to write and submit water quality monitoring reports to DEQ to meet all regulatory permit conditions. Contractor shall maintain on site an adequate supply of materials needed to control erosion.

Where appropriate, catch basins shall be protected with a Clean Water Services approved inlet protection. Contractor shall maintain inlet protection to ensure proper function throughout the construction activity. Contractor shall remove and properly dispose of inlet protection upon completion of the project.

Contractor shall install a sediment barrier in accordance with the erosion control plans or where needed to meet applicable regulatory requirements. Multiple erosion control BMPs are required within wetland and other sensitive areas as shown on the drawings. The barrier shall remain and be maintained until vegetation is established enough to prevent erosion from occurring. Contractor shall remove the barrier when vegetation is established or as directed by City.

During dry weather, Contractor shall inspect erosion and sediment controls on active construction, borrow, or disposal sites weekly and inspect erosion and sediment controls on inactive construction, borrow, or disposal sites at least biweekly and in accordance with the permit requirements. Contractor shall comply with the City's wet weather requirements between October 1 and May 31. During rainy periods, stockpiles outside the active work area shall be covered with an impervious material when unattended or at the end of each

workday. Contractor shall construct erosion control facilities so that any runoff will be contained or filtered before entering WQSAs.

Where indicated on the approved erosion control plans or where required by City, Contractor shall protect bare soils with ground cover. The ground cover may be straw, mixed yard debris compost, or City approved material applied to a uniform thickness of 1.5 to 2.5 inches. The ground cover may also be an approved jute or coir fabric. Straw mulch shall be either weed free native or sterile straw.

#### 11.3.1 Dust Prevention

During all phases of work, Contractor shall minimize dust to the extent practicable by sprinkling haul and access roads and other exposed dust producing areas with water, applying dust palliatives on access and haul roads, sweeping asphalt surfaces, placing wood chips or other effective mulches on vehicle and pedestrian use areas, pre-wetting cut/borrow area surfaces and using covered haul equipment.

#### 11.3.2 Street Cleanup

Where appropriate, the construction site shall have a gravel construction entrance. If conditions allow, wood chips may serve as an acceptable alternative to gravel for the protection of soils. Contractor shall make every effort to avoid tracking mud, dirt, or debris onto paved surfaces, including private easements, and City and Washington County Right of Way.

Prior to washing road surfaces, Contractor shall remove all tracked mud, dirt, or debris by mechanical means. All runoff from washing shall be collected and filtered using a City approved method prior to discharging to any WQSA.

Contractor shall clean all dirt, mud, rock, gravel, or other foreign material caused by the construction operations, from all streets and roads at the conclusion of each day's operation, and as required throughout the day to maintain a clean paved surface. Cleaning shall be by brushing and hand labor unless otherwise approved by City. Dirt, mud and debris shall not be washed or brushed into storm drain inlets or catch basins.

### 11.4 PROTECTION OF NATIVE VEGETATION

Contractor shall protect native vegetation to the maximum extent practicable through the installation of construction fencing. Orange no work construction fencing shall be installed at all easement and construction limits as shown on the plans. Contractor shall make every effort to avoid impacting native trees within the authorized work area. During clearing operations, trees shall not be permitted to fall outside the work area unless authorized by City. In areas designated for selective cutting or clearing, Contractor shall take care in falling

and removing trees and brush to avoid injuring trees and shrubs to be left in place. Where native vegetation has been removed or the original land contours disturbed, the site shall be re-vegetated as soon as practicable after construction is completed in that area.

## 11.5 PROTECTION OF FISH AND WILDLIFE

Contractor shall meet the requirements contained in ORS Chapter 498 and ORS 509.605, et al, and the Washington County Community Development Code and ODOT Best Management Practices or their successors. These rules and resolutions mandate protection of fish and wildlife during construction and are outlined in the Oregon Department of Fish and Wildlife (ODF&W) "Guidelines and Criteria for Stream-Road Crossings". Additional information regarding environmental requirements is contained within the "Endangered Species Act – Section 7 Consultation Biological Opinion & Magnuson - Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation – Revised Standard Local Operation Procedures for Endangered Species (SLOPES III) for Certain Regulatory and Operations Activities Carried Out by the Department of the Army in Oregon and the North Shore of the Columbia River – NOAA's National Marine Fisheries Service Northwest Region – November 2004".

### 11.5.1 In-Water Work

Contractor shall only be permitted to work within the jurisdictional waters of the state between July 15 and September 30 unless otherwise approved in writing by the appropriate regulatory agencies.

### 11.5.2 Turbidity Standards

All runoff from the construction site shall meet required turbidity standards. Contractor shall monitor turbidity in stream and shall prevent it from exceeding the natural stream turbidity by 10 percent as measured 100 feet downstream from the project, or as required by DEQ or by the amount approved by DEQ. The monitoring methodology shall comply with the conditions stated in the DEQ permit. The turbidity standard may be exceeded for a limited period not to exceed 2 hours within a 24-hour period, provided that all practicable erosion control measures have been implemented. If this standard is violated, Contractor shall stop action, report violations to City and take actions as directed by City.

### 11.5.3 De-watering and Creek Isolation

Contractor shall submit a Creek Isolation and Dewatering Plan including, at a minimum, a description of proposed temporary isolation structure material, product information and maintenance requirements; calculations for maximum hydrostatic pressure forces behind the completely dewatered isolation structure to ensure design of isolation structure exceeds anticipated forces; description of proposed piping, material and route for bypass flows around or through the project

area; drawing showing the layout of isolation structure, route of bypass piping, and valves with associated sizes and dimensions; mitigation efforts to reduce impact to resident or anadromous fish species; maintenance plan describing regular maintenance to be performed while the isolation structure and piping are in service and the length of the maintenance period when system will be out of service; contingency plan describing steps to be taken if isolation structure fails and emergency contact phone numbers. Alarms shall be sent to Contractor and notify City personnel of any and all alarms.

Upon plan approval, the scope includes the installation, maintenance and removal of the approved techniques or devices. In the event that no stream flow is present during construction, the City waives these requirements and the standard specification for temporary erosion control and environmental protection apply.

Isolation of construction activities from the stream flow may be accomplished by techniques including, but not limited to the installation of bypass piping, flume or culvert, the installation of a sheetpile or sandbag wall, or the use of a water filled cofferdam. For treatment of water removed from the isolated work area refer to Sections 11.3 and 11.5.2. Any excess sub or surface flow shall be removed and/or treated each day prior to initiating construction activities.

Tualatin Basin streams rise rapidly with minimal precipitation. Contractor shall monitor weather reports throughout the period of in-stream work, and shall inspect the creek diversion daily, including non-working days, during periods of anticipated rain, rain, and or high water. If any rain is anticipated on any day, Contractor shall have backup and redundant pumps or diversion systems in place, tested, and operational prior to commencement of work. Contractor shall provide current, local weekly or daily weather and precipitation forecasts at weekly construction meetings, and notify City between submittals of any revisions to weekly forecasts that involve rain anticipation.

Contractor shall maintain downstream passage for adult and juvenile fish for the duration of the project unless temporary short-term upstream impoundment of fish is included in the approved Creek Isolation and Dewatering Plan. Approved impoundment of the fish does not include blocking stream flow from entering the channel downstream of the project. No equipment will be allowed in the stream channel outside of the dewatered work area.

Contractor shall notify City of any stranded fish identified outside of the dewatered and de-fished work area. If the fish are positively identified as not being sensitive, threatened and/or endangered under Federal or State ESA regulations, Contractor may relocate fish with the approval of City and under the supervision of an ODFW biologist or designee. If the fish are suspected to be listed salmonid species, Contractor shall contact City immediately and shall avoid moving the fish unless directed to do so by City or other on-site state or federal representatives. If a listed



fish is in imminent danger of death due to low flow or high water temperatures, Contractor may add sufficient stream water or shade to the area containing the stranded fish until ODF&W or NOAA Fisheries staff arrives to salvage the fish.

Any listed species that is found deceased within the project limits must be retained until the City is notified, the fish is photographed and the information forwarded to the appropriate regulatory agencies. Disposal of deceased fish shall be in accordance with instructions from those agencies.

## 11.6 SITE RESTORATION

Contractor shall de-compact soils driven on by vehicles and equipment, and restore top 12-inches of topsoil for all disturbed areas prior to performing final site restoration and planting. If final site restoration is to be delayed and disturbed areas are to remain exposed, contractor shall apply City approved native seed for erosion control at a rate of 10 pounds per acre and cover seed with native or certified weed-free straw. No fertilizers shall be applied within WQSAs. Contractor shall perform permanent seeding and planting work per the drawings and General Conditions and Standard Specifications Chapter 10.7 within the seeding dates. re-seed with the same seed if permanent-seeding work, done within the seeding dates, does not provide uniform coverage of disturbed areas at 70 percent cover.

## 11.7 SUSPENSION OF WORK

City may suspend the work or require additional or different protection measures if City determines, based upon observed conditions of the project, that the either the approved plan or its implementation by Contractor is insufficient to prevent environmental harm. The City may require the Contractor to submit a written plan for protection of the site for the duration of the project before work resumes.

## 11.8 HISTORICAL AND ARCHAEOLOGICAL AREAS

In accordance with ORS 358.905 and ORS 97.740, when burial sites, buried camp areas or village sites and other distinctive archaeological or historical items are uncovered, Contractor shall report the same to City and the state liaison officer. Construction operations shall be stopped until the appropriate authorities can examine the area and give clearance to proceed with the work.

## 11.9 MEASUREMENT AND PAYMENT

### 11.9.1 Erosion and Sediment Control

Payment for installing, maintaining, and removing sediment barrier shall be based on the cost per linear foot installed. Payment shall constitute full compensation for all labor, material and equipment costs.

Payment for installing, maintaining, and removing Type 4 & 5 inlet protection shall be on a per each basis installed. Payment shall constitute full compensation for all labor, material and equipment costs.

Payment for installing ground cover for the purpose of erosion control and sediment prevention shall be considered incidental to the Miscellaneous Erosion Control work item.

Payment for all other erosion control measures required through the one-year warranty period shall be considered incidental to the Miscellaneous Erosion Control work item.

#### 11.9.2 Dust Prevention

Payment for dust prevention shall be considered incidental to the Miscellaneous Erosion Control work item.

#### 11.9.3 Street Cleanup

Payment for street cleanup shall be considered incidental to the Miscellaneous Erosion Control work item.

#### 11.9.4 Protection of Trees and Native Vegetation

Payment for tree protection fencing shall be considered incidental to Tree Protection and Removal work item.

#### 11.9.5 Protection of Fish and Wildlife

Payment for protection of fish and wildlife shall be considered incidental to the Creek Isolation and Bypass Piping work item.

#### 11.9.6 De-watering and Creek Isolation

De-watering and creek isolation shall be paid for at the Contract unit price on a lump sum basis. Payment shall constitute full compensation for all labor, material and equipment costs.

Approval of Contractor Submittals	20% of Unit Cost amount
Installation of Diversion and De-watering Devices	40% of Unit Cost amount
Removal of Diversion and De-watering Devices	40% of Unit Cost amount

#### 11.9.7 Site Restoration

There shall be no separate payment for site de-compaction. Payment for all other site restoration work shall be on a lump sum basis per the Final Site Restoration

and Clean-Up work item based upon establishment of 70 percent native grass cover.

Payment shall constitute full compensation for all labor, material and equipment costs.

END OF CHAPTER

## CHAPTER 12

### TRENCH EXCAVATION AND BACKFILL

#### PART 12

#### 12.1 SCOPE

This Chapter concerns the work necessary for trench excavation and backfill.

#### 12.2 DEFINITIONS

##### 12.2.1 Trench Excavation

Trench Excavation is the removal of all material encountered in the trench to the depths shown on the plans or as directed by City. Trench Excavation shall be classified as either common or rock excavation.

- A. Common Excavation - Common Excavation is defined as the removal of all material, which is not classified as Rock Excavation.
- B. Rock Excavation - Rock Excavation is defined as boulders exceeding ½ cubic yard in size, or as reasonably excavated with a Cat 235 size of backhoe equipped with two rippers, or solid ledge rock, which in the opinion of City requires for its removal, drilling and blasting, wedging, sledging, barring or breaking up with power-operated tools. Rock Excavation does not include any of the following: soft or disintegrated rock, hard-pan or cemented gravel that can be removed with a hand pick or power operated excavator or shovel; loose, shaken, or previously blasted rock or broken stone in rock fillings or elsewhere, and rock outside of the minimum limits of measurements or that may fall into the excavation.

##### 12.2.2 Trench Foundation

Trench Foundation is defined as the bottom of the trench on which the pipe bedding is to be placed and that provides support for the pipe.

##### 12.2.3 Pipe Bedding

Pipe Bedding is defined as the furnishing, placing, and compacting of specified materials on the trench foundation to uniformly support the barrel of the pipe from the trench foundation to the springline of the pipe.

##### 12.2.4 Pipe Zone

The Pipe Zone is defined as the full width of the trench from six inches above the top outside surface of the barrel of the pipe to the springline of the pipe.

#### 12.2.5 Springline

Springline is defined as halfway up the sides of the pipe after it has been placed on the pipe bedding.

#### 12.2.6 Trench Backfill

Trench Backfill is defined as the furnishing, placing and compacting of specified material in the trench between the top of the pipe zone material and the bottom of the pavement base rock, ground surface, or surface materials as directed.

#### 12.2.7 Native Topsoil

Native Topsoil is defined as the top 12 inches of existing material prior to excavation.

#### 12.2.8 Subsoil

Subsoil is defined as that soil which is below the top twelve (12) inches of existing material prior to excavation.

### 12.3 MATERIALS

#### 12.3.1 Class A Backfill

Class A Backfill shall be native or subsoil material that, in the opinion of City, meets the desired characteristics required for the specific surface loading or other criteria of the backfill zone.

The native material shall be free of humus, organic matter, vegetative matter, frozen material, clods, sticks and debris and shall present no isolated points or areas, or larger stones which would cause fracture or denting of the structure or subject it to undue stress.

#### 12.3.2 Class B Backfill

Class B Backfill shall be granular material consisting of gravel or crushed rock meeting the requirements of Section 12.3.5. Designated size shall be 3/4"-0 unless otherwise specified.

#### 12.3.3 Pipe Bedding Material

The Pipe Bedding Material shall be 3/4"-0 crushed rock that meets the requirements of Section 12.3.5.

12.3.4 Pipe Zone Material

The Pipe Zone Material shall be 3/4"-0 crushed rock that meets the requirements of Section 12.3.5.

12.3.5 Granular Material

Granular Material shall be crushed gravel or rock meeting the following quality standards:

Abrasion (AASHTO T96)	Maximum wear	35 percent
Fractured Face	Min. Particles	75 percent
Liquid Limit (AASHTO T89)	Not greater than	30 percent
Plasticity Index (AASHTO T91)	Not greater than	6 percent

The aggregate shall consist of uniform quality, clean, tough, durable fragments of rock or gravel, free from flat, elongated, soft or disintegrated pieces, organic and/or other objectionable matter occurring either free or as a coating on the stone. Granular material shall conform to the following:

<u>1 1/2-Inch Minus</u>		<u>3/4-Inch Minus</u>	
<u>Sieve Sizes</u>	<u>% Passing</u>	<u>Sieve Sizes</u>	<u>% Passing</u>
2-inch	100	1-inch	100
1-1/2 inch	95-100	3/4-inch	90-100
3/4-inch	55-75	3/8-inch	60-80
1/4-inch	35-50	1/4-inch	40-60
No. 4	15-30	No. 200	0-5

12.3.6 Foundation Stabilization (Crushed Rock)

Foundation Stabilization shall be 1-1/2" to No. 4 open-graded crushed rock fractured on at least two faces that meets the requirements of Section 12.3.5, or

as required to stabilize the trench bottom with a reasonably uniform gradation from coarse to fine and free from excessive dirt or organic matter.

12.3.7 Foundation Geotextile Fabric

The Foundation Geotextile Fabric used in trench stabilization shall be lightweight, nonwoven filter fabric (Mirafi 140N or equal) for unstable soil conditions or high-strength woven filter fabric (Mirafi 600x) for highly unstable soil conditions. Geotextile fabrics shall be subject to City approval.

12.3.8 Imported Topsoil

Imported Topsoil shall be natural, fertile, friable topsoil, 90 percent free of clay lumps or other foreign matter and larger than 2 inch diameter that is not frozen or muddy and with a pH range of 5 to 7 and not less than 3 percent humus as determined by loss on ignition of moisture-free samples dried at 100°F. Gravel portion particles larger than 2mm shall not exceed 15 percent of total volume. It shall be free of quack grass, horsetail and other noxious vegetation and seed. It shall not be infested with nematodes or other undesirable insects or plant disease organisms.

12.3.9 Riprap

Rock for Riprap shall be angular in shape.

Thickness of a single rock shall not be less than one-third its length. Rounded rock will not be accepted unless approved by the City.

Grade Riprap shall be the class and size of rock according to the following:

Class	Class	Class	Class	Class	Percent
25	50	100	200	1000	(by mass)
<b>SIZE OF ROCK (LB)</b>					
55-33	110-60	220-140	200-100	2200-1430	20
33-15	60-25	140-75	100-50	1430-660	30
15-2	25-2	75-10	50-20	660-40	40
2-0	2-0	10-0	20-0	40-0	10

12.4 CONSTRUCTION

12.4.1 Preparation of Right-of-Way

Where clearing or partial clearing of the right-of-way is necessary, such clearing shall be completed prior to the start of excavation. Individual property owners have the right to remove trees within the easement on their property prior to the start

of construction. The Contractor shall attempt to save as many trees as possible, but is allowed to remove the trees within the permanent easement unless otherwise shown on the plans.

All trees that are removed shall include the removal of the stump and root wad unless otherwise indicated on the plans.

If trees are removed by the Contractor that were shown on the plans to remain or were otherwise outside of the limits of allowed removal, compensation shall be made to the property owner by the Contractor in the form of the City approved replacement trees for each tree removed, or a cash settlement approved by the property owner and the City.

Contractor shall not remove any tree larger than 4 inches in diameter and three feet above the ground from the temporary easement without written approval by the City.

Any tree in the temporary easement located in a landscaped yard shall not be removed unless removal is indicated on the plans or Contractor receives written permission from City.

#### 12.4.2 Disposal of Excavated and Cleared Material

The Contractor shall bear all costs of disposing of excavated material not required elsewhere on the project (trees, stumps, brush, roots, limbs, etc.) and other waste materials from the clearing operation. Material shall be disposed of in such a manner as to meet all the requirements of state, county, regional and local regulations regarding health, safety, the environment, and public welfare. Contractor shall not permit excavated materials to cover brush or trees prior to disposal.

No material shall be left on the project, on abutting private properties, or embankments or trenches on the project except as approved by City and/or the property owner. Vegetation in areas to be cleared may be pulverized by means of rotary brush cutter and/or chipper. Pulverized materials may remain on site if approved in writing by the property owner and City and spread or scattered to a depth of not over 2 inches.

#### 12.4.3 Removal of Pavement

Contractor shall cut all bituminous and concrete pavements (regardless of the thickness), and all curbs and sidewalks before excavation of the trenches. Cuts shall be made using an approved pavement cutter that will leave a clean, straight cut surface on the width required at the trench surface. The remaining pavement shall not be subject to a lifting or separating force, either by direct contact with the



excavating equipment or by inadequate pavement precutting. Any pavement beyond the trench line that is lifted shall be removed and replaced at no cost to City. Pavement and concrete materials removed shall be hauled from the site and not used for trench backfill.

#### 12.4.4 Removal of Topsoil

Where trenches cross a wetland, lawn, garden area, pastureland, cultivated field, or similar areas, the topsoil shall be removed to a depth of twelve (12) inches for the full width of the trench to be excavated. This topsoil shall be stockpiled to one side of the right-of-way and not mixed with the remaining excavated material. The topsoil in the top twelve (12) inches of the backfilled trench shall be replaced. The minimum finished depth of topsoil over all trenches shall be twelve (12) inches.

In lieu of stockpiling the topsoil, imported topsoil may be substituted in the top twelve (12) inches when approved by City.

The finished grade of the topsoil shall be level with the area adjacent to the trench. Damage to adjacent topsoil caused by work operations shall be repaired or replaced with imported topsoil as necessary. All rock, gravel, subsoil clay, and any other foreign materials shall be removed from the surface of the adjacent working areas; regraded, and imported topsoil shall be added as required at no additional cost to City.

#### 12.4.5 Rock Excavation

Where ledge rock or boulders that meet the definition of Rock Excavation as described in Section 12.2.1B are encountered during trench excavation, the rock shall be removed to provide a minimum of 6 inches of clearance to each side of and below all pipe and appurtenances. Contractor will be required to excavate and remove the overburden and expose the rock to allow City to profile or cross section the rock for measurement pay quantity. The measurement shall be completed before removal of the rock.

The use, transport, and storage of explosives shall comply with all laws and ordinances.

When blasting rock in trenches, the area to be shot shall be covered with blasting mats or other protective material to prevent the scattering of rock fragments outside the excavation area. Contractor shall assume all liability and responsibility connected with or accruing from blasting or the use of explosives.

#### 12.4.6 Pipe Bedding

Pipe Bedding consists of leveling the bottom of the trench on the top of the foundation material and placing bedding material to the horizontal centerline of

the pipe. Contractor shall spread the bedding smoothly to the proper grade so that the pipe is uniformly supported along the barrel, and excavate bell holes at each joint to permit proper assembly and inspection of the entire joint. Bedding under the pipe shall provide a firm, unyielding support along the entire pipe length. Particular attention shall be given to the area from the flow line to the horizontal centerline of the pipe to ensure that firm support is obtained to prevent any lateral movement of the pipe. Pipe Bedding shall be placed in the full width of the trench.

The minimum depth of Pipe Bedding shall be as follows:

<u>Pipe Size</u>	<u>Depth of Base</u>
15-inch and smaller	4-inches
18-inch and larger	6-inches

#### 12.4.7 Trench Width

The maximum permissible trench width through the bedding and pipe zone, shall be as follows:

15-inch diameter and smaller - 40 inches

18-inch diameter and larger - outside diameter plus 24 inches

Greater trench widths must be approved by City prior to excavation. The maximum width of trench above the top of pipe will not be limited, except in cases where excess width would cause damage to adjacent structures or property, or cause environmental damage. Trench widths shall be confined to dedicated rights-of-way or within areas for which construction easements have been obtained, unless special written arrangements have been made with the affected property owners.

#### 12.4.8 Open Trench Limitation

The length of trench excavated in advance of the pipe laying shall be kept to a minimum, and in no case shall it exceed 100 feet unless otherwise specifically authorized by City prior to excavation. The trench shall be backfilled so that no section of trench or pipe is left open longer than 24 hours. Trenches located in a right-of-way shall be completely backfilled before Contractor leaves the site each day or protected with steel plates. Trench excavations on private property shall be covered and/or protected at the end of each workday.

#### 12.4.9 Grade

Excavate the trench to the lines and grades shown or as established by City, with proper allowance for pipe thickness, Pipe Bedding, and foundation stabilization.

The foundation upon which the Pipe Bedding is placed shall be firm, undisturbed, and true to grade.

If the Contractor excavates the trench below the required grade without the approval of City, Contractor shall restore the grade with Pipe Bedding at no additional cost to the City.

#### 12.4.10 Shoring and Sheeting

Contractor shall provide all materials, labor and equipment necessary to adequately shore trenches to protect the work, existing property, utilities, etc., and to provide safe working conditions in the trench. The method of shoring shall be according to Contractor's design, provided the method meets with the approval of all applicable local, state, and federal safety codes. If a movable box or steel sheeting is used and the bottom of the shoring or sheeting cannot be kept above the springline of rigid pipe or the crown elevation of flexible pipe, the bedding or side support shall be carefully consolidated behind the movable box or steel sheeting prior to placing backfill.

The use of horizontal strutting below the barrel of pipe or the use of the pipe as support for trench bracing is not permitted.

#### 12.4.11 Location of Excavated Materials

During Trench Excavation, the excavated material shall be placed within the construction easement, right-of-way or approved working area. Excavated material shall be stockpiled in such a manner that it will cause a minimum of inconvenience to the traveling public. No private or publicly traveled streets shall be obstructed without the written approval from the property owner or the jurisdiction having authority over the public street. All federal, state, and local codes governing the safe loading of all trenches with excavated material shall be followed.

Contractor shall maintain access to all fire hydrants, water valves and meters, and shall allow clearance to enable the free flow of storm water in all gutters, other conduits and natural watercourses.

#### 12.4.12 Dewatering

Contractor shall promptly remove and dispose of all water entering the Trench Excavation during the time the trench is being prepared for the pipe laying, during the laying of the pipe, and until the backfill at the pipe zone has been completed. Groundwater shall be controlled to prevent the softening of the bottom of excavations or the formation of "quick" conditions or "boils" during excavation.

The water shall be disposed of in a manner approved by City and without damage to adjacent property. Contractor shall filter all water pumped from the trench

excavation through an approved system before the water enters a creek, wetland or other storm system. Drainage of trench water through the pipeline under construction is prohibited unless specifically approved by City prior to such drainage.

#### 12.4.13 Foundation Stabilization

When in the judgment of City, the existing material in the bottom of the trench is unsuitable for supporting the pipe, Contractor shall either use foundation stabilization (crushed rock) or foundation geotextile fabrics as specified in the Schedule of Bid Prices. Material such as boulders, peat or other organic material shall not be used for supporting the pipe. Foundation stabilization used in lieu of dewatering may be used only with the prior written approval of City and will be at no additional cost to City.

When using crushed rock for foundation stabilization, Contractor shall excavate below the flow line of the pipe and backfill the trench to the subgrade of the pipe bedding with City approved foundation stabilization material. The material shall be placed over the full width of the trench in thoroughly compacted layers, not exceeding 6 inches deep. When using foundation geotextile fabric, the selection of the appropriate fabric shall be made in the field during construction by City. The installation of the fabric shall be in accordance with the contract drawings. To help reduce the subgrade disturbance, Contractor shall excavate at trench subgrade level with a smooth-edge grading bucket, and place the geotextile fabric as soon as possible after the excavation is completed.

#### 12.4.14 Trench Backfill Placement

City reserves the right to modify the use, location, and quantities of the various types of backfill during construction. Backfill material shall not be permitted to free fall into the open trench until at least 2 feet of cover is provided over the top of the pipe. Under no circumstances shall sharp, heavy pieces of material be allowed to drop directly onto the pipe or the tamped material around the pipe. Backfill material of consolidated masses larger than 12 inches in any dimension shall not be used.

#### 12.4.15 Class A Backfill

After Contractor has completed backfilling the trench, the entire working area including the trench shall be graded. With the approval of City, a windrow of excavated material may be placed over the trench to allow for settlement, but only in areas that are not classified as wetlands, or flood plain or landscaped. Contractor shall estimate the amount of settlement that will occur and may windrow enough material to compensate for settlement. Any excess or deficiency of backfill material which becomes apparent after settlement and within the warranty period shall be

corrected by regrading, disposal of excess material, and adding additional material where required. Contractor shall ensure that the top 12 inches of the trench backfill is topsoil.

Where the contract specifications require that the construction area be returned to its original elevations, backfill shall be compacted by Contractor to 90 percent relative compaction as determined by Method A of AASHTO T99. Contractor may also have the option to water settle the trench to reach the compaction requirement of 90 percent. In water settling the trench, Contractor shall inject water into the trench so that the entire trench from pipe to top of ditch is saturated with water.

Contractor shall correct any settlement of the trench during the warranty period, along with any damage to the landscaping at no additional cost to City.

#### 12.4.16 Class B Backfill

Class B backfill shall be placed and compacted with a vibratory compactor or mechanical tampers. The granular backfill within four (4) feet of finished grade shall be compacted to not less than 95 percent relative compaction as determined by Method A of AASHTO T99. Backfill more than four (4) feet below finished grade shall be compacted to not less than 90 percent relative compaction. Contractor, at no cost to City, shall promptly repair any subsequent settlement of the finished surface during the warranty period.

City may retain a testing laboratory to take periodic density tests. Should such tests show inadequate compaction, no additional backfill shall be placed until compaction of the in-place material conforms to these specifications. If the required compaction density has not been obtained, Contractor shall remove the backfill from the trench and recompact at no cost to City.

#### 12.4.17 Maintenance of Trench Backfill

The surface of the backfilled trench shall be maintained level with the existing grade until final surface restoration is completed or the entire project is accepted by City. The maintenance shall include, but not be limited to, the addition of gravel and cold-mix asphalt to keep the surface of the backfilled trenches reasonably smooth and suitable for normal traffic flow. Temporary pavement replacement of a one-inch lift of approved cold-mix asphalt shall be installed on the same day as backfilling above all trenches that cross paved streets. If final paving does not occur within 5 days of backfilling the trench, Contractor may be required to install cold-mix asphalt in sewer trenches that parallel the street. In all pavement cuts in major streets, Contractor shall place cold-mix asphalt the same day of the work.

#### 12.4.18 Drainage Culverts and Tile

All drainage culverts or tiles, which are removed, shall be replaced. If the pipe is damaged during removal, it shall be disposed of and new pipe shall be furnished and installed at no cost to City unless otherwise specified in the bid proposal. Culvert pipe or tiles shall be replaced to the lines and grades established by City.

#### 12.4.19 Trench Dam

Where indicated on the construction plans, Contractor shall construct bentonite trench dams in the pipe trench per the dimensions shown on the plans. Coordinate exact location of trench dams with the Engineer or City Representative.

#### 12.4.20 Temporary Trench Plating

All excavations to be left open overnight shall be covered and or protected to the satisfaction of the engineer prior to completion of construction operations for the day.

### 12.5 MEASUREMENT

#### 12.5.1 Trench Excavation and Backfill

The work performed under this item for gravity sewer pipe shall be paid for on a linear-foot basis for the type of backfill installed and for the depth of the trench from the ground surface to the flow line of the pipe. The depth figures indicated in the proposal are to the nearest 0.1 foot; that is a trench depth measured as 14.9 feet will be paid for at the unit price for excavation 10 to 15 feet deep. A trench depth measured as 15.0 feet will be paid for at the unit price for excavation greater than 15 feet deep.

The length of trench shall be measured horizontally from center-to-center of manholes or to the end of the pipe, whichever is applicable. The depth of the trench will be measured at intervals of 25 feet along the centerline of the trench, and the depth of each measuring point will be the depth used for computing the depth of trench for a distance of 25 feet ahead of the point of measurement.

Payment for this item shall cover all work specified under this section except for Rock Excavation and foundation stabilization. These will be paid for as separate items. No extra payment will be made for providing additional cover over the pipe when required. The price bid per linear foot shall include any extra excavation required to provide space for gravel base.

#### 12.5.2 Foundation Stabilization (Crushed Rock)

Payment for this item will be made on a per Ton basis. The volume will be computed upon the following basis for length, width, and depth of trench:

Length - The length will be the entire horizontal distance on a linear foot basis, along the centerline of the trench, including measurement through manhole or structure locations, except that the measurement through such structures will be deducted if the proposal carries a separate item for structure excavation that is applicable to the structure.

Width - The width upon which trench foundation will be calculated shall be the maximum outside diameter of the pipe barrel plus 12 inches.

Depth - The depth measured will be the actual depth placed below the Pipe Bedding. The depth will be measured at intervals of 25 feet along the centerline of the trench, taking the average depth between measuring points. Payment for this item shall constitute full compensation for all work necessary to furnish materials at trench side, placing and compacting material in the trench, and for the extra depth of Trench Excavation and disposal required below the Pipe Bedding grade to provide for a stable foundation for the pipe. Payment for this item shall include costs associated with any unstable base encountered in the progress of the work.

#### 12.5.3 Foundation Stabilization Geotextile Fabric

Payment for this item will be made on a price per linear foot of fabric installed as measured along the centerline of trench. Payment for this item shall constitute full compensation for all labor, material, and equipment costs for installing the geotextile fabric as designed. This will include all costs to install the foundation stabilization design above the costs of installing the standard Pipe Bedding material.

#### 12.5.4 Rock Excavation

Measurement for Rock Excavation shall be on a cubic yard basis as calculated below, unless another method is agreed to in advance of the excavation.

Depth - Depth for payment purposes shall be 6 inches below flow line.

Width - Width for payment purposes shall be the outside diameter of the pipe bell plus 12 inches.

Rock Excavation for manholes shall be paid for as measured, up to a maximum of 21 inches greater than the outside diameter of the manhole walls.

Payment for Rock Excavation will be based on the unit price per cubic yard stated in the Contractor's proposal and will be paid in addition to the linear foot payment for trench excavation and backfill. Payment for Rock Excavation shall

include full compensation for all labor, equipment and materials necessary.

12.5.5 Impervious Zone

Payment shall be based on a price for each impervious zone installed. Payment shall constitute full compensation for all labor, material, and equipment costs.

12.5.6 Shoring and Sheeting

The cost of complying with this section shall be considered incidental to the project cost.

12.5.7 Dewatering

The cost of complying with this section shall be considered incidental to the project cost unless otherwise indicated in the bid quantities or special specification.

END OF CHAPTER



**CHAPTER 13**  
**MANHOLES AND CATCH BASINS**

PART 13

13.1 SCOPE

This section covers the construction requirements for the construction of manholes, catch basins, and miscellaneous concrete structures.

13.2 MANHOLE MATERIALS

13.2.1 Base Rock

Clean crushed rock with a maximum size of 3/4-inch, uniformly graded from coarse to fine and meeting the specifications of Section 12.3.5.

13.2.2 Concrete

Concrete shall conform to the requirements of ASTM C 94, Alternate 2. Compressive field strength for manhole bases and miscellaneous structures shall not be less than 3000 psi in 28 days; maximum size aggregate shall be 1-1/2"; slump shall be between 2 and 4 inches, unless specified otherwise.

13.2.3 Precast Manhole Sections

Precast manhole sections shall be a minimum of 48 inches in diameter and conform to ASTM C 478. Minimum wall thickness shall be 5 inches. All cones shall be eccentric and have the same wall thickness and reinforcement as manhole sections. Joints shall be tongue and groove, rubber ring or keylock type. Top and bottom of all sections shall be parallel. The manufacturer of the manhole sections shall cast manhole steps in the precast sections.

Before delivery of any size of precast manhole section to the job site, yard permeability tests shall be conducted at the point of manufacture. The precast sections to be tested shall be selected at random from the stockpile material that is to be supplied to the project. The sections shall meet the permeability test requirements of ASTM C14.

13.2.4 Manhole Steps

Manhole steps shall be 3/4-inch galvanized Grade 40, ASTM A-123/A615 or plastic with reinforcing bar with a minimum of 1/2-inch Grade 60 and meet the

requirements of ASTM A615, including encapsulated with injection molded copolymer polypropylene with serrated surface.

#### 13.2.5 Precast Base Sections and Bases

Precast base sections or manhole bases shall be approved by Engineer prior to installation. Base sections shall have the base slab integral with sidewalls. The base slab shall be 6 inches thick with No. 5 reinforcing bar on 12-inch centers, both directions in center of slab.

#### 13.2.6 Preformed Plastic Gaskets

Gaskets shall be Kent-Seal No. 2 or Ram-Nek and conform to Federal Specifications SS-5-00210 or an approved equal.

#### 13.2.7 Manhole Extension

Concrete rings for extensions shall be a maximum of 6 inches thick and a minimum of 4 inches thick.

#### 13.2.8 Manhole Rings, Frames, and Covers

All castings shall be tough, close-grained gray iron, smooth and clean, free from blisters, blowholes, and all defects, and conform to ASTM A48 Class 30. Bearing surfaces shall be planed or ground to ensure flat, true surfaces. Covers shall be true and seat within rings at all points. Frames and covers shall be standard or suburban, solid; and shall have two holes for sanitary and sixteen holes for storm, unless otherwise approved by Engineer.

#### 13.2.9 Reinforcing Steel

All reinforcing steel shall conform to ASTM A615, Grade 60, deformed bars.

#### 13.2.10 Pipe and Fittings Used in Outside Drop Manholes

Tees, ells, and pipe used in manhole drop assemblies may be either concrete conforming to ASTM C 14, Class 3, or Class 50 mechanical joint ductile iron pipe.

#### 13.2.11 Pipe Stubouts

Pipe stubouts shall consist of the same material as the lateral, main, or trunk lines. Pipe stubouts shall be the bell or hub sections of the pipe. Rubber-gasketed watertight plugs shall be furnished with each stubout on a sanitary sewer line and shall be adequately braced against air test pressures.

#### 13.2.12 Non-shrink Grout

Non-shrink grout shall be Sika 212, Euco N-S, Five Star, or an approved equal nonmetallic, cementitious, commercial grout exhibiting zero shrinkage. Grout shall not be amended with cement or sand and shall not be reconditioned with water after initial mixing. Non-shrink grout shall be placed or packed only with the use of an approved commercial concrete bonding agent applied to all cured concrete surfaces being grouted. Unused grout shall be discarded after 20 minutes and shall not be used.

#### 13.2.13 Chimney Seals

Internal and external rubber seal and seal extensions shall be as manufactured by Cretex Specialty Products, or an approved equal. The sleeves and extensions shall have a minimum thickness of 3/16 of an inch and shall be extruded from a high-grade rubber compound conforming to the applicable requirements of ASTM C923. The bands used for compressing the sleeve and extension against the manhole shall be fabricated from 16-gauge stainless steel that conforms to ASTM A240 type 304. Screws, bolts, or nuts shall be stainless steel.

#### 13.2.14 Manhole Pipe Connector

Flexible connectors designed to produce a positive watertight connection for pipes entering a precast manhole shall be manufactured by A.Lok or an approved equal that meets the requirements of ASTM C-923.

### 13.3 MANHOLE CONSTRUCTION

#### 13.3.1 Excavation and Backfill

Excavation and backfill shall conform to applicable portions of Chapter 12, TRENCH EXCAVATION AND BACKFILL.

#### 13.3.2 Foundation Stabilization

If, in the opinion of the Engineer, unstable material exists that will not support the manhole or other structures, Contractor shall excavate below grade and backfill with foundation stabilization material to the subgrade of the manhole in accordance with Section 12.4.13.

#### 13.3.3 Concrete Base - Poured in Place

Contractor shall remove from the excavation all excess water that will interfere with the pouring of concrete. Contractor shall provide a 12-inch minimum layer of compacted 3/4-inch minus crushed rock as a base. The concrete base shall be leveled off so that the first manhole section to be placed has a level uniform bearing for the full circumference. Contractor shall place sufficient concrete on the base to assure a watertight seal between manhole base and wall. There shall be a minimum

of 8-inches of concrete between the compacted gravel and the lowest invert of the manhole. Twenty-four hours shall be allowed to elapse before placing the remaining sections on the base, unless otherwise approved by Engineer. Manhole steps shall be positioned over the largest shelf in the manhole base, unless directed otherwise by Engineer. The contractor shall place steel reinforcement in manhole bases 60-inches or larger.

#### 13.3.4 Precast Concrete Base

The precast base section shall be carefully placed on the prepared bedding so as to be fully and uniformly supported in true alignment and so that all entering pipes can be inserted on proper grade.

#### 13.3.5 Placing Manhole Sections

Contractor shall clean the ends of manhole sections of all foreign materials. The preformed plastic gasket shall be installed in conformance with the manufacturer's recommendations. Precast sections shall be placed and aligned to provide vertical sides. The completed manholes shall be rigid, true to dimensions, and watertight. Manhole sections shall not have lift holes.

#### 13.3.6 Manhole Inverts

Contractor shall construct manhole inverts in conformance with details and with smooth transitions to ensure an unobstructed flow through manhole. Contractor shall remove all sharp edges or rough sections, which obstruct flow.

#### 13.3.7 Drop Manholes

##### A. Free Fall Drop Manhole

The maximum free fall drop for a sanitary manhole is two feet; for a storm manhole the maximum is four feet and is measured from the top of the existing pipe to the new flowline in. When the drop is more than specified above, an Inside Drop Manhole, Outside Drop Manhole, Fiberglass Panel, or an approved equal shall be used.

##### B. Inside Drop Manhole

The Inside Drop Manhole shall be constructed in accordance with Standard Drawings No. 060 and 090. The maximum pipe size allowed on an inside drop 48-inch manhole shall be 12-inches. The drop material shall be PVC 3034 unless otherwise specified. The drop shall be attached to the manhole wall with stainless steel bands. The manhole channel shall be constructed so that the flow will enter the main channel without flowing onto the manhole shelf. Where the drop assembly connects with the pipe coming into the manhole,

Contractor shall install a Tee fitting so that there is access into the mainline pipe.

C. 13.3.7.2 Outside Drop Manhole

The outside drop manhole shall be constructed with ductile iron pipe, C-900 PVC, or encased concrete pipe.

1. Concrete Outside Drop Manhole

Drop manholes shall be constructed in conformance with Standard Drawing No. 0900. When concrete pipe is used, the entire riser pipe and inlet pipe shall be encased in concrete with a minimum of 6 inches of cover.

2. Ductile Iron Outside Drop Manhole

Contractor may use class 150 mechanical joint ductile-iron pipe for the encased drop construction. The cast iron pipe run shall extend beyond the area of manhole excavation and shall be connected to the pipe with an adapter or closure collar as approved by Engineer. The lower cast iron elbow shall be cast into the existing stubout or manhole base.

13.3.8 Flexible Joints

All flexible pipes shall be connected to manholes by using Kor-N-Seal boot, or A.Lok or an approved equal according to the manufacturer's recommendations. Pipes entering manholes shall be placed on firmly compacted base rock. Where the last joint of the line that has been placed up to the manhole is more than 1.0 foot from the manhole base on non-reinforced concrete pipe smaller than 24 inches, a 6-inch concrete encasement shall be constructed around the entire pipe from the manhole base to within 1.0 foot of the pipe joint. The pipe encasement shall be constructed integrally with the manhole base. Pipes laid out of the manhole shall be shortened to ensure that the first flexible joint is no more than 1.0 foot from the manhole base.

13.3.9 Manhole Stubouts

Stubouts from manholes shall be installed as shown on the construction drawings or as required by Engineer. A watertight flexible connection shall be used for pipe sizes of 6-inches through 18-inches, and will be in all new manholes installed. Invert channels shall be constructed in accordance with standard drawings. Stubouts shall be installed using the flexible joints described above to ensure a watertight seal around the stubout. Compacted base rock as specified shall be provided under all stubouts.

#### 13.3.10 Manhole Extensions

Manhole Extensions shall be limited to a maximum height of 27 inches from the center point of the first step to the top of the casting. The extensions (rings) shall be set with non-shrinking grout. Only one 2-inch ring may be used. No steps are allowed in the grade rings.

#### 13.3.11 Frames and Covers

Frames and covers shall be installed on top of sanitary sewer manholes to positively prevent all infiltration of surface or ground water into manholes. Frames shall be set in a bed of non-shrinking concrete with the concrete carried over the flange of the ring. Frames shall be set so that the tops of the covers are flush with the surface of the adjoining pavement, unless otherwise specified by Engineer. In the absence of pavement, frames shall be set one foot above natural ground, unless otherwise specified by the Engineer.

#### 13.3.12 Connection to Existing Manholes

For connections to existing manholes, all diversion facilities shall be provided and all work necessary shall be performed to maintain flow in the existing pipe during the connection process. Existing manhole bases shall be bored out as needed and replaced or grouted to provide a smooth flow into and through the existing manholes. Contractor shall allow no debris to enter the existing system while making the connection.

#### 13.3.13 Manholes over Existing Sewers

Contractor shall construct manholes over existing operating line(s) at locations shown on plans and shall construct the new base under the existing line as specified. Contractor shall not break into any existing sanitary sewer lines until authorized by Engineer. After acceptance, Contractor shall break out the existing line inside the manhole so that a smooth channel exists with no broken edges. All broken edges shall be covered with non-shrinking grout and troweled smooth. Contractor shall prevent any debris from entering the manhole while breaking into the existing pipe.

### 13.4 CATCH BASINS AND INLETS

#### 13.4.1 Materials

##### A. Base Rock

Aggregate for base rock shall meet the requirements set forth in Section 13.2.1.

B. Concrete

Concrete shall meet the requirements set forth in Section 13.2.2.

C. Frames, Grates, and Covers

All materials shall be flat bar steel (standard grade), cast iron or ductile iron meeting the requirements of ASTM A48 Class 30B. The cover shall be designed to withstand H-20 wheel loading.

D. Forms

All exterior surfaces shall be formed with steel or plywood. Other surfaces shall be formed with matched boards, plywood, or other approved material. Trench walls, rock, or earth will not be acceptable form material.

E. Metal Reinforcement

All metal reinforcement shall conform to the requirements of ASTM A615, Grade 60, deformed bars.

F. Precast Concrete Units

All precast concrete units shall conform to the same requirements as manholes per ASTM C478.

13.4.2 Construction

A. Trench Excavation and Backfill

Trench excavation and backfill will conform to the requirements of Section 12.4.

B. Bedding

Contractor shall remove all water and debris from the ditch area and provide an 8-inch minimum layer of compacted 3/4-inch minus crushed rock for a base.

C. Cast-in-Place

Cast-in-place catch basins shall have a minimum of 6 inches of concrete between the compacted gravel and the lowest invert. The forms used for cast-in-place catch basins shall be tight and well braced. The storm pipe material being used shall extend into the poured concrete of the catch basin. All corners shall be chamfered. Immediately after placement, the concrete shall be consolidated with an approved vibrator. The top surface shall be screed and exposed surfaces troweled to a smooth finish free from marks or irregularities.

After forms are removed, Contractor shall patch any defects in the concrete with an approved material.

D. Precast

After the base is prepared, Contractor shall set the precast catch basin to the proper line and grade. The storm pipe material being used shall connect to the precast catch basin.

E. Inverts, Stubouts, and Sections

Contractor shall clean the ends of all pipes and sections that come in contact with the catch basin. All inverts, stubouts and sections shall be installed according to the details using a non-shrinking grout, making sure all sharp edges or rough sections are removed to prevent obstruction of the flow.

F. Oversize Catch Basins

All catch basins deeper than 4-feet measured from the top of frame to flowline shall have steps.

## 13.5 TESTING

### 13.5.1 Sanitary Manholes

Sanitary manholes shall be free from visible leaks and tested in accordance with this Section. The first three sanitary manholes built on any project shall be tested. Unless otherwise approved by Engineer, acceptance tests shall be conducted on a random sample of 15 percent of sanitary sewer manholes that have been selected by Engineer. Each manhole that fails the acceptance testing will obligate Contractor to test additional manholes to be selected at random by Engineer. Sanitary manholes shall be tested for acceptance after backfilling the trench, compaction requirements have been met, road base rock has been installed, and/or the road has been paved and chimney seals or concrete manhole closure collars installed. If the manholes have passed the test and the castings have been disturbed by construction activities and need to be reinstalled, the manholes shall be re-tested.

### 13.5.2 Hydrostatic Testing

The hydrostatic test shall consist of plugging all inlets and outlets, and filling the manhole with water to the rim. Leakage in each manhole shall not exceed 0.2 gallons per hour, per foot of head above the invert. A manhole may be filled 24 hours prior to the time of testing, if desired, to permit normal absorption into the manhole walls to take place. Leakage will be determined by refilling to the rim using a calibrated or known volume container.



### 13.5.3 Vacuum Testing

The vacuum test shall consist of plugging all inlets and outlets. The test head shall be placed at the inside of the top of the cone, including grade rings and casting, and the seal inflated in accordance with the manufacturer's recommendations. A vacuum of 10-inches of mercury shall be drawn and the vacuum pump shut off. With the valves closed, the time shall be measured for the vacuum to drop to nine inches. The manhole shall be considered passing the test if the time for the vacuum reading to drop 9-inches, meets or exceeds the values indicated in the following table:

Depth of Manhole (feet)	Allowable Time (sec)		
	48"	60"	72"
8	20	26	33
10	25	33	41
12	30	39	49
14	35	46	57
16	40	52	65
18	45	59	73
20	50	65	81
22	55	72	89
24	59	78	97
26	64	85	105
28	69	91	113
30	74	98	121

## 13.6 MEASUREMENT AND PAYMENT

### 13.6.1 Manholes

Payment for standard manholes and drop manholes will include payment for all work necessary to construct the manholes of the type and depth specified. Manhole depths will be measured to the nearest foot, from the top of the manhole frame and cover, to the manhole invert at the center of the manhole. Payment for standard and drop manholes shall be based on price per each manhole installed for an 8-foot deep manhole. No deduction will be made from the manhole price for depths of less than 8-feet. The above payment includes compensation for over-excavating and placement of compacted 12-inch layers of base rock under the concrete base and the cost of the frame and cover. The above payment also includes compensation for all labor, material and equipment costs for completing each manhole.

### 13.6.2 Additional Manhole Depth

Payment for standard and drop manholes for depths greater than 8 feet deep shall be based on a price per each additional foot of depth including extensions. The

depth shall be measured to the nearest foot. Payment shall include compensation for all labor, material and equipment cost for completing this Section.

#### 13.6.3 Manhole Stubouts

Payment for manhole stubouts shall include all work required to stub a pipe of the size specified to at least 12 inches outside the manhole wall. Payment shall be based on a price for each stubout installed of the size specified. Payment shall include compensation for all labor, material, and equipment for completing this Section.

#### 13.6.4 Catch Basins

Payment for catch basins will include payment for all work necessary to construct each catch basin of the type specified. Payment for catch basins will be based on a price stated in Contractor's proposal for each catch basin. Payment shall include compensation for all labor, material, and equipment costs for completing each catch basin including the excavation, placement of the required base rock, and the casting.

#### 13.6.5 Manhole Testing

The cost for complying with this Section shall be considered incidental to the project cost.

END OF CHAPTER

## CHAPTER 14

### PIPE AND FITTINGS

#### 14.1 SCOPE

This section covers all work necessary for the installation of gravity pipe and fittings.

#### 14.2 PIPE MATERIALS

##### 14.2.1 Concrete Pipe

The plane of the ends of the pipe, except for special shapes, shall be perpendicular to the longitudinal axis of the pipe. The interior surface shall be smooth and well finished. The completed pipe shall be free from fractures, large or deep cracks, laminations, and surface roughness. Each pipe shall be marked clearly and legibly to show the class of pipe, the date of manufacture, and the name or trademark of the manufacturer. If steam cured, the pipe shall be at least seven (7) days old before installed. If not steam cured, the pipe shall be aged 21 days prior to installation.

##### A. Nonreinforced Concrete Pipe

Nonreinforced concrete pipe shall conform to ASTM C-14. Unless otherwise specified, pipe shall conform to Class 3.

##### B. Reinforced Concrete Pipe

Reinforced concrete non-pressure pipe shall conform to ASTM C76 or C655 requirements and shall be of the class as noted on the plans or bid proposal. Unless otherwise specified, pipe shall meet the design requirements of Wall B.

##### 14.2.2 Concrete Pipe Joints

Joint shall be rubber-gasketed type. Rubber-gasketed type with "captive gasket in groove" design will be required on all pipe 24-inch-diameter and larger. Gaskets shall conform to ASTM C 443. Free movement of water through the pipe joint or pipe well will be grounds for rejection of the pipe.

A certified statement may be required from the manufacturer of the gaskets, setting forth the basic polymer used in the gaskets and results of the tests of the physical properties of the compound. Gaskets shall be shipped in containers with identification of the batch from which the gaskets were fabricated. Only lubricants for jointing approved by gasket manufacturer shall be used.

##### 14.2.3 Polyvinyl Chloride (PVC) Pipe

PVC pipe shall conform to ASTM D-3034 or ASTM F-679, and have a minimum SDR of 35 with gaskets conforming to requirement of ASTM 477 and ASTM 3212. PVC pipe may also conform to ASTM C-900 or ASTM C-905.

#### 14.2.4 Ductile Iron Pipe

Ductile iron pipe shall conform to ANSI A12.5-1 or AWWA C150-1. Class of pipe shall be as specified in the bid form or the plans.

#### 14.2.5 A2000 Plastic (Storm Only)

All A2000 plastic pipe and fittings shall conform to ASTM F949 specifications.

#### 14.2.6 Corrugated Polyethylene (Storm Only)

Corrugated polyethylene pipe, double wall, and fittings shall be made of polyethylene compounds which conforms with the physical requirements of Type III, Category 3, 4 or 5, P23, P33, P34, Class C with the applicable requirements defined in ASTM 1248. Spiral pipe is not acceptable.

#### 14.2.7 PVC Rib (Storm Only)

PW Rib pipes and fittings shall be made of PVC, as defined in ASTM D1784. The pipe stiffness shall correspond with the series as determined in accordance with ASTM D2412. Series 46 and 28 are allowed.

#### 14.2.8 Tee Fittings

##### A. General

A tee fitting shall be provided in the sewer main for each sanitary and/or storm side sewer. All fittings shall be of sufficient strength to withstand all handling and load stresses encountered. All fittings shall be of the same materials as the pipe unless otherwise approved. Fittings shall be free from cracks and shall adhere tightly to each joining surface. All fittings shall be capped or plugged and gasketed with the same gasket material as the pipe joint, fitted with an approved mechanical stopper, or have an integrally cast knockout plug. The plug shall be able to withstand all test pressures without leaking and when later removed, shall permit continuation of piping with joints similar to those in the installed line.

##### B. Ductile Iron

Fittings shall be mechanical or push-on of the class specified. Mechanical joint cast iron fittings shall conform to AWWA C110 and shall be of a class at least

equal to that of the adjacent pipe. Push-on joint fittings shall be gray iron with body thickness and radii of curvature conforming to ANSI A21.10.

#### C. PVC

Fittings shall conform to the applicable portions of the following specifications: ASTM D1785, ASTM D2729, ASTM D2466, ASTM 2467, ASTM D3034, and ASTM D3033. Fitting joints shall be the same as the pipe joints.

#### 14.2.9 Mechanical Couplings

Mechanical couplings shall be wrought steel or ductile iron. For all pipes except PVC, couplings shall be Fernco or approved equal. For PVC pipe, use only the PVC repair sleeve. Diameter of the coupling shall be compatible with the outside diameter of the pipe on which the coupling is installed. All joint accessories shall be furnished with mechanical couplings. Dimensions of all existing pipelines shall be verified in the field before ordering couplings.

### 14.3 PROOF TESTS

The City may require that a joint system be prequalified as to the watertightness capability of the joint system. The manufacturer shall provide material and test equipment for proof testing. Each pipe material and joint assembly may be subject to any of the following proof tests at the discretion of the City.

#### 14.3.1 Pipe in Straight Alignment

No less than three, or more than five pipes selected from stock by the City shall be assembled according to the manufacturer's installation instructions with the ends suitably plugged and restrained against internal pressure. The pipe shall be subjected to 10-psi hydrostatic pressure for 10 minutes. Free movement of water through the pipe joint wall shall be grounds for rejection of the pipe.

#### 14.3.2 Pipe in Maximum Deflected Position

The test section shall be assembled as described for each pipe type. The pipe shall be subjected to 10-psi hydrostatic pressure for 10 minutes. Free movement of water through the pipe joint or pipe wall shall be grounds for rejection of the pipe.

#### 14.3.3 Joints Under Differential Load

The test section shall be supported on blocks or otherwise as described. There shall be no visible leakage when the stressed joint is subjected to 10-psi internal hydrostatic pressure for 10 minutes.

#### 14.3.4 Test Configuration

A. Concrete Pipe

For deflected position tests on concrete pipe, a position one-half inch wider than the fully compressed position shall be created on one side of the outside perimeter. For differential load tests, one pipe shall be supported so that it is suspended freely between the adjacent pipe and bearing only on the joints. In addition to the weight of the suspended pipe, a test load shall be added as given in the following table:

**TEST LOADS FOR PIPES UNDER DIFFERENTIAL LOAD**

Pipe Size (Inches)	Load/Foot Lgth up to 4' (Pounds)	Total Load for Pipe 4' and Over (Pounds)
4	650	2,600
6	1,000	4,000
8	1,300	5,200
10	1,400	5,600
12	1,500	6,000
15	1,850	7,400
18	2,200	8,000
21	2,500	10,000
24 and over	2,750	11,000

B. Ductile Iron Pipe

For deflected position, a position 1/2-inch wider than the fully compressed section shall be created on one side of the outside perimeter. For differential load, one of the pipes shall be supported so that it is suspended freely between adjacent pipe and bearing only on the joints. A force shall be applied per the following table along a longitudinal distance of 12-inches immediately adjacent to one of the joints:

**TEST LOADS FOR PIPES UNDER DIFFERENTIAL LOAD**

Pipe Size (Inches)	Force (Pounds)	Pipe Size (Inches)	Force (Pounds)
4	600	15	3,700
6	900	18	4,400
8	1,200	21	5,000
10	1,500	24 and over	5,500
12	1,800		

C. PVC Pipe

For deflected position, two 12-1/2 foot lengths shall be joined, then deflected along an arc of 720-foot radius (0.11 feet offset at the end of each length from a tangent at the joint). For differential load, two lengths shall be joined and uniformly supported for at least two feet on both sides of the joint and adjacent pipe to 95 percent of its vertical diameter.

## 14.4 CONSTRUCTION

### 14.4.1 Ground Water

Pipe shall not be placed in water. Ground water shall be controlled such that softening of the bottom excavation or formation of "quick" conditions during excavation is prevented.

When laying a sanitary sewer, inflow of water from the trench shall be prevented from entering into the sanitary sewer line. A plug shall be installed in the downstream sanitary manhole at the end of each day's work period, or when so ordered by the City. The accumulated water shall be pumped out at the beginning of each day. Precautions shall be taken to prevent the uplift or floating of the line prior to the completion of the backfilling operation.

### 14.4.2 Bedding

Pipes shall not be placed on blocking or any material other than Bedding material in conformance with Section 12.3.3. Bell holes shall be excavated at each joint of sufficient depth that bells do not touch base or native material. Pipe base shall be fine graded by hand to give uniform, even support to the barrel of the pipe.

### 14.4.3 Pipe Distribution

Pipe, which cannot be physically handled by workers, shall be unloaded by approved means. Pipe shall not be unloaded by dropping from the bed of a truck to the ground or in any manner that will result in damage to the pipe. Contractor shall distribute material on the job in an orderly and timely fashion.

All pipe and fittings shall be inspected prior to lowering into trench to insure no cracked, broken, or otherwise defective materials are being used. Ends of pipe shall be cleaned thoroughly. Foreign matter and dirt shall be removed from inside of pipe. Pipe shall be kept clean during and after placement.

Contractor shall use approved implements, tools and facilities for the safe and proper protection of the work. All damaged pipes shall be removed from the job site.

### 14.4.4 Pipe Line and Grade

Deviation from line or grade as established by the City shall not exceed 1/2-inch for line and 1/4-inch for grade at any point, provided that such deviations do not result in a level or reverse sloping grade. Grade shall be measured at the pipe invert, not at the top of the pipe. The Contractor shall constantly check line and grade and in the event they do not meet the limits described, the work shall be immediately stopped, the City notified, and the cause remedied before proceeding with the work.

#### 14.4.5 Pipe Laying

Pipe placement shall proceed upgrade with spigot ends pointing in direction of flow. After a section of pipe has been lowered into the prepared trench, the contractor shall clean the end of the pipe to be joined; the inside of the joint and the rubber ring shall be cleaned immediately before joining the pipe. The joint shall be assembled in accordance with the recommendations of the manufacturer of the type of joint used. The Contractor shall provide all special tools and appliances for the jointing assembly.

After the joint has been made, pipe shall be checked for alignment and grade. The trench bottom shall form a continuous and uniform bearing and support for the pipe at every point between joints.

The contractor shall not break into an existing sanitary sewer line until the system has been tested and ready for acceptance by the City. When a contractor ties into a "live" sanitary line, the contractor shall keep the new line plugged at the downstream end of the construction to prevent entry of groundwater and debris into the system.

#### 14.4.6 Concrete Closure Collars

Closure collars shall be used only with prior approval of the City, and then only to make connections between dissimilar pipe or where standard rubber-gasketed joints are impractical. The contractor shall pour closure collars against undisturbed earth. The Contractor shall wash pipe to remove all loose material and soil from the surface on which the concrete will be placed. The Contractor shall wet nonmetallic pipe thoroughly prior to pouring the collars. The Contractor shall wrap and securely fasten a light gauge of sheet metal or building felt around the pipe to insure that no concrete shall enter the line. The entire collar shall be constructed in one pour and extend a minimum of 12 inches on each side of the joint. The minimum thickness around the outside diameter of the pipe shall be 6 inches. No collar shall be poured in water. After the collars are poured and have taken their initial set, the collar shall be covered with well-moistened earth for final curing.

#### 14.4.7 Transition Fittings



When joining different types of pipes, the Contractor shall use approved rigid fittings. No flexible fittings will be approved. Bell type couplings are considered flexible and are not acceptable.

A. Shear Ring/Ridge Couplings

Shear ring/rigid transition couplings meeting the ASTM C564 or equal shall be used.

B. PVC Couplings

PVC couplings or adapters shall meet the ASTM 3034-SDR 35/C900-DR 18-D1784 specifications.

C. Ductile Iron Couplings

Ductile iron transition couplings shall meet the ASTM A536-80 for center and end rings, ASTM D2000 3 BA75 for gaskets and AWWA C-111-80 for bolts and nuts.

14.4.8 Placing Pipe Zone Material

Pipe Zone Material shall be placed uniformly on both sides of the pipe up to 6-inches above the pipe. For reinforced pipe material, pipe zone material shall be placed up to horizontal centerline of pipe. Pipe Zone Material shall be placed in lifts not exceeding 6-inches and each lift shall be sliced with a hand shovel to insure that there are no voids beneath the pipe, and compacted.

14.5 PRECAUTIONS

14.5.1 Foreign Material

The Contractor shall prevent excavated or other foreign material from getting into the pipe during the placement operation. At all times when pipe laying operations are not in progress, the Contractor shall close and block the open end of the last laid section of pipe to prevent entry of foreign material or creep of the gasketed joints.

14.5.2 Movable Shield

When pipe is laid within a movable trench shield, the Contractor shall take all necessary precautions to prevent pipe joints from pulling apart when moving the shield ahead. The bottom of the shield shall not extend below the springline of the pipe without recompacting the pipe zone.

14.5.3 Cutting Pipe

When cutting and/or machining the pipe is necessary, the Contractor shall use tools and methods recommended by the pipe manufacturer and approved by the City. The contractor shall cut cast iron or ductile iron pipes with milling type cutter or with rolling pipe cutter and shall not be flame cut.

## 14.6 ACCEPTANCE TESTS

### 14.6.1 General

All sanitary sewers shall pass the required hydrostatic or air tests, pass the required compaction test, be video inspected, and be free of visible leaks. All aluminum and other flexible pipes shall pass a deflection test. All storm sewers shall be video inspected and pass the required compaction test.

The City shall determine whether the pipe must pass a hydrostatic or air test. All pipe openings shall be plugged with gasketed caps or plugs securely fastened or blocked to withstand internal test pressures. Plugs and caps shall be removable and after removal shall not affect the installation of additional pipes or appurtenances to the tested pipe. Contractor shall furnish all test equipment and shall provide the City with satisfactory evidence that gauges for air testing are properly calibrated.

Acceptance tests shall only be performed after all house service laterals, manholes, and backfilling are complete. Infiltration of ground water, following a successful hydrostatic or air test as specified, shall be considered evidence that the original test was in error or that subsequent failure of the pipeline has occurred. The Contractor shall promptly correct such failures should they occur within the warranty period.

### 14.6.2 Cleaning Prior to Test

Prior to the internal pressure and deflection testing, the Contractor shall flush and clean all parts of the system. The Contractor shall remove all accumulated construction debris, rock, gravel, and other foreign material from the system. If necessary, the Contractor shall use mechanical rodding equipment. If any foreign matter is present when the City conducts the final inspection, those sections not passing inspection shall be reflashed and cleaned. Under no circumstances shall any material be allowed to enter the downstream existing sewer system.

### 14.6.3 Deflection Test

The Contractor shall conduct a deflection test on all plastic aluminum pipes installed prior to acceptance by the City. The test shall be conducted by pulling an approved mandrel through the completed pipeline. The diameter of the mandrel shall be 95 percent of the nominal pipe diameter for plastic pipe and 92 percent of the nominal pipe diameter for aluminum pipe. The mandrel shall be a rigid,

nonadjustable, odd-numbering-leg (9 legs minimum) mandrel having an effective length of not less than its nominal diameter.

Deflection testing shall be conducted after the line has been completely balled and flushed out with water, and compaction tests completed and accepted. Sanitary sewer line air test must be completed and accepted. The contractor will be required to locate and repair any sections failing to pass the deflection test and to retest the section with air (sanitary only) and deflection tests.

#### 14.6.4 Air Testing

After completion of the sewer system including service connections, compaction testing where required, and backfilling, the contractor shall conduct a low-pressure air test. The contractor shall provide all equipment and personnel for the test. The method, equipment, and personnel shall be subject to the approval of the City. The City may at any time require a calibration check of the instrument used. The pressure gauge used shall have minimum divisions of 0.10 psi and have an accuracy of 0.0625 psi. All air used shall pass through a single control panel.

##### A. Safety Precautions

All plugs used to close the sewer for the air test must be capable of resisting the internal pressures and must be securely braced. All air testing equipment must be placed above ground and no one shall be permitted to enter a manhole or trench where a plugged line is under pressure. All pressure must be released before the plugs are removed. The testing equipment must include a pressure relief device designed to relieve pressure in the line under test at 10 psi or less and must allow continuous monitoring of the test pressures in order to avoid excessive pressure. The Contractor shall use care to avoid the flooding of the air inlet by ground water.

##### B. Air Test Procedure

Prior to conducting the air test, the Contractor has the option of wetting the lines. The Contractor shall determine the height of the ground water table at the time of the test. The air test pressure shall be increased 0.433 pounds per square inch (psi) for each foot of average water depth over the line. After all plugs are secured, air shall be added into the pipe section being tested until the internal air pressure reaches 4.0 psi greater than the average back pressure of any ground water that may submerge the pipe. A minimum of two minutes shall be allowed for the air temperature to stabilize adding only the amount of air required to maintain pressure. The time shall be recorded in seconds that it takes for the internal air pressure to drop from 3.5 psi to 2.5 psi greater than the average back pressure of any ground water for concrete pipe. For plastic pipe the time shall be recorded in seconds that it takes for the internal air

pressure to drop from 3.5 psi to 3.0 psi greater than the average back pressure of any ground water.

C. Basis of Acceptance for Gravity Sewers

The pipe section being air tested shall be considered acceptable when the total rate of air loss does not exceed 0.003 cfm per square foot of internal pipeline surface, or 2.0 cubic feet per minute whichever is greater. If a line fails to meet these requirements, the Contractor shall determine at his expense, the reason for leakage and shall repair or replace all defective materials or workmanship.

14.6.5 Television Inspection

Upon completion of all construction, repairs and tests, the contractor shall commence television inspection of the system. Any problems with the system will be recorded and the Contractor will be required to correct all deficiencies at no expense to the City.

14.7 MEASUREMENT AND PAYMENT

Payment for pipe shall be based upon the unit price per linear foot as stated in the Bid for the various classes, types and sizes of pipe installed as shown or as directed by the City. Payment shall be based on the actual number of feet installed as measured horizontally from center-to-center of manholes or to the end of the pipe, whichever is applicable. The unit price per linear foot shall constitute full payment for the pipe in place, pipe bedding, backfill in the pipe zone, leakage testing, closure collars and all other work specified. No payment for pipe in place will be made until the pipe has successfully passed the air or hydrostatic test. The City will withhold full payment on any section of pipe deemed unsatisfactory due to excessive leakage, pressure drop, failure to pass the required test, or any other cause until such defects have been corrected in accordance with the intent of these Contract Documents to the satisfaction of the City.

END OF CHAPTER

**CHAPTER 15**  
**STREET RESTORATION**

15.1 SCOPE

This section covers the work necessary for the replacement of pavement and other street features.

15.2 MATERIALS

15.2.1 Course Rock

A. Base Course Rock

Rock for the base course of the street shall be 1-1/2 inch minus and shall conform to the applicable portion of the Standard Specifications for Highway Construction of the Oregon Department of Transportation for course aggregate base material.

B. Crushed Rock - Leveling Course Rock

Rock for leveling course shall be 3/4 inch, and shall conform to Section 12.3.5.

15.2.2 Asphalt Concrete

A. Surface Course

Asphalt concrete for the surface course shall be Class C mix and shall conform to the Standard Specifications for Highway Construction of the Oregon Department of Transportation. The surface course mix design is subject to City's approval.

B. Base Course

When more than 2 inches of asphalt concrete is required, the asphalt concrete shall be placed in lifts of no more than two inches each. The base course shall be Class B asphalt concrete mix and shall conform to the Standard Specifications for Highway Construction of the Oregon Department of Transportation.

15.2.3 Tack Coat

Materials for the tack coat shall be emulsified asphalt type RS-1, CSS-1 or approved equal and shall conform to the applicable portions of the Standard Specifications for the Oregon Department of Transportation.

#### 15.2.4 Cold Mix Asphalt

Asphalt for temporary pavement replacement shall be SC-800, and shall meet the requirements of Specification Series No. 2 of the Asphalt Institute. The maximum aggregate size shall be 3/4 inch. The final mixture shall contain from 4 to 6 percent liquid asphalt by weight of total mix.

#### 15.2.5 Concrete

Concrete for curbs, sidewalks, and concrete driveways shall conform to ASTM C 94, Alternate 2 and shall have a design mix that will have 3,000 pounds per square inch compressive strength in 28 days. The concrete mix shall contain no less than 5-1/2 sacks of cement per cubic yard.

##### A. Concrete Forms

All forms for curbs and sidewalks shall be 2-inch dimensioned lumber, plywood or metal forms. Forms on the face of the curb shall have no horizontal form joints within 11 inches of the top of the curb.

##### B. Curing Compound

Curing compound shall be approved commercial grade and shall conform to ASTM C 309, Type I.

##### C. Reinforcing Steel

Reinforcing steel shall conform to ASTM A 615, Grade 40.

### 15.3 CONSTRUCTION

#### 15.3.1 Trench Maintenance Prior to Permanent Pavement

When traffic will pass over backfilled trenches before they are paved, the top of the trench shall be maintained in a condition that will allow normal vehicular movement to continue. Temporary pavement placement of a 1-inch lift of an approved cold-mix asphalt shall be installed above all trenches that cross-paved streets on the same day as backfilling.

If Contractor fails to install or maintain the cold-mix asphalt surfacing, City may do so and deduct such costs from payments due Contractor. The installation of cold-mix asphalt surface shall not release Contractor from the responsibility to complete the paving as specified in this Section. Clean up operations shall follow immediately behind backfilling and the work site shall be kept in an orderly condition at all times. The costs for installing and maintaining temporary trench patches shall be borne by Contractor.

### 15.3.2 Trench Preparation

The trench shall be brought to a smooth, even grade at the correct distance below the top of the existing pavement surface to allow for the placement of leveling rock and asphalt concrete. If cold mix asphalt has been installed, the cold mix shall be removed entirely prior to paving. Contractor shall trim existing pavement so that the trench width plus 12-inches of asphalt is removed, creating a "T" cut section, and all pavement shall be removed which has been damaged or which is broken or unsound. The asphalt edge shall be smooth and sound for joining the new asphalt pavement. Trimming the asphalt edge shall be accomplished by use of a saw, or approved equal.

If City requests, Contractor shall trim off and repave sections of surrounding pavement that show indications of base failure or deterioration resulting from construction activities.

The top 8 inches of pavement subgrade shall be compacted to 95 percent relative density in accordance with ASTM D 2049. Supplementary compaction shall be accomplished where required with approved mechanical vibrating or power tampers.

After the leveling course has been compacted, Contractor shall apply an asphalt tack coat at 0.06 to 0.12 gallon per square yard to the edges of the existing pavement and manhole frames. The surface upon which the tack coat is applied shall be dry and clean of dirt and other matter detrimental to the adherence of asphalt.

### 15.3.3 Placing Asphalt

#### A. Pavement Replacement Thickness

Pavement shall be replaced to match the existing pavement thickness, with a minimum allowable thickness of 3 inches, or as directed by the governing authority and approved by the City.

#### B. Weather Conditions

Asphalt concrete shall not be placed when the atmospheric temperature is lower than 40 degrees Fahrenheit, or when the surface upon which it is to be placed is frozen or wet. Exceptions will be permitted only in special cases and only with the prior written approval of City.

#### C. Base Course

If a base course of asphalt is required, Contractor shall place the base course on the prepared subgrade over the trench to a depth of 2 inches. The asphalt concrete shall then be spread and leveled.

The asphalt shall be compacted by rolling or by use of hand tampers where rolling is impossible. Power rollers shall be capable of providing compression of 250 pounds per inch of width.

#### D. Surface Course

The surface course of asphalt concrete shall be placed to the required depth. The asphalt concrete shall be spread and leveled with hand tools or by use of a mechanical spreader, depending upon the area to be paved. Asphalt concrete shall be brought to the proper grade and compacted to 90 percent relative density by rolling or the use of hand tampers where rolling is impossible. Power rollers shall be capable of providing compression of 250 pounds per inch of width. The rolling shall start from the outside edge of the replacement, progressing toward the existing surface, lapping the existing surface at least one-half the width of the roller. If existing surfacing bounds both edges of the replacement, the rolling shall start at the edges of the replacement, lapping the existing surface at least one-half the width of the roller, and progressing toward the center of the replacement area. Each preceding track shall be overlapped by at least one-half the width of the roller and sufficient passes shall be made over the entire area to produce the desired result as determined by City.

The finished surface of the new compacted paving shall be flush with the existing surface and shall conform to the grade and crown of the adjacent pavement. Immediately after the new paving is compacted, all joints between the new and original asphalt pavement shall be painted and sealed with hot asphalt or asphalt emulsion and be covered with dry paving sand before the asphalt solidifies. Each manhole frame, water valve frame and other appurtenance that exists in the new paving shall be sealed with asphalt emulsion.

#### 15.3.4 Sidewalks, Curbs and Concrete Driveways

Sidewalks, curbs and driveways shall be replaced to the section width, depth, line and grade as required by the responsible jurisdiction and/or City. On private property or in other areas not under the jurisdiction of a public agency, the replacement work shall match the existing walk, curb, driveway, etc., in quantity, quality and finished appearance. All discontinuous edges shall be finished with a suitable edging tool.

Concrete sidewalks shall be replaced between scored joints and replacement shall be made in a manner that will avoid a patched appearance. Curbs and sidewalks



shall be finished in a way that is similar to the existing and abutting areas. A minimum of 2-inch thick compacted leveling course of clean 3/4 inch minus rock shall be used as a subgrade under all sidewalks. The Contractor has the option of tunneling under curbs and sidewalks. If any subsequent cracking, subsidence, or any other indication of failure occurs within the warranty period, the damaged section shall promptly be replaced at no additional cost to City.

#### 15.3.5 Protection of Structures

Contractor shall provide whatever protective coverings may be necessary to protect the exposed portions of bridges, culverts, curbs, gutters, posts, guard fences, road signs, and any other structures from splashing oil and asphalt caused by the paving operations. Contractor shall remove any oil, asphalt, dirt, or other undesirable matter that accumulates upon these structures by reason of the paving operations.

Where water valve boxes, manholes, catch basins, or other underground utility appurtenances are within the area to be surfaced, the resurfacing shall be level with the top of the existing finished elevation of these facilities. If it is evident that these facilities are not in accordance with the proposed finished surface, Contractor shall notify City to have the proper authority contacted in order to have the facility altered before proceeding with the resurfacing around the obstruction. Any delays experienced from such obstructions shall be considered incidental to the paving operation. No additional payment shall be made for such delays.

#### 15.3.6 Settlement of Pavement

Contractor shall repair all pavement settlement over the sewer trench within the warranty period at no additional charge to City.

### 15.4 MEASUREMENT AND PAYMENT

Payment for the work under this Chapter shall be considered full compensation for furnishing all labor, materials, and equipment to complete the work as specified under this section. Payment for temporary "cold-mix asphalt" pavement is included in the unit prices for Trench Excavation and Backfill.

#### 15.4.1 Asphalt Concrete Pavement Replacement

When the trench centerline crosses asphalt concrete driveways or walks or is under or at the edge of existing pavement, payment for asphalt concrete pavement shall be based on the unit price per linear foot of centerline of trench (for the full width of the disturbed or damaged surface) stated in Contractor's proposal. The number of linear feet will be measured by City. The unit prices shall include payment for the excavation required to provide space for the surfacing, preparation of the trench,

including the addition of crushed rock to the subgrade and compaction of the subgrade, disposal of all excess excavated materials, and all other work required to complete the resurfacing.

Should Contractor elect to jack or tunnel under certain sections of pavement, payment will be made as though removal and replacement had been accomplished.

#### 15.4.2 Sidewalks, Curbs, and Driveways

Payment for driveway and sidewalk replacement shall be based on the unit price per square foot as stated in Contractor's Proposal. Payment for sidewalk replacement will be limited to sidewalks replaced within 5 feet of the trench centerline. All sidewalks damaged outside of these limits shall be replaced at Contractor's expense.

Payment for concrete curb replacement shall be based on the unit price per linear foot as stated in Contractor's Proposal. Payment for curb replacement will be limited to curbs replaced within 5 feet of the trench centerline. All curbs damaged outside of these limits shall be replaced at Contractor's expense. No differentiation for payment will be made between curb and monolithic curb and gutter sections.

If Contractor elects to tunnel under curbs, sidewalks, driveways, etc., payment will be the same as if the structures were actually removed and replaced.

END OF CHAPTER

## CHAPTER 16

### LANDSCAPE RESTORATION

#### 16.1 SCOPE

This section covers the work necessary for restoration of the landscape.

#### 16.2 MATERIALS

##### 16.2.1 Plants

All plants shall be grown within the Willamette Valley and be of local genetic stock. Plants shall be first-class representatives of their normal species or varieties as follows: The branch system shall have normal development and be free from disfiguring knots, sunscald, injuries, abrasions of the bark, dead or dry wood, or other objectionable disfigurements. Trees shall have reasonably straight stems and be well branched and symmetrical in accordance with their natural habits of growth. Grading of plants shall conform to the "American Standard for Nursery Stock," as approved by the American National Standard Institute. Plants shall be free from plant diseases and insect pests.

Should it be necessary to substitute a plant of a different variety than the plant material specified, the Contractor shall secure approval from the City for the substitution prior to digging the plants. An approved substitute plant shall be of equal or greater value to the specified plant for which the substitution is being made.

##### 16.2.2 Seed

All seed shall be collected within the Willamette Valley and be of local genetic stock. Seed shall be from blue tag stock and from the latest crop available. Each variety shall be from tested seed and shall be delivered in standard sealed containers labeled in accordance with Oregon State laws and U.S. Department of Agriculture rules and regulations under the Federal Seed Act in effect on the date of invitation of bids. The percentage of purity, germination and maximum weed content shall be as set forth in the General Seed Certification Standard by Oregon State University Certification Board or as specified. The label shall show the variety of seed, the percentage of germination, purity and weed content, and the date of test. The seed shall have been tested within nine months of date of delivery and shall not be moldy or show evidence of having been wet or otherwise damaged.

*The City shall approve all grass seed prior to application. Seed not meeting the requirements of these specifications or not labeled as specified, will be rejected and shall be replaced with seed conforming to the specifications.*

Grass seed may be delivered to the project as a mixture, providing each variety of grass seed in the mixture is identified and labeled as specified or a certification from the supplier is attached giving the percentage of each variety of grass seed in the mixture and the percentage of purity, germination, and weed content.

### 16.2.3 Seed Mix

Seed mixes to be used are as follows:

Zone A, B1, B2, C – PEM, PSS/PFO Wetlands & Stormwater Swale:

29% Tufted hairgrass (*Deschampsia Cespitosa*)  
18% Slender hairgrass (*Deschampsia Elongata*)  
24% Slender rush (*Juncus tenuis*)  
29% Spike bent grass (*Agrostic Exarata*)

Zone D1, D2, E - Upland Areas:

2% Western yarrow (*Achillea millefolium*)  
18% California oatgrass (*Danthonia californica*)  
38% Blue wildrye (*Elymus glaucus*)  
38% Meadow barley (*Hordeum brachyantherum*)  
4% Meadow checkerbloom (*Sidalcea campestris*)

All percentages specified are by weight.

### 16.2.4 Fertilizer

Fertilizer shall be furnished in moisture-proof bags. Each bag shall be marked with the grade, weight and the manufacturer's analysis of the contents showing the percentage for each ingredient contained therein. Fertilizer shall be furnished in a dry condition, free from lumps and caking. Fertilizing material shall not contain toxic ingredients or fillers in quantities harmful to human life, animals, or plants. Fertilizer shall be standard commercial grade, conforming to state and federal laws.

Fertilizer shall have the following minimum percentage of plant food by weight for soil preparation: 16 percent nitrogen, 16 percent phosphoric acid, 16 percent potash, and 5 percent iron.

### 16.2.5 Mulch

#### A. Straw Mulch

Sterile, straw mulch shall consist of native bent grasses, blue grasses, fescues and rye grasses, singly or in combination. Straw mulch shall not be musty,

moldy, caked, decayed or of otherwise low quality, and shall be free of noxious weeds and includes no seed heads.

B. Bark Mulch

Bark mulch shall be ground or broken particles from bark of fir, pine, or hemlock trees and shall be free from weed seeds, harmful bacteria or disease spores and substances toxic to plant growth. The mulch shall be of the size commonly known as "medium bark mulch."

C. Compost

The compost shall be derived from plant material and shall be the result of biological degradation of plant derived materials under conditions designed to promote aerobic decomposition. The material shall be well composted, free of viable weed seeds and stable in regard to oxygen consumption and carbon dioxide generation. The compost shall have no visible free water and produce no dust when handled. The compost shall meet the following criteria as reported by the US Composting Council STA Compost Technical Data Sheet provided by the vendor.

1. 100% of the material shall pass through a ½-inch screen.
2. The pH of the material shall be between 6 and 8.
3. Manufactured inert material shall be less than 1.0% by weight.
4. Organic matter shall be between 30% and 70% by dry unit weight.
5. Soluble salt content shall be less than 6.0 mmhos/cm.
6. Maturity Indicator shall be greater than 80% for germination and vigor.
7. Stability shall be "Stable" to "Very Stable."
8. Carbon/Nitrogen (C/N) ratio shall be less than 25:1.
9. Trace metals test result must "Pass."

Compost shall consist of either cleaned sanitary biosolids or other organic compost, free from weed seeds, harmful bacteria, or disease spores and substances toxic to plant growth.

16.2.6 Matting/Blankets

Matting shall be jute matting, coir matting, coconut matting or geotextile matting, as defined in the Clean Water Services' Erosion Prevention and Sediment Control Measures and BMP's (Chapter 4, Table 4.3) or equal, approved in writing by the City. Plastic reinforced matt/blanket shall not be used in active stream areas.

A. Jute Matting

Jute matting shall be heavy-duty netting and shall consist of a uniform open plain weave of single jute yarn. The yarn shall be of loosely twisted construction

and shall not vary in thickness by more than one half of its normal diameter. The weave shall provide openings approximately 1-inch square. The matting shall be in widths of 45 inches or more and shall weigh not less than 0.9 pounds per square yard. It shall be furnished in continuous lengths of not less than 150 feet. Staples for use with jute matting shall be of 12-gauge or heavier steel wire bent U-shaped approximately 1-½ to 2 inches in width and shall be not less than 12 inches long unless hard pan soil conditions dictate and shorter lengths are approved in writing by the City.

B. Coir Matting

Coir matting shall be heavy-duty coconut fiber netting. Coir matting shall consist of 0.35 inch thick twisted bristle coir twines with tensile strength ranging from 75 to 150 lbs. /inch, in wet condition. The weave shall be of grade 7 (½ inch openings, 23 oz/sq. yd.) or grade 9 (less than ½ inch openings, 29 oz/sq.yd.) depending on the site application. It shall be furnished in continuous lengths of not less than 150 feet. Staples for use with coir matting shall be 12 gauge or heavier steel wire, bent U-shaped and be approximately 1-½ to 2 inches in width and not less than 12 inches long, unless approved by the City.

C. Coconut Blankets

Biodegradable coconut blankets shall consist of a double net jute mesh interwoven over a coconut fiber matrix, 80% of which shall be of consistent thickness with the fibers evenly distributed over the entire area of the blanket. The top and bottom netting shall be biodegradable and weigh a minimum of 9 pounds per 100 square feet. The coconut fiber shall weigh a minimum of 0.5 pounds per square yard.

D. Geotextile Matting

Geotextile matting shall be a green, highly flexible polymeric mat possessing an intricate three-dimensional web-like weave. The mat shall be a minimum of ¼ inches thick. The matting shall be resistant to ultraviolet light degradation and have had testing to prove maintenance of physical properties over a minimum of 16 months.

## 16.3 CONSTRUCTION

### 16.3.1 Wetland Restoration, Zones A, B, C

For the areas designated as wetlands as defined by the Oregon Department of State Lands and/or the U.S Army Corps of Engineers, the Contractor shall restore such areas as described in this section.

Upon completion of backfilling, the Contractor shall remove all excess excavated material. The Contractor shall meet all permit requirements of the government agencies that have jurisdiction of restoration of the area. The area shall be raked and graded to conform to its original contours and elevations or as shown on the construction plans. The surface soil on all areas to be seeded shall be in a condition favorable for germination and growth of native grass seed, trees and shrubs. A minimum of 12 inches of surface soil shall be installed in a loose condition prior to seeding, free from rock, and free from clods larger than one inch in diameter.

A. Seeding

Unless otherwise approved by the City, this work should be performed during either the "spring season" (February 1 to May 31), or the "fall season" (September 1 to November 30). The work shall be performed only at times when local weather and other conditions affecting the work are favorable to proper prosecution within the specified time periods. Seed shall be applied uniformly at the rate of 5.73 pounds per acre for wetland seed mix. No seeding is to take place until approval of surface preparation by the City. The work under this specification shall not be undertaken when wind velocities would prevent uniform application of the materials involved or when winds would drift the materials to areas on which they are not desired.

B. Placing Sterile Straw Mulch

Sterile straw mulch materials on seeded areas shall be placed not later than two work days after seeding. Straw material shall be maintained in place by whatever means may be appropriate. The Contractor shall be responsible for the replacement of any material, which becomes displaced prior to acceptance of the work.

Straw material shall be placed to a reasonably uniform thickness, within the range of 1½ to 2½ inches, and averaging approximately 2 inches in loose condition. This rate requires approximately two tons of dry straw per acre. The straw shall be loose enough for sunlight to penetrate and air to circulate, but dense enough to shade the ground, reduce the rate of water evaporation, and prevent or materially reduce erosion of underlying soil.

C. Planting

Plant placement shall be consistent with naturally occurring plant communities. Trees and shrubs shall be placed in singles or clusters of the same species to provide a natural planting scheme. Random planting pattern shall be utilized to avoid straight rows, and randomly mix different plant species.

The contractor shall be responsible for a two-year plant establishment and maintenance period. Installed plants that fail to meet the acceptance criteria per Clean Water Services Design & Construction Standards Appendix A – Planting Requirements shall be replaced during the two-year plant establishment and maintenance period.

### 16.3.2 Upland Restoration, Zones D, E

#### A. Site Preparation

Upon completion of backfilling, the Contractor shall remove all excavated material and restore or replace the native topsoil. All areas shall be raked and graded to conform to their original contours and shall be free draining, free from holes, rough spots or other surface features detrimental to a seeded area. The surface soil on all areas to be seeded shall be in a condition favorable for germination and growth of native grass seed, shrubs, and trees. A minimum of 8- 12 inches of surface soil shall be in a loose condition prior to seeding or planting, free from rock, and free from clods larger than one inch in diameter. If Engineer determines that surface soil needs soil amendments or conditioners the following shall be completed:

1. The sub-grade within the (designated) upland areas shall be tilled to a depth of at least 12 inches and,
2. at least 4 inches of clean, compost-amended soil shall be uniformly applied to all disturbed areas throughout the site and tilled in to a depth of 8 inches.

The compost-amended topsoil shall have at least 35% organic matter (by bulk density) to ensure a good growing medium for the selected plants.

#### B. Seeding

Unless otherwise approved by the City, this work shall be performed during either the "spring season" (February 1 to May 31), or the "fall season" (September 1 to November 30) and only at times during these seasons when local weather and other conditions affecting the work are favorable to proper execution. Seed shall be applied uniformly at the rate of 24.65 pounds per acre for upland seed mix. No seeding is to take place until approval of surface preparation by the City. The work under this specification shall not be undertaken when wind velocities would prevent uniform application of the materials involved or when winds would drift the materials to areas on which they are not desired.

#### C. Placing Sterile Straw Mulch



Sterile straw mulch materials on seeded areas shall be placed not later than two work days after seeding. Straw material shall be maintained in place by whatever means may be appropriate. The Contractor shall be responsible for the replacement of any material, which becomes displaced prior to acceptance of the work.

Straw material shall be placed to a reasonably uniform thickness, within the range of 1½ to 2½ inches, and averaging approximately 2 inches in loose condition. This rate requires approximately two tons of dry straw per acre. The mulch shall be loose enough for sunlight to penetrate and air to circulate, but dense enough to shade the ground, reduce the rate of water evaporation, and prevent or materially reduce erosion of underlying soil.

D. Placing Coconut Blanket

In the disturbed area within 5 feet of a stream bank, the Contractor shall apply Zone 2 seed mixture (see Section 16.2.3). Coconut blanket shall be placed across the stream channel with the ends tied into the toe of the stream bank by placing rock or tacking down with 2" x 2" x 18" wood stakes. The blanket shall be overlapped 4 inches with the upstream piece overtopping the downstream piece. Rocks, large woody debris, and pole cuttings shall be used to hold the blanket in place. On smaller, low velocity streams, the blanket may be installed parallel to the stream and held in a similar manner.

E. Placing Riprap

Clean, non-erodible, upland angular rock of sufficient size shall be used as riprap for long-term armoring of the storm outfall to be improved. Placement of armament material shall protect the existing embankment and box culvert wingwall and headwall from erosion in the case of a storm event. Banks shall be sloped as shown on the drawings prior to riprap placement. Riprap shall have a toe trench (a foundation below the substrate level) and be tied into the embankment. Gravel or filter fabric shall be placed behind riprap rock as a filter blanket.

F. Placing Coir Matting

Matting shall be placed over the areas to be protected from erosion. Seeding should occur on the bank before and after matting placement. The matting shall be placed perpendicular to the stream flow with each matting piece overlapping 4 to 6 inches. The end of the upstream piece shall be on top of the downstream piece. Matting shall be secured at the toe of the slope with rock, stakes, or trenching. Matting shall extend a minimum of 5 feet past the top of creek bank. Matting shall be held in place by wooden stakes at all four corners

of each piece, and at 4-foot centers throughout the coverage area. Staples shall also be placed along lapped edges of matting every 1 to 2 feet.

## 16.4 MAINTENANCE

### 16.4.1 Plants in Zone A Areas

All plant materials shall be guaranteed for two years following installation. The Contractor shall replace, at no additional cost to the City, any plant material that is not in healthy condition after one year as determined by City representative. Planting of replacement materials shall be in accordance with planting procedures and job conditions specified herein. Replacement plant materials shall also be guaranteed for an one-year period from the date of installation.

### 16.4.2 Reseeding

If a satisfactory stand of grass as defined herein has not been established, the Contractor shall renovate and reseed area within the maintenance period.

A satisfactory stand of grass is defined as an area of grass that has:

- A. Not more than 10 percent of the area with bare spots larger than one square foot.
- B. Not more than 15 percent of the total area with bare spots larger than 6 inches square.

## 16.5 SENSITIVE AREA SIGN INSTALLATION

The Contractor shall install Sensitive Area and Vegetated Corridor signs within the project area at locations to be determined by Clean Water Services. Installation of Sensitive Areas signs shall meet the requirements of Drawing No. VCS-1 (Section 16.8).

## 16.6 EXISTING FENCING

All existing fences requiring removal due to interference with the new construction shall be removed so as to prevent damage to the fencing. Fencing damaged by the Contractor's operations shall be replaced with like material at Contractor's expense.

## 16.7 MEASUREMENT AND PAYMENT

### 16.7.1 Zone A (PEM Wetland)

Payment for work in Zone A shall be made on a lump sum basis of the unit prices stated in the Contractor's bid. Payment shall include soil preparation, mulch, straw and application of fertilizer and wetland seed mix.

#### 16.7.2 Zone B (PSS/PFO Wetland)

Payment for work in Zone B shall be made on a lump sum basis of the unit prices stated in the Contractor's bid. Payment shall include soil preparation, mulch, straw application of fertilizer and wetland seed mix, and planting of shrubs and trees as shown on the drawings.

#### 16.7.3 Zone C (Stormwater Swale)

Payment for work in Zone C shall be made on a lump sum basis of the unit prices stated in the Contractor's bid. Payment shall include soil preparation, mulch, straw and application of fertilizer and wetland seed mix, planting of shrubs and trees as shown on the drawings, and replacement of the existing chainlink fence surrounding the swale.

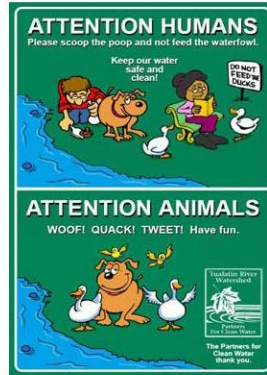
#### 16.7.4 Zone D (Forested Upland)

Payment for work in Zone B shall be made on a lump sum basis of the unit prices stated in the Contractor's bid. Payment shall include soil preparation, mulch, straw application of fertilizer and upland seed mix, sensitive area sign installation, and planting of shrubs and trees as shown on the drawings.

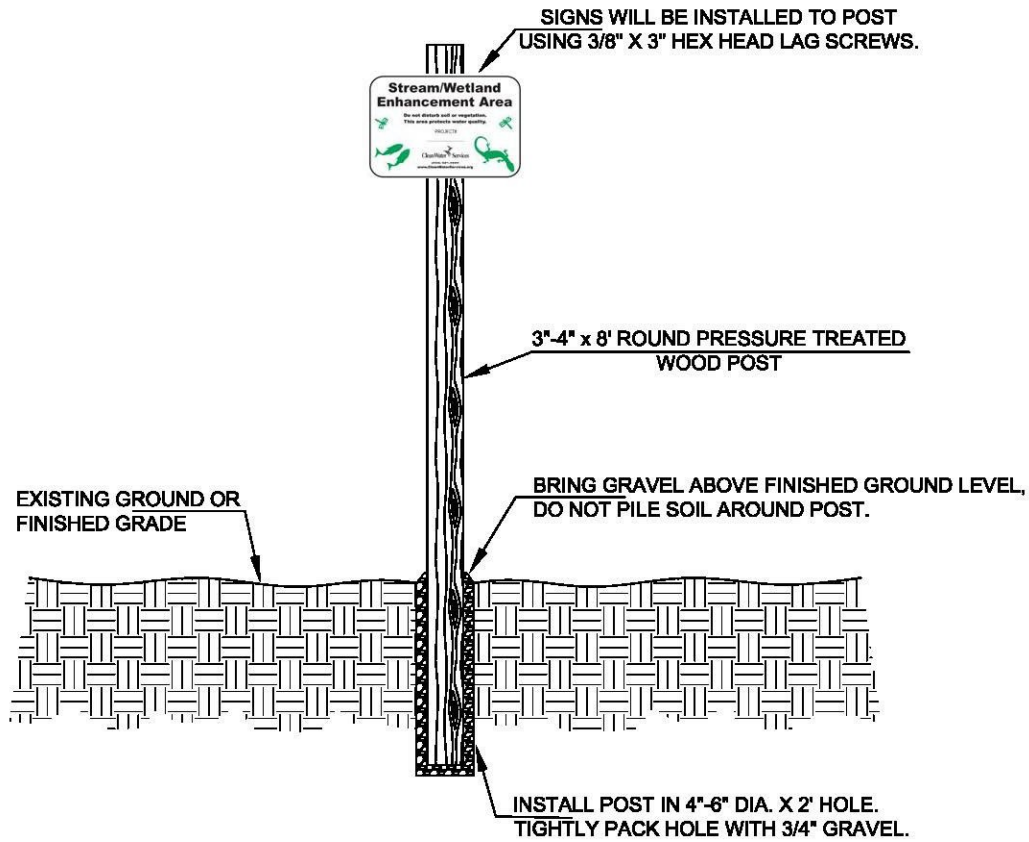
#### 16.7.5 Zone E (Upland)

Payment for work in Zone B shall be made on a lump sum basis of the unit prices stated in the Contractor's bid. Payment shall include soil preparation, mulch, straw application of fertilizer and upland seed mix.

16.8 VEGETATED CORRIDOR SIGNAGE



12"X18" SIGNS (SUPPLIED BY THE DISTRICT) SHALL BE PLACED IN A MANNER AS TO CLEARLY IDENTIFY THE SENSITIVE AREA AND VEGETATED CORRIDOR. PLACEMENT OF SIGNS WILL BE DETERMINED BY DISTRICT STAFF.



**VEGETATED CORRIDOR  
SIGNAGE-CAPITAL PROJECTS**

DRAWING NO. VCS-1

REVISED 3-07



END OF CHAPTER

## CHAPTER 17

### SIDE SEWERS

#### 17.1 SCOPE

This section covers the work necessary for installation of side sewer and building sewer. Side sewers will extend from the gravity sanitary sewer or manhole as shown on plans. Replacement of street surfacing, curbs and sidewalks damaged by side sewer construction is included in Chapter 15, Street Restoration.

#### 17.2 MATERIALS

##### 17.2.1 Trench Excavation and Backfill

The Contractor shall comply with the applicable requirements in Chapter 12.

##### 17.2.2 Pipe Material

Pipe material for the side sewer shall be one type of material throughout.

Residential services shall normally be 4 inches unless otherwise specified. The approved pipe material for the building of a sewer shall conform to the Uniform Plumbing Code (Oregon Plumbing Specialty Code).

###### A. Concrete Pipe

Concrete pipe shall be a minimum of 6 inches and will conform to the requirements of ASTM C14, Class 3 unless otherwise specified.

###### B. Ductile Iron Pipe

Ductile iron pipe shall conform to ANSI A21.51, Class 50.

###### C. Polyvinyl Chloride Pipe (PVC)

PVC pipe shall conform to ASTM D3034, SDR 35.

##### 17.2.3 Marking Stakes

Marking stakes shall be new 2" x 4" utility grade or better in one piece. No splicing shall be permitted.

## 17.3 CONSTRUCTION

Conform to the applicable portions of Chapter 12, Trench Excavation and Backfill; Chapter 14, Gravity Sewer Pipe; Chapter 15, Street Restoration; and Chapter 16, Landscape Restoration.

### 17.3.1 Pipe Installation

Workmanship for construction of side sewer shall conform to Chapter 14, Gravity Sewer Pipe. Lay pipe upgrade from connection to the sanitary sewer with bell or coupling ends upgrade. Pipe shall be laid in a straight line at uniform grade between fittings or on a uniform horizontal or vertical curvature achieved by deflecting the pipe joints within manufacturer's recommended limits. Maximum alignment change at one fitting shall not exceed 45 degrees.

Workmanship for construction of building sewers shall conform to the Uniform Plumbing Code (Oregon Plumbing Specialty Code). Ends of all side sewers shall have standard watertight plugs, caps and stopper, suitably braced to prevent blowoff during internal hydrostatic or air testing.

### 17.3.2 Bends

Where so directed by the City, manufactured bends shall be installed in side sewer at no additional cost to the City.

### 17.3.3 Line and Grade

The City will establish the line and grade to the tract of land to be served by the side sewer. At the location of the upper end of the side sewer, the City will drive a stake into the ground showing the depth of excavation required. The sewer tee shall be installed as close as practical to the lateral stake.

The Contractor shall lay the pipe uniformly between the tee and the stake. Where minimum slopes are used, the pipe shall be laid by means of a builder's level of good quality and not less than 24 inches in length. Minimum slope for side sewers shall be 1/4 inch per foot unless otherwise permitted in writing by the City.

### 17.3.4 Marking Stakes

After the side sewer pipe is installed, the Contractor shall install marking stakes at the end of the building sewer extending to one foot above finished ground. The exposed portion of the stake shall be painted immediately after its installation with first-quality green, quick-drying enamel.

#### 17.3.5 Magnetic Tape

The side sewers shall be marked with a detectable underground magnetic tape. The magnetic tape shall be placed from the main pipeline to the end of the side sewer with 18-inches separation between the tape and pipe. The magnetic tape shall be green in color and have the following markings, depending whether it is a sanitary or storm line:

- A. CAUTION: SEWER BURIED BELOW
- B. CAUTION: STORM DRAIN BURIED BELOW

### 17.4 PAYMENT

#### 17.4.1 Trench Excavation and Backfill

The work required under this item will be paid for on the basis of the unit prices per linear foot set forth in the Proposal for the type of backfill installed. No differentiation will be made for trench depth. Payment for this item shall constitute full compensation for all work connected with excavation and backfill, (except pipe base), which is included in payment for the pipe. The length of trench will be measured horizontally to the nearest foot from the main or lateral centerline to the end of the pipe as established by the City.

#### 17.4.2 Side Sewer Pipe

Payment for this item shall constitute full compensation for all materials and work required to install the complete pipe. The length of the side and/or building sewer will be measured horizontally to the nearest foot from the main centerline to the end of pipe.

No payment for side and/or building sewer pipe will be made until the section of line in which the building sewers are installed has successfully passed the leakage test, as specified in Chapter 14, Gravity Sewer Pipe.

#### 17.4.3 Side Sewer Surface Restoration

Payment for this item shall be based upon the unit price per linear foot set forth in the Proposal. The number of linear feet will be measured by the City. Payment will be based on the linear foot along the centerline of trench from the edge of mainline trench to the edge of pavement. The unit price shall include payment for excavation required to provide space for the surfacing, preparation of the trench including addition of crushed rock to the subgrade; and compaction of the subgrade, disposal of all excess excavated materials and all other work required to complete the resurfacing.

END OF CHAPTER



## CHAPTER 19

### SEWER REHABILITATION

#### 19.1 SCOPE

This section covers all work necessary to construct, rehabilitate, and replace sanitary and storm sewer lines, manholes, etc.

#### 19.2 SEWER LINE CLEANING

##### 19.2.1 General

The Contractor shall furnish all labor, materials and equipment necessary to clean the lines and manholes (remove foreign materials) prior to joint-testing, sealing, pipe lining, or television inspection.

##### 19.2.2 Cleaning Precautions

When hydraulically propelled cleaning tools which depend upon water pressure to provide their cleaning force, or tools which retard the flow in the sewer line are used, the contractor shall take precautions to ensure that the water pressure created does not cause pipe damage, property damage, or flooding of public or private property. Any flooding, property damage or pipe damage caused by the Contractor's cleaning operations shall be repaired by the Contractor to a condition as good or better than the original.

##### 19.2.3 Sewer Cleaning

The equipment shall be capable of removing dirt, grease, rocks, sand, roots, and other materials and obstructions from the sewer lines and manholes. If cleaning of an entire line section cannot be successfully performed from one manhole, the equipment shall be set up at the other manhole and cleaning again attempted. If, again, successful cleaning cannot be performed or the equipment fails to traverse the entire manhole section, the Contractor shall notify City before proceeding with any further work in that section of line.

##### 19.2.4 Material Removal

All sludge, dirt, sand, rocks, grease, and other solid or semisolid material resulting from the cleaning operation shall be trapped and removed at the downstream manhole of the line section being cleaned. Passing material from line section to line section, which could cause line stoppages, accumulations of debris in wet wells, or damage pumping equipment, shall not be permitted.

##### 19.2.5 Disposal of Materials

All solids or semisolids resulting from the cleaning operations shall be removed from the site and disposed of in a manner that meets all requirements of state, county, regional and local regulations regarding health, safety, and public welfare. Under *NO* circumstances shall the Contractor accumulate debris, etc., on the construction site beyond a single workday except in totally enclosed containers and as approved by City. Contractor shall dispose of the material off the construction site in an approved and lawful location. The cost of disposal shall be considered incidental to the project cost.

#### 19.2.6 Acceptance of Cleaning

Acceptance of sewer line cleaning shall be based on television inspection. If internal sealing is to follow the line cleaning, particular attention shall be given to the adequacy of the cleaning to ensure that proper seating of the sealing packer can be achieved.

### 19.3 ROOT REMOVAL

The Contractor shall remove roots from line sections indicated on the construction plans. Line sections where cleaning is unsuccessful because of roots may be added to root removal work with the approval of the City. The Contractor shall pay special attention to the removal of roots from the joints. Root removal procedures may include the use of mechanical equipment such as rodding machines, root cutters and porcupines.

### 19.4 SEWER FLOW CONTROL

#### 19.4.1 General

When depth of flow at the upstream manhole of the line section being worked on is above the maximum allowable, or when necessary to accomplish the specified sewer line rehabilitation, the flow shall be reduced to the required level by blocking of the flow or bypassing of the flow around the line section being worked on. The Contractor shall furnish, install and operate pumps, plugs and conduits to divert the flow around the line section in which work is to be performed. Depth of flow shall not exceed that shown below for the respective pipe sizes as measured in the manhole.

<u>Pipe Size In Inches</u>	<u>Max. Depth of Flow in Inches</u>
6	1.2
8	1.6
10	2.0
16	3.75

Depth of flow allowed in sewer lines to be rehabilitated shall be in accordance with the manufacturer's recommendations or these specifications, whichever is stricter, unless approved by City.

#### 19.4.2 Plugging or Blocking

Prior to the work being performed, the Contractor shall insert a sewer line plug into the line upstream of the section being worked. The plug shall be designed so that all or any portion of the sewage can be released through the plug. After the work has been completed, the plug shall be removed and flow shall be restored to normal.

#### 19.4.3 Pumping and Bypassing

When pumping and bypassing is required, the Contractor shall supply the pumps, pipes, and other equipment that is needed to divert the flow of sewage around the line section to be worked on. The bypass system shall have sufficient capacity to handle existing flow plus additional flow that may occur during a rainstorm. The Contractor shall furnish the necessary labor and supervision to set up and operate the pumping and bypassing system. If pumping is required on a 24-hour basis, pumps shall be equipped in a manner to keep noise to a minimum and shall be monitored during the entire 24-hour period. Pumping shall be done in a manner that will not damage public or private property or create a nuisance or threat to public health.

#### 19.4.4 Flow Control Precautions

When flow in a sewer line is plugged, blocked, or bypassed, sufficient precautions must be taken to protect the adjacent properties from damage that might result from sewer surcharging. Precautions must be taken to ensure that sewer flow control operations do not cause flooding or damage to public or private property. Any damage shall be repaired by the Contractor at his expense to a condition as good or better than the original. The bypass piping system, if above ground, shall have watertight joints. Sewage shall not be allowed to flow or leak on to the ground surface, into gutters or streets, or over sidewalks or into storm inlets.

### 19.5 TELEVISION INSPECTION

#### 19.5.1 General

Television (CCTV) inspection shall be performed prior to and after all rehab work. The inspection shall be done one line section at a time, and the flow in the section being inspected will be controlled as specified in Section 19.4.

#### 19.5.2 Equipment

The television camera used for the inspection shall be made for operation in connection with sewer inspection, pipe joint sealing, and testing. It shall be operative in 100 percent humidity conditions. Lighting and camera quality shall allow clear in-focus picture of a minimum of six lineal feet of the entire inside periphery of the sewer pipe. Lighting for the camera shall minimize reflective glare. Focal distance shall be adjustable through a range of from six inches to infinity. Continuously displayed on the monitors shall be the date of the survey, number designation of the line section being surveyed, and a continuous forward and reverse readout of the camera distance from the manhole of reference. The remote reading footage counter shall be accurate to two-tenths of a foot. The camera, television monitor and other components shall be capable of producing a minimum 500-line resolution color video picture.

### 19.5.3 Operation

The camera shall be moved through the line in either direction at a uniform rate, stopping when necessary to permit proper documentation of the sewer's condition. The television camera shall not be pulled at a speed greater than 30 feet per minute. Manual winches, power winches, TV cable, and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the sewer conditions shall be used to move the camera through the sewer line. If, during the inspection operation, the television camera will not pass through the entire line section, the Contractor shall set up his equipment to perform the inspection from the opposite manhole. If, again, the camera fails to pass through the entire line section, the Contractor shall immediately notify the City before proceeding with any further work in that section.

All inspection videotapes and logs shall show distance measurements. Marking on the cable, which would require interpolation for depth of manhole, will not be allowed. Accuracy of the distance meter shall be checked by use of a walking meter, roll-a-tape, or other suitable device, and be accurate to two-tenths of a foot.

In the event the line section being televised has substantial flow entering the sewer between manholes so that inspection of the sewer is impaired, the Contractor shall coordinate with the owner of source of the flow to have the flow temporarily stopped and/or reschedule television inspection of the line section to a time when the flow is reduced to permit the television inspection.

### 19.5.4 Documentation of the CCTV results

#### 19.5.4.1 CCTV Inspection Logs

Contractor shall make printed television inspection records on a form approved by the City which shows the following that was observed during inspection:

- a) the date of inspection
- b) location on the videotape,
- c) location of infiltration points, building sewers, joints, unusual conditions, roots, storm sewer connections, broken pipe, presence of scale and corrosion, and other discernible features shall be recorded.

A copy of the inspection logs will be supplied to the City at the completion of each television inspection.

#### 19.5.4.2 CCTV Recordings

The Contractor shall furnish color CCTV recordings in a digital format. Recordings shall be clearly labeled and indexed by section and footage. The CCTV recording shall be of such quality to provide a clear visual and audio record of the line section being televised. The recordings shall be accompanied by CCTV inspection logs, which provide written documentation of the visual and audio recording. The City shall be the owner of all tapes and tape content. Tapes shall include the following information:

##### 1. Data view:

- Date of CCTV inspection
- Upstream and downstream manhole numbers
- Include property address if televising a building lateral
- Current distance along reach

##### 2. Audio:

- Date of CCTV inspection
- Verbal confirmation of upstream and downstream manhole numbers
- Verbal confirmation of property address if televising a building lateral
- Verbal description of pipe size, type and pipe joint length
- Verbal description and location of each defect

- Verbal description and location of each service connection

#### 19.5.5 Final Acceptance

The final acceptance of CCTV inspection work shall be made after review of the videotapes by the City. Any videotape not clear or not meeting these specifications shall be rejected and the work shall be redone by the Contractor at no cost to City.

### 19.6 SLIPLINING PIPE REPLACEMENT SYSTEM

#### 19.6.1 General

The Contractor shall rehabilitate the sanitary sewer system by the sliplining method. The sliplining process shall utilize polyvinyl chloride (PVC) pipe as the carrier pipe and existing 18-inch diameter concrete sewer as the casing pipe.

#### 19.6.2 Submittals

The Contractor shall submit the following to the City prior to performing work covered in this section:

1. Manufacturer certification that all furnished material is manufactured, sampled, tested and inspected in accordance with the sliplining method being proposed in these specifications. The manufacturing date of the lining materials shall be included in the certification. Certification shall be signed by an authorized agent of the manufacturer.
2. Construction details including complete manufacturer's recommendations for storage, procedures for trimming, finishing at manhole walls, and lateral reconnection method as specified for this project.
3. Verification of product conformance by third party testing for the chemical resistance and physical testing requirements along with a report of test results.
4. Literature and background information on the independent third party testing laboratory proposed for testing the physical properties of the installed liner pipe.
5. Methods, materials, equipment, and procedures to seal annular space between the new carrier pipe and the existing casing pipe at manholes and ends of casing pipe.
6. Shop drawings and manufacturers literature for casing spacers to be utilized.
7. Proposed method of installing sand within annular space, including means for verifying no voids between the carrier pipe and casing remain.

### 19.6.3 Materials

#### 19.6.3.1 Pipe and Fittings

All PVC carrier pipe and fittings for sliplining shall conform to ASTM D-3034 or ASTM F-679, and have a SDR of 26 with gaskets conforming to requirement of ASTM 477 and ASTM 3212. PVC pipe may also conform to ASTM C-900 or ASTM C-905. Internal and external surfaces of the pipe should be smooth, clean and free of grooving and other defects. Pipe will be unacceptable if ovality exceeds 1 percent of the external diameter of the pipe. Each pipe length should be stamped with a clear and permanent mark indicating:

Standard

Date

Raw material

Thickness

Nominal pressure

Name and signature of manufacturer

#### 19.6.3.2 Casing Spacers

Utilize casing spacers that fully supports the carrier pipe, restrains the carrier pipe from rotating during installation in casing; maintains the grade of the sanitary sewer within specified tolerances; protects the pipes from flotation, movement, and damage during backfill placement; and allows for installation of the carrier pipes in accordance with specified tolerances over the lengths shown on the Plans. Casing spacers must be able to support the combined weight of the carrier pipe filled with water.

Spacers shall be a minimum of 12 inches wide and shall be constructed of heat-fused plastic coated galvanized steel with a built up PVC or EPDM rubber lining. Spacers shall be multi-segmented to attach firmly around the pipeline. Spacers shall be specially fabricated to achieve specified grade for the carrier pipe with a restrained configuration per the contract drawings. Spacer runners shall be made of glass reinforced polymer. Spacer risers shall be sized to provide for clearance of the carrier pipe bell couplings or retainer glands with not more than 1-1/2 inches of clearance from the top skids to the inside top of the casing. Each casing spacer shall have a minimum of four (4) spacer riser and

runner assemblies with a minimum of two (2) risers on top and two (2) risers on the bottom. At least one (1) casing spacer shall be installed at each carrier pipe joint. Additional casing spacers shall be installed such that the spacer spacing does not exceed eight (8) feet unless closer spacing is recommended by the casing spacer manufacturer. Insulators shall be sized to fit and attach to the carrier pipe material including any identified special coatings without damage. Casing spacers shall be M-12 Series, as manufactured by Calpico, Inc., CSC-12 Series as manufactured by CCI Pipeline Systems, or approved equal.

#### 19.6.3.3 Clean Sand

Sieve Size	Coarse Sand	Medium Sand	Fine Sand
1"	100	100	100
3/8"	95 - 100	95 - 100	-
#4	80 - 100	70 - 95	90 - 100
#30	10 - 30	10 - 45	-
#100	-	2 - 10	2 - 10
#200	0 - 8	0 - 7	0 - 4
Sand Equivalent	50 min.	50 min.	50 in.

#### 19.6.3.4 Grout

Unless otherwise specified, casing end seals shall be cast-in-place non-shrink, cementitious grout, free of chlorides.

At the time of delivery, the material shall be homogeneous, free of defects, cracks, holes, blisters, foreign materials or deleterious faults. Tests for compliance with this specification shall be made in accordance with the applicable ASTM Specification. A certificate of compliance with this specification shall be furnished, upon request, by the manufacturer for all material furnished under this specification.



#### 19.6.4 Excavations

Prior to beginning work, the Contractor shall indicate the location and size of all pits required for the work. Excavations shall be prepared in accordance with ASTM D-2774 and D-2321. Contractor shall adequately shore, brace, and dewater all pits to ensure a safe work area. The actual length of the pit shall be in accordance with ASTM F 585-94. The Contractor shall locate the excavation pits to minimize traffic disruption.

Where manholes are used for pits, the Contractor shall indicate any modifications to manholes prior to beginning work. The Contractor shall be required to restore or replace manholes damaged by modifications at no additional cost to the City.

The in-service portion of active sewers shall be cut and isolated, and temporary bypassing established in compliance with Section 19.4.

#### 19.6.5 Pipe Joining

##### 19.6.5.1 General

The Contractor shall assemble sections of the new PVC pipe on site and joined in the launching pit (segmented pipe). Joining shall be in strict conformance with the manufacturer's recommendations.

##### 19.6.5.2 Segmented Pipe

Pipe ends shall be joined by a leak proof, interference fit stab joint method.

#### 19.6.6 Installation of Pipe

Contractor shall push PVC pipe into the casing once casing spacers are installed. Pipe shall be oriented such that bells are pointing upstream.

Contractor shall install the new sewer main with the centerline of the new sewer similar with that of the replaced sewer and on the same line and grade.

#### 19.6.7 Anchoring Pipe and Sealing Manholes

After inserting the PVC pipe in the existing manhole, the Contractor shall anchor the pipe at the manhole. The pipe end shall be trimmed to correspond to the manhole inside diameter. Care must be exercised to prevent the new pipe from slipping out of position prior to final sealing of the manhole. The PVC pipe should protrude far enough into the manhole to allow the contractor to perform the sealing and trimming operations. After pipe insertion, the Contractor shall place

the seals in the annular space between the PVC pipe and the existing concrete pipe in the manhole at each manhole location and at end of casing.

#### 19.6.8 End Seals

The beginning and end of the liner pipe shall be sealed at manholes and all termini to the host or existing pipe by applying a chloride free non-shrink grout, 12-inch thick. Any leakage through the annular space between the existing pipe, manhole, and liner shall be sealed as necessary to prevent infiltration. Manhole troughs shall be raised using a quick set cement type grout. Liner or new pipe shall be cut smooth with the manhole wall at all pipe entrances and exits

#### 19.6.9 Filling Annular Space

After end seal have been installed contractor shall fill the annular space between the carrier and casing with clean sand.

#### 19.6.10 Acceptance

Contractor shall CCTV inspect the pipe replacement line sections. The finish-replaced pipe shall be continuous over the entire length of the installation and shall be free from visual defects, damage, wrinkles, flow obstructions, holes, and other detrimental features. There shall be no visible infiltration through the pipe or from the pipe at manholes and service lateral connections. Installation of service lateral connections shall be neat and smooth. End seals at manholes shall be complete and manhole troughs raised.

### 19.7 MEASUREMENT AND PAYMENT

#### 19.7.1 Sewer Line Cleaning

Payment for sewer line cleaning shall be included in other bid items.

#### 19.7.2 Sewer Flow Control

Payment for sewer flow control shall be included in other bid items.

#### 19.7.3 CCTV Inspection

Payment for television inspection shall be included in other bid item.

#### 19.7.4 Sewer Pipe Sliplining

Payment for pipe sliplining shall be based on a unit price per linear foot of pipe lined. Payment shall provide complete compensation for all labor, material, equipment, incidentals, flow control, preparatory cleaning necessary to televise the

mainline sewer, casing spacers, reinstatement of active sewer service, end seals/bulkheads at manholes or end of casing, manhole 401NSAN bench and channel re-channelizing, filling annular space, and air tests.

END OF CHAPTER

**Division Five**  
**Supplemental Information**



# Rock Creek Sanitary Trunk Line Upsizing Phase 1

## Geotechnical Data Report

**Final  
Revision No. 1**



February 12, 2021

*This page intentionally left blank.*

## Table of Contents

<b>1.0</b>	<b>Introduction</b> .....	<b>1</b>
1.1	General .....	1
1.2	Project Description .....	1
1.3	Purpose and Scope of Work .....	1
1.4	Authorization .....	1
<b>2.0</b>	<b>Site Description</b> .....	<b>2</b>
2.1	Surface Conditions .....	2
2.2	Geology.....	2
2.2.1	Regional Geologic Setting .....	2
2.2.2	Site Geology.....	2
<b>3.0</b>	<b>Explorations</b> .....	<b>4</b>
3.1	General .....	4
3.2	Exploratory Borings.....	4
3.2.1	Machine-Drilled Borings .....	5
3.2.2	Hand-Auger Borings.....	5
3.2.3	Borehole Backfill and Abandonment.....	5
3.3	Test Pit .....	6
3.4	Vibrating Wire Piezometers .....	6
3.5	Previous Explorations .....	6
3.6	Laboratory Testing .....	6
<b>4.0</b>	<b>Subsurface Conditions</b> .....	<b>8</b>
4.1	Summary.....	8
4.2	Unit Description.....	8
4.2.1	Fill.....	8
4.2.2	Alluvium.....	8
4.2.3	Coarse-Grained Missoula Flood Deposits .....	9
4.2.4	Fine-Grained Missoula Flood Deposits .....	9
4.2.5	Hillsboro Formation .....	9
4.3	Groundwater .....	10
<b>5.0</b>	<b>Limitations</b> .....	<b>11</b>
<b>6.0</b>	<b>References</b> .....	<b>12</b>

## List of Tables

<b>Table 3-1. Exploration Summary</b> .....	4
---	---

## List of Figures

Figure 1	Project Vicinity Map
Figure 2	Exploration Plan
Figure 3	Geologic Profile

## Appendices

Appendix A	Exploration Logs
Appendix B	Previous Explorations
Appendix C	Laboratory Test Results
Appendix D	Groundwater Level Plots
Appendix E	Photos of Excavated Material



## Distribution

To: Brendan O'Sullivan, P.E.  
Murraysmith

From: Farid Sariosseiri, P.E.  
McMillen Jacobs Associates

Prepared By: Jeffrey Quinn, P.E.  
McMillen Jacobs Associates

Farid Sariosseiri, P.E.  
McMillen Jacobs Associates

Reviewed By: Kim Elliott, C.E.G  
McMillen Jacobs Associates

## Revision Log

Revision No.	Date	Revision Description
0	July 19, 2019	Draft submitted for Murraysmith review
1	September 17, 2019	Incorporated Murraysmith's comments - Final Submittal
2	February 12, 2021	Included photographs of excavated coarse-grained Missoula Flood Deposits in Appendix E – Final Revision No. 1

## 1.0 Introduction

### 1.1 General

This Geotechnical Data Report (GDR) has been developed by McMillen Jacobs Associates (McMillen Jacobs) for the Rock Creek Sanitary Trunk Line Upsizing Project Phase 1 (Project). The Project owner is the City of Sherwood and Murraysmith is the primary consultant. McMillen Jacobs has been retained by Murraysmith to provide geotechnical engineering services for the project. The Project is in Sherwood, Oregon, as shown on the Project Vicinity Map, Figure 1.

### 1.2 Project Description

The City of Sherwood plans to replace their existing, 18-inch diameter Reinforced Concrete Pipe (RCP), Rock Creek Sanitary Trunk Line. The approximate 1,105-foot-long Project alignment runs along the west bank of Rock Creek, between Clean Water Services (CWS) Onion Flats Manhole No. 829081 (north end of alignment) and CWS Manhole No. 398NSAN (south end of alignment), and crosses under SW Tualatin-Sherwood Road approximately 250 feet east of its intersection with SW Century Drive. The Project alignment is shown on the Exploration Plan, Figure 2. The existing sanitary trunk discharges at the north end into a 27-inch diameter sanitary sewer system maintained by Clean Water Services (CWS). The proposed upsizing will include replacing the 18-inch diameter pipeline with a 24-inch or 27-inch diameter, polyvinyl chloride (PVC) pipeline. The project includes a trenchless crossing for the segment crossing under SW Tualatin-Sherwood Road.

### 1.3 Purpose and Scope of Work

This GDR presents a summary of geologic and geotechnical data collected from field explorations, laboratory testing, and a review of available geological data.

The primary purpose of this GDR is to compile the geologic and geotechnical data gathered in support of the project, and to characterize subsurface conditions on and under the project site. The information included in this GDR can then be used as a basis for project design and to assist in developing recommendations for construction.

### 1.4 Authorization

The City of Sherwood entered into a contract dated April 19, 2019 with Murraysmith for professional engineering services for the Rock Creek Sanitary Trunk Line Upsizing Project – Phase 1. McMillen Jacobs was authorized by Murraysmith under the terms and conditions of their *Task Order Under Agreement for Services on Continuing Basis*, dated April 26, 2019, to provide geotechnical design services for, or in connection with the Project.

## 2.0 Site Description

### 2.1 Surface Conditions

The approximately 1,105-foot-long Project alignment runs along the west bank of north-flowing Rock Creek and crosses under SW Tualatin-Sherwood Road approximately 250 feet east of its intersection with SW Century Drive. Where not affected by fill, the topography along the Project alignment rises gently to the south, with an overall topographic relief of approximately 12 feet. The land is sparsely to moderately forested, with forest density increasing with proximity to the creek. The entire alignment is approximately 50 to 150 feet west of Rock Creek.

The approximate southern half of the Project alignment (i.e., south of SW Tualatin-Sherwood Road) is situated on a relatively flat floodplain terrace that sits approximately 8 feet above Rock Creek on the west and about 15 feet below undeveloped land on the east. The 10- to 12-foot high SW Tualatin-Sherwood Road embankment is located approximately at the mid-point of the Project alignment with embankment slopes generally inclined at 2H:1V (horizontal:vertical).

The approximate northern half of the alignment is also situated on a relatively flat floodplain terrace adjacent to a shopping center on the west and Rock Creek on the east. Artificial fill appears to be present from approximately 200 feet north SW Tualatin-Sherwood Road to the southern edge of the road. The fill is likely associated with regrading for development of the shopping center and roadway construction.

### 2.2 Geology

#### 2.2.1 Regional Geologic Setting

The northwest-trending Tualatin Basin is a synclinal valley that lies within the Willamette Lowland, a broad regional depression between the Coast and the Cascade Ranges (Wilson, 1998). The Tualatin Basin is one of several sub-basins within the Willamette Lowland created by complex faulting and folding of the middle Miocene Columbia River Basalt Group (CRBG), which comprises the basement, or floor, of the Tualatin Basin. During the upper Miocene to lower Pliocene Epochs (approximately 11 to 3 million years ago), the Tualatin Basin accumulated up to 860 feet of sediment, named the Hillsboro Formation (Wilson, 1998), which was eroded from the surrounding highlands. Additional sediments transported via catastrophic flooding from ice dam failures at glacial Lake Missoula in western Montana during the late Pleistocene Epoch (15,000 to 12,000 years ago), blanket Hillsboro Formation sediments up to an elevation of approximately 250 feet. During the last 12,000 years, the Tualatin River and its many tributaries have locally eroded and redeposited the Missoula Flood sediment as Holocene alluvium. Numerous wetland areas with clayey, organic-rich soils have also developed in low-lying areas of the basin.

#### 2.2.2 Site Geology

Located near the southern edge of the Tualatin Basin, the Project alignment approximately parallels the channelized banks of Rock Creek. Crossing under Tualatin-Sherwood Road, Rock Creek flows north and across Onion Flat to its confluence with the Tualatin River. South of Tualatin Sherwood Road, the Project alignment follows the west bank of Rock Creek. Near-surface soils are dominated by clayey silt, fine-

grained sand and poorly graded gravel with cobbles deposited by the Missoula Floods. Hillsboro Formation sediments, generally consisting of stiff to very stiff lean clay and silt, underlie the coarse-grained Missoula Flood deposits along the Project alignment. The Tualatin River and its tributary, Rock Creek, have locally eroded the Missoula Flood deposits and redistributed them along their modern floodplains. The recent Holocene deposits (referred to as alluvium in this report) vary in depth depending on their location and are often difficult to distinguish from the older Missoula Flood deposits, from which they are generally derived.

North of Tualatin Sherwood Road, the Project alignment terminates in the Onion Flat wetland, a floodplain of the Tualatin River. Flood waters from the Portland-Vancouver Basin flowed through a restricted gap near Lake Oswego and poured into the lower Tualatin Valley, depositing deltaic gravels to the west of the gap. These gravels grade westward to fine to coarse sands near Cipole, Oregon as a complex braided sequence. This thick layer of flood deposits created a local geographical low in the vicinity of Onion Flats. Regular flooding of this area by the ancestral Tualatin River created a shallow lake that gradually filled with organic-rich deposits (peat). Alluvial deposits associated with this water body (i.e., within Onion Flat) generally consist of organic rich silts and clays.

## 3.0 Explorations

### 3.1 General

The subsurface exploration program was performed between May 28 and June 19, 2019 and consisted of six exploratory boreholes, and one test pit. The locations of the explorations are shown in the Exploration Plan, Figure 2. Details of the explorations are presented in the following sections.

All explorations were performed under the direction of a geologist or geotechnical engineer from McMillen Jacobs, who examined and logged the soil conditions encountered in the explorations. The soils were classified in the field in accordance with the Visual-Manual Procedure (ASTM D 2488). Sample depths, stratigraphy, groundwater occurrence, and soil engineering characteristics were also recorded. The stratigraphic contacts indicated on the exploration logs represent the approximate boundaries between soil types and actual transitions may be more gradual. The soil samples were transported to McMillen Jacobs Portland office for further examination. The exploration logs are presented in Appendix A.

Table 3-1 summarizes some of the details of our exportations, including locations, depths, and borehole installations.

**Table 3-1. Exploration Summary**

Boring ID	Station <sup>1</sup> and Offset <sup>2</sup>	Depth (feet bgs <sup>3</sup> )	Borehole Installations
B-1	12+30, 10.3'L	26.5	
B-2	10+11, 1.9'L	41.5	Vibrating wire piezometer installed at 18 feet bgs
B-3	7+72, 37.8'R	41.5	
B-4	6+10, 6.9'R	36.5	Vibrating wire piezometer installed at 15 feet bgs
HA-1	3+37, 27.4'R	6.2	
HA-2	13+95, 31.8'R	5.8	
TP-1	10+77, 12.1'L	12.5	

Notes:

1. Stationing is based on Murraysmith's 30-percent submittal drawings dated August 2019.
2. Offset left (L) and right (R) convention is looking up-station, which in the case of this project is south.
3. bgs = Below ground surface.

### 3.2 Exploratory Borings

The exploratory borings consisted of four machine-drilled borings (designated B-1 through B-4) and two hand-auger borings (designated HA-1 and HA-2).

### 3.2.1 Machine-Drilled Borings

The machine-drilled borings were advanced to approximate depths ranging from 26.5 feet to 41.5 feet below ground surface (bgs) with a track-mounted Geoprobe 7822DT drill rig using mud-rotary drilling techniques. The borings were drilled between May 28 and 29, 2019. The drill rig was provided by Western States Soil Conservation Services (Western States) of Hubbard, Oregon. Upon completion, Borings B-1 and B-3 were abandoned by backfilling the holes with granular bentonite. Upon completion of Borings B-2 and B-4, vibrating-wire piezometers (VWPs) were installed. Piezometer installations are described in Section 3.4.

Disturbed soil samples were collected in the machine-drilled borings in conjunction with Standard Penetration Testing (SPT) at selected intervals using a standard 2-inch outside diameter, split-barrel sampler or a 3-inch outside diameter Modified California split-barrel sample in conjunction with an automatic safety hammer system. Samples collected with a Modified California sampler are noted as “Mod.Cal” on the logs. In each test, an attempt was made to advance the sampler 18 inches by dropping a 140-pound hammer 30 inches for each strike in accordance with ASTM D 1586. The number of hammer blows for each six inches of penetration was recorded. The standard penetration resistance (N-value) of the soil is calculated as the sum of the number of blows required for the final 12 inches of sampler penetration. N-values of 50 blows or more per six inches of penetration is referred to as “refusal.” The N-value is an indication of the relative density of granular soils and the relative consistency of cohesive soils. Uncorrected N-values, i.e., as counted in the field, are presented in the boring logs.

### 3.2.2 Hand-Auger Borings

The hand-auger borings (designated HA-1 and HA-2) were advanced to approximate depths ranging from 5.8 to 6.2 feet bgs by McMillen Jacobs engineering staff using an AMS 2½-inch diameter hand auger on May 30, 2019. Upon completion, the hand-auger borings were backfilled with the auger soil cuttings.

Disturbed grab/bulk samples were collected at selected intervals from the hand-auger borings. To evaluate soil consistency and relative density, drive probe soundings were completed adjacent to each hand-auger boring using the Williamson Drive Probe (WDP) method in general accordance with the methods described in Williamson (1994). The WDP method uses an 11-pound slide hammer that is dropped a vertical distance of 39 inches to drive sections of ¾-inch diameter, Schedule 80 steel pipe into the ground. The bottom end of the pipe, referred to as the test point, is fitted with a threaded pipe end cap. A correlation between the blows required to drive the WDP six inches into the ground is used to estimate the relative density for granular soils or the relative consistency for fine-grained soils.

### 3.2.3 Borehole Backfill and Abandonment

Upon completion, boreholes not designated for conversion to piezometers were abandoned by backfilling the holes with granular bentonite in accordance with Oregon Water Resources Department Regulations (OAR 690-240) to prevent the vertical migration of surface water or the intermingling of multiple perched aquifers.

### 3.3 Test Pit

One test pit (TP-1) was excavated to a depth of 12.5 feet on June 19, 2019, using a track-mounted Hitachi ZX-135 excavator equipped with a 24-inch wide toothed digging bucket operated by Western States. Upon completion, TP-1 was backfilled with the excavated soil and compacted with the excavator bucket. Disturbed grab/bulk samples were collected at selected intervals within the test pit.

To estimate the shear strength of the fine-grained soils encountered in TP-1, we conducted rapid (i.e., undrained) shear strength tests at selected depths of the exposed soils on the test pit sidewalls. Undrained shear strength was evaluated using a Torvane device. The Torvane is a hand-operated vane shear device equipped with a calibrated torsion spring. The device records the maximum reading on its dial head, which is divided into units of 0.1 kilogram per square centimeter ( $\text{kg}/\text{cm}^2$ ). The Torvane shear test values are included in the log of TP-1 in Appendix A.

### 3.4 Vibrating Wire Piezometers

A vibrating wire piezometer (VWP) was installed in machine-drilled Borings B-2 and B-4, at respective depths of approximately 18 feet and 15 bgs, to measure long-term groundwater levels. The VWPs were connected to dataloggers to collect data at selected time intervals. The VWP instrumentation and dataloggers are protected by flush-mounted monuments set in concrete at the surface. Well installation details and measured water levels are shown in the logs of Borings B-2 and B-4 in Appendix A.

Piezometer construction was performed in accordance with requirements of the Oregon Department of Water Resources (OAR 690-240, Construction, Maintenance, Alteration, Conversion, and Abandonment of Monitoring Wells, Geotechnical Holes, and Other Holes in Oregon).

### 3.5 Previous Explorations

McMillen Jacobs has previously completed geotechnical explorations for Onion Flat Sewer upgrade project, located immediately to the north of the Rock Creek Sanitary Trunk alignment (McMillen Jacobs, 2015). The explorations included 13 boreholes and 2 hand augers. These explorations are included in Appendix B. The closest exploration to the Rock Creek Trunk alignment (HA-1) is shown on Figure 2.

### 3.6 Laboratory Testing

Field samples were obtained from exploratory borings and brought to the McMillen Jacobs Portland office for examination and storage. Each of the samples was re-examined and compared to the field boring log description to confirm the field classifications. Representative samples were then selected for laboratory testing. The laboratory testing program included the following soil index property tests:

- Moisture content analyses (ASTM D 2216)
- Atterberg limits tests (ASTM D 4318)
- Organic content test (ASTM D 2974)
- Percent fines (passing No. 200 sieve) (ASTM D 1140)
- Particle Size Analysis of Soil (ASTM D 422)

All laboratory testing was performed by Benchmark Geolabs, of McMinnville, Oregon and Breccia Geotechnical Testing, LLC of Tigard, Oregon, except for the particle size distribution test from Test Pit TP-1, which was performed by NW Testing, Inc., of Wilsonville, Oregon. All laboratory testing was performed in accordance with applicable ASTM standards. Laboratory test results were used to characterize soil properties and refine soil classifications. Results of the moisture contents and Atterberg limits tests are indicated in the exploration logs in Appendix A. All laboratory test reports are included in Appendix C and summarized in Table C1.



## 4.0 Subsurface Conditions

### 4.1 Summary

The following geotechnical units were identified in the subsurface explorations:

- **Fill:** Fill soil was typically medium dense, Poorly Graded Gravel with Silt and Sand (GP-GM).
- **Alluvium:** Alluvium was typically soft to medium stiff, moist to wet, Silt (ML), Silt with Sand (ML), or Sandy Silt (SM).
- **Fine-Grained Missoula Flood Deposits:** Typically consisted of very loose to medium dense, Silty Sand (SM) and gray, very soft to stiff, Silt and Sandy Silt (ML), or Lean Clay (CL).
- **Coarse-Grained Missoula Flood Deposits:** Consisted predominantly of medium dense to dense, moist to wet, Silty Gravel to Silty Gravel with sand (GM), and Poorly Graded Gravel with Silt and Sand (GP-GM). The coarse-grained Missoula Flood deposits contain varying amounts cobbles and boulders.
- **Hillsboro Formation:** Generally consisted of stiff to very stiff, Lean Clay (CL) and Silt (ML).

These units have been defined by their geologic origin, stratigraphic position, engineering properties, and their distribution in the subsurface. Variations in subsurface conditions may exist between the locations of the borings. Contacts between the units may be more gradational than shown on the boring logs in Appendix A. The SPT N-values shown on the boring logs and discussed below, are reported as counted in the field (uncorrected). The following paragraphs describe the geotechnical unit characteristics in greater detail.

### 4.2 Unit Description

#### 4.2.1 Fill

Fill was only encountered in Boring B-4, extending from the ground surface to an approximate depth of 2.5 feet bgs. The fill material consists of medium dense, moist, dark brown, poorly graded gravel with silt and sand (GP-GM), low plasticity fines, fine to coarse sand, and fine to coarse sub-rounded gravel.

#### 4.2.2 Alluvium

Alluvium was encountered in Borings B-1, B-2, Hand Auger Borings HA-1 and HA-2, and in Test Pit TP-1, extending from the ground surface to approximate depths ranging from 1.2 to 9.0 feet bgs. The alluvium typically consisted of soft to medium stiff silt, silt with sand, and sandy silt (ML), with varying amounts of sub-angular to sub-rounded gravel and cobbles. Stiff, dark brown, fat clay (CH) was encountered in Boring B-2 above the coarse-grained Missoula Flood Deposits and was typically moist to wet with organics consisting of roots and wood fragments. Based on the results of laboratory testing, natural moisture contents of the alluvium ranged from 23.1 to 77.2 percent. SPT N-values in the alluvium ranged from 4 to 13 blows per foot (bpf), with an average N-value of 9 bpf. Results of Atterberg limits testing on a sample at a depth of 7.5 feet bgs in Boring B-2 indicated a liquid limit of 75.0, a plastic limit of 34.7, and a plasticity index of 40.3; classifying this sample as fat clay (CH).

### 4.2.3 Coarse-Grained Missoula Flood Deposits

Coarse-Grained Missoula Flood Deposits were encountered below the alluvium in all explorations, except for Boring B-3 and Boring B-4, where they were encountered at the ground surface and below the fill, respectively. The coarse-grained Missoula Flood deposits extended to approximate depths ranging from 7.5 to 27.5 feet bgs. In hand auger borings HA-1 and HA-2, we encountered refusal conditions at approximate depths of 6.2 and 5.8 feet bgs, respectively. Although negligible amounts of soil samples were actually collected at these depths from the hand auger borings, we interpret the contact to the coarse-grained Missoula Flood deposits to correspond with the depths at which refusal conditions were encountered. The coarse-grained Missoula Flood Deposits consisted predominantly of medium dense to dense, moist to wet, brown to red-brown or dark gray, silty gravel to silty gravel with sand (GM), and poorly graded gravel with silt and sand (GP-GM). The material was generally fine to coarse, sub-rounded gravel with varying amounts cobbles and boulders, angular to subangular fine to coarse sand, and low plasticity fines. SPT N-values ranged from 12 to 30 bpf, indicating medium dense conditions. Particle size distribution testing on samples collected in the coarse-grained Missoula Flood deposits resulted in the following (percent by dry weight): gravel content ranging from 47 to 72 percent; sand content ranging from 9 to 22 percent; and fines contents ranging from 9 to 36 percent.

Particle size distribution testing in Test Pit TP-1 resulted in 17 percent (by dry weight) of the sample being greater than 3 inches in diameter (i.e., cobbles and boulders). It should be noted that sub-rounded to rounded boulders up to 18 inches in diameter were observed during the excavation of test pit TP-1. It is also important to note that difficult/chattering drilling action, drilling fluid loss, and loss of drilling fluid circulation were observed within the coarse-grained Missoula Flood deposits, suggesting the presence of a poorly-graded gravel unit with potentially significant cobble and boulder content. We have provided photographs taken during our test pit excavation, which show representative conditions within the coarse-grained Missoula Flood deposits, in Appendix E.

### 4.2.4 Fine-Grained Missoula Flood Deposits

Fine-Grained Missoula Flood Deposits were encountered below the coarse-grained Missoula Flood Deposits in Borings B-1, B-2, and B-3; at respective depths of 7.5, 22.5, and 9 feet bgs, and extending to respective depths of 21.5, 30, and 25 feet bgs. The fine-grained Missoula Flood Deposits typically consisted of very soft to stiff, wet, gray, non-plastic to low plasticity, silt (ML) and sandy silt (ML). The sand constituent was typically fine-grained. SPT N-values in fine-grained Missoula Flood Deposits ranged from 1 to 15 bpf, with an average N-value of 6 bpf. Natural moisture contents ranged from 27.6 to 65.1 percent. Percent fines testing of two samples at a depth of 10 feet bgs in Borings B-1 and B-3 determined the fines content to be 87.3 and 65.8 percent, respectively. Results of Atterberg limits testing on a sample at a depth of 7.5 feet bgs in Boring B-1 indicated a liquid limit of 48.6, a plastic limit of 30.8, and a plasticity index of 17.8; classifying this sample as silt (ML).

### 4.2.5 Hillsboro Formation

Hillsboro Formation was encountered below the fine-grained Missoula Flood Deposits in Borings B-1 through B-3 and below the coarse-grained Missoula Flood Deposits in Boring B-4, at depths ranging from 21.5 feet to 30 feet bgs. The Hillsboro Formation extended to the maximum depths explored in these borings, between 26.5 and 41.5 feet bgs, typically consisting of stiff to very stiff, moist to wet, brown and red-brown with gray mottled lean clay (CL) and silt (ML). Trace fine- to coarse-grained sand and fine,

sub-angular to sub-rounded gravel was observed in Borings B-1 and B-3. SPT N-values in the Hillsboro Formation ranged from 8 to 22 bpf, with an average N-value of 14 bpf. Two natural moisture content tests, on Sample S-7 in Boring B-1 and Sample S-7 in Boring B-3, indicated moisture contents of 39.5 and 28.9 percent, respectively.

### 4.3 Groundwater

Vibrating wire piezometers were grouted into Boreholes B-2 and B-4 at depths of 18 and 15 feet, respectively, for long-term water level monitoring. The piezometers were installed on May 28 (B-2) and May 29, 2019 (B-4). Upon their installation, the VWP's were connected to dataloggers and programmed to collect groundwater data every 4 hours. We uploaded groundwater data from the dataloggers on June 24 and September 6, 2019. This dataset includes all data from the time of VWP installation to the time of data collection; the results of which are presented in Appendix D. Due to a datalogger malfunction in boring B-2, we were unable to collect groundwater level data between June 24 and September 6, 2019 in boring B-2. We collected one groundwater data point on September 11, 2019 with a digital readout device and is shown on the boring B-2 groundwater data plot in Appendix D.

The maximum water level at Boring B-2 was recorded on May 28, 2019 at an elevation of 131.4 feet (8.5 feet bgs), the minimum water level was recorded on June 12, 2019 at an elevation of 130.3 feet (9.6 feet bgs). The maximum water level at Boring B-4 was recorded on June 8, 2019 at an elevation of 136.6 feet (1.1 feet bgs), and the minimum water level was recorded on August 28, 2019 at an elevation of 135.0 feet (2.7 feet bgs). The maximum groundwater levels recorded to date for Borings B-2 and B-4 are presented on the respective boring logs in Appendix A. We measured a groundwater level at an approximate elevation of 130.8 feet (9.5 feet bgs) during the excavation of Test Pit TP-1 on June 19, 2019, which is also shown in the log of Test Pit TP-1 in Appendix A.

Groundwater levels vary with precipitation, the time of year, and other factors. Generally, groundwater highs occur near the end of the wet season in late spring or early summer and groundwater lows occur near the end of the dry season in the early fall.

## 5.0 Limitations

This Geotechnical Data Report has been prepared for the City of Sherwood Rock Creek Sanitary Trunk Line Upsizing Project - Phase 1 in Sherwood, Oregon. This report contains a compilation of information from field explorations, laboratory test data, and published literature. The professional judgements and characterizations presented herein are based on this information.

It shall be noted that the geotechnical data were obtained at specific exploration locations at specific times. It must be acknowledged that variations in soil/rock conditions exist between exploration locations and this report does not necessarily reflect the variations between explorations. The nature and extent of variation may not become evident until exposed during construction. No analyses, interpretations between exploration locations, conclusions, or design recommendations are contained in this report. This report should be made available to prospective contractors for use as factual data only, and not as a warranty of subsurface conditions.

The scope of our geotechnical services has not included an environmental evaluation regarding the presence or absence of hazardous or toxic materials in the soil, surface water, groundwater, or air, on or below the site, or for evaluation of disposal of contaminated soils or groundwater, should they be encountered.

This report has been completed within the limitations of the agreement between the City of Sherwood and Murraysmith and the Murraysmith-approved scope of work, schedule, and budget with McMillen Jacobs Associates. The services rendered have been performed in a manner consistent with the level of care, and skill ordinarily exercised by members of the profession currently practicing under similar conditions in the same area. McMillen Jacobs Associates is not responsible for the use of this report in connection with anything other than the project at the location described above.

### MCMILLEN JACOBS ASSOCIATES

---

Jeffrey P. Quinn, P.E.  
Sr. Project Engineer

---

Farid Sariosseiri, P.E.  
Associate

## 6.0 References

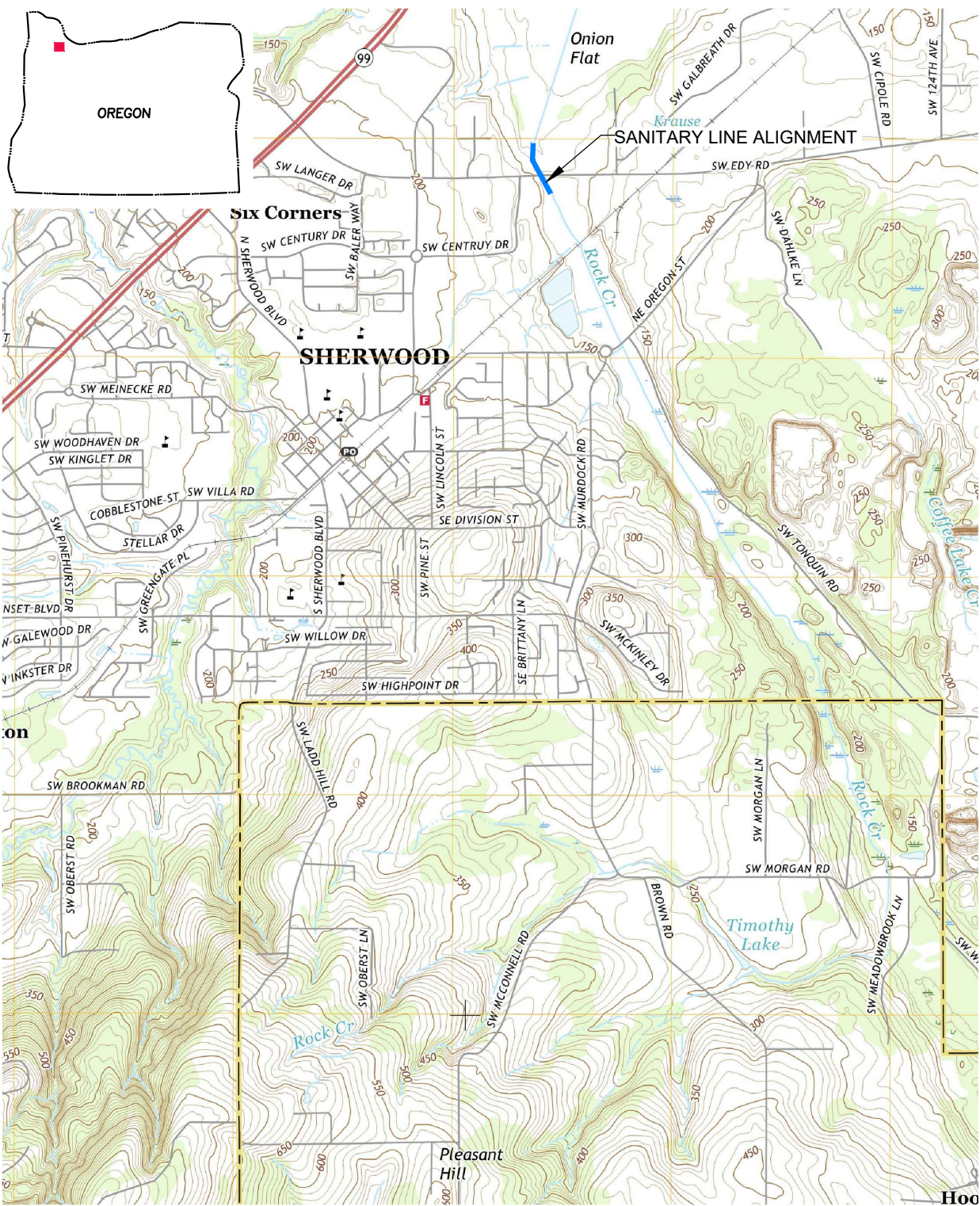
ASTM Standard, 2017, ASTM International, West Conshohocken, PA, 2017, [www.astm.org](http://www.astm.org).

McMillen Jacobs, 2015, *Onion Flat Sewer Upgrade Project*, Geotechnical Data Report, Prepared for Clean Water Services.

Williamson, D.A. 1994. Geotechnical exploration – drive probe method. In Hall, D.E., Long, M.T. & Remboldt, M.D. (editors), *Slope Stability Guide for National Forests in the United States*: U.S. Forest Service Washington DC Office Engineering Publication EM 7170-13, 317-321.

Wilson, D.C., 1998. *Post-middle Miocene geologic evolution of the Tualatin basin, Oregon*, Oregon Geology, Volume 60, Number 5, September/October 1998.

## Figures



PROJECT VICINITY MAP

SCALE: NTS

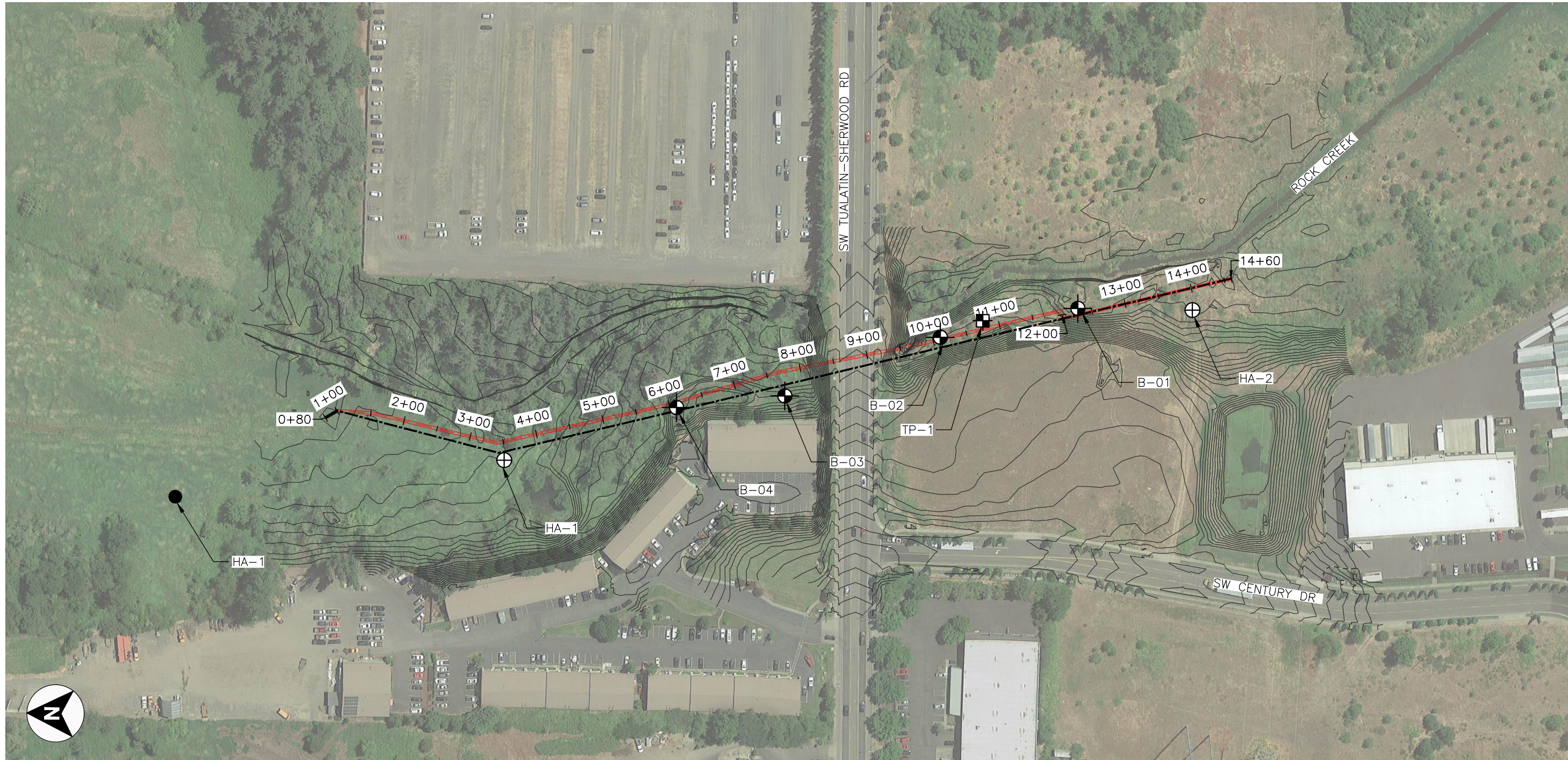


CITY OF SHERWOOD  
 ROCK CREEK SANITARY TRUNK LINE UPSIZING

GEOTECHNICAL DATA REPORT  
 PROJECT VICINITY MAP

FIG. 1

FEB 2021

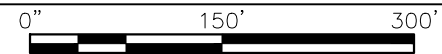


**LEGEND:**

- PROPOSED SANITARY LINE ALIGNMENT
- - - EXISTING SANITARY LINE ALIGNMENT
- B-01 BOREHOLE LOCATION
- TP-1 TEST PIT LOCATION
- HA-1 HAND AUGER LOCATION
- HA-1 HAND AUGER COMPLETED AS PART OF ONION FLAT SEWER UPGRADE PROJECT

**EXPLORATION PLAN STA 0+80 TO 14+60**

SCALE: 1"=150'



**NOTES:**

1. ALL EXPLORATION LOCATIONS ARE APPROXIMATE.
2. BASEMAP PROVIDED BY MURRAYSMITH IN SEPTEMBER 2019.

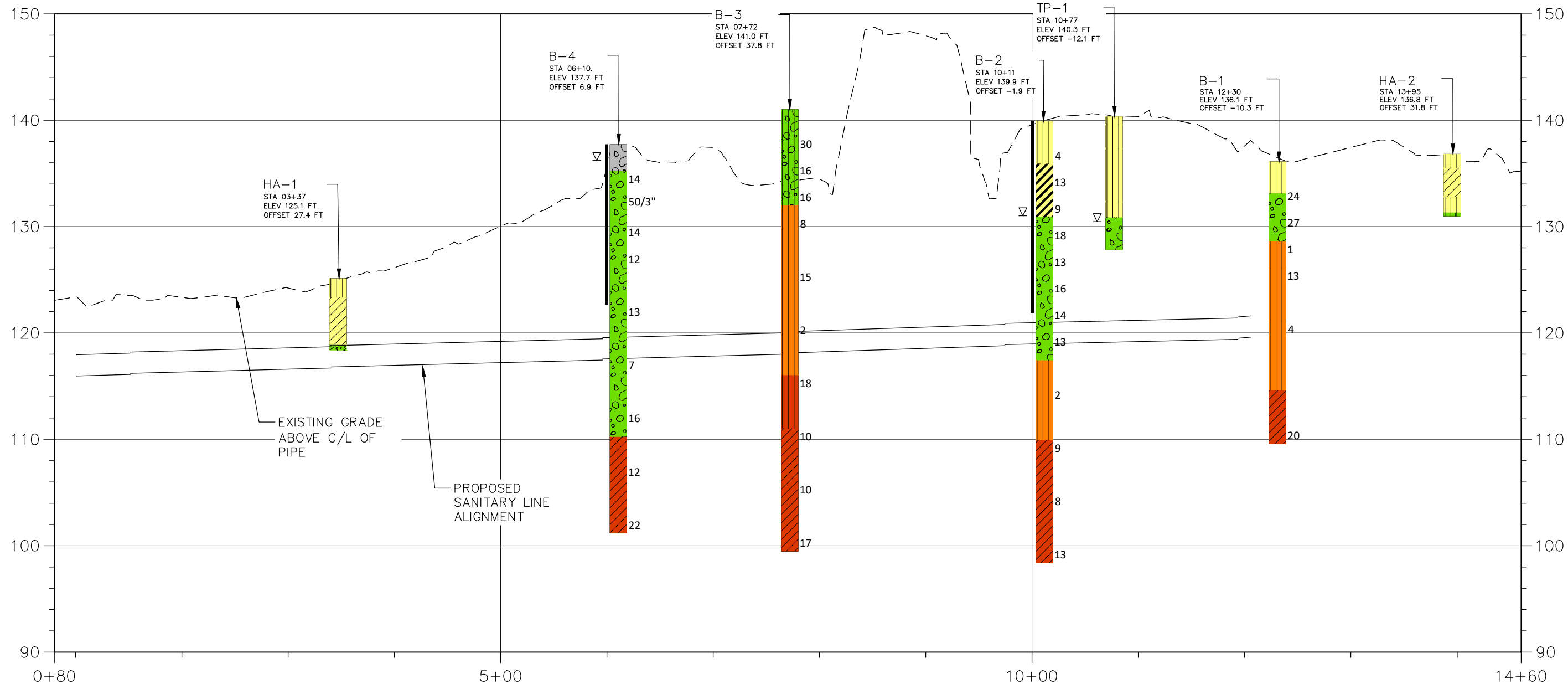


**CITY OF SHERWOOD**  
**ROCK CREEK SANITARY TRUNK LINE UPSIZING**  
 GEOTECHNICAL DATA REPORT  
 EXPLORATION PLAN STA 0+80 TO 14+60

**FIG.2**

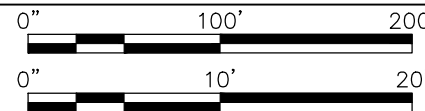
FEB 2021





GEOLOGIC PROFILE STA 0+80 TO 14+60

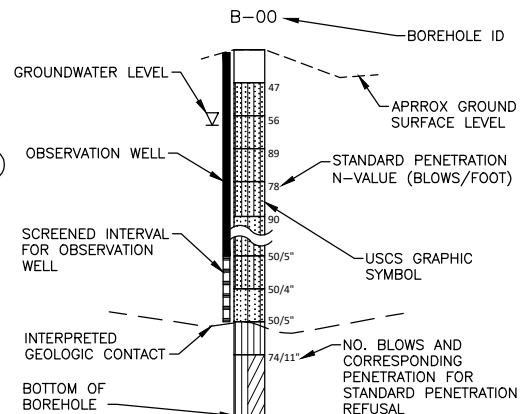
SCALE: 1"=100' HORIZ  
1"=10' VERT



LEGEND:

- ASPHALT
- SILT (ML)
- LEAN CLAY (CL)
- FAT CLAY (CH)
- SILTY SAND (SM)
- POORLY GRADED GRAVEL (GP)
- CLAYEY GRAVEL (GC)
- SILTY GRAVEL (GM)

BOREHOLE LEGEND:



- FILL
- ALLUVIUM
- COARSE-GRAINED MISSOULA FLOOD DEPOSITS
- FINE-GRAINED MISSOULA FLOOD DEPOSITS
- HILLSBORO FORMATION

NOTES:

1. BOREHOLE LOCATIONS ARE APPROXIMATE.
2. BOREHOLE LOCATIONS PROJECTED PERPENDICULAR TO ALIGNMENT.



CITY OF SHERWOOD  
**ROCK CREEK SANITARY TRUNK LINE UPSIZING**  
 GEOTECHNICAL DATA REPORT  
 GEOLOGIC PROFILE STA 0+80 TO 14+60

**FIG.3**

FEB 2021

# **Appendix A**

## **Exploration Logs**

## UNIFIED SOIL CLASSIFICATION SYSTEM (USCS based on ASTM D2488)

MAJOR DIVISIONS		GROUP/SYMBOL		TYPICAL DESCRIPTION	
COARSE-GRAINED SOILS (50% or more passes No. 200 sieve)	GRAVELS (more than 50% retained on No. 4 sieve)	CLEAN GRAVELS (less than 5% fines)	GW		WELL-GRADED GRAVEL
			GP		POORLY GRADED GRAVEL
		GRAVELS (with 5 to 15% fines)	GW-GM		WELL-GRADED GRAVEL WITH SILT
			GW-GC		WELL-GRADED GRAVEL WITH CLAY
			GP-GM		POORLY GRADED GRAVEL WITH SILT
			GP-GC		POORLY GRADED GRAVEL WITH CLAY
	GRAVELS WITH FINES (more than 15% fines)	GM		SILTY GRAVEL	
		GC		CLAYEY GRAVEL	
	SANDS (less than 50% retained on No. 4 sieve)	CLEAN SANDS (less than 5% fines)	SW		WELL-GRADED SAND
			SP		POORLY GRADED SAND
		SANDS (with 5 to 15% fines)	SW-SM		WELL-GRADED SAND WITH SILT
			SW-SC		WELL-GRADED SAND WITH CLAY
			SP-SM		POORLY GRADED SAND WITH SILT
			SP-SC		POORLY GRADED SAND WITH CLAY
SANDS WITH FINES (more than 15% fines)		SM		SILTY SAND	
		SC		CLAYEY SAND	
FINE-GRAINED SOILS (50% or more passes No. 200 sieve)	SILTS & CLAYS (liquid limit less than 50)	INORGANIC	ML		SILT
			CL		LEAN CLAY
	SILTS AND CLAYS (liquid limit greater than 50)	INORGANIC	MH		ELASTIC SILT
			CH		FAT CLAY
		ORGANIC	OH		HIGH PLASTICITY ORGANIC CLAY
			CL-ML		CLAYEY SILT/SILTY CLAY
SILT/CLAY (liquid limit 12-25; PI 4-7)	INORGANIC	CL-ML		CLAYEY SILT/SILTY CLAY	
HIGHLY ORGANIC SOILS	PRIMARILY ORGANIC MATTER	PT		PEAT	

**Note:**

Dual symbols (symbols separated by a hyphen, e.g. SP-SM) are used for soils between 5% and 15% fines or when liquid limit and plasticity index values plot in the CL-ML area of the plasticity chart.

### Coarse-Grained Soils

Relative Density	N, SPT Blows/Foot
Very Loose	0 - 4
Loose	5 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	> 50

### Fine-Grained Soils

Relative Consistency	N, SPT Blows/Foot
Very Soft	< 2
Soft	2 - 4
Medium Stiff	5 - 8
Stiff	9 - 15
Very Stiff	16 - 30
Hard	> 30

## Abbreviations

AL	Atterberg Limit
MC	Moisture Content
SA	Sieve Analysis
LL	Liquid Limit
PL	Plastic Limit

## Sample Symbols

	SPT Sample 2" OD
	Shelby Tube Sample
	Grab Sample
N	Blows/ft

## Backfill Symbols

	Bentonite Chips
	Concrete
	Sand
	Asphalt
	Gravel
	Grout
	Observation Well - Solid Interval
	Observation Well - Screened Interval

## AL/MC Symbols

	Blows/Ft
	Moisture Content
	Liquid Limit/Plastic Limit

## Modifiers & Percentages

Trace	Component is present at less than 5% of the less than 3-inch portion.
With (Sand or Gravel)	Coarse particles present at levels estimated at 15-30%.
Sandy or Gravelly	Coarse particles present at levels estimated at 30-50%.

## Moisture Content

Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp, but no visible water
Wet	Visible free water, usually soil is below water table

## Groundwater Symbols

	Maximum measured water level
	Vibrating Wire Piezometer

**Project: Rock Creek Sanitary Trunk Line Upsizing Project**  
**Project Location: Rock Creek, OR**  
**Project Number: 5993.0**

**Log of Boring B-1**

Date(s) Drilled 05/28/2019 - 05/28/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By GTB	Checked By F Sariosseiri
Drilling Method/ Rig Type Mud Rotary/Geoprobe Track 7822 DT	Drilling Contractor Western States Soil Conservation, Inc.	Total Depth of Borehole 26.5 ft	
Hole Diameter 4.00 in	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 136.1 ft	
Station 12+30	Offset 10.3 feet left	Elevation Source Project Survey	

ELEV. (FT)	WATER LEVEL	DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	BLOW COUNTS	SAMPLE NUMBER	PENETRATION RESISTANCE BLOWS/FT		USCS GRAPHIC	USCS	MATERIAL DESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
							10	20					
132		5		17	4-11-13 (N=24)	S-1				ML	Medium stiff, moist, brown, SILT (ML); low plasticity, some cobbles up to 8-inches in diameter. [Alluvium]	Rod chatter at 2.5 feet. Driller says gravel at 3 feet.	
				22	13-14-13 (N=27)	S-2				GP-GM	Medium dense, wet, brown, poorly-graded GRAVEL with silt, sand, and cobbles (GP-GM); some cobbles up to 6-inch in diameter, fine to coarse subrounded to subangular gravel, fine to coarse sand. [Coarse-Grained Missoula Flood Deposits]		
127		10		67	0-1-0 (N=1)	S-3				ML	Very soft, wet, gray, SILT (ML); low plasticity. [Fine-Grained Missoula Flood Deposits] <i>1.5 inch layer of clean, poorly-graded medium to coarse sand at 7.5 feet.</i>		
				83	4-6-7 (N=13)	S-4				ML	Stiff, wet, gray, SILT (ML); non plastic, trace fine sand. [Fine-Grained Missoula Flood Deposits]		
122		15		80	2-2-2 (N=4)	S-5				ML	Soft, wet, gray, sandy SILT (ML); low plasticity, fine sand. [Fine-Grained Missoula Flood Deposits]		
117		20				S-8					<i>Grades to very soft at 20.0 feet.</i>		
112		25		100	9-12-8 (N=20)	S-7				CL	Very stiff, moist, red-brown with gray mottles, LEAN CLAY (CL); low plasticity, trace fine subangular to subrounded gravel and medium sand. [Hillsboro Formation]	Driller notes material stiffens at 21.5 feet.	
107												Borehole completed at 26.5 feet below ground surface (bgs).	



**Boring B-1**

Sheet 1 of 1

**Project: Rock Creek Sanitary Trunk Line Upsizing Project**  
**Project Location: Rock Creek, OR**  
**Project Number: 5993.0**

**Log of Boring B-2**

Date(s) Drilled 05/28/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By GTB	Checked By F Sariosseiri
Drilling Method/ Rig Type Mud Rotary/Geoprobe Track 7822 DT	Drilling Contractor Western States Soil Conservation, Inc.	Total Depth of Borehole 41.5 ft	
Hole Diameter 4.00 in	Hammer Weight/Drop (lb/in./)Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 139.9 ft	
Station 10+11	Offset 1.9 feet left	Elevation Source Project Survey	

ELEV. (FT)	WATER LEVEL	DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	BLOW COUNTS	SAMPLE NUMBER	PENETRATION RESISTANCE BLOWS/FT		USCS GRAPHIC	USCS	MATERIAL DESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
							10	20					
135		5		33	2-2-2 (N=4)	S-1	□		[Vertical Lines]	ML	Soft, moist to wet, brown with orange mottles, SILT (ML); low plasticity, scattered organics consisting of fine roots. [Alluvium]		
				53	4-5-8 (N=13)	S-2	□	○	[Diagonal Lines]	CH	Stiff, wet, dark brown with gray mottles, FAT CLAY (CH); high plasticity, scattered organics consisting of fine roots.		
				33	2-3-6 (N=9)	S-3	□	○	[Diagonal Lines]	CH			
130		10		50	8-9-9 (N=18)	S-4	□		[Stippled]	GP-GM	Medium dense, wet, dark gray, poorly-graded GRAVEL with silt and sand, with boulders and cobbles (GP-GM); gravel appears to be decomposing. [Coarse-Grained Missoula Flood Deposits]	Driller felt gravel at 9 feet.	
				20	12-8-5 (N=13)	S-5	□		[Stippled]	GP-GM		Driller lost 50 gallons of mud at 12.5 feet.	
125		15		53	10-9-7 (N=16)	S-6	□		[Stippled]	GP-GM		Vibrating Wire Piezometer installed at 18 feet bgs.	
				33	9-6-8 (N=14)	S-7	□		[Stippled]	GP-GM			
120		20		33	6-6-7 (N=13)	S-8	□		[Stippled]	GP-GM			
115		25		0	2-1-1 (N=2)	S-9	□		[Vertical Lines]	ML	Soft, wet, gray, SILT (ML); low plasticity. [Fine-Grained Missoula Flood Deposits]		



**Boring B-2**

Sheet 1 of 2

**Project: Rock Creek Sanitary Trunk Line Upsizing Project**  
**Project Location: Rock Creek, OR**  
**Project Number: 5993.0**

**Log of Boring B-2**

Date(s) Drilled 05/28/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By GTB	Checked By F Sariosseiri
Drilling Method/ Rig Type Mud Rotary/Geoprobe Track 7822 DT	Drilling Contractor Western States Soil Conservation, Inc.	Total Depth of Borehole 41.5 ft	
Hole Diameter 4.00 in	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 139.9 ft	
Station 10+11	Offset 1.9 feet left	Elevation Source Project Survey	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	BLOW COUNTS	SAMPLE NUMBER	PENETRATION RESISTANCE BLOWS/FT		USCS GRAPHIC	USCS	MATERIAL DESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
						10	20					
			67	3-4-5 (N=9)	S-10	<input type="checkbox"/>			CL	Stiff, wet, brown with gray mottles, LEAN CLAY (CL); low plasticity. [Hillsboro Formation]		
105	35		95	2-4-4 (N=8)	S-11	<input type="checkbox"/>			CL	At 35.0 feet bgs becomes medium stiff.		
100	40		100	4-6-7 (N=13)	S-12	<input type="checkbox"/>				At 40.0 feet bgs becomes stiff.		
95	45										Borehole completed at 41.5 feet below ground surface (bgs).	
90	50											
85	55											



**Boring B-2**

Sheet 2 of 2

**Project: Rock Creek Sanitary Trunk Line Upsizing Project**  
**Project Location: Rock Creek, OR**  
**Project Number: 5993.0**

**Log of Boring B-3**

Date(s) Drilled 05/29/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By GTB	Checked By F Sariosseiri
Drilling Method/ Rig Type Mud Rotary/Geoprobe Track 7822 DT	Drilling Contractor Western States Soil Conservation, Inc.	Total Depth of Borehole 41.5 ft	
Hole Diameter 4.00 in	Hammer Weight/Drop (lb/in./)Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 141.0 ft	
Station 7+72	Offset 37.8 feet right	Elevation Source Project Survey	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	BLOW COUNTS	SAMPLE NUMBER	PENETRATION RESISTANCE BLOWS/FT		USCS GRAPHIC	USCS	MATERIAL DESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
						10	20					
136	5		45	8-10-20 (N=30)	S-1		30		GM	Medium dense, wet, red-brown with gray mottles, silty GRAVEL with sand, with cobbles and boulders (GM); low plasticity fines, fine to coarse, angular, subangular and subrounded gravel, fine to coarse sand. [Coarse-Grained Missoula Flood Deposits] <i>Boulders visible on ground surface.</i>	Driller noted "cobble" at 2.5 feet.	
			33	7-7-9 (N=16)	S-2		30					
			55	6-6-10 (N=16)	S-3		30					
131	10		50	4-4-4 (N=8)	S-4		30		ML	Medium stiff, wet, gray, sandy SILT (ML); low plasticity, fine sand. [Fine-Grained Missoula Flood Deposits]	Driller noted that soil becomes notably softer at 9 feet.	
126	15		22	12-11-4 (N=15)	S-5		30		ML	<i>Grades to stiff at 15.0 feet.</i>		
121	20		39	3-1-1 (N=2)	S-6		30		ML	<i>Grades to soft at 20.0 feet.</i>		
116	25		100	2-6-12 (N=18)	S-7		30		ML	Very stiff, moist, dark gray, SILT (ML); low plasticity, trace fine subangular to subrounded gravel, trace fine to coarse sand. [Hillsboro Formation]	Switched to drag bit at 28 feet.	



**Boring B-3**

Sheet 1 of 2

**Project: Rock Creek Sanitary Trunk Line Upsizing Project**  
**Project Location: Rock Creek, OR**  
**Project Number: 5993.0**

**Log of Boring B-3**

Date(s) Drilled 05/29/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By GTB	Checked By F Sariosseiri
Drilling Method/ Rig Type Mud Rotary/Geoprobe Track 7822 DT	Drilling Contractor Western States Soil Conservation, Inc.	Total Depth of Borehole 41.5 ft	
Hole Diameter 4.00 in	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 141.0 ft	
Station 7+72	Offset 37.8 feet right	Elevation Source Project Survey	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	BLOW COUNTS	SAMPLE NUMBER	PENETRATION RESISTANCE BLOWS/FT		USCS GRAPHIC	USCS	MATERIAL DESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
						10	20					
			100	2-4-6 (N=10)	S-8	<input type="checkbox"/>				Stiff, moist, lean CLAY (CL); low plasticity. [Hillsboro Formation]		
106	35		100	2-4-6 (N=10)	S-9	<input type="checkbox"/>			CL			
101	40		100	3-7-10 (N=17)	S-10	<input type="checkbox"/>					Grades to very stiff at 40.0 feet.	
96	45										Borehole completed at 41.5 feet below ground surface (bgs).	
91	50											
86	55											



**Project: Rock Creek Sanitary Trunk Line Upsizing Project**  
**Project Location: Rock Creek, OR**  
**Project Number: 5993.0**

**Log of Boring B-4**

Date(s) Drilled 05/29/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By GTB	Checked By F Sariosseiri
Drilling Method/ Rig Type Mud Rotary/Geoprobe Track 7822 DT	Drilling Contractor Western States Soil Conservation, Inc.	Total Depth of Borehole 36.5 ft	
Hole Diameter 4.00 in	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 137.7 ft	
Station 6+10	Offset 6.9 feet right	Elevation Source Project Survey	

ELEV. (FT)	WATER LEVEL	DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	BLOW COUNTS	SAMPLE NUMBER	PENETRATION RESISTANCE BLOWS/FT		USCS GRAPHIC	USCS	MATERIAL DESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
							10	20 30 40					
133		5		39	3-6-8 (N=14)	S-1				GP-GM	Medium dense, moist, dark brown, poorly-graded GRAVEL with silt and sand (GP-GM); low plasticity fines, fine to coarse, subrounded gravel, fine to coarse sand. [Fill]		
				33	7-50/3" (Refusal)	S-2					Medium dense, wet, brown, poorly-graded GRAVEL with silt and sand (GP-GM); low plasticity fines, fine to coarse subrounded gravel, fine to coarse sand. [Coarse-Grained Missoula Flood Deposits] At 5.0 feet SPT refusal likely due to presence of cobble or cobbles.		
128		10		33	7-8-6 (N=14)	S-3						Losing drilling fluid in formation	
				33	9-8-4 (N=12)	S-4						Rod chatter through layer.	
123		15		17	7-5-8 (N=13)	S-5				GP-GM		At 15.0 feet additional fluid loss (hundreds of gallons). Vibrating Wire Piezometer installed 15 feet bgs.	
118		20		33	4-2-5 (N=7)	S-6							
113		25		28	7-6-10 (N=16)	S-7							
108											Stiff, moist, brown with gray mottles, lean CLAY (CL); low plasticity. [Hillsboro Formation]	Driller noted that soil transitions to soft at 27.5 feet.	



**Boring B-4**

Sheet 1 of 2

**Project: Rock Creek Sanitary Trunk Line Upsizing Project**  
**Project Location: Rock Creek, OR**  
**Project Number: 5993.0**

**Log of Boring B-4**

Date(s) Drilled 05/29/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By GTB	Checked By F Sariosseiri
Drilling Method/ Rig Type Mud Rotary/Geoprobe Track 7822 DT	Drilling Contractor Western States Soil Conservation, Inc.	Total Depth of Borehole 36.5 ft	
Hole Diameter 4.00 in	Hammer Weight/Drop (lb/in.)/Type 140 lb / 30 in / Automatic	Ground Surface Elevation/Datum 137.7 ft	
Station 6+10	Offset 6.9 feet right	Elevation Source Project Survey	

ELEV. (FT)	WATER LEVEL DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	BLOW COUNTS	SAMPLE NUMBER	PENETRATION RESISTANCE BLOWS/FT		USCS GRAPHIC	USCS	MATERIAL DESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
						10	20					
103	35		89	4-4-8 (N=12)	S-8	<input type="checkbox"/>			CL	Stiff, moist, brown with gray mottles, lean CLAY (CL); low plasticity. [Hillsboro Formation]	Lost approximately 400 gallons of drilling fluid by 30 feet.	
			100	6-9-13 (N=22)	S-9	<input type="checkbox"/>				At 35.0 feet bgs becomes very stiff.		
98	40										Borehole completed at 36.5 feet below ground surface (bgs).	
93	45											
88	50											
83	55											
78												

**Project: Rock Creek Sanitary Trunk Line Upsizing Project**  
**Project Location: Rock Creek, OR**  
**Project Number: 5993.0**

**Log of Boring HA-1**

Date(s) Drilled 05/30/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By GTB	Checked By F Sariosseiri
Drilling Method/ Rig Type Hand Auger/AMS Hand Auger	Drilling Contractor McMillen Jacobs Associates	Total Depth of Borehole 6.2 ft	
Hole Diameter 2.125 in	Hammer Weight/Drop (lb/in.)/Type	Ground Surface Elevation/Datum 125.1 ft	
Location 3+37	Coordinates 27.4 feet right	Elevation Source Project Survey	

ELEV. (FT)	WATER LEVEL	DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	BLOW COUNTS	SAMPLE NUMBER	PENETRATION RESISTANCE BLOWS/FT		USCS GRAPHIC	USCS	MATERIAL DESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
							10	20					
						G-1				ML	Wet, dark brown, SILT with sand (ML); nonplastic, trace fine gravel, fine to coarse sand, trace organics consist of fine roots and plant fibers. [Alluvium]		
		100									<i>At 1.6 feet, organic content test results, 7.3% organic matter.</i>		
						G-2				CL	Wet, dark brown, CLAY (CL); medium plasticity, trace fine to coarse sand. [Alluvium]		
-121													
		5									<i>Thin bed (4 inches) of well-graded, sand at a depth of 5.8 feet.</i>		
						G-3							
		100										Refused by gravel/cobble.	
												Borehole completed at 6.2 feet below ground surface (bgs).	
-116													

**Project: Rock Creek Sanitary Trunk Line Upsizing Project**  
**Project Location: Rock Creek, OR**  
**Project Number: 5993.0**

**Log of Boring HA-2**

Date(s) Drilled 05/30/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By A Judy	Checked By F Sariosseiri
Drilling Method/ Rig Type Hand Auger/AMS Hand Auger	Drilling Contractor McMillen Jacobs Associates	Total Depth of Borehole 5.8 ft	
Hole Diameter 2.125 in	Hammer Weight/Drop (lb/in.)/Type	Ground Surface Elevation/Datum 136.8 ft	
Location 13+95	Coordinates 31.8 feet right	Elevation Source Project Survey	

ELEV. (FT)	WATER LEVEL	DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	BLOW COUNTS	SAMPLE NUMBER	PENETRATION RESISTANCE BLOWS/FT		USCS GRAPHIC	USCS	MATERIAL DESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
							10	20					
										ML	Moist, red-brown, sandy SILT with some gravel and cobbles (ML); fine to coarse subangular gravel, frequent root fibers in the upper 3 inches. [Alluvium]		
										CL	Moist, dark brown with trace black mottles, lean CLAY (CL); low plasticity, trace mica. [Alluvium]		
132		5		100		G-1				ML	Moist, light brown with red mottles, SILT with sand (ML); trace fine subrounded to subangular gravel, trace fine to medium sand. [Alluvium]		
										GM	Wet, brown, silty GRAVEL with sand (GM); fine to coarse gravel. [Coarse-Grained Missoula Flood Deposits]		
127												Borehole completed at 5.8 feet below ground surface (bgs).	



**Boring HA-2**

Sheet 1 of 1

**Project: Rock Creek Sanitary Trunk Line Upsizing Project**  
**Project Location: Rock Creek, OR**  
**Project Number: 5993.0**

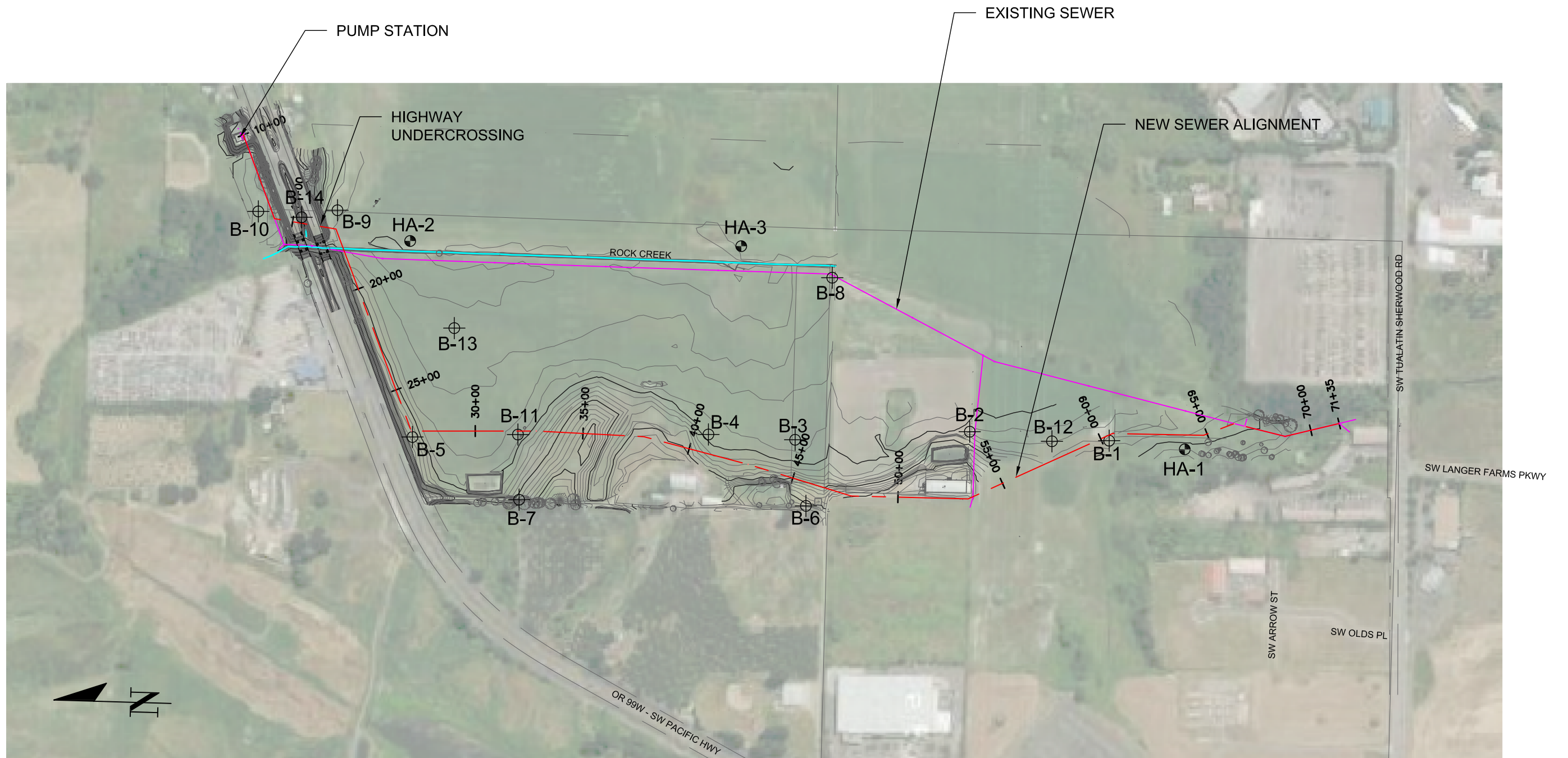
**Log of Test Pit TP-1**

Date(s) Drilled 06/19/2019	Geotechnical Consultant McMillen Jacobs Associates	Logged By J Quinn	Checked By F Sariosseiri
Drilling Method/ Rig Type Hitachi ZX-135	Drilling Contractor Western States Soil Conservation, Inc.	Total Depth of Borehole 12.5 ft	
Test Pit Dimensions 13 ft by 2 ft	Hammer Weight/Drop (lb/in./)Type	Ground Surface Elevation/Datum 140.3 ft	
Location 10+77	Coordinates 12.1 feet left	Elevation Source Project Survey	

ELEV. (FT)	WATER LEVEL	DEPTH (FT)	SAMPLE TYPE	RECOVERY (%)	BLOW COUNTS	SAMPLE NUMBER	PENETRATION RESISTANCE BLOWS/FT		USCS GRAPHIC	USCS	MATERIAL DESCRIPTION	REMARKS AND TESTS	BACKFILL/INSTALL.
							10	20					
-136		5				G-1				ML	Medium stiff, dry, brown, SILT with sand (ML); low plasticity, trace fine to coarse rounded gravel up to approximately 3 inches in diameter, frequent fine roots.		
		100				G-2				ML	[Alluvium] Medium stiff, dry, brown with gray and orange mottles, brown, sandy SILT (ML); low plasticity, trace fine angular gravel, fine to medium sand.	At 2.5 feet, torvane shear test = 0.3 tsf.	
		100				G-3				ML	[Alluvium] At 2.5 feet becomes moist. Medium stiff, wet, brown to red-brown with gray mottles, SILT with sand (ML); low plasticity, trace fine sand, occasional rounded, fine gravel-sized indurated silt clasts.	At 3.5 feet torvane shear test = 0.3 tsf.	
-131		10				G-4				GP-GM	Dense, wet, gray, poorly-graded GRAVEL with silt and sand, with cobbles and boulders (GP-GM); occasional boulders up to 18 inches in diameter, frequent rounded cobbles up to 12-inches in diameter, coarse, subangular to rounded gravel, fine to coarse sand.	At 9.5 feet: stabilized groundwater level measured. Minor sidewall caving observed below depth of 9.5 feet.	
-126		15										Borehole completed at 12.5 feet below ground surface (bgs).	

## **Appendix B**

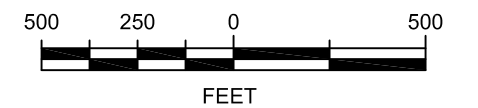
### **Previous Explorations**



NOTES:

1. AERIAL IMAGE FROM GOOGLE EARTH
2. STANDPIPE PIEZOMETERS INSTALLED IN BORINGS B-2, B-4, AND B-9
3. HYDRAULIC CONDUCTIVITY TESTING IN BORING B-14
4. NEW SEWER ALIGNMENT BASED ON CLEAN WATER SERVICES 30% DESIGN DRAWINGS

**PLAN**  
SCALE: 1" = 500'



## Appendix A – Boring Logs



# Log of B-1

PROJECT: ONION FLAT SEWER UPGRADE  
 PROJECT NUMBER: 5140.2  
 LOCATION: 25' North of PL fence

DATE: 7/16/2014  
 DEPTH OF EXCAVATION: 36.5 FT

**SHEET 1 of 2**  
 ELEVATION: 118.045 FT  
 DATUM: KPFF topo survey  
 COORDINATES: N 630175.0706  
 E 7603455.691

JA PORTLAND GENERAL SOIL LOG 5140.2 ONION FLAT BORING LOGS.GPJ JACOBS DATA TEMPLATE\_GENERAL SOIL PROJECTS.GDT 10/5/15 REV.

DEPTH (FT) WATER LEVEL ELEV. (FT)	DESCRIPTION	USCS	GRAPHIC LOG	WELL	SAMPLES				PENETRATION RESISTANCE BLOWS/FT		NOTES
					NUMBER	TYPE/ REC%	BLOWS	N	WATER CONTENT - ATTERBERG		
									PL	MC	
7/16/2014	PEAT with some silt, very soft, wet, brown and black. [Recent Alluvium]	PT									
					N-1	56%	2-1-1	2		96	Groundwater measured at end of drilling
	Silty SAND, loose, wet, dark gray. Sand is fine grained. [Flood Deposits]	SM			N-2	67%	1-2-2	4		35	P200 = 41 (ASTM D1140)
	becomes with some organics.				N-3	67%	2-2-2	4		59	Bottom 6" of spoon and shoe is empty.
	SAND with some organics and silt, loose, wet, dark gray. Sand is fine grained. [Flood Deposits]	SP-SM			N-4		2-1-2	3			93
	Organic SILT, soft, wet, brown. [Flood Deposits]	OL			N-5	78%	1-2-1	3			90
	becomes gray and brown.				N-6		1-1-1	2			
	Silty SAND with some organics, very loose, wet, black. [Flood Deposits]	SM			N-7	100%	1-1-1	2			
	Elastic SILT with some organics, very soft, wet, medium plasticity. [Flood Deposits]	MH									

DRILL METHOD/HAMMER: Solid Stem Auger/Safety  
 DRILLING CONTRACTOR: Vandehey Drilling  
 DRILLER:

DRILL RIG: Simco 2400-SK-1  
 LOGGED BY: MJS  
 CHECKED BY:





# Log of B-2

PROJECT: ONION FLAT SEWER UPGRADE  
 PROJECT NUMBER: 5140.2  
 LOCATION: ~300' East of SE corner of barn

DATE: 7/16/2014  
 DEPTH OF EXCAVATION: 21.5 FT

**SHEET 1 of 2**  
 ELEVATION: 115.88 FT  
 DATUM: KPFF topo survey  
 COORDINATES: N 630821.4215  
 E 7603497.168

JA PORTLAND GENERAL SOIL LOG 5140.2 ONION FLAT BORING LOGS.GPJ JACOBS DATA TEMPLATE\_GENERAL SOIL PROJECTS.GDT 10/5/15 REV.

DEPTH (FT) WATER LEVEL ELEV. (FT)	DESCRIPTION	USCS	GRAPHIC LOG	WELL	SAMPLES				PENETRATION RESISTANCE BLOWS/FT ■		NOTES
					NUMBER	TYPE/ REC%	BLOWS	N	WATER CONTENT - ATTERBERG		
									PL	MC	
115.88	Sandy SILT with some organics, soft, damp, light brown. [Recent Alluvium]	OL									Standpipe piezometer installed to 19.5' Oregon well # L-106437.
				N-1		2-1-3	4	■			
					11%						
	becomes moist, dark brown.			N-2		1-3-2	5	■			
	SAND with some silt, loose, wet, gray. [Flood Deposits]	SP-SM									
					78%						
				N-3		7-9-13	22	■			
					78%						
	Elastic SILT with some sand, very stiff, damp, gray, mottled orange, high plasticity. [Hillsboro Formation]	MH									
				N-4		6-10-11	21	■			
					67%						
				N-5		5-7-10	17	■			
					67%						
	becomes brown with orange, red, and light brown lenses.			N-6		4-8-10	18	■			
					67%						
	SILT with some sand, stiff, moist, light brown, mottled orange, low plasticity. [Hillsboro Formation]	ML									

DRILL METHOD/HAMMER: Solid Stem Auger/Safety  
 DRILLING CONTRACTOR: Vandehey Drilling  
 DRILLER:

DRILL RIG: Simco 2400-SK-1  
 LOGGED BY: MJS  
 CHECKED BY:



# Log of B-2

**SHEET 2 of 2**

PROJECT: ONION FLAT SEWER UPGRADE  
 PROJECT NUMBER: 5140.2  
 LOCATION: ~300' East of SE corner of barn

DATE: 7/16/2014  
 DEPTH OF EXCAVATION: 21.5 FT

ELEVATION: 115.88 FT  
 DATUM: KPFF topo survey  
 COORDINATES: N 630821.4215  
 E 7603497.168

DEPTH (FT) WATER LEVEL ELEV. (FT)	DESCRIPTION	USCS	GRAPHIC LOG	WELL	SAMPLES				PENETRATION RESISTANCE BLOWS/FT ■		NOTES
					NUMBER	TYPE/ REC%	BLOWS	N	WATER CONTENT - ATTERBERG		
									PL	MC	
	SILT with some sand, stiff, moist, light brown, mottled orange, low plasticity. [Hillsboro Formation](continued)	ML			N-7		5-4-6	10	■		

BOTTOM OF BOREHOLE AT 21.5 FT

67%

JA PORTLAND GENERAL SOIL LOG 5140.2.ONION FLAT BORING LOGS.GPJ JACOBS DATA TEMPLATE\_GENERAL SOIL PROJECTS.GDT 10/5/15 REV.

DRILL METHOD/HAMMER: Solid Stem Auger/Safety  
 DRILLING CONTRACTOR: Vandehey Drilling  
 DRILLER:

DRILL RIG: Simco 2400-SK-1  
 LOGGED BY: MJS  
 CHECKED BY:



# Log of B-3

SHEET 1 of 2

PROJECT: ONION FLAT SEWER UPGRADE

DATE: 7/14/2014

ELEVATION: 113.493 FT

PROJECT NUMBER: 5140.2

DEPTH OF EXCAVATION: 20 FT

DATUM: KPFF topo survey

LOCATION: On alignment, north of E-W Refuge access rd.

COORDINATES: N 631631.393  
E 7603459.95

JA PORTLAND GENERAL SOIL LOG 5140.2 ONION FLAT BORING LOGS.GPJ JACOBS DATA TEMPLATE\_GENERAL SOIL PROJECTS.GDT 10/5/15 REV.

DEPTH (FT) WATER LEVEL ELEV. (FT)	DESCRIPTION	USCS	GRAPHIC LOG	WELL	SAMPLES				PENETRATION RESISTANCE BLOWS/FT		NOTES
					NUMBER	TYPE/ REC%	BLOWS	N	20	40 60 80	
110	PEAT with some silt and sand, Very soft, wet, dark brown. [Recent Alluvium]	PT			N-1	2-1-1	2	2	2	Groundwater measured after leaving hole open overnight	
						22%					
	SAND with some silt, loose, wet, gray, sand is fine grained. [Flood Deposits]				N-2	3-2-4	6	6	35	Sampler comes out wet.	
						33%					
					N-3	5-6-2	8	8			
	becomes medium dense.	SP-SM			N-4	5-8-4	12	12			
	becomes dense.				N-5	2-9-11	20	20			
	becomes loose.				N-6	3-3-4	7	7	28		
						56%				Sieve (ASTM C136/C117) %Sand=94, %Fines=6	
	SILT lens from 19' to 19.3': becomes with trace silt, dark gray.				N-7	7-8-6	14	14			

DRILL METHOD: POWER BORING  
 DRILLING CONTRACTOR: Vandehey Drilling  
 DRILLER:

DRILL RIG: Simco 2400-SK-1  
 LOGGED BY: MJS  
 CHECKED BY:



# Log of B-3

**SHEET 2 of 2**

PROJECT: ONION FLAT SEWER UPGRADE

DATE: 7/14/2014

ELEVATION: 113.493 FT

PROJECT NUMBER: 5140.2

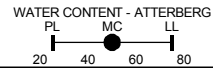
DEPTH OF EXCAVATION: 20 FT

DATUM: KPFF topo survey

LOCATION: On alignment, north of E-W Refuge access rd.

COORDINATES: N 631631.393  
E 7603459.95

DEPTH (FT) WATER LEVEL ELEV. (FT)	DESCRIPTION	USCS	GRAPHIC LOG	WELL	SAMPLES		PENETRATION RESISTANCE		NOTES		
					NUMBER	TYPE/ REC%	BLOWS	N		BLOWS/FT ■	
										20	40



67%

JA PORTLAND GENERAL SOIL LOG 5140.2 ONION FLAT BORING LOGS.GPJ JACOBS DATA TEMPLATE\_GENERAL SOIL PROJECTS.GDT 10/5/15 REV.

DRILL METHOD/HAMMER: Solid Stem Auger/Safety  
 DRILLING CONTRACTOR: Vandehey Drilling  
 DRILLER:

DRILL RIG: Simco 2400-SK-1  
 LOGGED BY: MJS  
 CHECKED BY:



# Log of B-4

PROJECT: ONION FLAT SEWER UPGRADE  
 PROJECT NUMBER: 5140.2  
 LOCATION: At center of barn to the west, on proposed alignment

DATE: 7/14/2014-7/15/2014  
 DEPTH OF EXCAVATION: 25 FT

**SHEET 1 of 2**  
 ELEVATION: 114.477 FT  
 DATUM: KPFF topo survey  
 COORDINATES: N 632033.1738  
 E 7603484.426

JA PORTLAND GENERAL SOIL LOG 5140.2 ONION FLAT BORING LOGS.GPJ JACOBS DATA TEMPLATE\_GENERAL SOIL PROJECTS.GDT 10/5/15 REV.

DEPTH (FT) WATER LEVEL ELEV. (FT)	DESCRIPTION	USCS	GRAPHIC LOG	WELL	SAMPLES		PENETRATION RESISTANCE BLOWS/FT ■	NOTES
					NUMBER	TYPE/ REC%		
110 8/15/2014 10 100 15 20	PEAT, Very soft, moist, dark brown. [Recent Alluvium]	PT			N-1	2-1-1 67%	2 ■	Standpipe installed to 12' Oregon well # L-106435.  Sieve (ASTM C136/C117) %Sand=86, %Fines=14.
	SAND with some silt and trace organics, loose, wet, brown and orange. Organics consist of rootlets. [Flood Deposits]	SP-SM		N-2	3-4-5 44%	9 ■		
	becomes dark gray, no organics.			N-3	12-5-3 56%	8 ■		
	becomes very loose.			N-4	3-1-2 44%	3 ■		
	SILT, soft, wet, brown. [Flood Deposits]			ML				
	SAND, loose, wet, brown. [Flood Deposits]	SP		N-5	2-2-7 33%	9 ■		
				N-6	6-4-2 22%	6 ■		
	N-7			2-6-11 67%	17 ■			

DRILL METHOD/HAMMER: Solid Stem Auger/Safety  
 DRILLING CONTRACTOR: Vandehey Drilling  
 DRILLER:

DRILL RIG: Simco 2400-SK-1  
 LOGGED BY: MJS  
 CHECKED BY:



# Log of B-4

**SHEET 2 of 2**

PROJECT: ONION FLAT SEWER UPGRADE

DATE: 7/14/2014-7/15/2014

ELEVATION: 114.477 FT

PROJECT NUMBER: 5140.2

DEPTH OF EXCAVATION: 25 FT

DATUM: KPFF topo survey

COORDINATES: N 632033.1738  
E 7603484.426

LOCATION: At center of barn to the west, on proposed alignment

DEPTH (FT) WATER LEVEL ELEV. (FT)	DESCRIPTION	USCS	GRAPHIC LOG	WELL	SAMPLES				PENETRATION RESISTANCE BLOWS/FT ■		NOTES
					NUMBER	TYPE/ REC%	BLOWS	N	WATER CONTENT - ATTERBERG		
									PL	MC	
25	SAND, loose, wet, brown. [Flood Deposits](continued) becomes medium dense	SP	[Graphic Log: Dotted pattern]		N-8	7-12-9	21	■			
90	becomes loose.					67%					
					N-9	5-3-3	6	■			

BOTTOM OF BOREHOLE AT 25 FT

44%

JA PORTLAND GENERAL SOIL LOG 5140.2 ONION FLAT BORING LOGS.GPJ JACOBS DATA TEMPLATE\_GENERAL SOIL PROJECTS.GDT 10/5/15 REV.

DRILL METHOD/HAMMER: Solid Stem Auger/Safety

DRILL RIG: Simco 2400-SK-1

DRILLING CONTRACTOR: Vandehey Drilling

LOGGED BY: MJS

DRILLER:

CHECKED BY:





# Log of B-5

PROJECT: ONION FLAT SEWER UPGRADE  
 PROJECT NUMBER: 5140.2  
 LOCATION: 305' East of East edge of gravel road

DATE: 7/15/2014  
 DEPTH OF EXCAVATION: 26.5 FT

**SHEET 1 of 2**  
 ELEVATION: 117.697 FT  
 DATUM: KPFF topo survey  
 COORDINATES: N 633405.7594  
 E 7603472.587

JA PORTLAND GENERAL SOIL LOG 5140.2 ONION FLAT BORING LOGS.GPJ JACOBS DATA TEMPLATE - GENERAL SOIL PROJECTS.GDT 10/5/15 REV.

DEPTH (FT) WATER LEVEL ELEV. (FT)	DESCRIPTION	USCS	GRAPHIC LOG	WELL	SAMPLES				PENETRATION RESISTANCE BLOWS/FT ■		NOTES	
					NUMBER	TYPE/ REC%	BLOWS	N	20	40		60
	Silty SAND, medium dense, dry, brown and orange. Sand is fine grained. [Flood Deposits]											
	becomes damp.	SM			N-1		8-11-10	21	■			
						67%						
	SAND with some silt, loose, wet, brown. Sand is fine to medium grained. [Flood Deposits]				N-2		3-4-3	7	■			Groundwater measured after leaving hole open overnight
						67%						
	becomes medium dense. Sand is medium grained.	SP-SM			N-3		4-8-9	17	■			
						56%						
	Sand is fine to medium grained.				N-4		3-4-9	13	■			
						56%						
	SILT, stiff, wet, brown and orange. [Flood Deposits]	ML			N-5		5-12-20	32	■			
	SAND with some silt, dense, wet, dark gray. Sand is fine to medium grained. [Flood Deposits]					67%						
	becomes with trace silt, brown. Sand is medium grained.											
	becomes with some silt, dark gray. Sand is fine to medium grained.	SP-SM			N-6		7-15-19	34	■			
						67%						
	becomes dense, with trace silt, moist, brown. Sand is medium grained.											

DRILL METHOD/HAMMER: Solid Stem Auger/Safety  
 DRILLING CONTRACTOR: Vandehey Drilling  
 DRILLER:

DRILL RIG: Simco 2400-SK-1  
 LOGGED BY: MJS  
 CHECKED BY:



# Log of B-5

**SHEET 2 of 2**

PROJECT: ONION FLAT SEWER UPGRADE  
 PROJECT NUMBER: 5140.2  
 LOCATION: 305' East of East edge of gravel road

DATE: 7/15/2014  
 DEPTH OF EXCAVATION: 26.5 FT

ELEVATION: 117.697 FT  
 DATUM: KPFF topo survey  
 COORDINATES: N 633405.7594  
 E 7603472.587

DEPTH (FT) WATER LEVEL ELEV. (FT)	DESCRIPTION	USCS	GRAPHIC LOG	WELL	SAMPLES				PENETRATION RESISTANCE BLOWS/FT ■		NOTES
					NUMBER	TYPE/ REC%	BLOWS	N	WATER CONTENT - ATTERBERG		
									PL	MC	
25	SAND with some silt, dense, wet, dark gray. Sand is fine to medium grained. [Flood Deposits](continued)  becomes with some silt, wet, dark gray. Sand is fine to medium grained.           becomes fine grained with trace silt, brown.	SP-SM			N-7           N-8	67%           78%	6-13-21           6-16-23	34           39			
	becomes silty, dark gray. Sand is fine grained. [Flood Deposits]	SM									
	BOTTOM OF BOREHOLE AT 26.5 FT										

JA PORTLAND GENERAL SOIL LOG 5140.2 ONION FLAT BORING LOGS.GPJ JACOBS DATA TEMPLATE\_GENERAL SOIL PROJECTS.GDT 10/15/15 REV.

DRILL METHOD/HAMMER: Solid Stem Auger/Safety  
 DRILLING CONTRACTOR: Vandehey Drilling  
 DRILLER:

DRILL RIG: Simco 2400-SK-1  
 LOGGED BY: MJS  
 CHECKED BY:





# Log of B-6

PROJECT: ONION FLAT SEWER UPGRADE  
 PROJECT NUMBER: 5140.2  
 LOCATION: Southern Boring on gravel road

DATE: 7/15/2014  
 DEPTH OF EXCAVATION: 31.5 FT

**SHEET 2 of 2**  
 ELEVATION: 126.175 FT  
 DATUM: KPFF topo survey  
 COORDINATES: N 631581.0435  
 E 7603153.346

JA PORTLAND GENERAL SOIL LOG 5140.2 ONION FLAT BORING LOGS.GPJ JACOBS DATA TEMPLATE\_GENERAL SOIL PROJECTS.GDT 10/5/15 REV.

DEPTH (FT) WATER LEVEL ELEV. (FT)	DESCRIPTION	USCS	GRAPHIC LOG	WELL	SAMPLES				PENETRATION RESISTANCE BLOWS/FT ■		NOTES
					NUMBER	TYPE/ REC%	BLOWS	N	WATER CONTENT - ATTERBERG		
									PL	MC	
	Elastic SILT, medium stiff, wet, gray. [Flood Deposits]	SP			N-4		4-10-15	25	■		
	Well graded SAND with trace silt, medium dense, wet, brown. [Flood Deposits]	MH				78%					
	Silty SAND, medium dense, wet, gray. Sand is fine grained. [Flood Deposits]	SW									
25											
100					N-5		3-4-7	11	■		
		SM									
					N-6		5-6-11	17	■		
	SAND with trace silt, medium dense, wet, black. Sand is fine to medium grained. [Flood Deposits]	SP									

BOTTOM OF BOREHOLE AT 31.5 FT

DRILL METHOD/HAMMER: Solid Stem Auger/Safety  
 DRILLING CONTRACTOR: Vandehey Drilling  
 DRILLER:

DRILL RIG: Simco 2400-SK-1  
 LOGGED BY: MJS  
 CHECKED BY:



# Log of B-7

PROJECT: ONION FLAT SEWER UPGRADE

DATE: 7/16/2014

SHEET 1 of 2

PROJECT NUMBER: 5140.2

DEPTH OF EXCAVATION: 31.5 FT

ELEVATION: 121.448 FT

DATUM: KPFF topo survey

COORDINATES: N 632911.2296  
E 7603181.717

LOCATION: 40' South of Refuge gate, center of gravel road

JA PORTLAND GENERAL SOIL LOG 5140.2 ONION FLAT BORING LOGS.GPJ JACOBS DATA TEMPLATE\_GENERAL SOIL PROJECTS.GDT 10/5/15 REV.

DEPTH (FT) WATER LEVEL ELEV. (FT)	DESCRIPTION	USCS	GRAPHIC LOG	WELL	SAMPLES				PENETRATION RESISTANCE BLOWS/FT ■		NOTES
					NUMBER	TYPE/ REC%	BLOWS	N	WATER CONTENT - ATTERBERG		
									PL	MC	
120	GRAVEL [Fill]	GW									
5	Silty SAND, medium dense, moist, brown, mottled orange. Sand is fine grained.	SM			N-1	6-10-12	22	■			
10	SAND with some silt, medium dense, wet, brown, mottled orange. [Flood Deposits] becomes with trace silt, brown (not mottled orange).				N-2	6-8-7	15	■			Groundwater measured at end of drilling
15	becomes with some silt, orange-brown.	SP-SM			N-3	9-11-16	27	■			

DRILL METHOD/HAMMER: Solid Stem Auger/Safety  
DRILLING CONTRACTOR: Vandehey Drilling  
DRILLER:

DRILL RIG: Simco 2400-SK-1  
LOGGED BY: MJS  
CHECKED BY:



# Log of B-7

PROJECT: ONION FLAT SEWER UPGRADE

DATE: 7/16/2014

SHEET 2 of 2

ELEVATION: 121.448 FT

PROJECT NUMBER: 5140.2

DEPTH OF EXCAVATION: 31.5 FT

DATUM: KPFF topo survey

COORDINATES: N 632911.2296  
E 7603181.717

LOCATION: 40' South of Refuge gate, center of gravel road

JA PORTLAND GENERAL SOIL LOG 5140.2 ONION FLAT BORING LOGS.GPJ JACOBS DATA TEMPLATE\_GENERAL SOIL PROJECTS.GDT 10/5/15 REV.

DEPTH (FT) WATER LEVEL ELEV. (FT)	DESCRIPTION	USCS	GRAPHIC LOG	WELL	SAMPLES				PENETRATION RESISTANCE BLOWS/FT ■		NOTES
					NUMBER	TYPE/ REC%	BLOWS	N	WATER CONTENT - ATTERBERG		
									PL	MC	
100	SAND with some silt, medium dense, wet, brown, mottled orange. [Flood Deposits](continued) becomes very loose.	SP-SM			N-4		2-1-2	3	■		
	Elastic SILT, soft, wet, gray.	MH				100%					
25	SAND with trace silt, medium dense, wet, brown. Sand is fine to medium grained.	SP			N-5		8-11-12	23	■		
	SAND with some silt, trace gravel, medium dense, wet, gray. Sand is fine grained.	SP-SM				100%					
10	SAND, medium dense, wet, brown, clean. Sand is fine to medium grained.	SP									
90	Silty SAND, medium dense, wet, gray. Sand is fine grained.	SM			N-6		6-12-18	30	■		
BOTTOM OF BOREHOLE AT 31.5 FT					89%						

DRILL METHOD/HAMMER: Solid Stem Auger/Safety  
 DRILLING CONTRACTOR: Vandehey Drilling  
 DRILLER:

DRILL RIG: Simco 2400-SK-1  
 LOGGED BY: MJS  
 CHECKED BY:



# Log of B-8

PROJECT: ONION FLAT SEWER UPGRADE  
 PROJECT NUMBER: 5140.2  
 LOCATION: 17.5' West of existing manhole at section of settled pipe

DATE: 7/16/2014  
 DEPTH OF EXCAVATION: 17.5 FT

**SHEET 1 of 1**  
 ELEVATION: 111.735 FT  
 DATUM: KPFF topo survey  
 COORDINATES: N 631459.296  
 E 7604211.246

JA PORTLAND GENERAL SOIL LOG 5140.2 ONION FLAT BORING LOGS.GPJ JACOBS DATA TEMPLATE - GENERAL SOIL PROJECTS.GDT 10/5/15 REV.

DEPTH (FT) WATER LEVEL ELEV. (FT)	DESCRIPTION	USCS	GRAPHIC LOG	WELL	SAMPLES				PENETRATION RESISTANCE BLOWS/FT		NOTES		
					NUMBER	TYPE/ REC%	BLOWS	N	20	40 60 80			
110	PEAT, very soft, wet, red-brown. [Recent Alluvium]	PT			N-1	1-1-1	2	■			617 >> Groundwater measured at end of drilling  621 >>  524 >>  370 >>		
					N-2	1-1-1	2	■					
						78%							
					N-3	1-1-1	2	■					
						100%							
					N-4	1-0-1	1	■					
						100%							
	Elastic SILT, very soft, wet, gray, medium plasticity. [Flood Deposits]	MH			N-5		1	■					

BOTTOM OF BOREHOLE AT 17.5 FT

100%

DRILL METHOD/HAMMER: Solid Stem Auger/Safety  
 DRILLING CONTRACTOR: Vandehey Drilling  
 DRILLER:

DRILL RIG: Simco 2400-SK-1  
 LOGGED BY: MJS  
 CHECKED BY:



# Log of B-9

PROJECT: ONION FLAT SEWER UPGRADE  
 PROJECT NUMBER: 5140.2  
 LOCATION: ~50' East of EB99W Bridge East Abutment

DATE: 7/15/2014  
 DEPTH OF EXCAVATION: 36.5 FT

**SHEET 1 of 2**  
 ELEVATION: 111.226 FT  
 DATUM: KPFF topo survey  
 COORDINATES: N 633753.1948  
 E 7604524.439

JA PORTLAND GENERAL SOIL LOG 5140.2 ONION FLAT BORING LOGS.GPJ JACOBS DATA TEMPLATE\_GENERAL SOIL PROJECTS.GDT 10/5/15 REV.

DEPTH (FT) WATER LEVEL ELEV. (FT)	DESCRIPTION	USCS	GRAPHIC LOG	WELL	SAMPLES				PENETRATION RESISTANCE BLOWS/FT ■		NOTES
					NUMBER	TYPE/ REC%	BLOWS	N	WATER CONTENT - ATTERBERG		
									PL	MC	
110	SILT with some sand and organics (rootlets), soft, damp, brown. Sand is fine grained. [Recent Alluvium]										Standpipe piezometer installed to 17' Oregon well # L-106536.
8/15/2014	becomes gray, mottled orange.	ML			N-1	2-2-3	5	■			
						67%					
	becomes moist with lenses of clean, fine sand. No organics. trace organics in sample.				N-2	2-3-2	5	■	● 38		
						78%					
100	SILT with some organics and trace sand, wet, gray, low plasticity. Sand is fine grained. [Recent Alluvium]	ML			N-3	2-1-2	3	■	■ 50		Atterberg Limits (ASTM D4318)
						89%					
	Silty SAND, very loose, wet, dark gray. Sand is fine grained. [Flood Deposits]	SM			N-4	2-1-1	2	■			
						100%					
									● 36		
15	SAND with some silt, loose, wet, black. Sand is medium grained. [Flood Deposits]	SP-SM			N-5	2-3-3	6	■	● 22		
						22%					
	Sandy SILT, soft, wet, dark gray. Sand is fine grained. [Flood Deposits]	ML			N-6	2-1-1	2	■			
						67%					
20									● 34		

DRILL METHOD/HAMMER: Solid Stem Auger/Safety  
 DRILLING CONTRACTOR: Vandehey Drilling  
 DRILLER:

DRILL RIG: Simco 2400-SK-1  
 LOGGED BY: MJS  
 CHECKED BY:





# Log of B-9

**SHEET 2 of 2**

PROJECT: ONION FLAT SEWER UPGRADE

DATE: 7/15/2014

ELEVATION: 111.226 FT

PROJECT NUMBER: 5140.2

DEPTH OF EXCAVATION: 36.5 FT

DATUM: KPFF topo survey

LOCATION: ~50' East of EB99W Bridge East Abutment

COORDINATES: N 633753.1948  
E 7604524.439

JA PORTLAND GENERAL SOIL LOG 5140.2 ONION FLAT BORING LOGS.GPJ JACOBS DATA TEMPLATE\_GENERAL SOIL PROJECTS.GDT 10/5/15 REV.

DEPTH (FT) WATER LEVEL ELEV. (FT)	DESCRIPTION	USCS	GRAPHIC LOG	WELL	SAMPLES				PENETRATION RESISTANCE BLOWS/FT ■			NOTES
					NUMBER	TYPE/ REC%	BLOWS	N	WATER CONTENT - ATTERBERG			
									PL	MC	LL	
90	Sandy SILT, soft, wet, dark gray. Sand is fine grained. [Flood Deposits](continued)  becomes soft.	ML			N-7	78%	2-2-2	4	■			P200 = 57 (ASTM D1140).
					N-8	56%	2-3-3	6	■			
25	becomes medium stiff. Slightly coarser gradation of fine sand.	MH			N-9	100%	5-5-7	12	■			
	Elastic SILT, medium stiff, damp, gray, medium plasticity. [Flood Deposits]				N-10		3-5-7	12	■			
80	Silty SAND, medium dense, wet, dark gray. Sand is fine grained. [Flood Deposits]	SM										
	BOTTOM OF BOREHOLE AT 36.5 FT					89%						Backfilled with bentonite chips.

DRILL METHOD/HAMMER: Solid Stem Auger/Safety  
 DRILLING CONTRACTOR: Vandehey Drilling  
 DRILLER:

DRILL RIG: Simco 2400-SK-1  
 LOGGED BY: MJS  
 CHECKED BY:



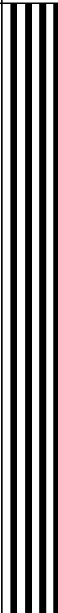

# Log of B-10

PROJECT: ONION FLAT SEWER UPGRADE  
 PROJECT NUMBER: 5140.2  
 LOCATION: N 99W Boring ~65' North of WACO 1/4 Monument, ~60' East of OH Distr. Pole

DATE: 7/18/2014  
 DEPTH OF EXCAVATION: 30 FT

**SHEET 1 of 2**  
 ELEVATION: 113.528 FT  
 DATUM: KPFF topo survey  
 COORDINATES: N 634120.2997  
 E 7604518.837

JA PORTLAND GENERAL SOIL LOG 5140.2 ONION FLAT BORING LOGS.GPJ JACOBS DATA TEMPLATE\_GENERAL SOIL PROJECTS.GDT 10/5/15 REV.

DEPTH (FT) WATER LEVEL ELEV. (FT)	DESCRIPTION	USCS	GRAPHIC LOG	WELL	SAMPLES				PENETRATION RESISTANCE BLOWS/FT ■		NOTES
					NUMBER	TYPE/ REC%	BLOWS	N	20	40 60 80	
110 ▼ 7/18/2014	Sandy elastic SILT with some organics, medium stiff, moist, gray, medium plasticity. [Flood Deposits]	MH			N-1	3-2-4	6	■	32	Groundwater measured at end of drilling	
					67%						
100	SAND with trace silt, medium dense, wet, black. Sand is fine to medium grained.  becomes loose.  becomes medium dense, with some organics in the sample.  no organics.	SP			N-2	3-6-7	13	■	23	Sieve (ASTM C136/C117) %Sand=91, %Fines=9.	
					78%						
					N-3	3-3-2	5	■			
					100%						
					N-4	2-5-7	12	■			
	100%										
	N-5	5-6-9	15	■							
	100%										
20								23			

DRILL METHOD/HAMMER: Solid Stem Auger/Safety  
 DRILLING CONTRACTOR: Vandehey Drilling  
 DRILLER:

DRILL RIG: Simco 2400-SK-1  
 LOGGED BY: MJS  
 CHECKED BY:



# Log of B-10

**SHEET 2 of 2**

PROJECT: ONION FLAT SEWER UPGRADE

DATE: 7/18/2014

ELEVATION: 113.528 FT

PROJECT NUMBER: 5140.2

DEPTH OF EXCAVATION: 30 FT

DATUM: KPFF topo survey

LOCATION: N 99W Boring ~65' North of WACO 1/4 Monument, ~60' East of OH Distr. Pole

COORDINATES: N 634120.2997  
E 7604518.837

DEPTH (FT) WATER LEVEL ELEV. (FT)	DESCRIPTION	USCS	GRAPHIC LOG	WELL	SAMPLES				PENETRATION RESISTANCE BLOWS/FT ■		NOTES
					NUMBER	TYPE/ REC%	BLOWS	N	WATER CONTENT - ATTERBERG		
									PL	MC	
<div style="text-align: center;">90</div> <div style="text-align: center;">25</div> <div style="text-align: center;">30</div>	<p>SAND with trace silt, medium dense, wet, black. Sand is fine to medium grained. <i>(continued)</i></p>	SP			N-6	100%	4-4-6	10	■		
	<p>becomes silty. Silt is medium plasticity.</p>										

BOTTOM OF BOREHOLE AT 30 FT

JA PORTLAND GENERAL SOIL LOG 5140.2 ONION FLAT BORING LOGS.GPJ JACOBS DATA TEMPLATE\_GENERAL SOIL PROJECTS.GDT 10/5/15 REV.

DRILL METHOD/HAMMER: Solid Stem Auger/Safety  
 DRILLING CONTRACTOR: Vandehey Drilling  
 DRILLER:

DRILL RIG: Simco 2400-SK-1  
 LOGGED BY: MJS  
 CHECKED BY:



# Log of B-11

PROJECT: ONION FLAT SEWER UPGRADE  
 PROJECT NUMBER: 5140.2  
 LOCATION: 300' East of North Refuge Gate, 50' South at Edge of Grass

DATE: 7/14/2014  
 DEPTH OF EXCAVATION: 46.8 FT

**SHEET 1 of 3**  
 ELEVATION: 113.35 FT  
 DATUM: KPFF topo survey  
 COORDINATES: N 632916.7525  
 E 7603484.06

JA PORTLAND GENERAL SOIL LOG 5140.2 ONION FLAT BORING LOGS.GPJ JACOBS DATA TEMPLATE\_GENERAL SOIL PROJECTS.GDT 10/5/15 REV.

DEPTH (FT) WATER LEVEL ELEV. (FT)	DESCRIPTION	USCS	GRAPHIC LOG	WELL	SAMPLES				PENETRATION RESISTANCE BLOWS/FT ■		NOTES
					NUMBER	TYPE/ REC%	BLOWS	N	WATER CONTENT - ATTERBERG		
									PL	MC	
110	SILT with some organics, medium stiff, moist, dark gray. Organics consist of rootlets. [Recent Alluvium]	ML									Groundwater measured after leaving hole open overnight
					N-1	3-3-3	6	38			
100	Silty SAND, loose, moist, dark gray. Sand is fine grained. [Flood Deposits]	SM									Sieve (ASTM C136/C117) %Sand=65, %Fines=35
					N-2	6-6-3	9	42			
	becomes very loose, clean.				N-3	2-0-1	1				
100	SILT, soft, wet, dark gray, high plasticity. [Flood Deposits]	MH									
	SAND, medium dense, moist, dark gray, clean. [Flood Deposits]	SP									
					N-4	2-8-11	19				
					N-5	2-2-7	9				
20									26		

DRILL METHOD/HAMMER: Solid Stem Auger/Safety  
 DRILLING CONTRACTOR: Vandehey Drilling  
 DRILLER:

DRILL RIG: Simco 2400-SK-1  
 LOGGED BY: MJS  
 CHECKED BY:



# Log of B-11

PROJECT: ONION FLAT SEWER UPGRADE  
 PROJECT NUMBER: 5140.2  
 LOCATION: 300' East of North Refuge Gate, 50' South at Edge of Grass

DATE: 7/14/2014  
 DEPTH OF EXCAVATION: 46.8 FT

**SHEET 2 of 3**  
 ELEVATION: 113.35 FT  
 DATUM: KPFF topo survey  
 COORDINATES: N 632916.7525  
 E 7603484.06

JA PORTLAND GENERAL SOIL LOG 5140.2 ONION FLAT BORING LOGS.GPJ JACOBS DATA TEMPLATE\_GENERAL SOIL PROJECTS.GDT 10/5/15 REV.

DEPTH (FT) WATER LEVEL ELEV. (FT)	DESCRIPTION	USCS	GRAPHIC LOG	WELL	SAMPLES				PENETRATION RESISTANCE BLOWS/FT ■		NOTES
					NUMBER	TYPE/ REC%	BLOWS	N	WATER CONTENT - ATTERBERG		
									PL	MC	
90	SAND, medium dense, moist, dark gray, clean. [Flood Deposits](continued)	SP			N-6	4-8-12	20	■	20		
					44%						
	SILT, soft to medium stiff, wet, gray. [Flood Deposits]	ML			N-7	5-6-10	16	■			
					44%						
130	Silty SAND, medium dense, wet, dark gray. [Flood Deposits]	SM			N-8	3-6-8	14	■	23		
	SILT, medium stiff, moist, gray. [Flood Deposits]	ML			67%						
80	Silty SAND, medium dense, wet, dark gray. [Flood Deposits]	SM			N-9	5-5-7	12	■			
	SILT, medium stiff, moist, gray. [Flood Deposits]	ML			67%						

DRILL METHOD/HAMMER: Solid Stem Auger/Safety  
 DRILLING CONTRACTOR: Vandehey Drilling  
 DRILLER:

DRILL RIG: Simco 2400-SK-1  
 LOGGED BY: MJS  
 CHECKED BY:



# Log of B-11

**SHEET 3 of 3**

PROJECT: ONION FLAT SEWER UPGRADE

DATE: 7/14/2014

ELEVATION: 113.35 FT

PROJECT NUMBER: 5140.2

DEPTH OF EXCAVATION: 46.8 FT

DATUM: KPFF topo survey

LOCATION: 300' East of North Refuge Gate, 50' South at Edge of Grass

COORDINATES: N 632916.7525  
E 7603484.06

DEPTH (FT) WATER LEVEL ELEV. (FT)	DESCRIPTION	USCS	GRAPHIC LOG	WELL	SAMPLES				PENETRATION RESISTANCE BLOWS/FT ■		NOTES
					NUMBER	TYPE/ REC%	BLOWS	N	WATER CONTENT - ATTERBERG		
									PL	MC	
<div style="text-align: center;">70</div> <div style="text-align: center;">45</div>	Sand with some silt, medium dense, wet, black. [Flood Deposits]	SP-SM			<div style="text-align: center;">N-10</div> <div style="text-align: center;">67%</div>	8-16-13	29				

BOTTOM OF BOREHOLE AT 46.8 FT

JA PORTLAND GENERAL SOIL LOG 5140.2.ONION FLAT BORING LOGS.GPJ JACOBS DATA TEMPLATE\_GENERAL SOIL PROJECTS.GDT 10/5/15 REV.

DRILL METHOD/HAMMER: Solid Stem Auger/Safety

DRILL RIG: Simco 2400-SK-1

DRILLING CONTRACTOR: Vandehey Drilling

LOGGED BY: MJS

DRILLER:

CHECKED BY:



# Log of B-12

**SHEET 1 of 3**

PROJECT: ONION FLAT SEWER UPGRADE  
 PROJECT NUMBER: 5140.2  
 LOCATION: Middle of clover field. North of B-1, 155' S. of dist. Pole

DATE: 7/18/2014  
 DEPTH OF EXCAVATION: 41.5 FT

ELEVATION: 116.666 FT  
 DATUM: KPFF topo survey  
 COORDINATES: N 630440.4315  
 E 7603452.831

JA PORTLAND GENERAL SOIL LOG 5140.2 ONION FLAT BORING LOGS.GPJ JACOBS DATA TEMPLATE - GENERAL SOIL PROJECTS.GDT 10/5/15 REV.

DEPTH (FT) WATER LEVEL ELEV. (FT)	DESCRIPTION	USCS	GRAPHIC LOG	WELL	SAMPLES				PENETRATION RESISTANCE BLOWS/FT ■		NOTES
					NUMBER	TYPE/ REC%	BLOWS	N	WATER CONTENT - ATTERBERG		
									PL	MC	
<div style="text-align: center;">  7/18/2014                 </div>	PEAT with some silt, very soft, moist, dark brown. [Recent Alluvium]	PT		WELL	N-1	1-1-1	2	■		Groundwater measured at end of drilling	
110	becomes wet.				100%						
	Elastic SILT, very soft, wet, gray. Medium plasticity. [Flood Deposits]	MH			N-2	1-1-1	2	■		Shelby tube pushed from 12.25 to 14.25 feet. At 14.5 feet, increase in stiffness.	
				100%							
	Silty SAND, loose, wet, gray. Sand is fine grained. [Recent Alluvium]	SM			S-1					Shelby tube pushed from 15 to 16.5 feet.	
100				100%							
					S-2						
					N-3	1-2-2	4	■			
20					67%						

DRILL METHOD/HAMMER: Solid Stem Auger/Safety  
 DRILLING CONTRACTOR: Vandehey Drilling  
 DRILLER:

DRILL RIG: Simco 2400-SK-1  
 LOGGED BY: MJS  
 CHECKED BY:



# Log of B-12

SHEET 2 of 3

PROJECT: ONION FLAT SEWER UPGRADE

DATE: 7/18/2014

ELEVATION: 116.666 FT

PROJECT NUMBER: 5140.2

DEPTH OF EXCAVATION: 41.5 FT

DATUM: KPFF topo survey

COORDINATES: N 630440.4315  
E 7603452.831

LOCATION: Middle of clover field. North of B-1, 155' S. of dist. Pole

JA PORTLAND GENERAL SOIL LOG 5140.2 ONION FLAT BORING LOGS.GPJ JACOBS DATA TEMPLATE\_GENERAL SOIL PROJECTS.GDT 10/5/15 REV.

DEPTH (FT) WATER LEVEL ELEV. (FT)	DESCRIPTION	USCS	GRAPHIC LOG	WELL	SAMPLES			PENETRATION RESISTANCE BLOWS/FT ■		NOTES
					NUMBER	TYPE/ REC%	BLOWS	N	20 40 60 80	
	Elastic SILT, very soft, wet, gray. Medium plasticity. [Recent Alluvium]				S-3					Shelby tube pushed from 20 to 22 feet.  Consolidation test (ASTM D2435). Atterberg limits (ASTM D4318). Sampler sinks under weight of rod
					N-4	89%	0	0	49	
25										
90	becomes soft.	MH			S-4					
					N-5	100%	1-2-2	4		
130										
	SAND with some silt, loose, wet, black. Sand is fine to medium grained.	SP-SM			N-6	100%	4-5-5	10		
135										
80										
40										

DRILL METHOD/HAMMER: Solid Stem Auger/Safety  
DRILLING CONTRACTOR: Vandehey Drilling  
DRILLER:

DRILL RIG: Simco 2400-SK-1  
LOGGED BY: MJS  
CHECKED BY:





# Log of B-12

**SHEET 3 of 3**

PROJECT: ONION FLAT SEWER UPGRADE

DATE: 7/18/2014

ELEVATION: 116.666 FT

PROJECT NUMBER: 5140.2

DEPTH OF EXCAVATION: 41.5 FT

DATUM: KPFF topo survey

COORDINATES: N 630440.4315  
E 7603452.831

LOCATION: Middle of clover field. North of B-1, 155' S. of dist. Pole

DEPTH (FT) WATER LEVEL ELEV. (FT)	DESCRIPTION	USCS	GRAPHIC LOG	WELL	SAMPLES				PENETRATION RESISTANCE BLOWS/FT ■	NOTES			
					NUMBER	TYPE/ REC%	BLOWS	N			WATER CONTENT - ATTERBERG		
											PL	MC	LL
	Elastic SILT, soft, wet, gray. Medium plasticity.	MH			N-7		3-2-2	4 ■					

BOTTOM OF BOREHOLE AT 41.5 FT

100%

JA PORTLAND GENERAL SOIL LOG 5140.2 ONION FLAT BORING LOGS.GPJ JACOBS DATA TEMPLATE\_GENERAL SOIL PROJECTS.GDT 10/5/15 REV.

DRILL METHOD/HAMMER: Solid Stem Auger/Safety

DRILL RIG: Simco 2400-SK-1

DRILLING CONTRACTOR: Vandehey Drilling

LOGGED BY: MJS

DRILLER:

CHECKED BY:



# Log of B-13

PROJECT: ONION FLAT SEWER UPGRADE  
 PROJECT NUMBER: 5140.2  
 LOCATION: Added boring in North middle of refuge

DATE: 7/18/2014  
 DEPTH OF EXCAVATION: 21.5 FT

**SHEET 1 of 2**  
 ELEVATION: 111.45 FT  
 DATUM: KPFF topo survey  
 COORDINATES: N 633211.6591  
 E 7603977.819

JA PORTLAND GENERAL SOIL LOG 5140.2 ONION FLAT BORING LOGS.GPJ JACOBS DATA TEMPLATE\_GENERAL SOIL PROJECTS.GDT 10/5/15 REV.

DEPTH (FT) WATER LEVEL ELEV. (FT)	DESCRIPTION	USCS	GRAPHIC LOG	WELL	SAMPLES				PENETRATION RESISTANCE BLOWS/FT ■		NOTES
					NUMBER	TYPE/ REC%	BLOWS	N	WATER CONTENT - ATTERBERG		
									PL	MC	
<div style="text-align: center;">  7/18/2014                 </div>	PEAT, very soft, wet, red-brown. [Recent Alluvium]	PT			N-1	1-1-1	2	■			Groundwater measured at end of drilling
	becomes silty.				100%						
	Organic SILT, very soft, wet, gray. [Recent Alluvium]	OH			N-2	1-1-1	2	■			
	Elastic SILT, very soft, wet, gray, medium plasticity. [Flood Deposits]	MH			S-1	100%			66		
	SAND with some silt, very loose, wet, black, fine to medium grained. [Flood Deposits]	SP-SM			N-3	67%	5-5-1	6	■		

DRILL METHOD/HAMMER: Solid Stem Auger/Safety  
 DRILLING CONTRACTOR: Vandehey Drilling  
 DRILLER:

DRILL RIG: Simco 2400-SK-1  
 LOGGED BY: MJS  
 CHECKED BY:



# Log of B-13

SHEET 2 of 2

PROJECT: ONION FLAT SEWER UPGRADE

DATE: 7/18/2014

ELEVATION: 111.45 FT

PROJECT NUMBER: 5140.2

DEPTH OF EXCAVATION: 21.5 FT

DATUM: KPFF topo survey

LOCATION: Added boring in North middle of refuge

COORDINATES: N 633211.6591  
E 7603977.819

DEPTH (FT) WATER LEVEL ELEV. (FT)	DESCRIPTION	USCS	GRAPHIC LOG	WELL	SAMPLES		PENETRATION RESISTANCE BLOWS/FT ■	NOTES	
					NUMBER	TYPE/ REC%			BLOWS
90	Elastic SILT, medium stiff, moist, gray, medium to high plasticity. [Flood Deposits]	SP-SM			N-4		1-3-9	12	
	SAND with some silt, medium dense, wet, black. Sand is fine to medium grained. [Flood Deposits]	MH							
		SP-SM							

78%

BOTTOM OF BOREHOLE AT 21.5 FT

JA PORTLAND GENERAL SOIL LOG 5140.2.ONION FLAT BORING LOGS.GPJ JACOBS DATA TEMPLATE\_GENERAL SOIL PROJECTS.GDT 10/5/15 REV.

DRILL METHOD/HAMMER: Solid Stem Auger/Safety

DRILL RIG: Simco 2400-SK-1

DRILLING CONTRACTOR: Vandehey Drilling

LOGGED BY: MJS

DRILLER:

CHECKED BY:



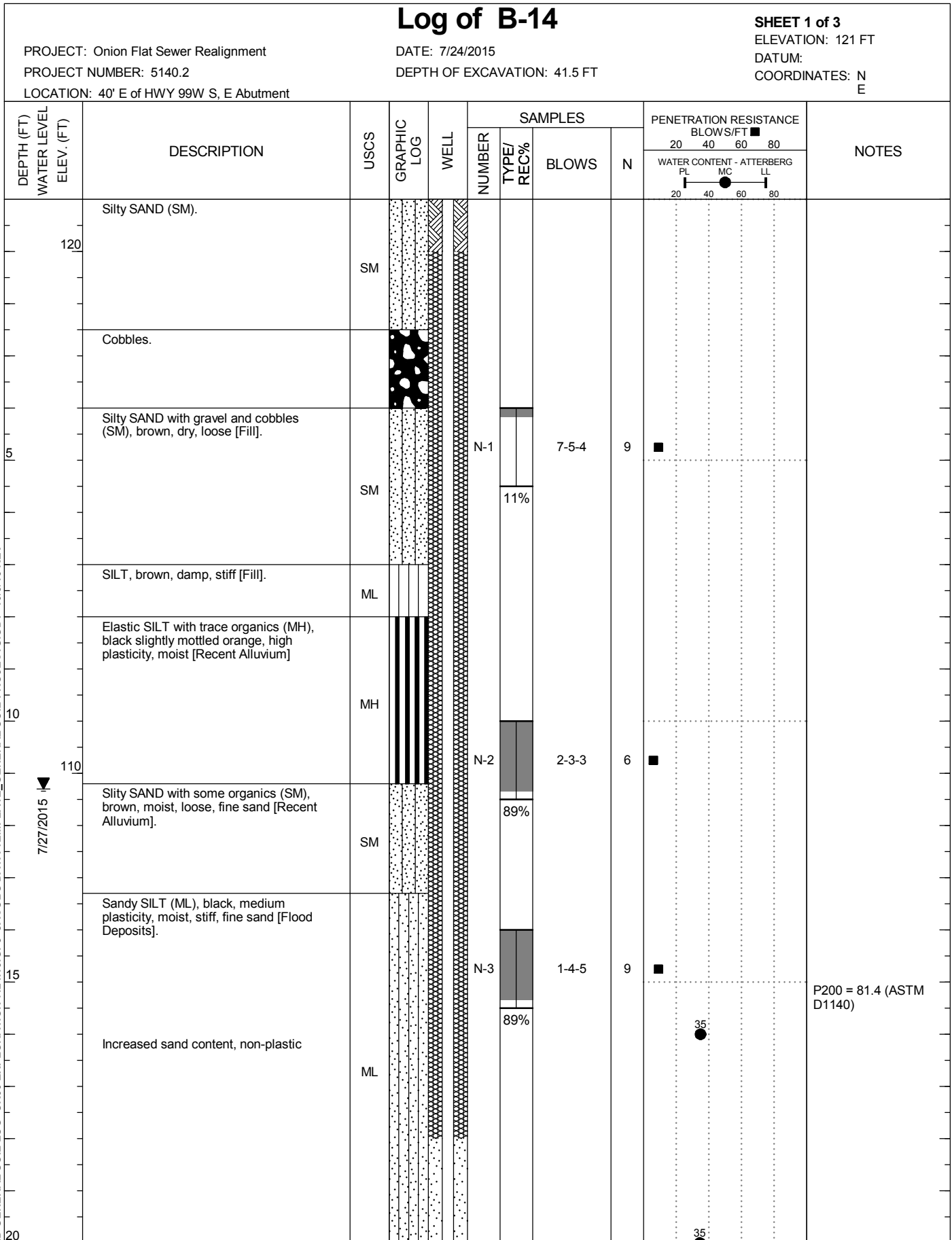
# Log of B-14

PROJECT: Onion Flat Sewer Realignment  
 PROJECT NUMBER: 5140.2  
 LOCATION: 40' E of HWY 99W S, E Abutment

DATE: 7/24/2015  
 DEPTH OF EXCAVATION: 41.5 FT

SHEET 1 of 3  
 ELEVATION: 121 FT  
 DATUM:  
 COORDINATES: N  
 E

JA PORTLAND GENERAL SOIL LOG OR899 EXPLORATION 7.24.15.GPJ JACOBS DATA TEMPLATE - GENERAL SOIL PROJECTS.GDT 10/15/15 REV.



DRILL METHOD/HAMMER: HSA/Auto  
 DRILLING CONTRACTOR: Hardcore Drilling  
 DRILLER:

DRILL RIG: CME Track Rig  
 LOGGED BY: Steffan  
 CHECKED BY: Schick



# Log of B-14

PROJECT: Onion Flat Sewer Realignment  
 PROJECT NUMBER: 5140.2  
 LOCATION: 40' E of HWY 99W S, E Abutment

DATE: 7/24/2015  
 DEPTH OF EXCAVATION: 41.5 FT

**SHEET 2 of 3**  
 ELEVATION: 121 FT  
 DATUM:  
 COORDINATES: N  
 E

JA PORTLAND GENERAL SOIL LOG OR99 EXPLORATION 7.24.15.GPJ JACOBS DATA TEMPLATE - GENERAL SOIL PROJECTS.GDT 10/15/15 REV.

DEPTH (FT) WATER LEVEL ELEV. (FT)	DESCRIPTION	USCS	GRAPHIC LOG	WELL	SAMPLES				PENETRATION RESISTANCE BLOWS/FT ■	NOTES			
					NUMBER	TYPE/ REC%	BLOWS	N			WATER CONTENT - ATTERBERG		
											PL	MC	LL
100	Sandy SILT (ML), black, medium plasticity, moist, stiff, fine sand [Flood Deposits]. (continued)	ML			N-4		1-4-8	12	20' - Sieve (ASTM C136/C117). %Sand=19, %Fines=81. 21' - Sieve (ASTM C136/117) %Sand=68.5, %Fines=31.5				
	Grades to silty SAND (SM), black, non-plastic, wet, medium dense [Flood Deposits].	SM				89%							
25	Sandy SILT (ML), black, non-plastic, wet, very soft, fine sand [Flood Deposits].	ML			N-5		1-1-1	2					
	Silty SAND (SM), black, non-plastic, wet, very loose [Flood Deposits].					100%							
30	becomes medium dense				N-6		3-6-10	16					
90	2" band of clean, medium sand.					89%							
	becomes with some silt	SM											
35	becomes silty, dark gray, moist				N-7		2-8-11	19					
						100%							
40	SILT with some sand (ML), black, low plasticity, moist, stiff, fine sand [Flood Deposits].	ML											

DRILL METHOD/HAMMER: HSA/Auto  
 DRILLING CONTRACTOR: Hardcore Drilling  
 DRILLER:

DRILL RIG: CME Track Rig  
 LOGGED BY: Steffan  
 CHECKED BY: Schick



# Log of B-14

**SHEET 3 of 3**  
 ELEVATION: 121 FT  
 DATUM:  
 COORDINATES: N  
 E

PROJECT: Onion Flat Sewer Realignment  
 PROJECT NUMBER: 5140.2  
 LOCATION: 40' E of HWY 99W S, E Abutment

DATE: 7/24/2015  
 DEPTH OF EXCAVATION: 41.5 FT

DEPTH (FT) WATER LEVEL ELEV. (FT)	DESCRIPTION	USCS	GRAPHIC LOG	WELL	SAMPLES				PENETRATION RESISTANCE BLOWS/FT ■		NOTES
					NUMBER	TYPE/ REC%	BLOWS	N	WATER CONTENT - ATTERBERG		
									PL	MC	
80	SILT with some sand (ML), black, low plasticity, moist, stiff, fine sand [Flood Deposits]. (continued)	ML	[Graphic Log Symbols]	[Well Symbols]	N-8	[Type/Rec%]	3-5-6	11	■	[Water Content]	

BOTTOM OF BOREHOLE AT 41.5 FT

100%

JA PORTLAND GENERAL SOIL LOG OR99 EXPLORATION 7.24.15.GPJ - JACOBS DATA TEMPLATE - GENERAL SOIL PROJECTS.GDT 10/6/15 REV.

DRILL METHOD/HAMMER: HSA/Auto  
 DRILLING CONTRACTOR: Hardcore Drilling  
 DRILLER:

DRILL RIG: CME Track Rig  
 LOGGED BY: Steffan  
 CHECKED BY: Schick



# Log of HA-1

PROJECT: ONION FLAT SEWER UPGRADE  
 PROJECT NUMBER: 5140.2  
 LOCATION: ~150' West of existing manhole

DATE: 7/25/2014  
 DEPTH OF EXCAVATION: 9 FT

**SHEET 1 of 1**  
 ELEVATION: 120.45 FT  
 DATUM: KPFF topo survey  
 COORDINATES: N 629837.0309  
 E 7603415

DEPTH (FT) WATER LEVEL ELEV. (FT)	DESCRIPTION	USCS	GRAPHIC LOG	WELL	SAMPLES				PENETRATION RESISTANCE BLOWS/FT ■	NOTES		
					NUMBER	TYPE/ REC%	BLOWS	N			WATER CONTENT - ATTERBERG	
									PL		MC	LL
120	CLAY with some organics, stiff, damp, blue-gray, high plasticity	CH								Groundwater measured at end of augering		
7/25/2014	becomes very stiff, blueish-gray, no organics											
	Organic CLAY, soft, wet, brown	OH							128			
	CLAY, medium stiff, moist, blueish-gray, mottled orange	CH							50	Lost sample from auger while extracting rod between 7' to 7.5'		
	becomes very stiff, gray											
	BOTTOM OF BOREHOLE AT 9 FT								53	Atterberg Limits (ASTM D4318) Backfilled with cuttings.		

JA PORTLAND GENERAL SOIL LOG 5140.2 ONION FLAT BORING LOGS.GPJ JACOBS DATA TEMPLATE\_GENERAL SOIL PROJECTS.GDT 10/5/15 REV.

DRILL METHOD/HAMMER:  
 DRILLING CONTRACTOR:  
 DRILLER:

DRILL RIG: Hand auger  
 LOGGED BY:  
 CHECKED BY:



# Log of HA-2

PROJECT: Onion Flat Sewer Realignment  
 PROJECT NUMBER: 5140.2  
 LOCATION: 500ft S of HWY 99W N, E Bank of R. Crk.

DATE: 7/24/2015  
 DEPTH OF EXCAVATION: 9.5 FT

**SHEET 1 of 1**  
 ELEVATION: 116 FT  
 DATUM:  
 COORDINATES: N  
 E

DEPTH (FT) WATER LEVEL ELEV. (FT)	DESCRIPTION	USCS	GRAPHIC LOG	WELL	SAMPLES				PENETRATION RESISTANCE BLOWS/FT ■		NOTES
					NUMBER	TYPE/ REC%	BLOWS	N	WATER CONTENT - ATTERBERG		
									PL	MC	
<div style="display: flex; align-items: center;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: 8px; margin-right: 5px;">                     JA PORTLAND GENERAL SOIL LOG OR99 EXPLORATION 7.24.15.GPJ - JACOBS DATA TEMPLATE - GENERAL SOIL PROJECTS.GDT 10/15/15 REV.                 </div> <div style="flex-grow: 1;"> </div> </div>	<p>SILT (ML), gray, low plasticity, dry, soft, rootlets and organics. Becomes damp, increased organics/wood fiber.</p> <p>PEAT, brown, wet, very soft, fibrous [Recent Alluvium]</p> <p>Becomes banded with silt/clay, gray, low plasticity, wet, very soft.</p> <p>SILT with some organics (ML), gray, low plasticity, wet, soft [Recent Alluvium].</p> <p>SILT with trace sand, gray, low plasticity, wet, soft, fine sand [Recent Alluvium]. Increasing fine sand content.</p>	<p>ML</p> <p>PT</p> <p>ML</p>		<p>WELL</p>	<p>NUMBER</p>	<p>TYPE/ REC%</p>	<p>BLOWS</p>	<p>N</p>		<p>PL</p> <p>MC</p> <p>LL</p>	<p>NOTES</p>

BOTTOM OF BOREHOLE AT 9.5 FT

DRILL METHOD/HAMMER: Hand Auger  
 DRILLING CONTRACTOR:  
 DRILLER:

DRILL RIG:  
 LOGGED BY: Bee  
 CHECKED BY: Steffan







## Appendix B – Laboratory Testing Results



# TECHNICAL REPORT

**Report To:** Mr. Matt Steffan, PE  
Jacobs Associates  
101 SW Main Street, Suite 360  
Portland, Oregon 97204

**Date:** 8/13/14

**Lab No:** 14-277

**Project:** Laboratory Testing – 5140.2

**Project No.:** 2286.1.1

**Report of:** Moisture content, Atterberg limits, sieve analysis, amount of material passing the number 200 sieve

### Sample Identification

NTI completed moisture content, Atterberg limits, sieve analysis, amount of material passing the number 200 sieve analysis on samples delivered to our laboratory on July 25, 2014 by a Jacobs Associates representative. Testing was performed in accordance with the standards indicated. Our laboratory test results are summarized on the following table and attached pages.

### Laboratory Test Results

Moisture Content of Soil (ASTM D 2216)			
Sample ID	Moisture Content (Percent)	Sample ID	Moisture Content (Percent)
B-1 @ 2.5 – 4 ft.	96.1	B-9 @ 15 ft.	36.2
B-1 @ 5 ft.	34.8	B-9 @ 16.2-16.5 ft.	22.4
B-1 @ 7.5 ft.	58.5	B-9 @ 20 ft.	33.6
B-1 @ 10 ft.	92.9	B-10 @ 5 ft. (Upper)	31.2
B-1 @ 12.5 ft.	90.1	B-10 @ 5 ft. (Lower)	32.1
B-3 @ 2.5 ft.	135.1	B-10 @ 12.5 ft.	22.9
B-3 @ 5 ft.	35.3	B-10 @ 20 ft.	23.3
B-3 @ 14.5 ft.	28.1	B-11 @ 5 ft.	37.6
B-4 @ 7.5 ft.	25.0	B-11 @ 10 ft.	42.1
B-4 @ 17.5 ft.	23.2	B-11 @ 20 ft.	25.5
B-8 @ 6 ft.	616.5	B-11 @ 30 ft.	22.6
B-8 @ 8.5 ft.	620.6	B-11 @ 45 ft.	26.1
B-8 @ 11 ft.	523.8	HA-1 @ 4 ft.	128.4
B-8 @ 13.5 ft.	370.2	HA-1 @ 4.5 ft.	50.3
B-9 @ 5 ft.	37.6	HA-1 @ 9 ft.	53.1
B-9 @ 10 ft.	49.6		

**Attachments:** Laboratory Test Results

**Copies:** Addressee

This report shall not be reproduced except in full, without written approval of Northwest Testing, Inc.

SHEET 1 of 10

REVIEWED BY: Bridgett Adame *BKA*

TECHNICAL REPORT

\\NGI-FS2\Laboratory\Lab Reports\2014 Lab Reports\2286.1.1 Jacobs & Associates\14-277 Moisture Content, Atterbergs, SA, Consolidation, P-200.docx



# TECHNICAL REPORT

**Report To:** Mr. Matt Steffan, PE  
Jacobs Associates  
101 SW Main Street, Suite 360  
Portland, Oregon 97204

**Date:** 8/13/14

**Lab No:** 14-277

**Project:** Laboratory Testing – 5140.2

**Project No.:** 2286.1.1

## Laboratory Test Results

Atterberg Limits (ASTM D 4318)			
Sample ID	Liquid Limit	Plastic Limit	Plasticity Index
B-9 @ 10 ft.	35	29	6
B-12 @ 21 – 22 ft.	42	26	16
B-13 @ 12.5 – 14.5 ft.	59	35	24
HA-1 @ 9 ft.	57	28	29

Amount of Material Finer than the No. 200 Sieve (ASTM D1140)		
Sample ID	Moisture Content (%)	Percent Passing the No. 200 Sieve
B-1 @ 5 ft.	34.8	41.0
B-9 @ 20 ft.	33.6	56.7

Sieve Analysis of Aggregate (ASTM C136/ C117)				
Sieve Size	B-3 @ 14.5 ft. Percent Passing	B-4 @ 7.5 ft. Percent Passing	B-10 @ 12.5 ft. Percent Passing	B-11 @ 10 ft. Percent Passing
#4	100	100	100	100
#8	100	99	100	100
#10	100	99	100	100
#16	100	99	100	100
#30	98	98	89	99
#40	82	92	64	97
#50	47	78	33	85
#100	12	36	14	49
#200	5.8	13.7	8.9	35.3

This report shall not be reproduced except in full, without written approval of Northwest Testing, Inc.

SHEET 2 of 10

REVIEWED BY: Bridgett Adame

TECHNICAL REPORT



# TECHNICAL REPORT

**Report To:** Mr. Matt Steffan, PE  
Jacobs Associates  
101 SW Main Street, Suite 360  
Portland, Oregon 97204

**Date:** 8/13/14

**Lab No:** 14-277

**Project:** Laboratory Testing – 5140.2

**Project No.:** 2286.1.1

## Laboratory Test Results

### Sample ID: B-13 @ 12.5 – 14.5 ft.

One Dimensional Consolidation of Soil (ASTM D 2435)		
Test	Initial Conditions	Final Conditions
Moisture Content, (%)	66.2	46.3
Dry Unit Weight, (pcf)	59.6	73.2
Height of Specimen, (inches)	0.7500	0.6108

One-Dimensional Consolidation Properties of Soils (ASTM D 2435)			
Load (psf)	Dial Reading (inches)	Load (psf)	Dial Reading (inches)
Initial	0.0003	2000	0.1165
125	0.0439	4000	0.1512
250	0.0561	1000	0.1466
500	0.0729	250	0.1395
1000	0.0950		

### Sample ID: B-12 @ 21 – 22 ft.

One Dimensional Consolidation of Soil (ASTM D 2435)		
Test	Initial Conditions	Final Conditions
Moisture Content, (%)	48.7	42.9
Dry Unit Weight, (pcf)	72.4	79.9
Height of Specimen, (inches)	0.7500	0.6794

One-Dimensional Consolidation Properties of Soils (ASTM D 2435)			
Load (psf)	Dial Reading (inches)	Load (psf)	Dial Reading (inches)
Initial	0.0002	2000	0.0547
125	0.0027	4000	0.0800
250	0.0060	1000	0.0758
500	0.0120	250	0.0708
1000	0.0245		

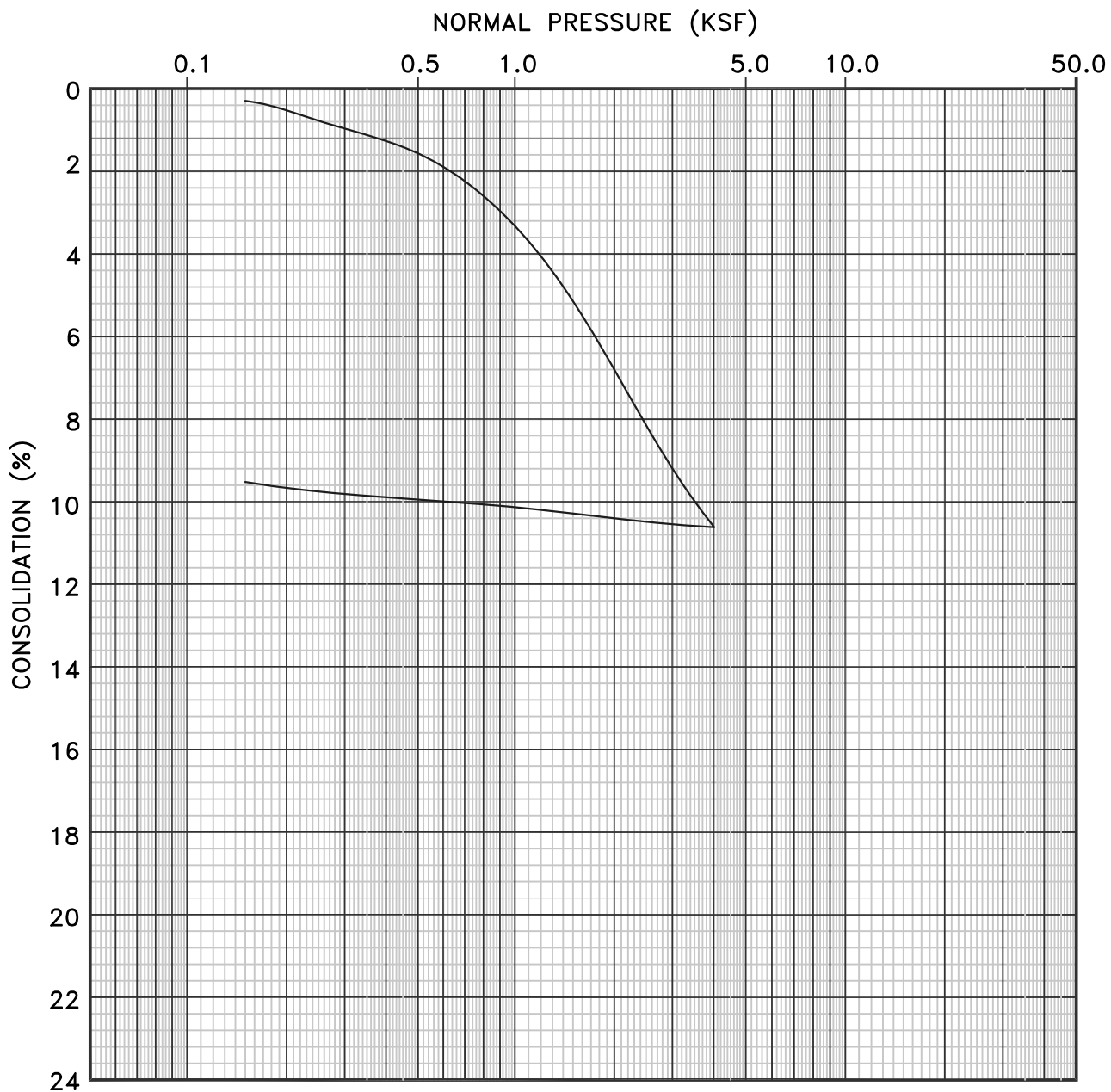
This report shall not be reproduced except in full, without written approval of Northwest Testing, Inc.

SHEET 3 of 10

REVIEWED BY: Bridgett Adame

TECHNICAL REPORT

\\NGI-FS2\Laboratory\Lab Reports\2014 Lab Reports\2286.1.1 Jacobs & Associates\14-277 Moisture Content, Atterbergs, SA, Consolidation, P-200.docx



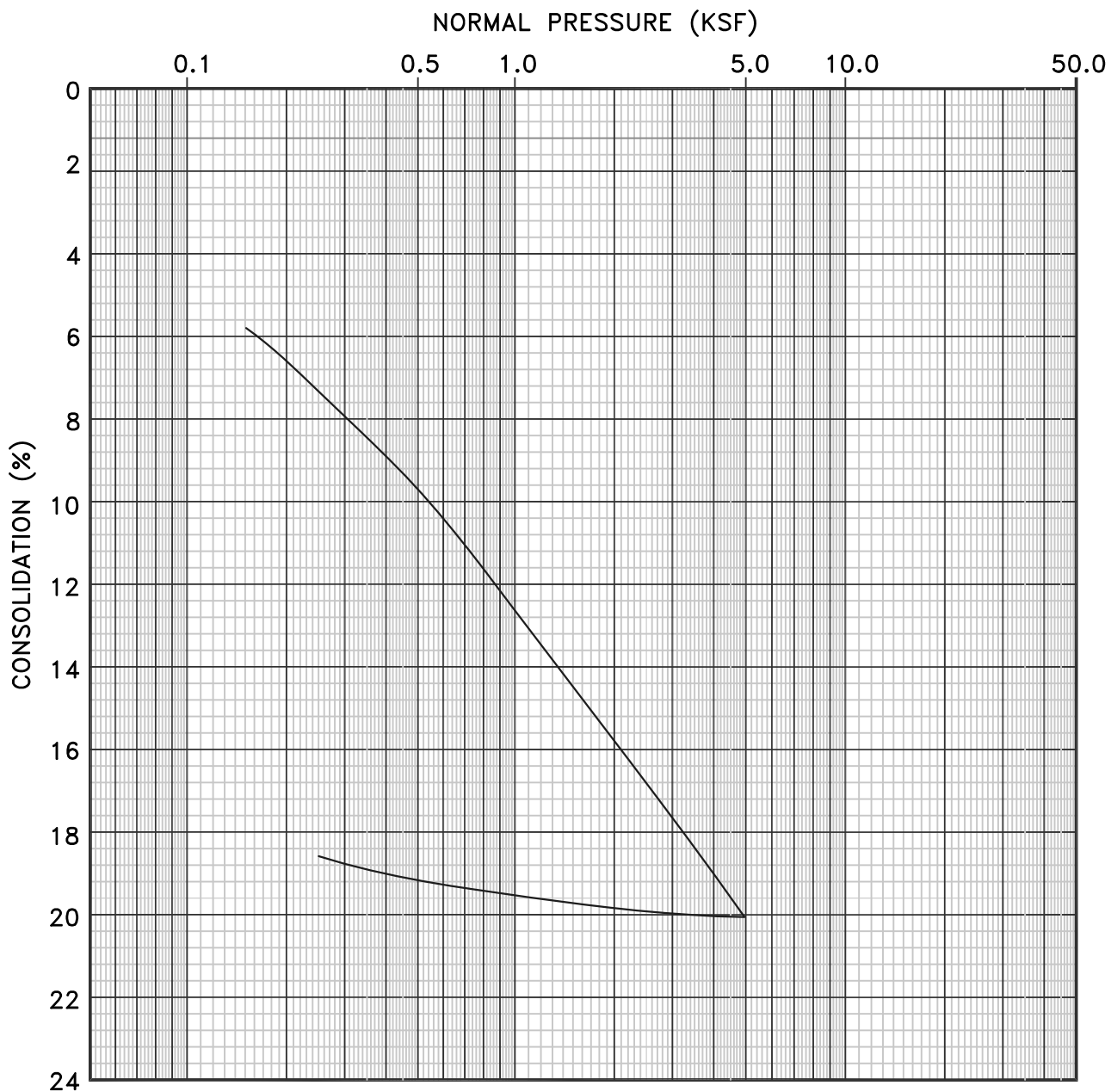
SYMBOL	SAMPLE LOCATION	NORMAL PRESSURE AT SATURATION (KSF)
—	B-12 @ 21 - 22 FT.	0.125

## CONSOLIDATION TEST RESULTS – ASTM D2435

PROJECT NO. 2286.1.1

JACOBS ASSOCIATES  
LABORATORY TESTING

LAB NO. 14-277



SYMBOL	SAMPLE LOCATION	NORMAL PRESSURE AT SATURATION (KSF)
—	B-13 @ 12.5-14.5 FT.	0.125

## CONSOLIDATION TEST RESULTS – ASTM D2435

PROJECT NO. 2286.1.1

JACOBS ASSOCIATES  
LABORATORY TESTING

LAB NO. 14-277



# TECHNICAL REPORT

**Report To:** Mr. Matt Steffan, PE  
McMillen Jacobs Associates  
1500 SW First Avenue, Suite 750  
Portland, Oregon 97201

**Date:** 7/31/15

**Lab No:** 15-207

**Project:** Laboratory Testing –  
Onion Flat

**Project No.:** 2286.1.1

**Report of:** Moisture content, dry density, sieve analysis, and amount of material passing the No. 200 sieve

### Sample Identification

NTI completed moisture content, dry density, sieve analysis, and amount of material passing the No. 200 sieve on samples delivered to our laboratory on July 27, 2015 by a Jacobs Associates representative. Testing was performed in accordance with the standards indicated. Our laboratory test results are summarized on the following tables and attached page.

### Laboratory Test Results

Moisture Content of Soil (ASTM D 2216)			
Sample ID	Moisture Content (Percent)	Sample ID	Moisture Content (Percent)
B-14 N-3 @ 15–16.5 ft.	34.9	HA-2 @ 7.5-8 ft.	124.5
B-14 N-4A @ 20-21 ft.	34.5	HA-2 @ 8.5 – 9 ft.	48.0
B-14 N-4B @21-21.5 ft.	30.2	HA-2 @ 9 – 9.5 ft.	38.1
HA-2 @ 6.5 – 7 ft.	268.2	HA-3 @ 16'8" – 17' 4"	728.8

Moisture Content and Dry Density of Soil (ASTM D 7263)		
Sample ID	Moisture Content (Percent)	Dry Density (pcf)
HA-2 U-1 @ 30" – 40"	460.4	11.1
HA-3 U-2 @ 3' 10" – 4' 9"	542.2	10.5

**Attachments:** Laboratory Test Results

**Copies:** Addressee

This report shall not be reproduced except in full, without written approval of Northwest Testing, Inc.  
SHEET 1 of 2

REVIEWED BY: Bridgett Adame





# TECHNICAL REPORT

**Report To:** Mr. Matt Steffan, PE  
McMillen Jacobs Associates  
1500 SW First Avenue, Suite 750  
Portland, Oregon 97201

**Date:** 7/31/15

**Lab No:** 15-207

**Project:** Laboratory Testing –  
Onion Flat

**Project No.:** 2286.1.1

## Laboratory Test Results

Amount of Material Finer than the No. 200 Sieve (ASTM D1140)		
Sample ID	Moisture Content (%)	Percent Passing the No. 200 Sieve
B-14 N-3 @ 15 – 16.5 ft.	34.9	81.4

Sieve Analysis of Aggregate (ASTM C136/ C117)		
Sieve Size	B-14 N-4A @ 20 – 21 ft. Percent Passing	B-14 N-4B @ 20 – 21 ft. Percent Passing
#30	100	100
#40	100	100
#50	99	95
#100	94	55
#200	81.0	31.5

## **Appendix C**

### **Laboratory Test Results**

TABLE C1

Lab Test Results Summary

Project Rock Creek Sanitary Trunk  
 Project # 5993.0  
 Date Updated July 19, 2019  
 Updated By FS



Sample Location or ID				Soil Description			Moisture Content %	Organic Content %	Grain Size				Atterberg Limits		
Boring	Sample, No.	Top Depth, ft.	Bottom Depth, ft.	Soil Description	USCS	Geologic Unit			% >3 inches	% Gravel	% Sand	% Fines	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)
B-1	S3	7.5	9	Very soft SILT	ML	Fine-grained Missoula Flood Deposits	65.1					48.6	30.8	17.8	
	S4	10	11.5	Stiff SILT	ML	Fine-grained Missoula Flood Deposits	27.6			87.3					
	S5	15	16.5	Soft sandy SILT	ML	Fine-grained Missoula Flood Deposits	33.9								
	S7	25	26.5	Very stiff CLAY	CL	Hillsboro Formation	39.5								
B-2	S2	5	6.5	Stiff fat CLAY	CH	Alluvium	23.1								
	S3	7.5	9	Stiff fat CLAY	CH	Alluvium	39.1				75	34.7	40.3		
	S4-S8 combined	10	22	Medium dense poorly graded GRAVEL with silt and sand	GP-GM	Coarse-grained Missoula Flood Deposits			71.6	18.9	9.5				
B-3	S1-S3 combined	2.5	9	Medium dense silty GRAVEL with sand	GM	Coarse-grained Missoula Flood Deposits			60.8	19.0	20.2				
	S4	10	11.5	Medium stiff sandy SILT	ML	Fine-grained Missoula Flood Deposits	32.6				65.8				
	S6	20	21.5	Medium stiff sandy SILT	ML	Fine-grained Missoula Flood Deposits	34.9								
	S7	25	26.5	Very stiff SILT	ML	Hillsboro Formation	28.9								
B-4	S5-S7 combined	15	26.5	Medium dense poorly graded GRAVEL with silt and sand	GP-GM	Coarse-grained Missoula Flood Deposits			68.7	22.2	9.1				
HA-1	S1	1.6	2	SILT with sand	ML	Alluvium		7.3							
	S2	3	3.3	Lean CLAY	CL	Alluvium	77.2								
	S3	6	6.3	Lean CLAY	CL	Alluvium	56.0								
HA-2	S2	5.8	6	Silty GRAVEL with sand	GM	Coarse-grained Missoula Flood Deposits			46.7	17.7	35.6				
TP-1	S4	11	12.5	Medium dense poorly graded GRAVEL with silt and sand	GP-GM	Coarse-grained Missoula Flood Deposits			17	65	8.9	9.1			

**BENCHMARK  
GEOLABS**



**Organic Content Test  
ASTM D 2974-00 (Method C - 440 °C)**

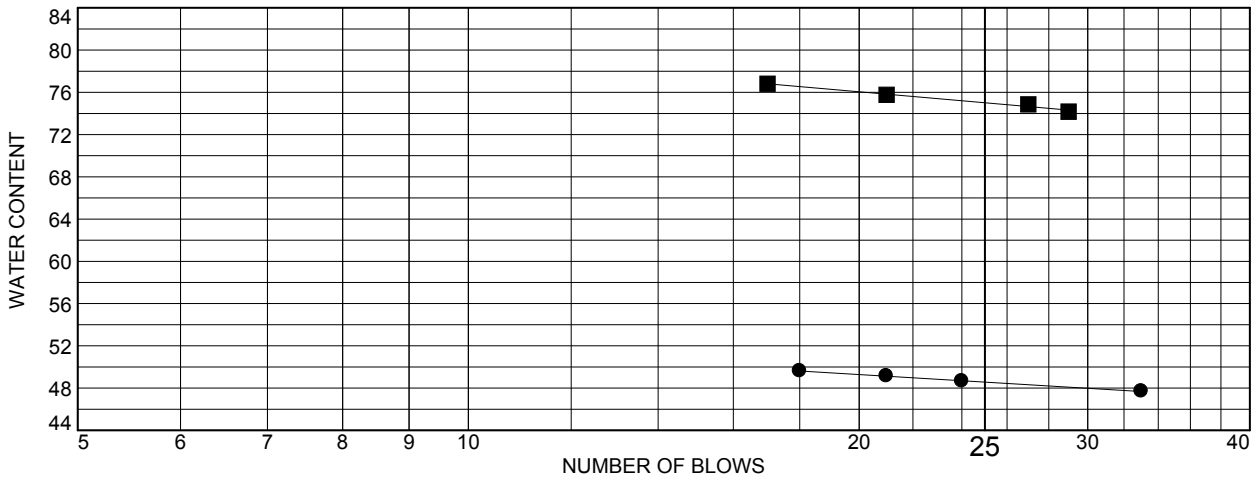
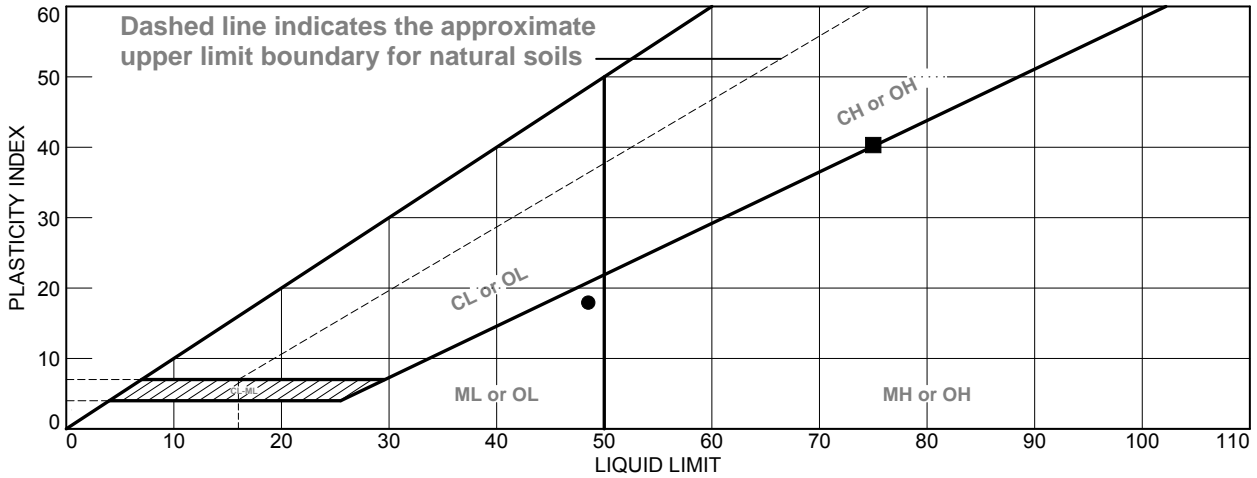
**BGL JOB NO.** 024-022      **PROJECT:** Rock Creek Trunk Upsizing Projec      **DATE:** 6/13/2019  
**CLIENT :** McMillen Jacobs      **PROJECT NO.:** 5993      **BY:** PJ

<b>Boring :</b>	HA-1							
<b>Sample :</b>	S1							
<b>Depth (ft.):</b>	19"							
<b>Visual Description:</b>	Very Dark Gray Sandy CLAY w/ organics							
<b>Dish No.</b>								
<b>Dish wt., gm</b>	75.12							
<b>Soil, Org, Dish &amp; H<sub>2</sub>O, gm</b>	285.00							
<b>Oven Dry wt (105°C), gm</b>	214.95							
<b>Furnace Dry wt. (440°C), gm</b>	204.77							
<b>Moisture Content, % of Oven Dry Mass</b>	50.1							
<b>Organic Matter, %</b>	7.3							

**Note:** ASTM provides no guidelines for including information about the organic content of a sample in the description when the wet/dry liquid limit data is not available. BGL developed the following guidelines to fill this gap:

- 0-5%: The organics are either not mentioned or mentioned as being "trace".
- 5-15%: The soil is considered as inorganic and is classified, as per ASTM 2487, with "with organics" included in the desc
- 15-50%: The soil is considered as organic and is described, per ASTM 2487.
- > 50%: The soil is described as "Peat".

# LIQUID AND PLASTIC LIMITS TEST REPORT



MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
● Gray SILT	48.6	30.8	17.8			
■ Very Dark Brown Fat CLAY w/ organics	75.0	34.7	40.3			

**Project No.** 024-022      **Client:** McMillen Jacobs  
**Project:** Rock Creek Trunk Upsizing Project - 5993.0

● **Source of Sample:** B-1      **Depth:** 7.5-9      **Sample Number:** S3  
 ■ **Source of Sample:** B-2      **Depth:** 7.5-9      **Sample Number:** S3

**Remarks:**  
 ■ Sample prepared by the wet prep method.

## Benchmark Geolabs, LLC

Figure

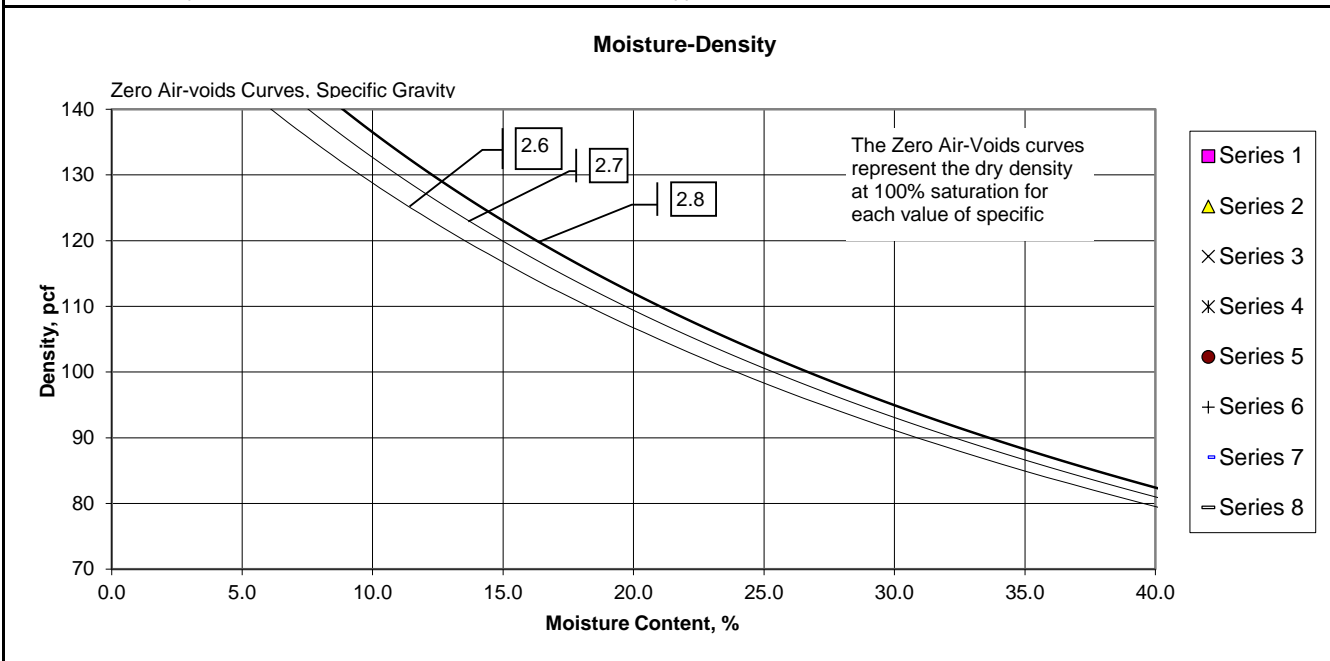


**Moisture-Density-Porosity Report  
(ASTM D7263b)**

**BGL Job No:** 024-022 **Project No.** 5933.0 **By:** PJ  
**Client:** McMillen Jacobs **Date:** 06/13/19  
**Project Name:** Rock Creek Trunk Upsizing Project **Remarks:** \_\_\_\_\_

<b>Boring:</b>	B-1	B-2						
<b>Sample:</b>	S3	S3						
<b>Depth, ft:</b>	7.5-9	7.5-9						
<b>Visual Description:</b>	Gray SILT	Very Dark Brown Fat CLAY w/ organics						
<b>Actual <math>G_s</math></b>								
<b>Assumed <math>G_s</math></b>								
<b>Moisture, %</b>	65.1	39.1						
<b>Wet Unit wt, pcf</b>								
<b>Dry Unit wt, pcf</b>								
Dry Bulk Dens.pb, (g/cc)								
<b>Saturation, %</b>								
<b>Total Porosity, %</b>								
Volumetric Water Cont, $\theta_w$ , %								
Volumetric Air Cont., $\theta_a$ , %								
<b>Void Ratio</b>								
<b>Series</b>	1	2	3	4	5	6	7	8

Note: All reported parameters are from the as-received sample condition unless otherwise noted. If an assumed specific gravity ( $G_s$ ) was used then the saturation, porosities, and void ratio should be considered to be approximate.



## Moisture-Density Lab Worksheet

<b>BGL Job No.:</b>	024-022				<b>Date:</b>	6/13/19		
<b>Client:</b>	McMillen Jacobs				<b>By:</b>	PJ		
<b>Project Name:</b>	Rock Creek Trunk Upsizing Project							
<b>Project No.:</b>	5933.0							
<b>Boring:</b>	B-1	B-2						
<b>Sample:</b>	S3	S3						
<b>Depth, ft.:</b>	7.5-9	7.5-9						

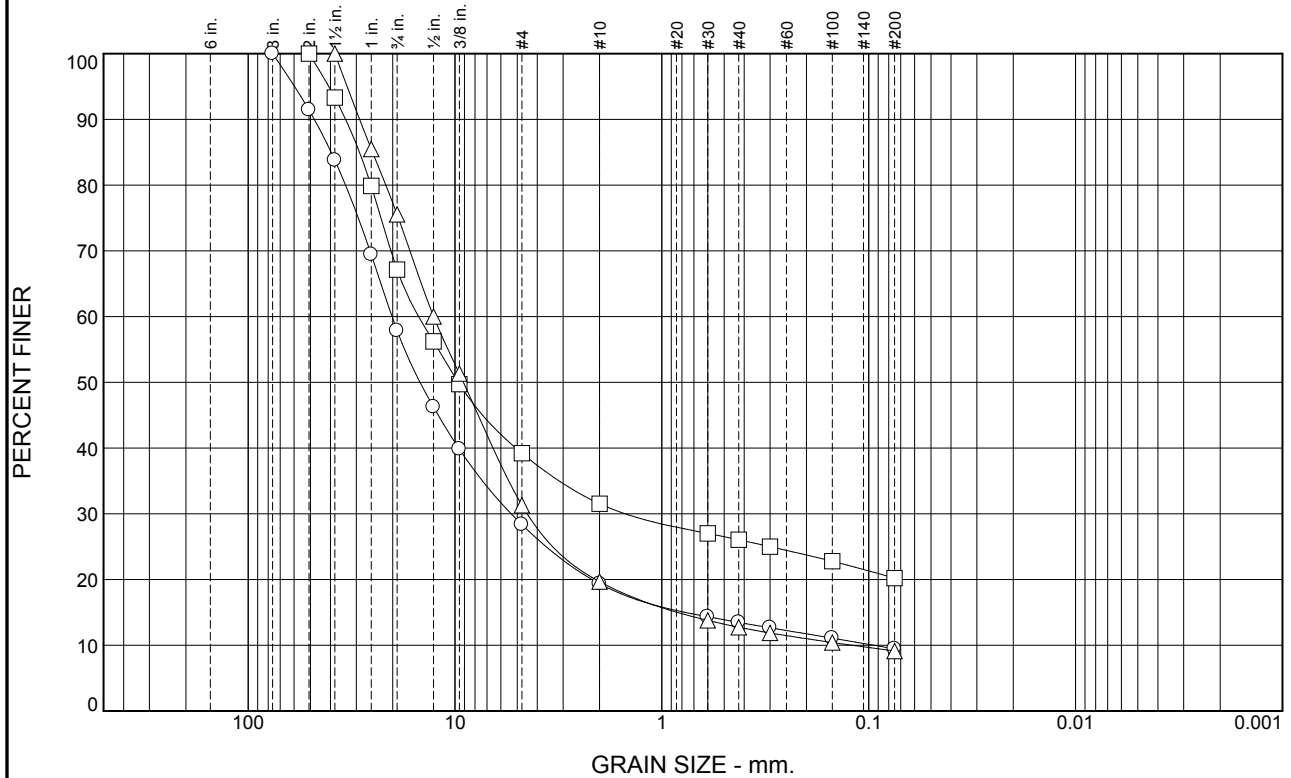
### Density Data

<b>Height, in.:</b>								
<b>Diameter, in.:</b>								
<b>Determined Sp. Grav.:</b>								
<b>Assumed Sp. Grav.:</b>	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
<b>Total Wt of Soil &amp; Tare, g:</b>								
<b>Tare, g:</b>								
<b>Total Wet Wt of Soil, g:</b>								

### Moisture Content Data

<b>Tare No.:</b>								
<b>Tare, g:</b>	21.87	22.46						
<b>Wet Wt. Of Soil &amp; Tare, g:</b>	153.57	107.36						
<b>Dry Wt of Soil &amp; Tare, g:</b>	101.64	83.51						
<b>Visual Classification:</b>	Gray SILT	Very Dark Brown Fat CLAY w/ organics						

# Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	71.6	18.9		9.5				
□	0.0	60.8	19.0		20.2				
△	0.0	68.7	22.2		9.1				

SIEVE inches size	PERCENT FINER		
	○	□	△
3"	100.0		
2"	91.4	100.0	
1.5"	83.8	93.3	100.0
1"	69.4	79.9	85.5
3/4"	57.9	67.1	75.5
1/2"	46.2	56.2	60.0
3/8"	39.8	49.7	51.3
GRAIN SIZE			
D60	20.1644	15.0075	12.6957
D30	5.3545	1.5072	4.4829
D10	0.0944		0.1203
COEFFICIENTS			
C <sub>c</sub>	15.06		13.16
C <sub>u</sub>	213.57		105.53

SIEVE number size	PERCENT FINER		
	○	□	△
#4	28.4	39.2	31.3
#10	19.4	31.5	19.7
#30	14.3	27.0	13.8
#40	13.5	26.0	12.7
#50	12.7	25.0	11.9
#100	11.1	22.8	10.4
#200	9.5	20.2	9.1

**Material Description**

○ Dark Gray Poorly-Graded GRAVEL w/ Clay & Sand

□ Brown Clayey GRAVEL w/ Sand

△ Dark Gray Poorly-Graded GRAVEL w/ Clay & Sand

**REMARKS:**

○ This sample was small, was observed to break down and contained freshly fractured gravel. Results approximate.

□ This sample was small, was observed to break down and contained freshly fractured gravel. Results approximate.

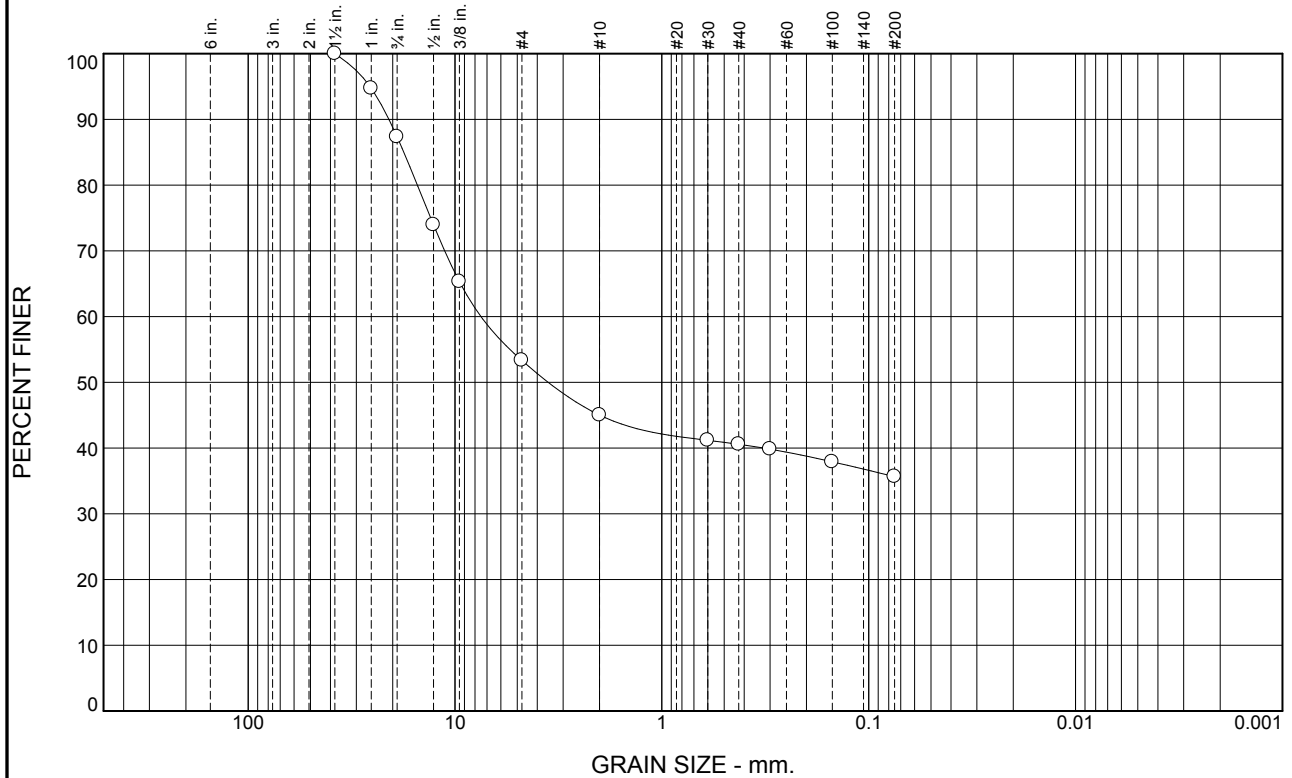
△ This sample was small, was observed to break down and contained freshly fractured gravel. Results approximate.

○ Source of Sample: B-2      Depth: 10-22      Sample Number: S4-S8 composite  
 □ Source of Sample: B-3      Depth: 2.5-9      Sample Number: S1-S3 composite  
 △ Source of Sample: B-4      Depth: 15-26.5      Sample Number: 5-S7 composite

<b>Benchmark Geolabs, LLC</b>	Client: McMillen Jacobs	Project: Rock Creek Trunk Upsizing Project - 5993.0
	Project No.: 024-022	Figure



# Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	46.7	17.7	35.6					

SIEVE inches size	PERCENT FINER		
	○		
1.5"	100.0		
1"	94.7		
3/4"	87.3		
1/2"	74.0		
3/8"	65.3		
<del>X</del>	GRAIN SIZE		
D60	7.4957		
D30			
D10			
<del>X</del>	COEFFICIENTS		
C <sub>c</sub>			
C <sub>u</sub>			

SIEVE number size	PERCENT FINER		
	○		
#4	53.3		
#10	45.0		
#30	41.2		
#40	40.6		
#50	39.8		
#100	37.9		
#200	35.6		

**Material Description**  
 ○ Brown Silty GRAVEL w/ Sand

**REMARKS:**  
 ○ This sample was small, was observed to break down and contained freshly fractured gravel. Results approximate.

○ Source of Sample: HA-2      Depth: 5'-5'10"      Sample Number: S2

**Breccia Geotechnical Testing, LLC.****Natural Moisture Content (ASTM D2216)**

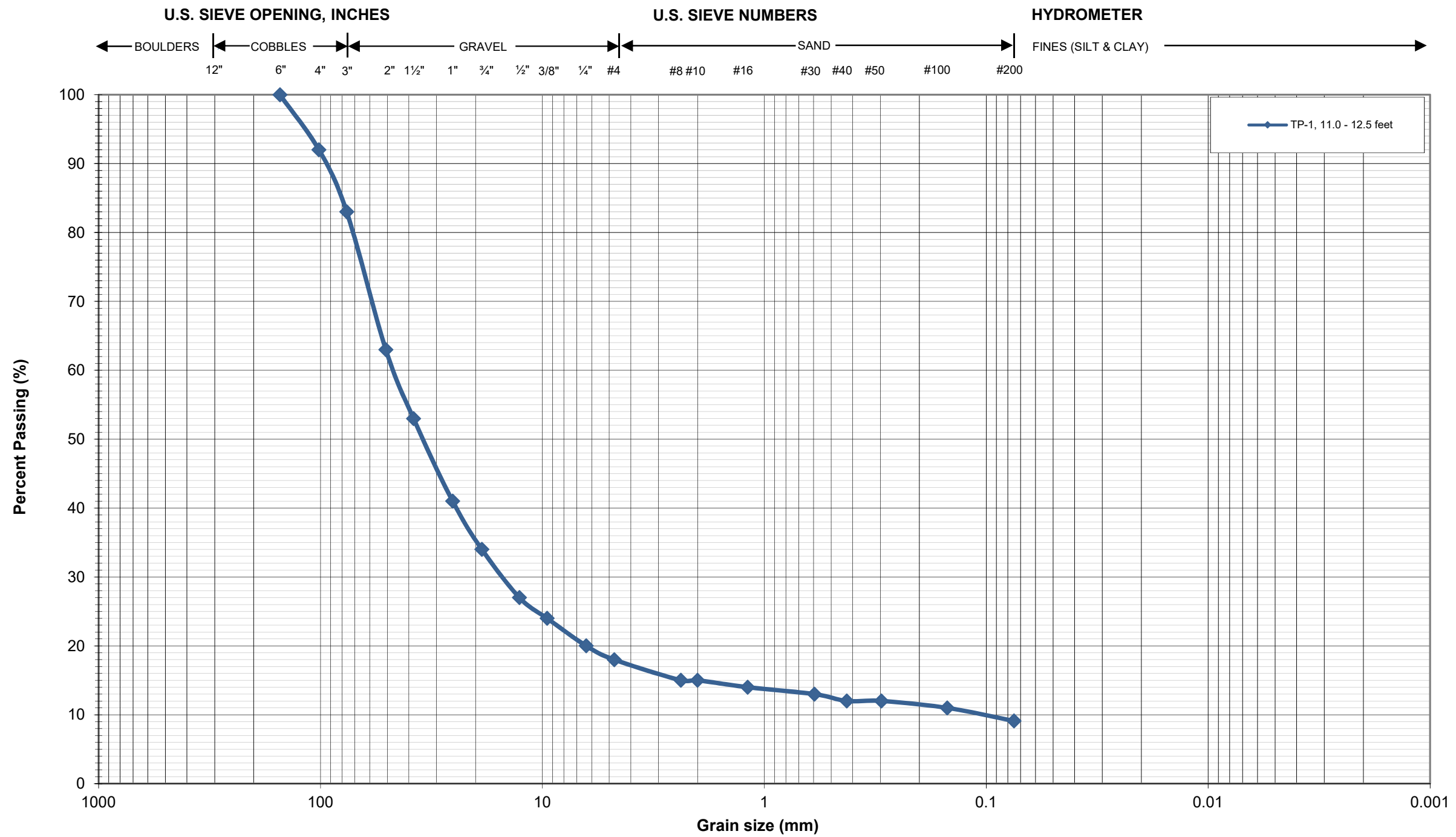
Client: McMillen Jacobs Associates By: FS  
Project Name: Rock Creek Sanitary Trunk Line Upsizing Date: 6/8/2019  
Project Number: 5993.0

Exploration ID	B-1	B-1	B-2	B-3	B-3	
Samples ID	S5	S7	S2	S6	S7	
Samples Depth (ft.)	15-16.5	25-26.5	5-6.5	20-21.5	25-26.5	
Moisture Content (%)	33.9	39.5	23.1	34.9	28.9	
Exploration ID	HA-1	HA-1				
Samples ID	S2	S3				
Samples Depth (ft.)	3	6				
Moisture Content (%)	77.2	56.0				

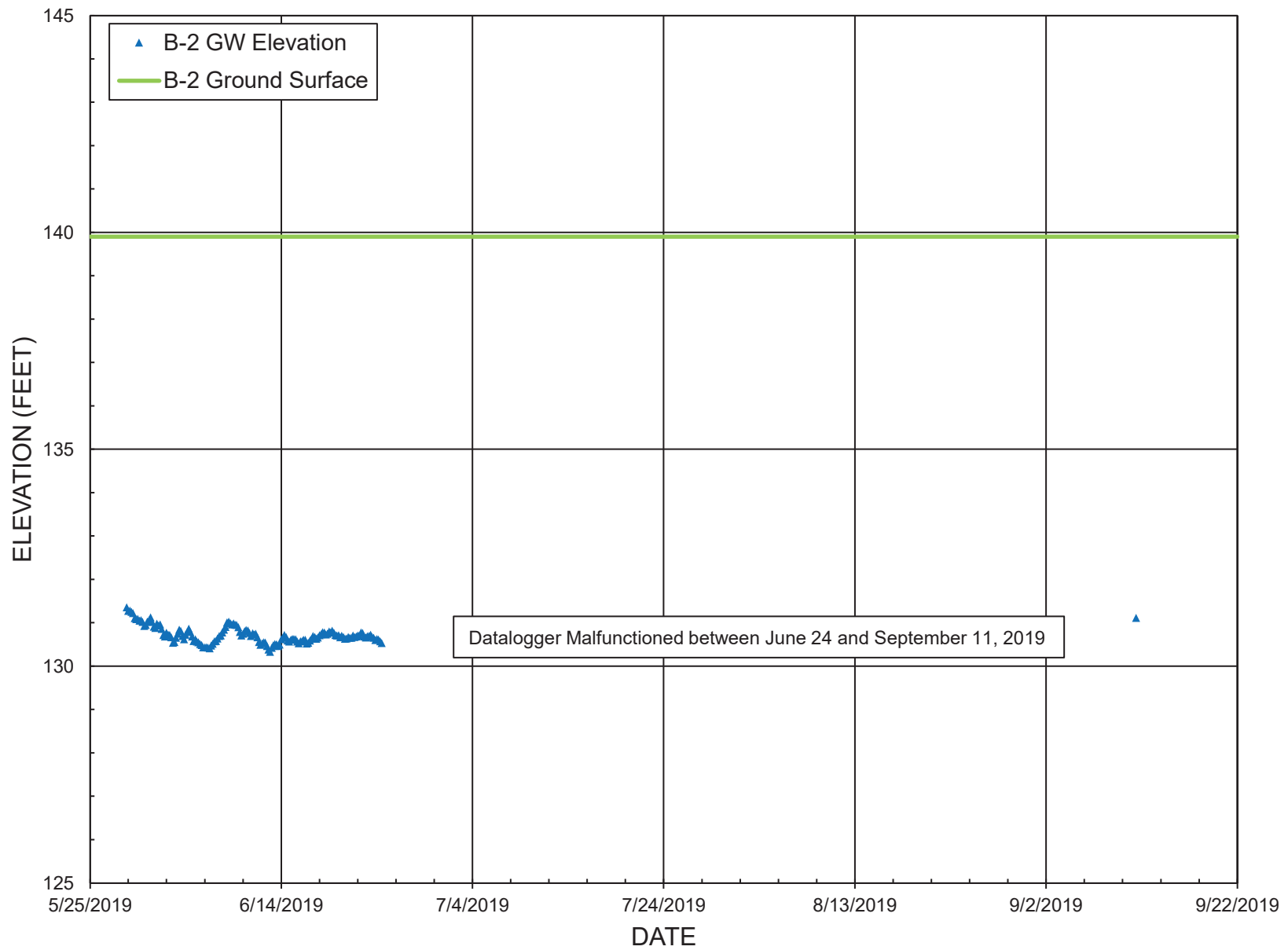
**Breccia Geotechnical Testing, LLC.****Percent Fines (ASTM D1140)**

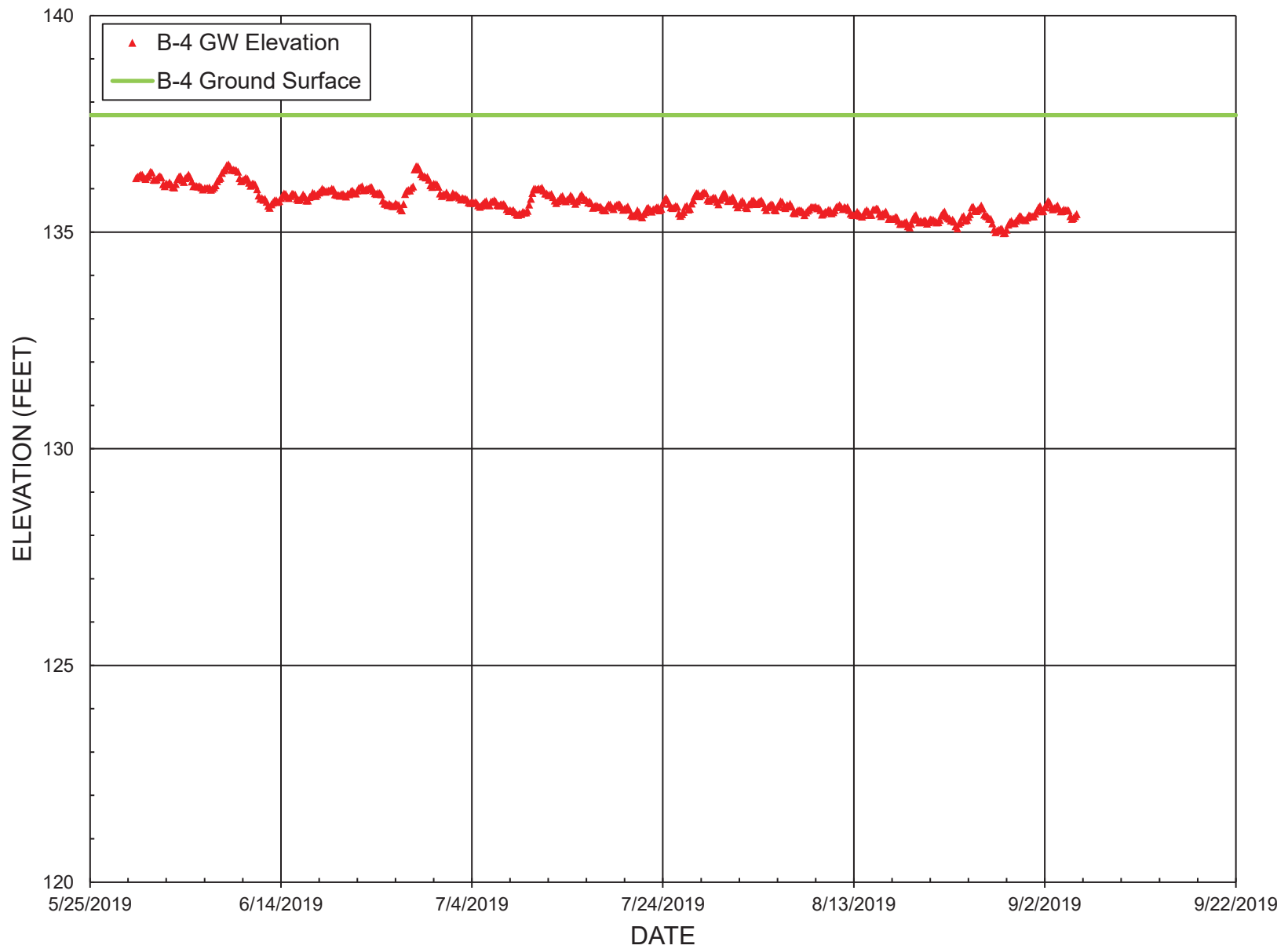
Client: McMillen Jacobs Associates By: FS  
Project Name: Rock Creek Sanitary Trunk Line Upsizing Date: 6/9/2019  
Project Number: 5993.0

Exploration ID	B-1	B-3				
Samples ID	S4	S4				
Samples Depth (ft.)	10-11.5	10-11.5				
Moisture Content (%)	27.6	32.6				
Percent Fines (%)	87.3	65.8				



**Appendix D**  
**Groundwater Data**





**Appendix E**  
**Photos of Excavated Material**





**Photo 1. Coarse-grained Missoula Flood Deposits Below 9 feet**



**Photo 2. 16-inch Diameter Boulder within Coarse-grained Missoula Flood Deposits**

# State Historic Preservation Office Report Cover Page

Year:

Title:

REPORT

Author(s):

Agency/Client:

District/Contractor:

Agency/Client Report#:

Project Acres:

Survey Acres:

LOCATION

County(ies):

Township:

Range:

Section(s):

Township:

Range:

Section(s):

TESTING

Archaeological Permit Number(s):

Accession Number:

Reports submitted to:

Tribes:

UOMNCH:

LCIS:

Curation:

Report Addresses Testing:

CONSULTATION

Have tribes been contacted or consulted?

List tribes:

List any other groups contacted or consulted:

PA/  
MOA

Report is associated with: PA

MOA

**REPORTS WITHOUT A COMPLETE AND ACCURATE COVER PAGE AND APPROPRIATE ADDITIONAL PAGES MAY BE RETURNED. CHECK THE SHPO WEBSITE TO MAKE SURE YOU HAVE THE MOST CURRENT VERSION.**

Report #

# State Historic Preservation Office Report Summary of Resources and NRHP Eligibility

Archaeological:

Site:      Isolate:      Built Environment:      TCP:      HPRCSIT:      Other:

Count:

**\*Please be sure all archaeological forms have been submitted on-line**

***EVALUATE PROPERTIES UNDER ALL FOUR CRITERIA.  
BE SURE TO INCLUDE JUSTIFICATION IN THE REPORT***

Oregon  
On-Line

Form #: Trinomial: Temp# or Name:    Criterion A:    Criterion B:    Criterion C:    Criterion D:

RESOURCES

NRHP ELIGIBILITY

Cultural Resources Investigations for the Rock Creek Trunk  
Upsizing Project, Sherwood, Washington County, Oregon

*SHPO A.P. No 2702*  
*OMNCH Accession No. 2672*

Submitted to:  
Mason, Bruce & Girard, Inc.

Submitted by:  
Historical Research Associates, Inc.  
Justin Hopt  
Libby Provost  
Catherin Bialas

Portland, Oregon  
December 2019



HISTORICAL  
RESEARCH  
ASSOCIATES, INC.

*This project was implemented by HRA Principal Investigators Catherin Bialas, MA, and Libby Provost, MA, who meet the Secretary of the Interior's professional qualifications standards for archaeology and architectural history, respectively. This report is intended for the exclusive use of the Client and its representatives. It contains professional conclusions and recommendations concerning the potential for project-related impacts to cultural resources based on the results of HRA's investigation. It should not be considered to constitute project clearance with regard to the treatment of cultural resources or permission to proceed with the project described in lieu of review by the appropriate reviewing or permitting agency. This report should be submitted to the appropriate state and local review agencies for their comments prior to the commencement of the project.*

# Management Summary

---

City of Sherwood (City) is planning a capital improvement to its sanitary sewer system for the Rock Creek Sanitary Sewer Upsizing Project (Project). The work consists of upsizing approximately 1,370 feet (ft) of existing 18-inch-diameter sanitary trunk line with 24-inch diameter trunk line. The City may be receiving a permit from the U.S. Army Corps of Engineers for project work that will take place near jurisdictional wetlands and the Rock Creek drainage.

Historical Research Associates, Inc. (HRA) completed a cultural resources investigation for the Project in July 2019. HRA's investigation included review of the environmental and cultural context of the project vicinity and background research. Additionally, HRA conducted a pedestrian survey to identify near-surface archaeological resources and subsurface shovel probing to assess the area for buried archaeological resources within the Project. One precontact isolate, 3001-IF1, was identified within the route of the proposed sewer pipeline. No additional artifacts were located around Isolate 3001-IF1. HRA recommends Isolate 3001-IF1 as not eligible for listing in the National Register of Historic Places (NRHP) and no additional archaeological work is needed. HRA recommends a finding of no effect for the Project for archaeological resources.

HRA identified two architectural resources (one power transmission line and one former agricultural complex) within the Project that are of an age to be evaluated for eligibility to the NRHP. Bonneville Power Administration (BPA) determined the Pearl–Keeler No. 1 Transmission Line (1961) not eligible (Tama Tochihara, personal communication 2018, 2019). The former agricultural complex could not be adequately assessed for eligibility from the right-of-way (ROW); though essentially unrecorded and unevaluated, for the purpose of assessing potential effects, HRA assumes 20555 SW Gerda Lane is eligible for listing in the NRHP.

The nature of the undertaking—replacement of an existing underground pipe with a new pipe in a similar and adjacent alignment—means that any visible project actions will be temporary and will not impact the integrity of the transmission line or the complex. Additionally, the sewer alignment will not physically touch the 20555 SW Gerda Lane parcel. HRA recommends the Project will have no adverse effect on historic properties.



# Table of Contents

---

MANAGEMENT SUMMARY	I
1. INTRODUCTION	1
1.1 PROJECT DESCRIPTION	1
1.2 REGULATORY CONTEXT AND PERMITTING	1
1.3 ACKNOWLEDGEMENTS	3
2. ENVIRONMENTAL AND CULTURAL CONTEXT	4
2.1 ENVIRONMENTAL CONTEXT	4
2.2 CULTURAL CONTEXT	5
2.2.1 PRECONTACT PERIOD	5
2.2.2 THE KALAPUYA	7
2.2.3 HISTORIC PERIOD	8
2.2.4 HISTORIC DOCUMENT REVIEW	9
3. PREVIOUS CULTURAL RESOURCE INVESTIGATIONS AND EXPECTATIONS	12
3.1 PREVIOUS STUDIES	12
3.2 ARCHAEOLOGICAL EXPECTATIONS	14
4. METHODS	15
4.1 ARCHAEOLOGICAL SURVEY	15
4.2 ARCHITECTURAL SURVEY	15
4.3 NRHP EVALUATION	16
5. RESULTS	18
5.1 ARCHAEOLOGICAL SURVEY RESULTS	18
5.1.1 ISOLATE 3001-IF1	21
5.2 ARCHITECTURAL INVENTORY	21
5.2.1 20555 SW GERDA LANE	22
6. CONCLUSIONS AND RECOMMENDATIONS	26
7. REFERENCES	27
APPENDIX A: PROJECT DESIGN DRAWINGS (30%)	33
APPENDIX B: SUBSURFACE SAMPLING DESCRIPTION	37
APPENDIX C: OREGON ARCHAEOLOGICAL ISOLATE FORM	40
APPENDIX D: OREGON SHPO HISTORIC PROPERTY INVENTORY CLEARANCE FORM	45



## List of Figures

Figure 1-1. Rock Creek Sanitary Sewer Upsizing Project location.	2
Figure 2.2-1. GLO plat map from 1852 depicting the setting at the time.	10
Figure 2.2-2. USGS topographic map from 1916 depicting the setting at the time.	10
Figure 2.2-3. USGS topographic map from 1940 depicting the setting at the time.	11
Figure 5.1-1 Results of the cultural resources survey.	19
Figure 5.1-2. Transect 1 overview, view north	20
Figure 5.1-3. Transect 8 overview, view north	20
Figure 5.1-4. Transect 8 overview, access road, view north	20
Figure 5.1-5. SP 8 overview, view southeast	21
Figure 5.1-6. Isolate 3001-IF1, ventral side	21
Figure 5.2.1-1. Modern aerial image depicting the structures at 20555 SW Gerda Lane.	23
Figure 5.2.1-2. Barn at 20555 SW Gerda Lane (ca. 1952; 1970); view northwest.	24
Figure 5.2.1-3. Outbuilding at 20555 SW Gerda Lane (ca. 1970); view northeast.	24
Figure 5.2.1-4. Outbuilding at 20555 SW Gerda Lane (ca. 1970); view southwest.	24
Figure 5.2.1-5. Three-sided barn at 20555 SW Gerda Lane (ca. 1952); view south.	24

## List of Tables

Table 2.2.4-1. Historic-Period Documents and Maps Depicting the API.	9
Table 3.1-1. Cultural Resource Investigations Conducted within 1 mi of the API.	12
Table 3.1-2. Cultural Resource Investigations Conducted within 1 mi of the API.	14
Table B-1. Results of Shovel Probe Excavations.	37

# 1. Introduction

---

## 1.1 Project Description

The City of Sherwood (City) is planning a capital improvement to its sanitary sewer system as part of the Rock Creek Sanitary Sewer Upsizing Project (Project). The work will consist of upsizing approximately 1,370 feet (ft) of existing 18-inch-diameter sanitary trunk line with a 24-inch diameter trunk line (Appendix A). The Project is in Washington County in Section 29 of Township 2 South, Range 1 West, Willamette Meridian. Specifically, the Project is located in Sherwood, Oregon, to the north and south of Tualatin-Sherwood Road between SW Gerda Land and SW Century Drive (Figure 1-1).

## 1.2 Regulatory Context and Permitting

The City may be receiving a permit from the U.S. Army Corps of Engineers (USACE) for project work that will take place near jurisdictional wetlands and the Rock Creek drainage. The issuance of a permit will be a federal action that requires compliance with Section 106 of the National Historic Preservation Act (NHPA) (43 USC 470f, as amended) and its implementing regulations (36 CFR Part 800). The NHPA requires federal agencies to take into account the effects of their undertakings on historic properties (cultural resources that are listed in or eligible for listing in the National Register of Historic Places [NRHP]).

The Project is also subject to compliance under Oregon state laws, including Oregon Revised Statute (ORS) 358.905, which provides definitions for archaeological objects and sites; ORS 358.920, which states that a person may not excavate or alter an archaeological site on private or public lands, make exploratory excavation on public lands to determine the presence of an archaeological site, or remove from private or public lands any material of an archaeological, historical, or anthropological nature without first obtaining a permit issued by the State Parks and Recreation Department issued under ORS 390.235; ORS 358.475, which declares that it is in the best interest of the state to maintain, preserve, and rehabilitate properties of Oregon historical significance; and ORS 97.740-97.760, which protects Native American graves and associated objects.

Mason Bruce & Girard, Inc. (MBG), retained Historical Research Associates, Inc. (HRA), to complete the cultural resources survey on behalf of Murraysmith and the City. At the time of the investigations, the area of potential effects (APE) had not been determined by the USACE; however, MBG provided HRA with an area of potential impacts (API) large enough to encompass all proposed ground-disturbing activities and likely staging areas. HRA proceeded under the assumption that the USACE will redefine the API as the APE. The API measures approximately 18.5 acres.

HRA completed archeological investigation within the API and completed an inventory of the historic-period structures (more than 50 years old) on the parcels that are within the API, per Oregon State Historic Preservation Office (SHPO) guidelines. HRA carried out the subsurface archaeological survey work on City property under Oregon State Parks and Recreation

Archaeological Survey Permit Number 2702 per ORS 390.235. The Oregon Museum of Natural and Cultural History (OMNCH) issued accession number 2672 for the curation of artifacts collected under the archaeology survey permit.

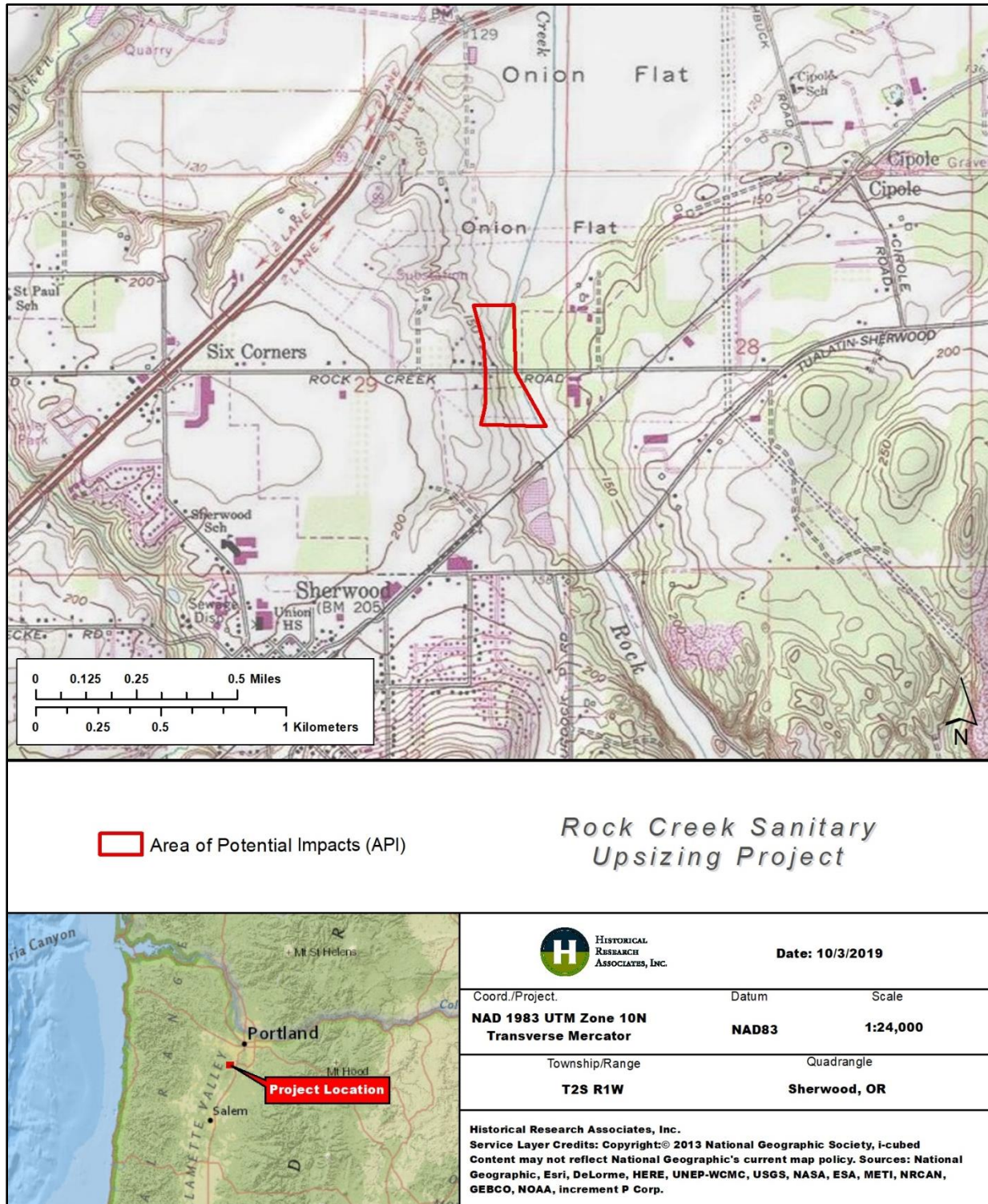


Figure 1-1. Rock Creek Sanitary Sewer Upsizing Project location.

## 1.3 Acknowledgements

Catherin M. Bialas managed and administered the Project and authored a portion of the report. Justin Hopt served as the Field Director and authored much of the report. Libby Provost, Architectural Historian, conducted background research, evaluated the historic-period built resources, and authored portions of the report. Archaeologists Tony Saunders, MA, and Eric Ball, BA, assisted with the fieldwork. Bialas and Hopt meet the Secretary of the Interior's Professional Qualifications Standards for Archaeology. Provost meets the Secretary of the Interior's Professional Qualifications Standards for Historic Architecture. Gabe Frazier managed the Geographic Information System (GIS) data and produced the report graphics. Bialas completed technical edits and provided quality assurance and control. Dawn Vogel line-edited the report. Jessica Frank formatted and produced the report. HRA would like to thank Stuart Myers (MBG) for his assistance during the Project.

## 2. Environmental and Cultural Context

---

### 2.1 Environmental Context

The Project is located within the Willamette Valley and Puget Sound physiographic province, an elongated series of lowlands that extend from Cottage Grove in Oregon to the Georgia Strait in Washington (Orr and Orr 2000). The Willamette Valley portion of the physiographic province is characterized by long alluvial plains with rolling hills. Much of the valley consists of nearly level to low-sloping floodplains, as is the case in the API. Rock Creek, a tributary of the Tualatin River, runs a channelized course through the center of the API. Its natural course differed little from the current course, with a historic map showing the creek meandered slightly more to the east (General Land Office [GLO] 1852).

The surficial sediment within the Willamette Valley originated from the late Pleistocene Missoula floods, which deposited sediment and rocks from eastern Washington and as far away as western Montana across the entire valley. These floods resulted when ice dams that held back enormous glacial lakes in Montana ruptured beginning around 19,000 radiocarbon years before present (B.P.), releasing immense quantities of water, ice, rock, and sediment that spread down through the Columbia River basin; the floods were repeated multiple times at an unknown interval over the course of thousands of years (Benito and O'Connor 2003). As the channel of the Columbia River could not contain the enormous volume of water released by the failure of each ice dam, water naturally backed up into the low-lying elevations of the Willamette Valley, leaving behind rock and sediment. The soils deposited by these flood events compose most of the surface of the present-day Willamette Valley (Orr and Orr 2000). Within the API, surficial sediments include fine-grained colluvial, alluvial, and reworked aeolian Missoula Flood deposits (Ma et al. 2012).

Most of the land within the API is, and has historically been, semi-saturated through much of the year, with early maps of the area indicating it as a swamp (GLO 1852). There are four primary types of soil mapped within the API: Wapato silty clay loam, Quatama loam, Briedwell stony silt loam, and Labish mucky clay. Wapato silty clay loam consists of a poorly drained soil with a typical profile of silty clay loam over silty clay. Quatama loam is a moderately well-drained soil with a typical profile of loam with interspersed clay loam. Briedwell stony silt loam is a well-drained soil with a typical profile of stony silt loam over clay loam, over an extremely cobbly clay loam. Labish mucky clay consists of a poorly drained soil with mucky clay over clay over mucky peat (Green 1982).

The Willamette Valley is categorized as the *Pinus-Quercus-Pseudotsuga* (pine-oak-Douglas fir) Zone, an interior valley vegetation zone considered too dry to support the lush forests of the nearby *Tsuga heterophylla* (western hemlock) Zone. Because of the long history of Native American land use, Euroamerican settlement, farming, flood control, fire suppression, and land reclamation in the valley, most native vegetation areas have been greatly altered (Franklin and Dyrness 1988). Common vegetation on the Tualatin River floodplain today includes riparian forests and wetlands, remnant oak stands, hazelnut orchards, and fields of hay and vegetables. Forests that are close to drainages include large stands of red alder, black cottonwood, Oregon ash, willow, and bigleaf maple.

Terrestrial animals located in the region include Roosevelt elk, black- and white-tailed deer, black bear, red fox, bobcat, beaver, muskrat, mink, raccoon, and rabbits. Dove, quail, and grouse are

common game birds found in the region, along with Canada goose and a wide variety of waterfowl. Rock Creek and the Tualatin River would have contained several species that could have been important to aboriginal and historic period inhabitants. These include freshwater salmonids, such as rainbow and cutthroat trout, as well as sculpin, lamprey, dace, coarctate sucker, and redbreast shiner. Historically, anadromous salmonids, such as coho and Chinook salmon, may have also been present (Bailey 1936; Hawksworth 2001).

## 2.2 Cultural Context

### 2.2.1 Precontact Period

There have been several cultural chronologies formulated for the Willamette Basin and the Northwest Coast. The following overview uses the terminology set forth in the general Willamette Basin chronology developed by Beckham and colleagues (1981), which was based primarily on the estimated dates for changes in projectile point types. The chronology has been modified by Toepel (1985) and Baxter (1986).

The time period between initial human settlement and the Early Archaic period has been commonly referred to as the Paleoindian period. Research at Paisley Caves in south-central Oregon has identified human coprolites dating to as old as 14,525 calibrated years (cal yr) B.P., and stemmed projectile points associated with radiocarbon dates as old as 13,293–13,519 cal yr B.P. (Jenkins et al. 2014:486, 498). The Paleoindian period in the Willamette Valley is represented by a handful of isolated projectile point finds and sites. A number of projectile points associated with the Western Stemmed and Clovis traditions have been found at the south end of the valley, in the Mohawk Valley, in the Cottage Grove area, and at Blue River and Fern Ridge Reservoirs (Aikens et al. 2011:289–291; Allely 1975:551; Connolly 1994; Gerity 1960; Heinz 1971; Minor 1985:35; Ozburn and Stueber 2001). Evidence of Clovis cultures has been tightly dated to between 12,800 and 13,250 calendar year (cal yr) B.P. (Waters and Stafford 2007). Recent research has also suggested that large stemmed projectile points of the Western Stemmed tradition may be associated with populations that pre-date Clovis cultures (i.e., Wisner 1998), though none have been found near the API. The dearth of evidence for Paleoindian occupation is likely a result of substantial deposition of alluvium over time and by the repeated Missoula floods. A number of deeply buried sites have been documented in the Long Tom Basin, to the west of Eugene. They contain simple flaked tool assemblages, hearths, fire-modified rock, and occasionally charred remains of hazelnut and camas (Aikens et al. 2011).

The Early Archaic period is characterized by broad-based hunting and gathering subsistence strategy (Minor et al. 1982). The Early Archaic has been described as extending between 7950 and 5950 cal yr B.P., but somewhat older sites with the same characteristics have been documented, suggesting that the Early Archaic cultural period may actually have begun around 10,000 B.P. Cascadia Cave (35LIN11), situated in the Cascade foothills to the southeast, has been dated to at least 8650 cal yr B.P. and provided evidence for hunting and nut collection (Baxter 1989; Newman 1966). Extensive excavations and analysis in the Long Tom River floodplain of the Upper Willamette Valley have revealed cultural deposits dating to 10,910 cal yr B.P. at Site 35LA658 (Stamp Site), 9905 cal yr B.P. at Site 35LA439 (Long Tom Site), and 8500 cal yr B.P. at Site 35LA647 (Hannavan Creek Site) (Cheatham 1984:102; O'Neill et al. 2004:34). Charred camas bulbs dating to approximately 7800 B.P.

at the Hannavan Creek Site indicate that floral resources played an important role in the diet of native inhabitants (Cheatham 1988:199). The most diagnostic tools of this period are the large, lanceolate Cascade projectile points. Other tools associated with this period include knives, scrapers, drills, modified flakes, manos, metates, hammerstones, and edge-ground cobbles. Early Archaic sites have been found in the foothills of the Cascade and Coast Ranges, at the valley edge, and on the valley floor, which suggests that groups of this period were familiar with, and utilized, a variety of environments.

Slightly younger sites representing the Middle Archaic period (5950–1950 cal yr B.P.) are also found in the Willamette Valley and have been well-studied. The Middle Archaic period has been divided into two cultural phases that describe the environmental variability during this time: the Flanagan and Lingo phases. The Flanagan phase dates from approximately 6000 to 4000 B.P. and coincides with the Hypsithermal interval, a period that was characterized by conditions that were warmer and drier than in previous and subsequent periods. This period is also referred to as the oak maximum, and evidence from the Flanagan Site indicates that acorns were likely an important resource during this period (Toepel 1985:152). The typical diagnostic tool of this phase is a broad-necked lanceolate projectile point (Toepel 1985:151–153). The Lingo phase dates from 4000 to 1750 B.P. and was a period that was had a cooler and wetter climate in comparison to the previous period, coinciding with the onset of the Late Post-Glacial period. A marked increase in mortars and pestles dating from this period indicates an increased utilization of vegetal resources. There is some indication that the change in environment may have resulted in decreased emphasis on acorns and increased emphasis on hazelnuts, camas, and other floral resources in the diets of native inhabitants of the region during this period (Cheatham 1988:201). Diagnostic artifacts from this phase include large stemmed and notched projectile points; lanceolate points decrease in frequency during this phase (Toepel 1985:154). Other tools associated with this period include knives, drills, graters, scrapers, reamers, spokeshaves, hammerstones, choppers, anvils, scraper planes, and abrading stones (Cheatham 1988). The Middle Archaic period thus represents a time of expansion and intensification of subsistence technologies that had already been in place from the Early Archaic period (Minor et al. 1982).

The Late Archaic period (1950 to 200 cal yr B.P.) was a time of population growth in the Willamette Valley. The climate remained much as it had been in the Middle Archaic. As a result, settlement and subsistence patterns did not change significantly; however, there is evidence to suggest that there was an increased focus and reliance on camas during this period, coinciding with significant population growth. Artifacts recovered from this period are typically small, narrow-necked, stemmed and diamond-shaped projectile points, replacing the broad-necked points of the preceding Middle Archaic period, reflecting the shift from atlatl and dart to bow and arrow (Toepel 1985:155). Euroamerican and Asian trade goods, such as glass beads, metal objects, and ceramics, begin to appear in the archaeological record.

This period is also marked by the development of “midden mounds” in the Willamette Valley—accumulations of camas-processing debris and other cultural materials that created slight topographic relief on the otherwise flat valley floor. Many of these mounds also contain human remains. They have been found in high concentrations along the South Yamhill River valley and along the Calapooia River to the south (Aikens et al. 2011:309–311; Cheatham 1988; White 1975). These mounds may represent seasonal camps or villages associated with landforms with particularly prolific camas meadows. It is probable that such features were common throughout the Willamette Valley though most of them were in all likelihood significantly altered or destroyed as a result of a century and a half of intensive agriculture across the valley (Aikens et al. 2011; Zenk 1990).

Cheatham (1988) has argued that the settlement subsistence system present during the ethnographic period began during this period. Winter villages typically held large groups of several families, whereas seasonal camps contained smaller kin-based groups engaged in specific tasks. Cheatham (1988) suggested that larger villages tended to be at the edges of the valley, likely due to periodic flooding of the Willamette and other tributaries during the winter and early spring months. Smaller sites associated with late spring, summer, and fall procurement activities, in contrast, tended to be on the valley floor. Alternatively, Bowden (1997:48–50) has suggested that in certain locations where midden mounds are especially prolific, such as along the Calapooia River, groups may have occupied a series of camas-processing sites over time, moving from site to site based on a multi-year camas-procurement cycle similar to that witnessed in the Flathead Valley of Montana (Thoms 1989). Such a pattern would generate a series of built up and clustered sites resembling seasonal camps.

### 2.2.2 *The Kalapuya*

The API falls within the traditional territory of the Kalapuya, who inhabited the Willamette Valley as far north as the Tualatin River and extended as far south as the tributaries of the Umpqua River. The Kalapuya comprised approximately 13 bands or tribes. The Tualatin (Atfalaiti) tribe, who were referred to as the Wapato or Wapato Lake Indians in historic times, inhabited the northernmost range of the Kalapuya, including the Sherwood area; they spoke a dialect of the Tualatin-Yamhill language (Zenk 1990:547–548). As many as eight of the approximately twenty known Tualatin Kalapuya villages were clustered around Wapato Lake, a marshy lowland adjacent to Gaston, 15 mi to the northwest. The shallow lake supported large amounts of wapato (*Sagittaria* spp.), an edible water lily that was an important food crop for the Tualatin Kalapuya (Zenk 1990).

The Kalapuya were an inland people who subsisted on vegetal and faunal resources of the valley and adjacent uplands; each band occupied a specific sub-basin of a major tributary that feeds into the Willamette River. Each band inhabited an area that offered a wide variety of riverine, lowland, and upland settings where seasonal foods and game could be gathered and hunted. Their diets relied heavily on the camas bulb (*Camassia* spp.) and wapato root, which was consumed at all times of the year (Aikens et al. 2011; Clyman 1960:153; Kramer 2000; Zenk 1990). Other gathered foods included acorns, tarweed seeds, hazelnuts, and berries. A variety of game was hunted and included several small mammals, birds, deer, elk, and black bear. Insects such as grasshoppers and caterpillar were also consumed (Zenk 1990:548).

Due to the varied location of the diversity of their food sources, the Kalapuya lived in permanent villages during the winter months and in temporary, transitory camps during the drier times of the year, gathering and processing seasonal foods for immediate consumption and for storage during leaner times. Temporary camps were small and might consist only of a grove of trees or of brush for shelter in the summer. Winter villages consisted of rectangular semi-subterranean multi-family lodges with either a shed or gabled roof. Families were partitioned off, and mats that were used for sleeping lined the walls. A central fireplace was shared by all the families (Zenk 1990:549). As discussed in the precontact section above, there is no strong indication that camas-processing task sites were significantly removed from winter villages. These may have been adjacent to the village, and task sites may have become villages (and vice versa) throughout a multi-year camas harvest schedule.

The material culture of the Kalapuya included a wide range of tools manufactured from wood, bone, antler, shell, plant fibers, and stone. They fashioned flaked stone tools (e.g., projectile points, knives,



scrapers, awls) from locally available tool stone, and obsidian from central Oregon was also obtained through trade in both core and finished-tool forms.

### **2.2.3 Historic Period**

Euroamerican trappers and traders began exploring western Oregon in the early nineteenth century, drawn by the burgeoning market for furs. The years 1811–1813 marked the beginning of the fur trade in the Willamette Valley. By 1821, the Hudson’s Bay Company (HBC) was established in the region, resulting in greatly expanded British and Euroamerican presence, along with an expansion of Euroamerican exploration of the region (Beckham et al. 1981).

Fort Vancouver was established in present day Vancouver, Washington, which served as headquarters for the HBC. John McLoughlin, the Chief Factor there, founded Oregon City in 1829 at Willamette Falls in order to take advantage of the water power to run a lumber mill. Around that time, many French-Canadian free agents and retiring HBC fur trappers were granted permission to establish permanent homes in the valley where they raised families with their native wives (Brauner 1989). Meanwhile, missionaries began to enter the area and, by the late 1830s, the first organized groups of American settlers came on what later became the Oregon Trail to claim the Kalapuya land. Beginning in 1841, a massive migration of Americans crossed the continent on the Oregon Trail, generally departing from Missouri and crossing to The Dalles, where they then traveled down the Columbia River or travelled overland to the Willamette Valley (Bassett et al. 1998).

Contact with Europeans and Euroamericans had tragic consequences for the Kalapuya, whose populations were greatly reduced from successive waves of epidemic diseases for which the people had no immunity (Aikens et al. 2011; Boyd 1990). In the mid-1800s, many of the remaining groups of Kalapuya were relocated to regional reservations (Zenk 1990:551). Many Kalapuya descendants are now members of the Confederated Tribes of the Grand Ronde and still live in the region.

The Tualatin Plains area was among the first areas to be settled and converted for use as farmland, beginning in the early 1840s. This open plain, crisscrossed by creeks and already cleared by native land management practices, was an attractive area to early settlers. The relatively easy access to the markets at Oregon City and the fast-growing community at Portland provided financial incentive. The earliest claims were along the Tualatin and Willamette Rivers and close to the established roads leading to Oregon City and Portland. At the time, Portland was only reachable by water or (after 1849) along the difficult Portland-Tualatin Valley Plank Road, which descended a canyon into the lowlands south of Portland (now Canyon Road) (Corning 1956:250). As these lands filled up, the next to be claimed were those somewhat farther to the north and west, made more attractive by the increasing reach and improving conditions of the road network. A contemporary witness noted that by 1854 nearly all of the Willamette Valley had been claimed, though the extent to which his definition of the Willamette Valley reached the far margins and foothills of the surrounding mountain ranges is unclear. Certainly by that time, the lands in the Tualatin Plains had been taken up, and farms and small farming communities had been firmly established (Bourke and DeBats 1995:62–65).

In 1850, the formalization of the U.S. government’s Donation Land Claim (DLC) Act, with its promise of free farm land, drew many additional settlers to the region (Schwantes 1996:121). The bulk of regional development was focused on the agricultural industries in the valley floor, resulting in a web of roads connecting Portland and the valley towns.

## 2.2.4 Historic Document Review

HRA researchers searched online archival resources and examined a series of historic maps to assist in identifying development trends within and around the API (Table 2-1). Some of the earliest maps of the area were prepared by the GLO in the mid- to late 1800s as part of its effort to survey the expanding territory and facilitate the various land claim acts. They show only landform characteristics and property claims. The United States Geological Survey (USGS) superseded the GLO as the primary federal surveying agency in the early 1900s, producing a wide variety of cartographic products depicting the area. These documents were examined to gain a sense of landscape use and change through time, and to anticipate where historic-period resources might be found within the API.

Table 2.2.4-1. Historic-Period Documents and Maps Depicting the API.

Date	Source	Title/Location	Notes
1852	GLO	Township 2 S, Range 1 W; Plat Map	Precursor to Tualatin-Sherwood Road present, labelled as “Road from Lafayette to Oregon City”; Project API shown in wetland/swamp, labelled as “Fir, Cedar, Y.Pine, Maple and Swamp.” (Figure 2.2-1)
1861	GLO	Township 2 S, Range 1 W; Plat Map	Nothing depicted.
1866	GLO	John and Elizabeth Hall; land patent	Oregon-Donation Act Patent filed on 10/8/1866 within Township 2S, Range 1W, Section 29 S ½.
1867	GLO	William and Caroline Garlick; land patent	Oregon-Donation Act Patent filed on 5/24/1867 within Township 2S, Range 1 W, Section 29 NE ¼.
1909	Wilkes Bro’s Abstract Co.	Atlas of Washington County Vol. 3	Depicts northern portion of API (north of Tualatin-Sherwood Road) owned by “John S. Mary B. Lester”; southern portion of API owned by “James Brown”; railroad tracks depicted to the southwest.
1916	USGS	Tualatin, OR. 1:62500 series topographic quadrangle	Tualatin-Sherwood Road depicted in current position; Railroad tracks still present (labelled as “Southern Pacific”); one building depicted to the northwest, one building depicted to the west of the API. (Figure 2.2-2)
1940	USGS	Tualatin, OR. 1:62500 series topographic quadrangle	Roads in project vicinity appear to be on current alignment. Building to the northwest still present, building to the west no longer present. (Figure 2.2-3)
1954	USGS	Tualatin, OR. 1:24000 series topographic	Roads in project vicinity appear to be on current alignment; Building to the northwest no longer present; four buildings present to the west.
1961	USGS	Sherwood, OR. 1:24000 series topographic	Roads in project vicinity appear to be on current alignment; Multiple buildings added to the east and west of API.

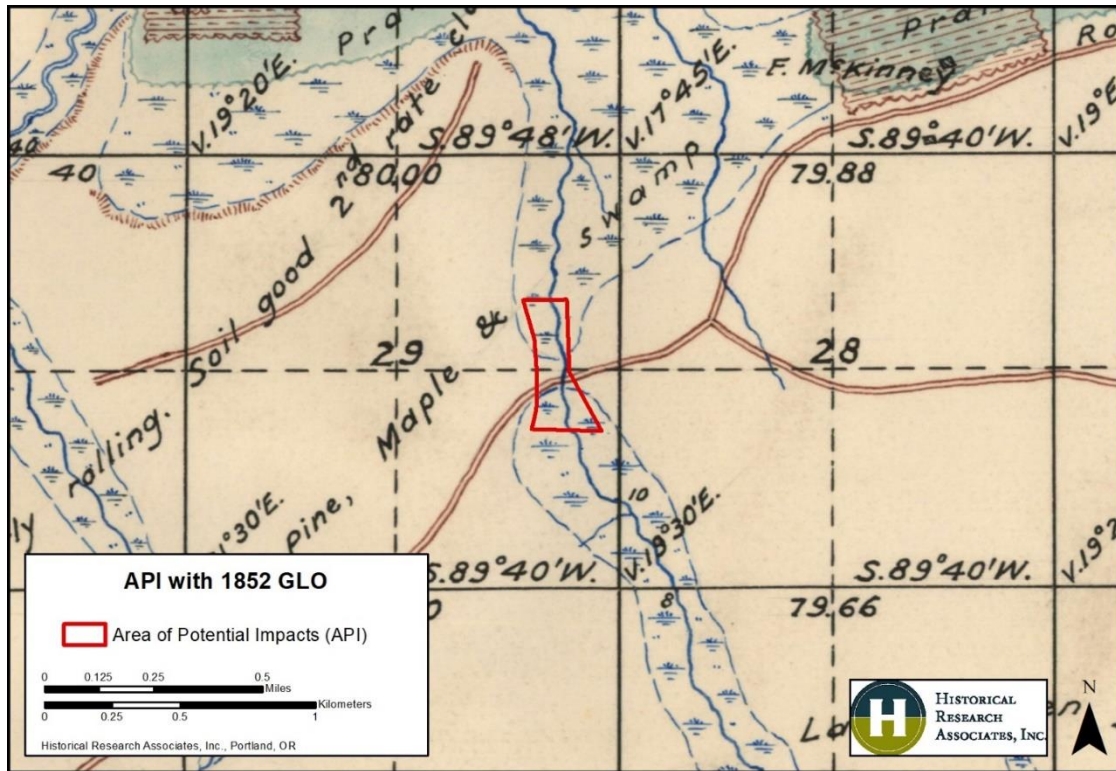


Figure 2.2-1. GLO plat map from 1852 depicting the setting at the time.

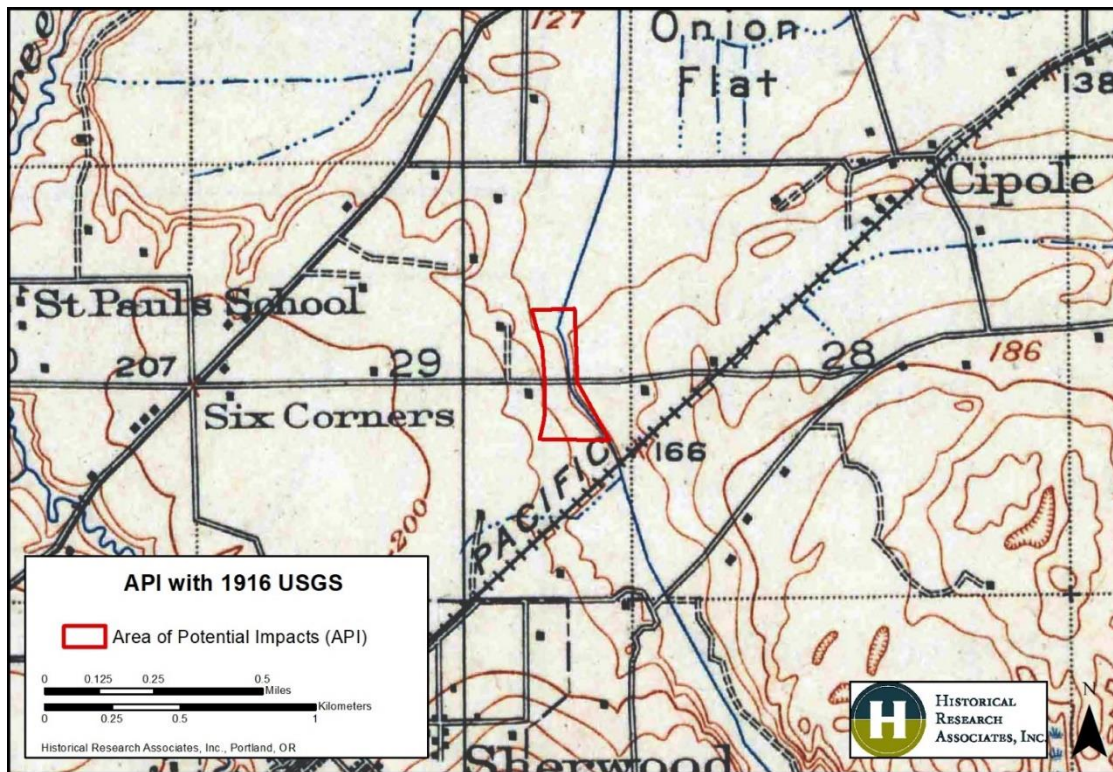


Figure 2.2-2. USGS topographic map from 1916 depicting the setting at the time.

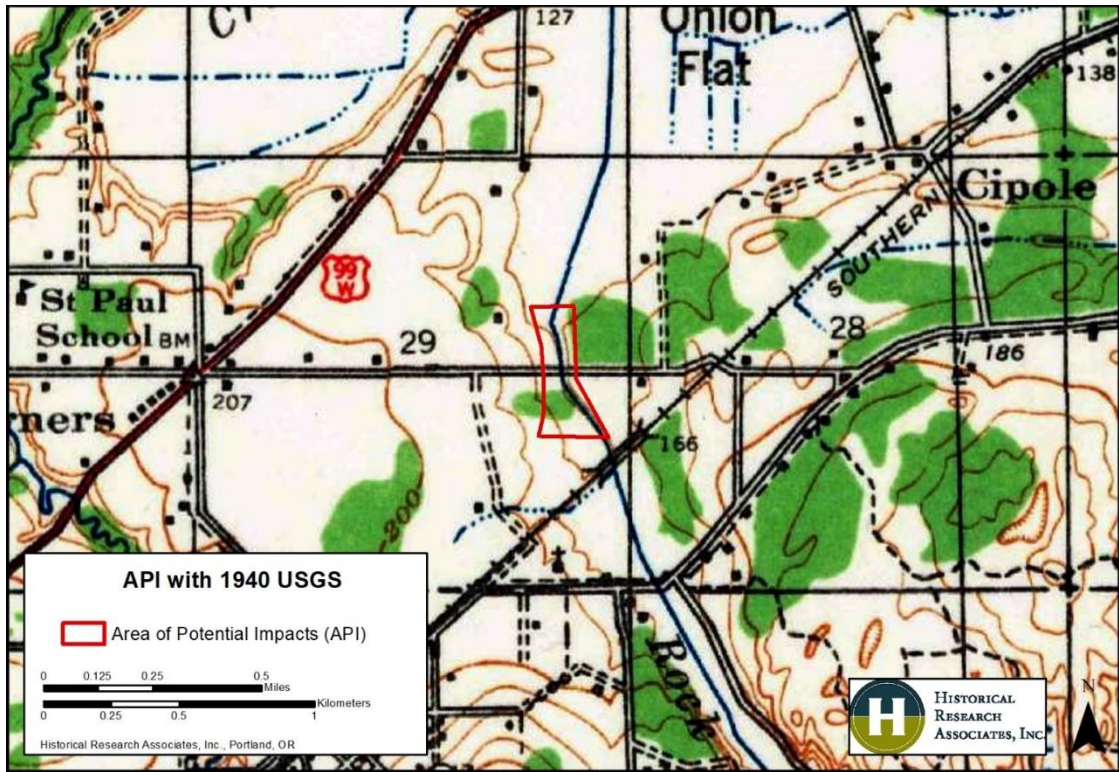


Figure 2.2-3. USGS topographic map from 1940 depicting the setting at the time.

# 3. Previous Cultural Resource Investigations and Expectations

## 3.1 Previous Studies

HRA reviewed previous cultural resource studies using the SHPO’s Oregon Archaeological Records Remote Access (OARRA) GIS server and the Oregon Historic Sites Database (OHSD). There have been 14 previous cultural resource surveys within 1 mile (mi) of the API. Six of these surveys were for road improvements/monitoring of road effects, five were for water and sewer pipeline projects, two were conducted on wetland/creek restoration projects, and one survey was initiated for a fiber optic placement.

Table 3.1-1. Cultural Resource Investigations Conducted within 1 mi of the API.

SHPO Report No.	Year	Author	Title	Distance and Direction from the API	Resources Identified
8276	1987a	Scott	A Cultural Resource Survey of the Tualatin-Sherwood/Edy Road Project	Within	35WN32
8292	1987	Minor and Beckham	Cultural Resources Survey for the US Sprint Fiber Optic Cable Project Eugene, Oregon to Seattle, Washington	0.5 mi west	-
8717	1987b	Scott	Archaeological Investigations at Two Sites within the Tualatin-Sherwood/Edy Road Project Corridor Washington County, Oregon	0.6 mi west	35WN32
18250	2001	Valentine	Steinborn Wetland Enhancement/Restoration – Tualatin River NWR	1 mi northwest	-
20718	1992	Tasa	Archaeological Testing in the Vicinity of Six Corners along the Sherwood Section of the Pacific Highway (99W), Washington County	0.9 mi west	-
22372	2006	Smits et al.	A Cultural Resources Reconnaissance Survey of the Proposed Tualatin Basin Water Supply Project (Willamette Pipeline), Clackamas and Washington Counties, Oregon	0.5 mi east	-
22373	2007	Punke et al.	Cultural Resource Survey and Selected Subsurface Testing for the Proposed Tualatin River Basin Water Supply Project, Clackamas and Washington Counties, Oregon	0.3 mi southwest	-

Table 3.1-1. Cultural Resource Investigations Conducted within 1 mi of the API.

SHPO Report No.	Year	Author	Title	Distance and Direction from the API	Resources Identified
26704	2014	Pettit	Section 106 Finding of No Historic Properties Affected OR99W at Tualatin National Wildlife Refuge t2S, R1W, Section 28; Beaverton Quad Washington County, Oregon ODOT Key No. 18444	0.75 mi north	-
27416	2014	Hambleton and Tisdale	Archaeological Survey for the SW 124 <sup>th</sup> Avenue Extension: SW Tualatin-Sherwood Road to SW Grahams Ferry Road Project, Washington County, Oregon	0.95 mi east	-
27695	2015	Bialas	Cultural Resources Survey for the Onion Flat Sewer Upgrade Project, Washington County, Oregon	Within	Isolate 2532-01
28457	2016	Olander and Bialas	Clean Water Services' Onion Flat Sewer Upgrade Project, Washington County, Oregon: Cultural Resource Monitoring	0.5 mi north	-
29865	2014	Davis and Perrin	Section 106 Programmatic Agreement Memo 4C Finding of No Historic Properties Affected Tualatin Sherwood Road ITS	Within	-
30495	2019	Valentine	Chicken Creek Restoration Project, Tualatin River National Wildlife Refuge. US Fish and Wildlife Service, Washington County, Oregon. Historic Properties Identification and Evaluation Report	0.5 mi north	-
None	2019	Bialas et al.	Cultural Resources Survey for the Willamette Water Supply System, Washington and Clackamas Counties, Oregon	Within	Isolate 2487-16i

Four archaeological resources have been documented within 1 mi of the API (Table 3.1-2). Two of the previously recorded resources are precontact, while the other two are from the historic period. Site 35WN32 is a precontact site located 0.6 mi to the west of the API and consists of a large lithic scatter. Isolate 2353-01 consists of a smaller lithic scatter located 0.5 mi to the north. The two historic-period resources consist of mid-twentieth century remains, including eight sherds of a ceramic (2487-16i) and several automobiles and domestic trash (2487-20).

Table 3.1-2. Cultural Resource Investigations Conducted within 1 mi of the API.

Resource Number	Resource Type	NRHP Status	Description	Reference	Distance and Direction from API
35WN32	Precontact Site	Unevaluated	35 pieces of debitage and 2 flaked lithic tools	Scott 1987a, 1987b	0.6 mi west
2352-01	Precontact isolate	Unevaluated	Four pieces of debitage	Bialas 2015	0.5 mi north
2487-16i	Historic-period isolate	Recommended not eligible	Eight sherds of ceramic (1949–1980s)	Bialas et al. 2019	0.4 mi west
2487-20	Historic-period site	Recommended not eligible	Three automobiles, one truck, two domestic artifacts (1920–1950s)	Dinwiddie and Bialas 2019	0.8 mi east

## 3.2 Archaeological Expectations

HRA’s review of environmental history, background research, historic documents and previous archaeological research in the area indicates a moderate to high potential for archaeological resources in the area. From our research we know the Kalapuya and their precontact ancestors were in the area since at least 13,000 years ago. Euroamerican populations have been in the area since the early nineteenth century, with permanent residences and landscape changes since the mid-nineteenth century.

The regional archaeological site distribution pattern indicates terraces and benches above the flood plain of perennial drainages and wetlands were especially desirable locations for resource processing stations and temporary camps, as well as historic-period farmsteads and the remnant of associated buildings and structures.

If found, precontact artifacts would likely consist of lithic debitage, flaked lithic tools such as projectile points, plant processing tools such as ground stone, and clusters of fire-modified rock. Historic-period artifacts may be found within the study area and would likely be roadside discards, domestic or agricultural rubbish dumps, or isolated pieces of agricultural equipment.

## 4. Methods

---

### 4.1 Archaeological Survey

The archaeological survey followed the guidelines of the Oregon SHPO. The methods included a pedestrian survey of the API, covering the proposed pipeline route and an extended portion around the route within the parcels impacted by the work, and subsurface sampling of high probability areas along the route. Three HRA archaeologists walked survey transects with 20 meter (m) spacing. HRA archaeologists examined all ground exposures for evidence of surface cultural materials and possible subsurface features. Observations about surface visibility and ground disturbances were recorded in a field notebook and overview photographs were taken and recorded in a standardized photo log.

Shovel probes (SPs) were excavated along the proposed sewer line route, spaced 20 m apart. An additional four shovel probes were placed in an area deemed to have a high probability for encountering archaeological resources, these were also spaced 20 m apart. The SPs measured approximately 30 centimeters (cm) in diameter and were excavated to a minimum of 50 cm below surface (bs) or to an underground obstruction (such as bedrock). Excavated soils were screened through 1/4-inch (in) mesh hardware cloth. All soil from archaeological resource delineation probes were screened through 1/8-in mesh hardware cloth. A sample of probes were augered to a maximum depth of 160 cm. Soil texture, color, and structure were observed in each SP and were recorded on standardized forms. After recording probe attributes, the holes were backfilled. Shovel probe locations, as well as features of the survey area, such as artifacts and areas of disturbance, were recorded with a Trimble® GeoXH™ global positioning system (GPS) and marked on aerial images and maps. Photographs were taken of each probe.

### 4.2 Architectural Survey

Prior to field investigations, HRA architectural historian Libby Provost, MA, reviewed Washington County tax assessor data, City of Sherwood online map data, and USGS maps to establish which resources within the API meet the age requirement for evaluation (in this case, 50 years or older). On July 18 and 19, 2019, HRA archaeologist Justin Hopt, MA, in the course of conducting pedestrian archaeological survey, recorded one parcel with historic-period architectural resources. Hopt photographed the exterior of historic-period resources per the *Guidelines for Historic Resource Surveys in Oregon* (Oregon SHPO 2011). Following survey, Provost conducted a desktop review of the historic-period architectural resources in the API using USGS maps, aerial photography, Washington County's Tax Assessor website, and HRA's in-house library. Provost also conducted research via the SHPO's Oregon Historic Sites Database (OHSD).



## 4.3 NRHP Evaluation

HRA evaluates resources using the following guidelines established by the National Park Service (NPS). To be individually eligible for listing in the NRHP, a property must be significant within a historic context. To evaluate significance, the following five things must be determined:

1. The facet of prehistory or history of the local area, state, or nation that the property represents;
2. Whether the facet of history is significant;
3. Whether it is a type of property that has relevance and importance in illustrating the historic context;
4. How the property illustrates that history; and
5. Whether the property possesses the physical features necessary to convey the aspect of history with which it is associated (NPS 1997:44).

The significance (items 1–3 above) of a resource must be established before assessing integrity (items 4 and 5). The significance of a resource within its historic context must relate to one or more of the following:

- A. Under Criterion A, properties can be determined eligible for listing in the NRHP if they are associated with events that have made a significant contribution to the broad patterns of our history.
- B. Under Criterion B, properties can be determined eligible for listing in the NRHP if they are associated with the lives of persons significant in our past (i.e., persons whose activities are demonstrably important within a local, state, or national context).
- C. Under Criterion C, properties can be determined eligible for listing in the NRHP if they embody the distinctive characteristics of a type, period, or method of construction, or represent the works of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction (i.e., are part of a district). Discrete features, a particular building for example, may best be documented under this Criterion, though collections of resources may also have significance under Criterion C for architecture or engineering association.
- D. Under Criterion D, properties may be eligible for listing in the NRHP if they have yielded, or may be likely to yield, information important in history. To be eligible under Criterion D, the property must have, or have had, information to contribute to our understanding of human history and that information must be considered “important.” Most commonly applied to archaeological sites, buildings, structures, and objects may be eligible under Criterion D if they are the principal source of information (NPS 1997:21).

Integrity is the ability of a property to convey its significance. To be eligible for the NRHP, a property must not only be shown to be significant under NRHP criteria (A–D above), but it must also have integrity. The evaluation of integrity is grounded in an understanding of a property’s physical features and how they relate to its significance. Historic properties either retain integrity

(that is, convey their significance) or they do not. To retain integrity, a property will always possess several, and usually most, of the seven aspects of integrity, which are:

1. Location. Location is the place where the historic property was constructed or the place where the historic event occurred.
2. Design. Design is the combination of elements that create the form, plan, space, structure, and style of a property.
3. Setting. Setting is the physical environment of a historic property.
4. Materials. Materials are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property.
5. Workmanship. Workmanship is the physical evidence of crafts of a particular culture or people during any given period in history or prehistory.
6. Feeling. Feeling is the property's expression of the aesthetic or historic sense of a particular period of time.
7. Association. Association is the direct link between an important historic event or person and a historic property (NPS 1997:44–45).

As noted above, HRA conducted a reconnaissance-level survey (RLS) of historic-period architectural resources in the study area. An RLS is intended to be a first look at historic-period resources and records basic information to assess potential eligibility for listing in the NRHP, either individually or as a contributing resource to a historic district. Generally, RLSs evaluate resources under Criterion C only and also provide a review of a resource's integrity from its period of construction. In some cases, an RLS will also reveal a resource's potential eligibility under other Criteria (A, B, or D).

# 5. Results

---

## 5.1 Archaeological Survey Results

HRA Research Archaeologist Justin Hopt, MA, directed the archaeological fieldwork session that took place on July 18 and 19, 2019. Archaeological technicians Eric Ball and Tony Saunders assisted in the survey. The pedestrian survey started in the western most portion of parcel 2S129D000150, located on the south side of Tualatin-Sherwood Road (Figure 5.1-1). This first transect covered a flat terrace on the west side of Rock Creek (Figure 5.1-2). The area appears to be an artificial terrace, created with imported fill. Vegetation consisted of grasses and assorted weeds. The area contained poor ground visibility, at approximately 20 percent.

Survey transects 2 through 5 were walked in an east to west direction on the east side of Rock Creek within parcel 2S129D000150. This portion of the survey area consisted of a natural terrace above the creek. Vegetation included a suite of riparian plants, including numerous grasses, cattails, blackberries, salmonberry, willows, and Douglas fir trees. There was no ground visibility due to tall grasses and shrubs. One area of high probability for archaeological sites was located. This was not investigated further due to the large distance between the area and the proposed sewer line placement (the sewer line is on to be placed on the other side of the creek).

Survey transects 6 and 7 were both located on the west side of Rock Creek within parcel 2S129D000150. Transect 6 started at the south side of Tualatin-Sherwood Road and extended south. Transect 7 was the last transect walked within the parcel and was walked west to east. These transects had similar vegetation and ground visibility as transects 2 through 5.

Survey transects 8, 9, and 10 were located on the north side of Tualatin-Sherwood Road within parcels 2S129A000400 and 2S129A000301 (Figure 5.1-3). The majority of parcel 2S129A000400 is heavily disturbed and contains a business complex, as well as a small access road that follows the current sewer line (Figure 5.1-4). Parcel 2S129A000301 contains a wetland with tall grasses, blackberries, cattails, and tules, as well as riparian tree species and Douglas firs. Survey transect 9 located another high-probability area consisting of a slightly elevated terrace located immediately to the west of Rock Creek. No archaeological artifacts were located in any of the survey transects.

HRA excavated 22 shovel probes (SP) within the API (Appendix B). SPs 1–4 were located on the proposed sewer line, south of Tualatin-Sherwood Road on parcel 2S129D000150. SPs 5–14 were placed on the proposed sewer line on the two parcels (2S129A000301 and 2S129A000400) north of the road. Four additional SPs (19–22) were placed approximately 25 m to the east of the proposed sewer line. These were placed on a slightly elevated terrace that was determined to have a high probability for containing archaeological materials. SPs 1, 12, and 13 were augured at the discretion of the field director. One artifact was found in SP 8 (see Section 5.1.1) and the remaining 17 SPs were negative for cultural material.

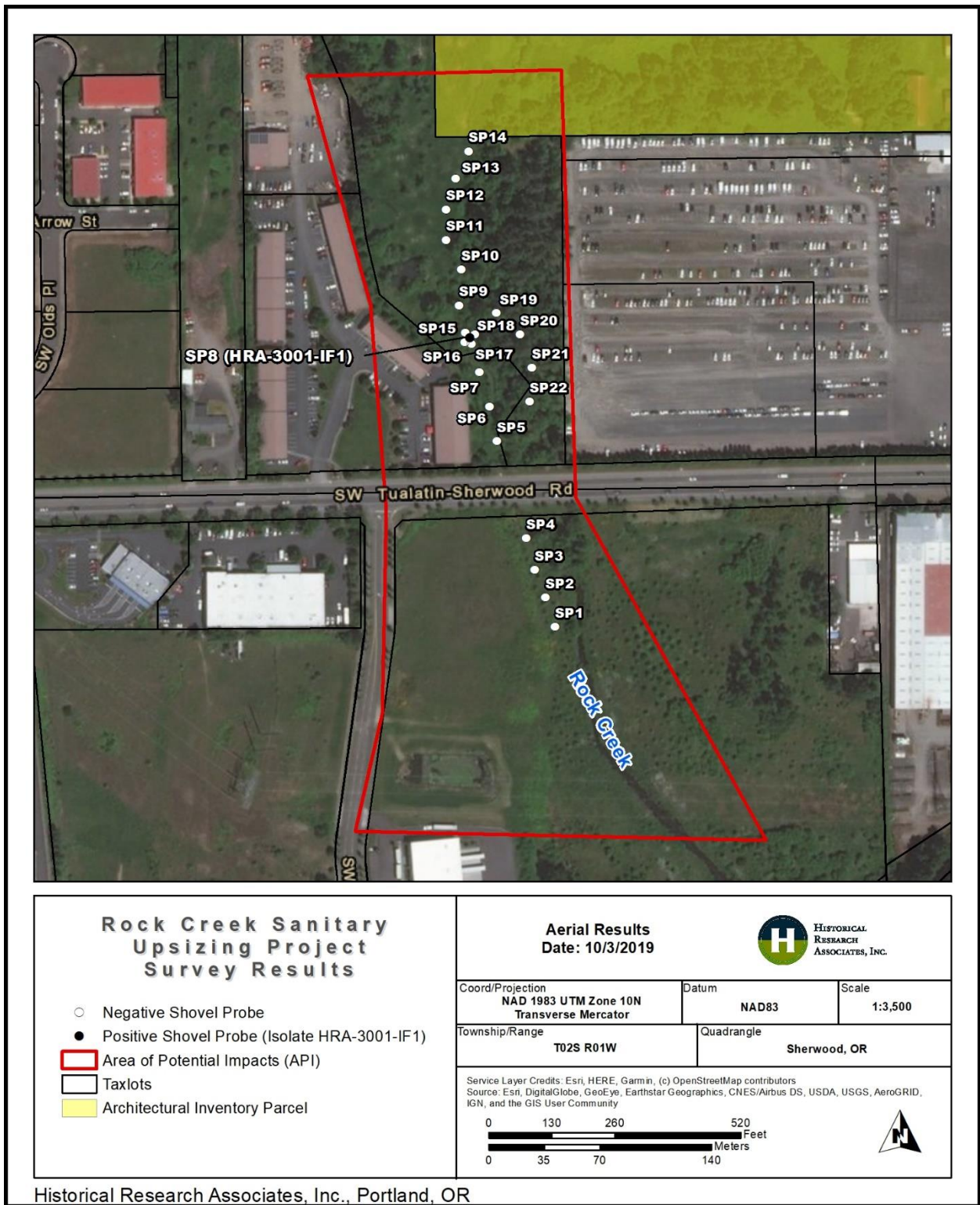


Figure 5.1-1 Results of the cultural resources survey.



Figure 5.1-2. Transect 1 overview, view north



Figure 5.1-3. Transect 8 overview, view north



Figure 5.1-4. Transect 8 overview, access road, view north

### 5.1.1 Isolate 3001-IF1

SP 8 contained a single complete obsidian flake (Isolate 3001-IF1) within the upper 10 cm (Figure 5.1-5; Appendix C). SP 8 is located within City of Sherwood property (parcel: 2S129A000301) and under archaeological permit 2702; thus, the artifact was collected (Figure 5.1-6). The flake exhibits three flake scars, a complex platform, a maximum (max) length of 1 cm, a max width of 1 cm, and a max thickness of 0.1 cm. Four radial probes were placed around SP 8 (SPs 15–18); all were negative for archaeological remains. Per archaeology survey permit number 2702, HRA collected the flake and curated it with the OMNCH under accession number 2672.

HRA recommends that the isolate is not eligible for listing in the NRHP. The artifact is not associated with significant events in the past (Criterion A); it is not associated with the lives of significant persons in our past (Criterion B), nor does it represent the work of a master of a distinctive period (Criterion C). The isolate does not have the potential to yield important information to the history of the area (Criterion D), as single pieces of debitage are common, similar isolated finds have been identified in the vicinity, and the isolated nature of the artifact was confirmed with SP excavations. HRA recommends no additional cultural resource studies at this location.



Figure 5.1-5. SP 8 overview, view southeast

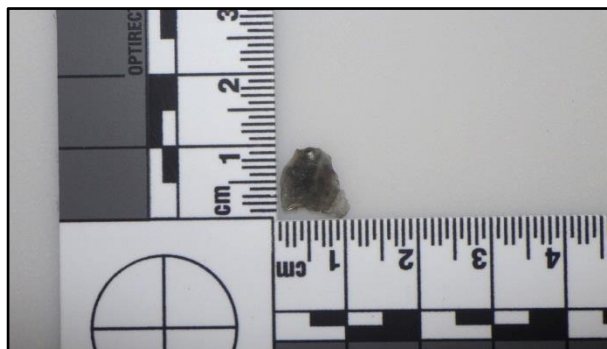


Figure 5.1-6. Isolate 3001-IF1, ventral side

## 5.2 Architectural Inventory

HRA identified two architectural resources (one power transmission line and one government complex) on one parcel in the study area that are of an age to be evaluated for listing in the NRHP.

The right-of-way (ROW) of the Bonneville Power Administration's (BPA) Pearl–Keeler No. 1 (1961) transmission line intersects with the API southeast of the intersection of SW Tualatin–Sherwood Road and SW Century Drive. Review of OHSD records and HRA's records indicate the Pearl–Keeler No. 1 Transmission Line was previously surveyed and determined not eligible by BPA (Tama Tochihara, personal communication 2018, 2019). The transmission line was surveyed within the past 10 years, so it was not included in this work. No architectural resources within or bordering the API are recorded in the OHSD.

## 5.2.1 20555 SW Gerda Lane

The agricultural complex at 20555 SW Gerda Lane is located on taxlot 2S129A000100 in Sherwood, Washington County, Oregon (Appendix D). Approximately eight buildings are positioned in the southeast corner of the L-shaped, 45-acre parcel (Figures 5.2.1-1–5.2.1-5). Four buildings were visible at the time of survey—a barn (Barn 1, ca. 1950 with ca. 1970 addition), a three-sided barn (Barn 2, ca. 1950), and two outbuildings (Outbuildings 1 and 2, both ca. 1970). View of the other four buildings on the parcel was restricted due to fencing, mature foliage, and distance from the ROW. These buildings include a ca. 1939 residence converted as an office, a barn (Barn 3, ca. 1952), and two outbuildings (Outbuildings 3 and 4, both ca. 1990).

All of the building dates are estimates based on review of the Washington County Tax Assessor data and various historic-period maps (USGS, Google Earth Pro). Washington County Tax Assessor reports the house construction date as 1940, however the house appears on maps by 1939 (USGS 1939). The three barns dated ca. 1952 appear on aerial photographs by 1952 (USGS 1952). Outbuildings 1 and 2, dated ca. 1970, first appear on maps in 1970 (USGS 1970). Outbuildings 3 and 4, dated ca. 1990, do not appear in a 1985 map but appear in aerial photographs by 1994 (Google Earth Pro 2019; USGS 1985).

Positioned near the center of the grouping of eight buildings is Barn 1, initially constructed ca. 1952 with a ca. 1970 addition that roughly doubled the size of the building (see Figure 5.2.1-2). The building is L-shaped, with a lean-to addition on the west side of the original, rectangular massing. The addition extends to the south, past the facade of the original massing, creating the L shape. The building has a varied roofline and is clad in horizontal board on the ca. 1952 massing and corrugated metal on the ca. 1970 addition. Two sliding barn doors are located on the center of the original massing, and an open wall on the southeast corner of the addition provides access to the addition. Fenestration includes a single wood-frame window with no glazing centered above the sliding doors, and additional windows on the west face.

East of Barn 1 is Outbuilding 1, constructed ca. 1970 and rectangular in plan (see Figure 5.2.1-3). The building is clad in corrugated metal and has a front-gabled roof with minimal eaves topped in metal. Sliding barn doors are located on the west side of the south face. Fenestration appears to include a single window opening near the roofline on the west face.

Positioned southwest of Barn 1 is Outbuilding 2, also constructed ca. 1970 and rectangular in plan (see Figure 5.2.1-4). The building is clad in corrugated metal and has a front-gabled roof with minimal eaves topped in metal. The building is marked by sliding barn doors located on the center of the north face and center of the east face.

Adjacent to Outbuilding 2 to the east is Barn 2, a three-sided barn constructed ca. 1952 (see Figure 5.2.1-5). The building has a rectangular footprint; the original rectangular massing has a lean-to addition on the south face. The building has a side-gabled roof topped in metal. The north face is open, revealing three evenly spaced wood beams extending from the ground to the roofline, where they are supported by wood brackets. At the time of survey, the barn appeared to house boat trailers, canoes, and kayaks.

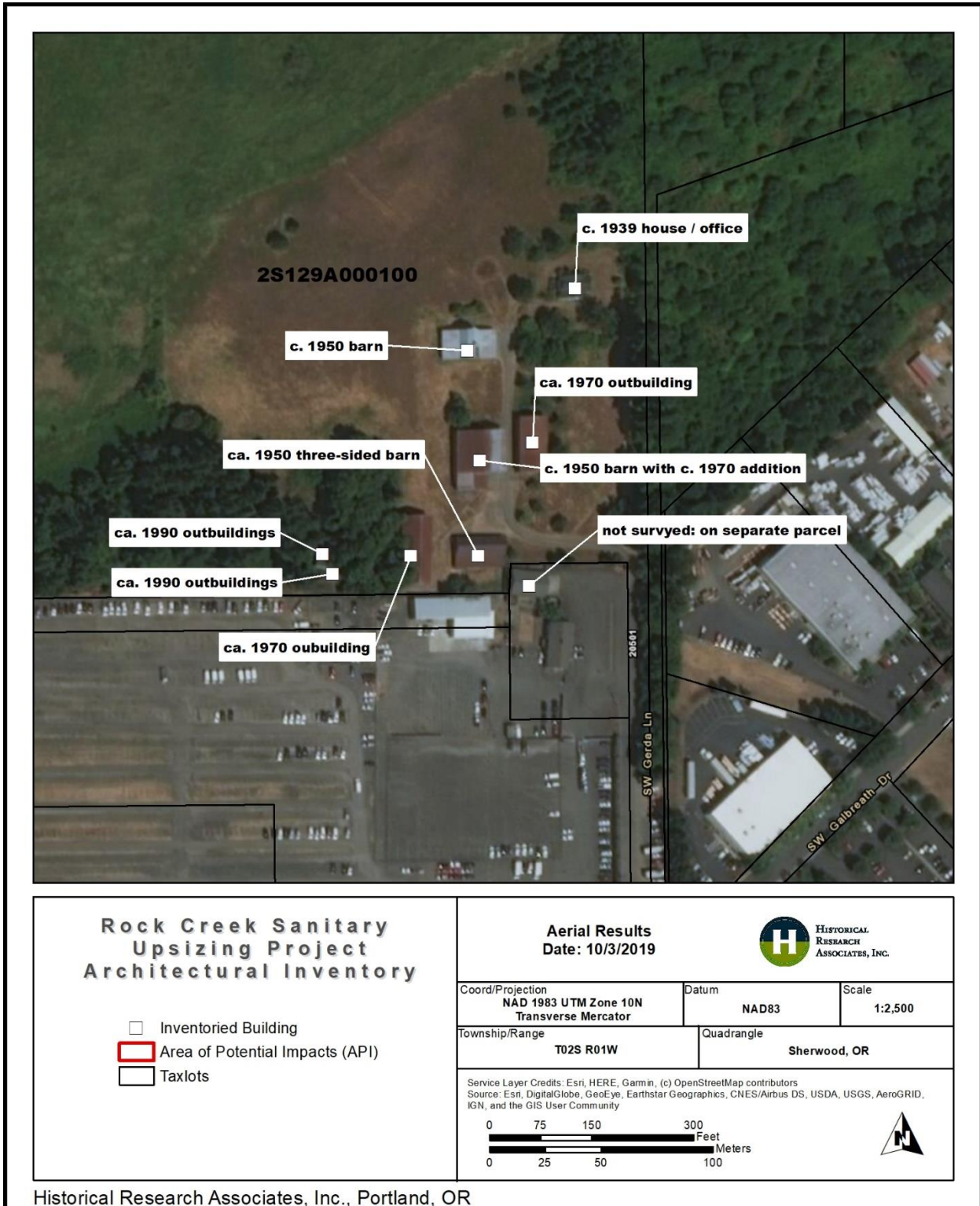


Figure 5.2.1-1. Modern aerial image depicting the structures at 20555 SW Gerda Lane.





Figure 5.2.1-2. Barn at 20555 SW Gerda Lane (ca. 1952; 1970); view northwest.



Figure 5.2.1-3. Outbuilding at 20555 SW Gerda Lane (ca. 1970); view northeast.



Figure 5.2.1-4. Outbuilding at 20555 SW Gerda Lane (ca. 1970); view southwest.



Figure 5.2.1-5. Three-sided barn at 20555 SW Gerda Lane (ca. 1952); view south.

## Integrity

The complex has four periods of construction; the house was built ca. 1939, three outbuildings were constructed ca. 1952, two more ca. 1970, and an additional two ca. 1990. The property, which houses facilities for the Oregon Department of Fish and Wildlife, appears to have been initially constructed as an agricultural complex due to the location of the house, the parcel size, and surrounding fields at the time of construction. The complex transferred to public ownership at an unknown date. HRA cannot accurately assess the integrity of the ca. 1939 house and Barn 4 (ca. 1952) because they were not visible at the time of survey. The two outbuildings constructed ca. 1990 are not of age to be evaluated for listing in the NRHP.

From its period of construction, Barn 1 no longer retains integrity of design, materials, workmanship, or feeling, due to numerous alterations to form and materials, including changes to cladding, fenestration, and doors, all of which have been altered. Outbuildings 1 and 2, which date to ca. 1970, appear to retain integrity of design, materials, workmanship, and feeling, as they appear

to have few, if any, alterations. Barn 2 (ca. 1952) features reduced integrity of design, materials, and workmanship, due to alteration of siding and the lean-to addition. The assessed buildings retain integrity of location, as they remain on their original parcel. The complex does not retain integrity of association, as the property no longer serves as an agricultural complex and has been converted for use as a government office.

## **Evaluation**

HRA's view of the complex at 20555 SW Gerda Lane was restricted due to mature foliage and building distance from the ROW. The complex does not appear to embody the distinctive characteristics of a type, period, or method of construction. The buildings do not appear to be the work of a master and do not possess high artistic value. From its initial period of construction (ca. 1939), the complex has reduced integrity due to remodeling of at least two of the original barns and construction of new outbuildings ca. 1970 and ca. 1990. However, due to restricted view from the ROW, the complex remains unevaluated. Though essentially unrecorded and unevaluated, for the purposes of this project, the complex at 20555 SW Gerda Lane is assumed eligible for listing in the NRHP.

## 6. Conclusions and Recommendations

---

HRA completed a cultural resources investigation for the Rock Creek Sanitary Sewer Upsizing Project in July 2019. HRA’s investigation included review of the environmental and cultural context of the project vicinity and background research. Additionally, HRA conducted a pedestrian survey to identify near-surface archaeological resources and subsurface shovel probing to assess the area for buried archaeological resources within the Project API. One precontact isolate, 3001-IF1, was identified within the route of the proposed sewer pipeline. No additional artifacts were located around 3001-IF1. HRA recommends Isolate 3001-IF1 as not eligible for listing in the NRHP; no additional archaeological work is needed.

Should archaeological resources be encountered during construction of the Project, all ground-disturbing activity near the find should be halted and the SHPO promptly notified to ensure compliance with relevant state laws and regulations. Should evidence of human burials or suspected human remains be encountered during construction, all ground-disturbing activity in the vicinity should be halted immediately, and the SHPO, the Washington County Coroner, and Sheriff’s Office, and the appropriate Tribes should be notified.

HRA identified two architectural resources (one power transmission line and one former agricultural complex) within the API that are of an age to be evaluated for eligibility to the NRHP. BPA determined the Pearl–Keeler No. 1 Transmission Line (1961) not eligible (Tama Tochiara, personal communication 2018, 2019). The former agricultural complex could not be adequately assessed for eligibility from the ROW; though essentially unrecorded and unevaluated, for the purpose of assessing potential effects, HRA assumes 20555 SW Gerda Lane is eligible for listing in the NRHP.

The nature of the undertaking—replacement of an existing underground pipe with a new pipe in a similar and adjacent alignment—means that any visible project actions will be temporary and will not impact the integrity of the transmission line or the complex. Additionally, the sewer alignment will not physically touch the 20555 SW Gerda Lane parcel. HRA recommends the Project will have no adverse effect on historic properties.

## 7. References

---

- Aikens, C. Melvin, Thomas J. Connolly, and Dennis L. Jenkins  
2011 *Oregon Archaeology*. Oregon State University Press, Corvallis.
- Allely, Steven  
1975 A Clovis Point from the Mohawk River Valley, Western Oregon. In *Archaeological Studies in the Willamette Valley, Oregon*, edited by C. Melvin Aikens, pp. 549–552. University of Oregon Anthropological Papers No. 8, Eugene.
- Bailey, Vernon  
1936 *The Mammals and Life Zones of Oregon*. North American Fauna No. 55. U.S. Department of Agriculture, Bureau of Biological Survey. U.S. Government Printing Office, Washington, D.C.
- Bassett, Karen, Jim Renner, and Joyce White  
1998 *Oregon Historic Trails Report*. Oregon Trails Coordinating Council, Salem.
- Baxter, Paul W.  
1986 Archaic Upland Adaptations in the Central Oregon Cascades. Unpublished PhD dissertation, Department of Anthropology, University of Oregon, Eugene.  
1989 *A Preliminary Report of Investigations at Cascadia Cave Linn County, Oregon*. Heritage Research Associates, Inc., Eugene, Oregon. Submitted to Oregon State Historic Preservation Office, Salem, in fulfillment of Historic Preservation Fund Agreement HSPP #8821.
- Beckham, Stephen Dow, Rick Minor, and Kathryn Anne Toepel  
1981 *Prehistory and History of BLM Lands in West-Central Oregon: A Cultural Resources Overview*. University of Oregon Anthropological Papers No. 25. C. Melvin Aikens, Editor. University of Oregon, Eugene.
- Benito, Gerardo, and Jim E. O'Connor  
2003 Number and Size of Last-Glacial Missoula Floods in the Columbia River Valley Between the Pasco Basin, Washington, and Portland, Oregon. *Geological Society of America Bulletin* 115(5):624–638.
- Bialas, Catherin M.  
2015 *Cultural Resources Survey for the Onion Flat Sewer Upgrade Project, Washington County, Oregon*. Historical Research Associates, Inc. Portland, Oregon.
- Bialas, Catherin M., Joshua D. Dinwiddie, Libby Provost, Bradley Bowden, Natalie K. Perrin  
2019 *Cultural Resources Survey for the Willamette Water Supply System, Washington and Clackamas Counties, Oregon*. Historical Research Associates, Inc., Portland, Oregon. Prepared for David Evans and Associates, Inc., Portland, Oregon.
- Bourke, Paul, and Donald A. DeBats  
1995 *Washington County: Politics and Community in Antebellum America*. Johns Hopkins University Press, Baltimore, Maryland.

Bowden, Bradley

- 1997 A New Look at Late Archaic Settlement Patterns in the Upper Willamette Valley. In *Contributions to the Archaeology of Oregon 1995–1997*, Occasional Papers No. 6, edited by Albert C. Oetting, pp. 31–54. Association of Oregon Archaeologists, Eugene.

Boyd, Robert Thomas

- 1990 Demographic History, 1774–1874. In *Northwest Coast*, edited by W. P. Suttles, pp. 135–148. Handbook of North American Indians, Vol. 7, William C. Sturtevant, general editor, Smithsonian Institution Press, Washington, D.C.

Brauner, David R.

- 1989 *The French-Canadian Archaeological Project, Willamette Valley, Oregon: Site Inventory and Settlement Pattern Analysis*. Oregon State Museum of Anthropology, Eugene. Prepared for Oregon Department of Transportation, Salem.

Ceatham, Richard D.

- 1984 *The Fern Ridge Lake Archaeological Project, Lane County, Oregon, 1982-1984*. Department of Anthropology, University of Oregon, Eugene. Submitted to the Portland District, U.S. Army Corps of Engineers, Portland, Oregon.

- 1988 *Late Archaic Settlement Pattern in the Long Tom Sub-basin, Upper Willamette Valley, Oregon*. University of Oregon Papers No. 39, Eugene.

Clyman, James

- 1960 *James Clyman, Frontiersman (Journals kept by James Clyman between 1840 and 1871)*. Charles L. Camp, ed. Champoeg Press, Portland, Oregon.

Connolly, Thomas J.

- 1994 Paleo Point Occurrences in the Willamette Valley, Oregon. In *Contributions to the Archaeology of Oregon, 1989–1994* edited by Paul W. Baxter, pp. 81–88. Association of Oregon Archaeologists Occasional Papers No. 5.

Corning, Howard McKinley

- 1956 *Dictionary of Oregon History*. Binford and Mort, Portland, Oregon.

Davis, Sara J., and Natalie K. Perrin

- 2014 *Tualatin Sherwood Road ITS*. Historical Research Associates, Inc., Portland, Oregon. Prepared for Oregon Department of Transportation, Salem.

Dinwiddie, Joshua D., and Catherin M. Bialas

- 2019 *Willamette Water Supply System: Work Package WTP 1.0 Cultural Resources Assessment, Washington County, Oregon*. Historical Research Associates, Inc., Portland, Oregon. Prepared for the Willamette Water Supply System Commission, Beaverton, Oregon.

Franklin, Jerry F., and C. T. Dyrness

- 1988 *Natural Vegetation of Oregon and Washington*. Oregon State University Press, Corvallis.

General Land Office

- 1852 Cadastral Survey Plat Map, Township 2 South, Range 1 West, Willamette Meridian. Electronic document, <http://www.glorerecords.blm.gov>, accessed September 20, 2019.

- 1866 Land Patent for John and Elizabeth Hall. Electronic document, <http://www.glorerecords.blm.gov>, accessed September 20, 2019.

- 1867 Land patent for William and Caroline Garlick. Electronic document, <http://www.glorerecords.blm.gov>, accessed September 20, 2019.
- 1861 Cadastral Survey Plat Map, Township 2 South, Range 1 West, Willamette Meridian. Electronic document, <http://www.glorerecords.blm.gov>, accessed September 20, 2019.
- Gerity, Thomas  
1960 Clovis Points from Oregon. *Screenings* 9(4):2.
- Google Earth Pro  
2019 Historic imagery of 45.370058, -122.826348, May 22, 1994.
- Green, George L.  
1982 *Soil Survey of Washington County, Oregon*. U.S. Department of Agriculture, Soil Conservation Service, Washington, D.C.
- Hambelton, Karla L., and Lucie Tisdale  
2014 *Archaeological Survey for the SW 124<sup>th</sup> Avenue Extension: SW Tualatin-Sherwood Road to SW Grahams Ferry Road Project, Washington County, Oregon*. Archaeological Investigations Northwest, Inc., Report No. 3134. Prepared for David Evans and Associated, Inc. On file with the Oregon State Historical Preservation Office, Salem, OR.
- Hawksworth, J. T.  
2001 *Middle Tualatin-Rock Creek Watershed Analysis*. U.S. Department of the Interior, Bureau of Land Management, Salem District Office, Tillamook Resource Area, Tillamook, Oregon. Electronic document, <http://trwc.org/wp-content/uploads/2013/03/Middle-Tualatin-Rock-Creek-Watershed-Analysis-2001.pdf>, accessed November 10, 2014.
- Heinz, Fred  
1971 Another Clovis Point. *Screenings* 20(7):3.
- Jenkins, Dennis L., Loren G. Davis, Thomas W. Stafford Jr, Paula F. Campos, Thomas J. Connolly, Linda Scott Cummings, Michael Hofreiter, Bryan Hockett, Katelyn McDonough, Ian Luthe, Patrick W. O'Grady, Karl J. Reinhard, Mark E. Swisher, Frances White, Bonnie Yates, Robert M. Yohe II, Chad Yost, and Eske Willerslev  
2014 Geochronology, Archaeological Context, and DNA at the Paisley Caves. In *Paleoamerican Odyssey*, edited by Kelly E. Graf, Caroline V. Ketron, and Michael R. Waters, pp. 485–510, Texas A&M University Press, College Station.
- Kramer, Stephenie  
2000 Camas Bulbs, the Kalapuya, and Gender: Exploring Evidence of Plant Food Intensification in the Willamette Valley of Oregon. Unpublished Master's thesis, Department of Anthropology, University of Oregon, Eugene.
- Ma, Lina, Serin Duplantis, and Kendra J. Williams  
2012 *Lidar-Based Surficial Geologic Map and Database of the Greater Portland Area, Clackamas, Columbia, Marion, Multnomah, Washington, and Yamhill Counties, Oregon, and Clark County, Washington*. Oregon Department of Geology and Mineral Industries, Portland.
- Minor, Rick  
1985 Paleo-Indians in Western Oregon: A Description of Two Fluted Projectile Points. *Northwest Anthropological Research Notes* 19(1):33–40.

Minor, Rick and Stephen Dow Beckham

1987 *Cultural Resources Survey for the US Sprint Fiber Optic Cable Project Eugene, Oregon to Seattle Washington*. Heritage Research Associates, Eugene, Oregon. Prepared for US Sprint. Report on file with the Oregon State Preservation Office, Salem.

Minor, Rick, Stephen D. Beckham, and Kathryn A. Toepel

1982 *Prehistory and History of the Upper Willamette Valley, Oregon: Research Questions and Approaches*. Heritage Research Associates Report No. 9, Eugene, Oregon. Submitted to U.S. Army Corps of Engineers, Portland District.

National Park Service (NPS)

1997 *How to Apply the National Register Criteria for Evaluation*. Government Publication Office, Washington, D.C. Electronic document, <https://www.nps.gov/NR/PUBLICATIONS/bulletins/pdfs/nrb15.pdf>, accessed June 20, 2019.

Newman, Thomas M.

1966 *Cascadia Cave*. Occasional Papers of the Idaho State University Museum 18, Pocatello.

Olander, Jennifer, and Cathy Bialas

2016 *Clean Water Services' Onion Flat Sewer Upgrade Project, Washington County, Oregon: Cultural Resource Monitoring*. Historical Research Associates, Inc., Portland, Oregon.

O'Neill, Brian L., Thomas J. Connolly, and Dorothy E. Freidel

2004 *A Holocene Geoarchaeological Record for the Upper Willamette Valley, Oregon: The Long Tom and Chalker Sites*. University of Oregon Anthropological Papers 61. Museum of Natural History and the Department of Anthropology, University of Oregon, Eugene.

Oregon State Historic Preservation Office (SHPO)

2011 *Guidelines for Historic Resource Surveys in Oregon*. Electronic document, [https://www.oregon.gov/oprd/HCD/SHPO/docs/guidelines\\_for\\_historic\\_resource\\_surveys\\_2011.pdf](https://www.oregon.gov/oprd/HCD/SHPO/docs/guidelines_for_historic_resource_surveys_2011.pdf), accessed January 8, 2019.

Orr, Elizabeth L., and William N. Orr

2000 *Geology of Oregon*. 5<sup>th</sup> ed. Kendall/Hunt, Dubuque, Iowa.

Ozbun, Terry L., and Daniel Stueber

2001 *Obsidian Clovis Points in Western Oregon*. *Current Archaeological Happenings in Oregon* 26(2):21–26.

Pettit, Daniel

2014 *Section 106 Finding of No Historic Properties Affected OR99W at Tualatin National Wildlife Refuge T2S, R1W, Section 28, Beaverton Quad Washington County, Oregon ODOT Key No. 18444*. ODOT. On file with the Oregon State Historical Preservation Office, Salem.

Punke, Michele L., Todd Ogle, David V. Ellis, and Elizabeth O'Brien

2007 *Cultural Resource Survey and Selected Subsurface Testing for the Proposed Tualatin River Basin Water Supply Project, Clackamas and Washington Counties, Oregon*. Archaeological Investigations Northwest, Inc., Portland, Oregon. Prepared for Clean Water Services. On file with the Oregon State Historical Preservation Office, Salem.

Scott, Sara

1987a *A Cultural Resource Survey of the Tualatin-Sherwood/Edy Road Project*. CH2M Hill. On file with the Oregon State Historic Preservation Office, Salem.

1987b *Archaeological Investigations at Two Sites within the Tualatin-Sherwood/Edy Road Project Corridor Washington County, Oregon*. CH2M Hill. On file with the Oregon State Historic Preservation Office, Salem.

Schwantes, Carlos A.

1996 *The Pacific Northwest: An Interpretive History*. University of Nebraska Press, Lincoln.

Smits, Nicholas, Elizabeth J. O'Brien, Jason Allen, and David V. Ellis

2006 *A Cultural Resources Reconnaissance Survey of the Proposed Tualatin Basin Water Supply Project (Willamette Pipeline), Clackamas and Washington Counties, Oregon*. Prepared for David Evans and Associates and Clean Water Services. Archaeological Investigation Northwest, Inc. Report No. 1656. On file with the Oregon State Historical Preservation Office, Salem.

Tasa, Guy L.

1992 *Archaeological testing in the vicinity of Six Corners along the Sherwood section of the Pacific Highway (99W), Washington County*. Oregon Museum of Natural and Cultural History, Eugene. On file with the Oregon State Historic Preservation Office, Salem.

Thoms, Alston

1989 *The Northern Roots of Hunter-Gatherer Intensification: Camas and the Pacific Northwest*. PhD dissertation, Department of Anthropology, Washington State University, Pullman. University Microfilms, Ann Arbor, Michigan.

Toepel, Kathryn Anne

1985 *The Flanagan Site: 6,000 Years of Occupation in the Upper Willamette Valley, Oregon*. Unpublished PhD dissertation, Department of Anthropology, University of Oregon, Eugene.

United States Geological Survey (USGS)

1916 Oregon-Washington, Tualatin Quadrangle, 1:62,500. Electronic document, <http://historicalmaps.arcgis.com/usgs/>, accessed August 30, 2019.

1939 Tualatin Quadrangle, 1:62,500. Electronic document, <http://historicalmaps.arcgis.com/usgs/>, accessed August 2019.

1940 Oregon-Washington, Tualatin Quadrangle, 1:62,500. Electronic document, <http://historicalmaps.arcgis.com/usgs/>, accessed August 30, 2019.

1952 Aerial Photograph # AR1ZJ0000040023. Electronic document, <https://earthexplorer.usgs.gov/>, accessed August 2019.

1954 Oregon-Washington, Tualatin Quadrangle, 1:24,000. Electronic document, <http://historicalmaps.arcgis.com/usgs/>, accessed August 30, 2019.

1961 Sherwood Quadrangle, Oregon. 1:24,000. Electronic document, <http://historicalmaps.arcgis.com/usgs/>, accessed August 30, 2019.

1970 Sherwood Quadrangle, 1:24,000. Electronic document, <http://historicalmaps.arcgis.com/usgs/>, accessed August 2019.

1985 Sherwood Quadrangle, 1:24,000. Electronic document, <http://historicalmaps.arcgis.com/usgs/>, accessed August 2019.



Valentine, Nicholas

2001 *Steinborn Wetland Enhancement/Restoration – Tualatin River NWR*. U.S. Fish and Wildlife Service Archaeological and Historical Resources Identification Report. On file with the Oregon State Historic Preservation Office, Salem.

2019 *Chicken Creek Restoration Project, Tualatin River National Wildlife Refuge*. U.S. Fish and Wildlife Service Historic Properties Identification and Evaluation Report. U.S. Fish and Wildlife Service, Sherwood, Oregon.

Waters, Michael R., and Thomas W. Stafford, Jr.

2007 Redefining the Age of Clovis: Implications for the Peopling of the Americas. *Science* 315:1122–1126.

White, John R.

1975 A Proposed Typology of Willamette Valley Sites. In *Archaeological Studies in the Willamette Valley, Oregon*, edited by C. Melvin Aikens, pp. 17–140. University of Oregon Anthropological Papers No. 8, Eugene.

Wilkes Brother's Abstract Company

1909 *Washington County*. Historic Map Works Rare Historic Maps Collection Electronic document, <http://www.historicmapworks.com>, accessed August 3, 2015.

Wisner, George

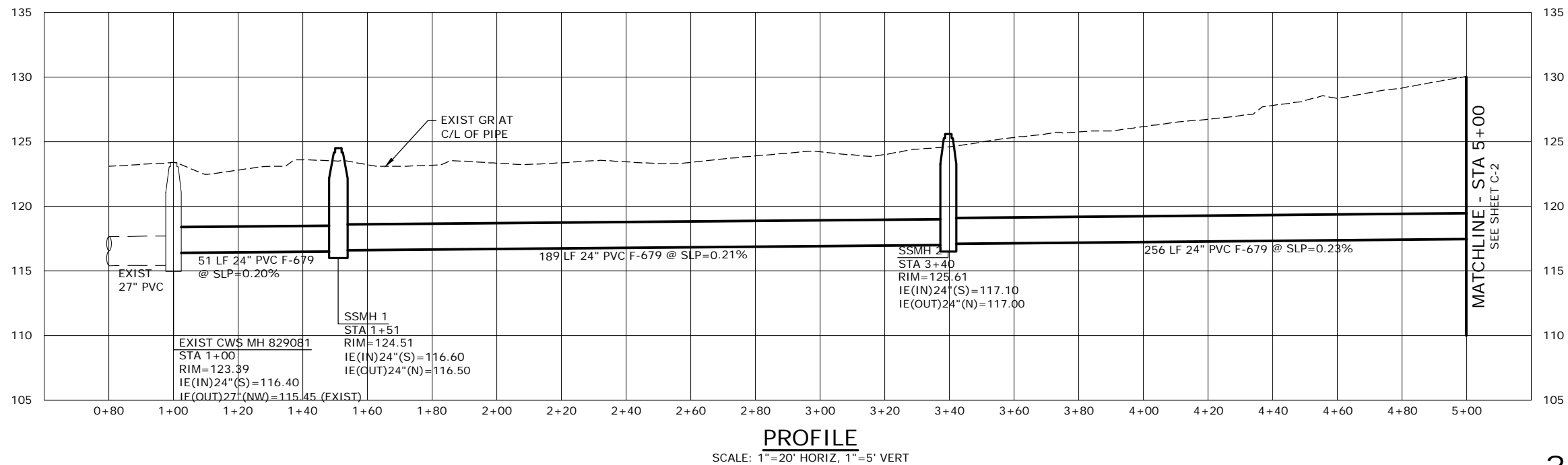
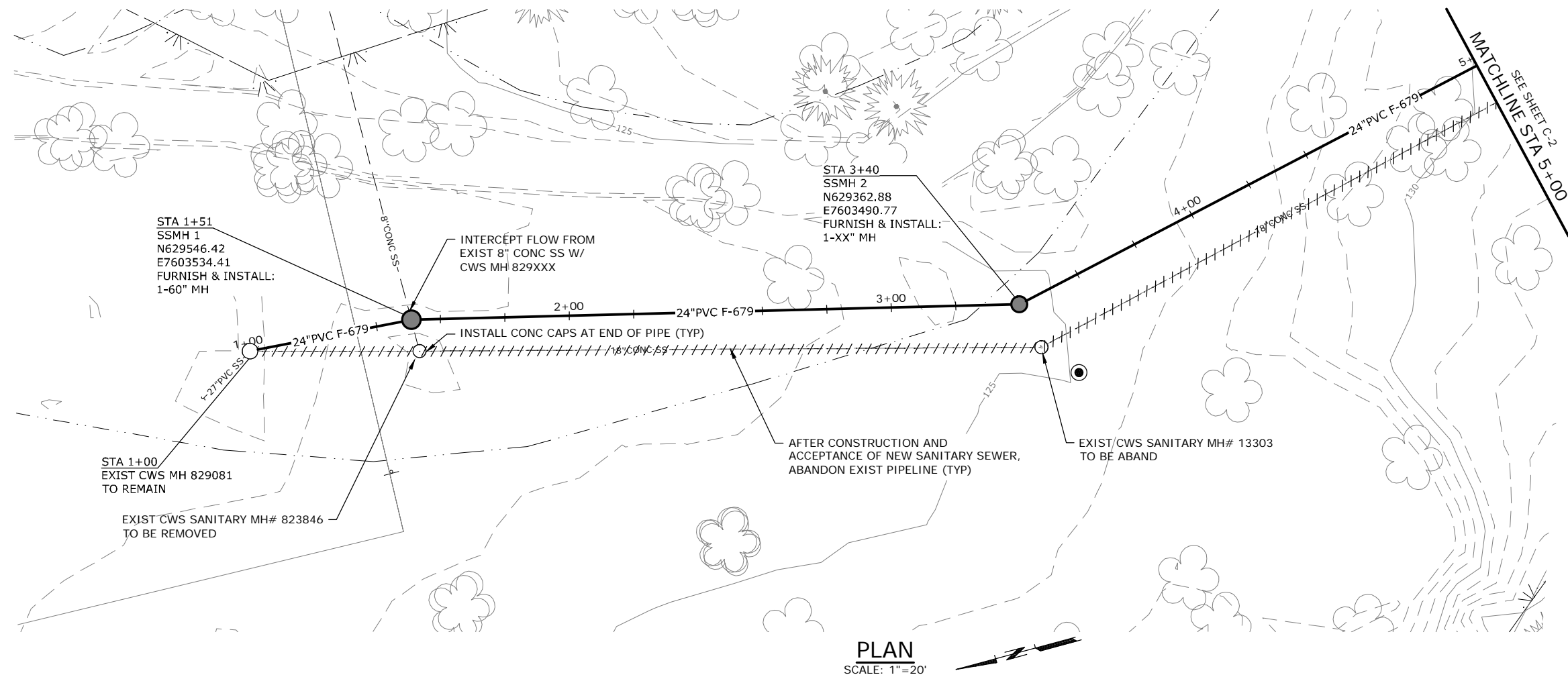
1998 Cooper's Ferry Spear Cache, One of NW's Oldest Sites. *Mammoth Trumpet* 13(4):1–6.

Zenk, Henry B.

1990 Kalapuyans. In *Northwest Coast*, edited by Wayne Suttles, pp. 547–553. Handbook of North American Indians, Vol. 7, William C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

# Appendix A: Project Design Drawings (30%)

G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-C.dwg C-1 7/16/2019 11:57 AM DAK 23.0s (LMS Tech)



30% SUBMITTAL

NO.	DATE	BY	REVISION

**NOTICE**  
 0 1/2 1  
 IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED: JJU  
 DRAWN: CAD  
 CHECKED: BVO

**PRELIMINARY ONLY**  
 DO NOT USE FOR CONSTRUCTION  
 JULY 2019  
 Murraysmith  
 www.murraysmith.us

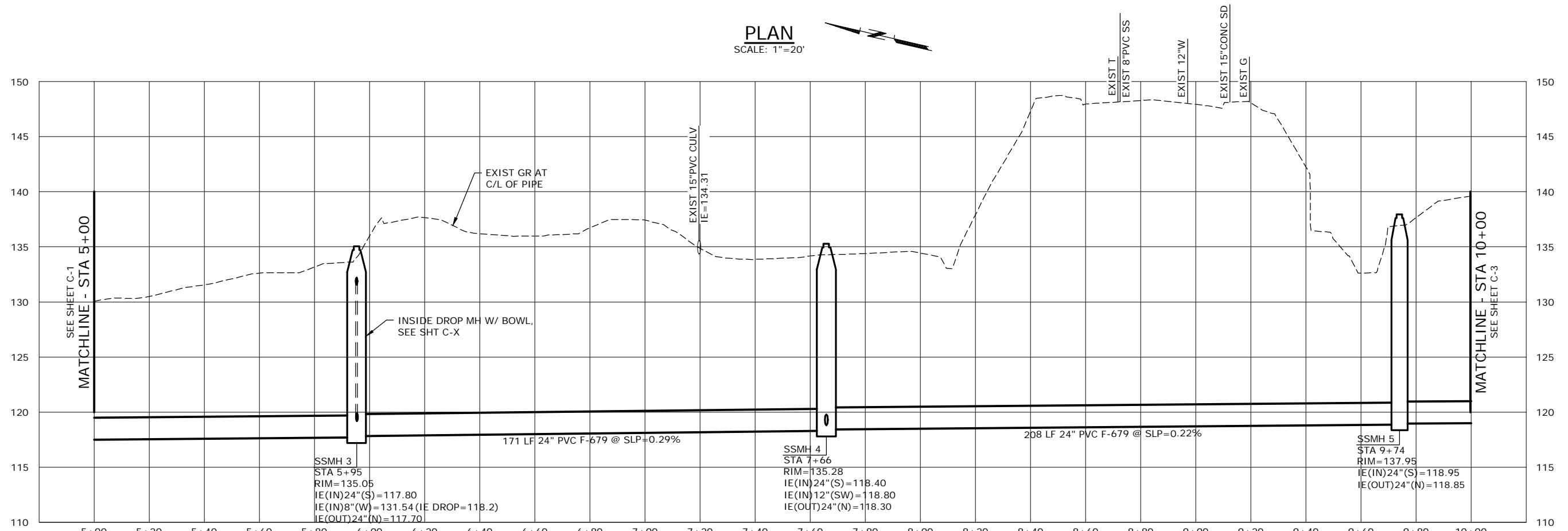
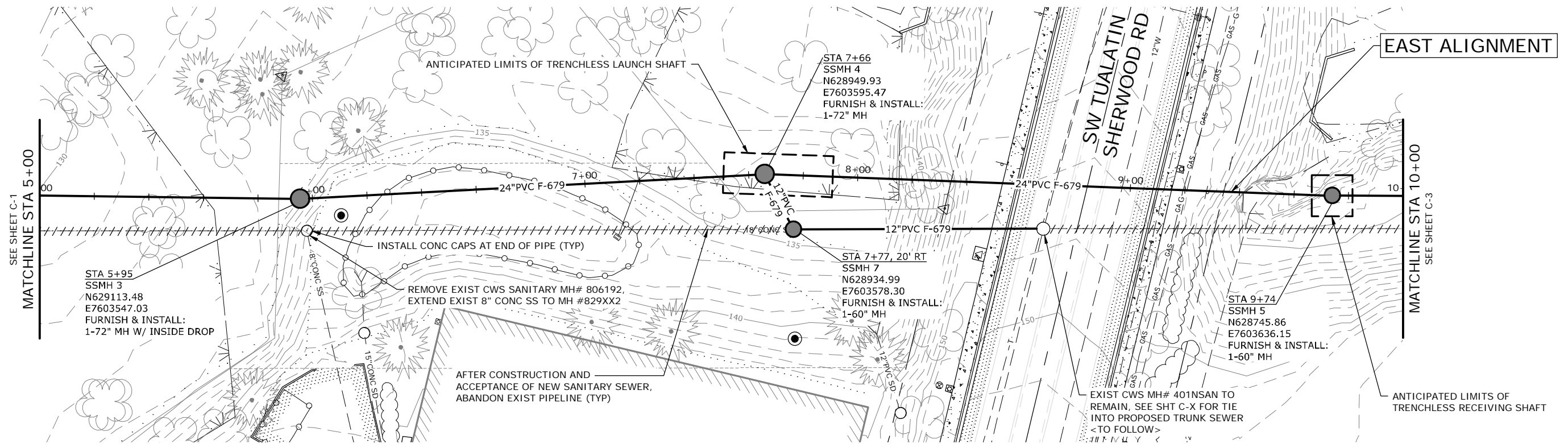


CITY OF SHERWOOD  
 2019 WATERLINE REPLACEMENT

PROJECT NO.: 19-2481.402		SCALE: AS SHOWN	DATE: JULY 2019
--------------------------	--	-----------------	-----------------

SHEET  
 C-1  
 6 of 8

G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-C.dwg C-2 7/16/2019 11:57 AM DAK 23.0s (LMS Tech)



30% SUBMITTAL

NO.	DATE	BY	REVISION

**NOTICE**

0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JJU  
DESIGNED  
CAD  
DRAWN  
BVO  
CHECKED

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION

JULY 2019

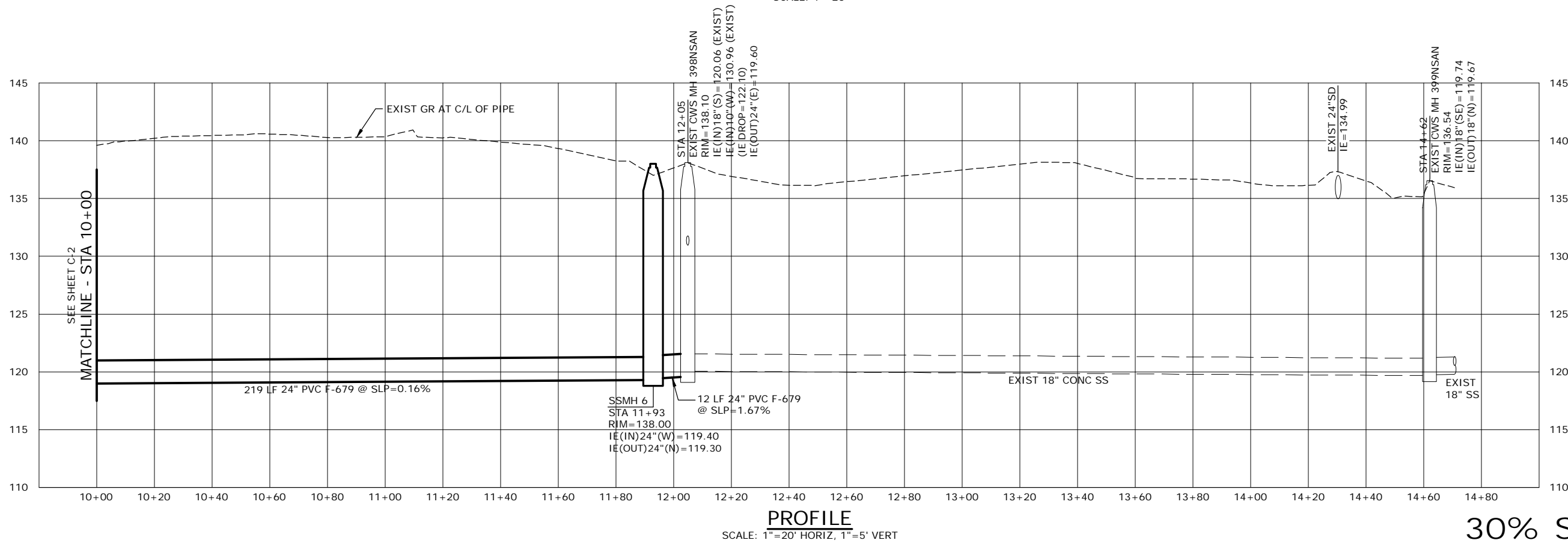
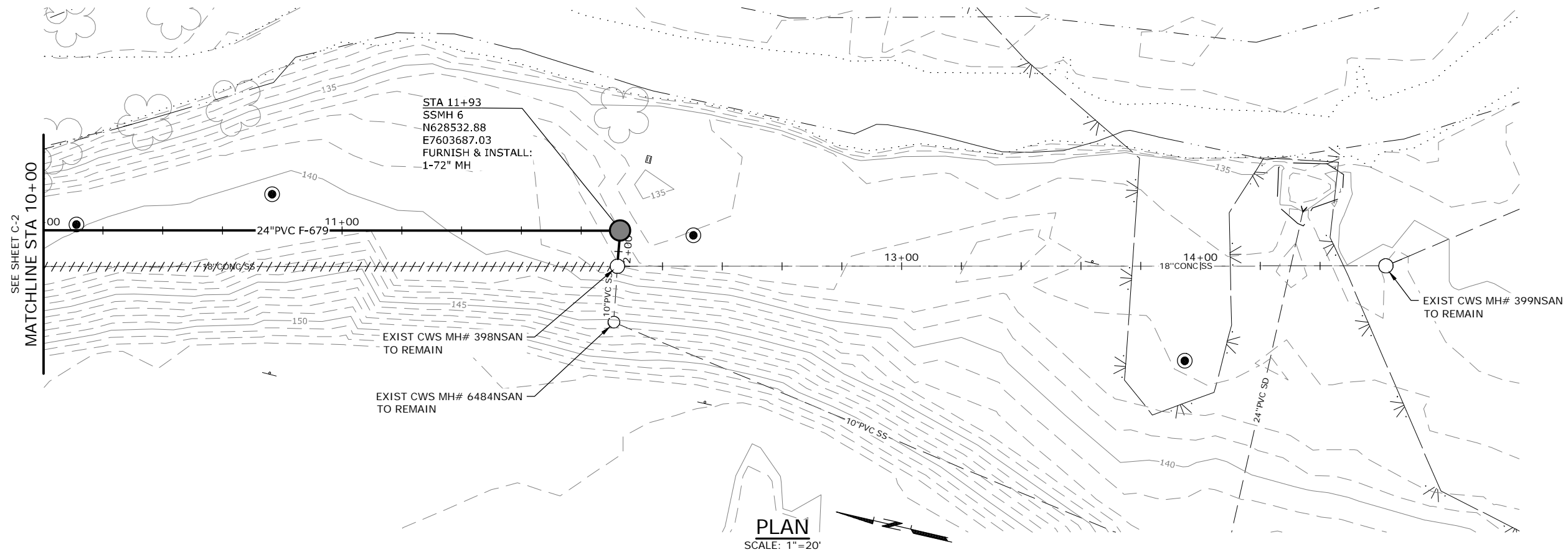
Murraysmith  
www.murraysmith.us



PROJECT NO.: 19-2481.402 SCALE: AS SHOWN DATE: JULY 2019

SHEET  
C-2  
7 of 8

G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-C.dwg C-3 7/16/2019 11:57 AM DAK 23.0s (LMS Tech)



**30% SUBMITTAL**

NO.	DATE	BY	REVISION

**NOTICE**  
  
 IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JJU  
 DESIGNED  
 CAD  
 DRAWN  
 BVO  
 CHECKED

**PRELIMINARY ONLY**  
 DO NOT USE FOR CONSTRUCTION  
 JULY 2019  
 Murraysmith  
 www.murraysmith.us



CITY OF SHERWOOD  
 2019 WATERLINE REPLACEMENT

SEWER PLAN AND PROFILE  
 STA 10+00 TO STA 14+80

PROJECT NO.: 19-2481.402 SCALE: AS SHOWN DATE: JULY 2019

SHEET  
**C-3**  
 8 of 8

# Appendix B: Subsurface Sampling Description

Table B-1. Results of Shovel Probe Excavations.

Shovel Probe (SP)	Total Depth Below Surface (cmbs)	Sediments Encountered (cmbs)	Archaeological Materials
SP 1	135	0–80: Medium brown dry silt loam, very firm, 3% angular pebbles, compact 80–135: Dark grey silty clay, very firm, < 1% angular pebbles, compact Augured from 50–135 cmbs; probe terminated due to cobble obstruction	Negative
SP 2	50	0–50: Yellowish-brown clay silt, friable, 15% angular pebbles and cobbles, compact Probe terminated at target depth	Negative
SP 3	50	0–50: Yellowish-brown silt loam, friable, 30% subangular cobbles (likely fill material), tarp located in upper 10 cm Probe terminated at target depth	Negative
SP 4	50	0–50: Yellowish-brown clay silt, friable, 15% angular pebbles and cobbles, compact Probe terminated at target depth	Negative
SP 5	30	0–30: Light grey brown clay silt, friable, 50% angular gravels and cobbles, compact Probe terminated due to cobble obstruction	Negative
SP 6	50	0–10: Grey silt, 80% subangular pebbles and cobbles (likely fill material), very compact 10–50: Red-brown silty clay, 40% subangular pebbles and cobbles (likely fill material), very compact Probe terminated at target depth	Negative
SP 7	N/A	Not excavated due to location on gravel access road	N/A
SP 8	30	0–30: Light grey-brown clay silt, friable, 50% angular pebbles and cobbles, very compact Probe terminated due to a cobble obstruction	Positive: 0–10 cmbs: one obsidian flake (Isolate 3001-IF1)

Table B-1. Results of Shovel Probe Excavations.

Shovel Probe (SP)	Total Depth Below Surface (cmbs)	Sediments Encountered (cmbs)	Archaeological Materials
SP 9	50	0–50: Grey-brown silty clay, 50% subround to subangular cobbles, very compact Probe terminated at target depth	Negative
SP 10	30	0–30: Grey-brown silty clay, friable, 20% angular pebbles and cobbles Probe terminated due to a cobble obstruction	Negative
SP 11	50	0–50: Dark grey silt loam, 40% subangular pebbles and cobbles, moist, water table at 30 cmbs Probe terminated at target depth	Negative
SP 12	90	0–80: Dark grey clay, < 1% pebble content, water table at surface 80–90: Dark brown sandy clay, < 1% pebble content Augured from 50–90 cmbs; probe terminated due to cobble obstruction	Negative
SP 13	160	0–40: Dark brown silt, < 5% subangular pebbles, water table at surface 40–90: Grey clay, 0% pebble content, iron staining present 90–150: Black clay, 0% pebble content 150–160: Brown silt, 0% pebble content Augured from 50–160 cmbs; probe terminated due to cobble obstruction	Negative
SP 14	50	0–50: Dark grey clay, < 5% angular pebbles and cobbles, water table at surface Probe terminated at target depth	Negative
SP 15	40	North Radial of SP8 0–40: Light grey brown clay silt, friable, > 50% angular pebbles and cobbles Probe terminated due to a cobble obstruction	Negative
SP 16	40	West Radial of SP8 0–40: Light brown silty sandy loam, 60% subangular cobbles Probe terminated due to a cobble obstruction	Negative

Table B-1. Results of Shovel Probe Excavations.

Shovel Probe (SP)	Total Depth Below Surface (cmbs)	Sediments Encountered (cmbs)	Archaeological Materials
SP 17	50	South Radial of SP8 0–50: Light brown silty sandy loam, 60% subangular cobbles Probe terminated at target depth	Negative
SP 18	50	East Radial of SP8 0–50: Light brown silty sandy loam, 60% subangular cobbles Probe terminated at target depth	Negative
SP 19	50	0–50: Yellow brown silt loam, 50% subangular cobbles Probe terminated at target depth	Negative
SP 20	40	0–40: Light brown silty loam, friable, 35% angular pebbles and cobbles Probe terminated due to a cobble obstruction	Negative
SP 21	50	0–50: Dark brown silt loam, 20% subangular pebbles and cobbles Probe terminated at target depth	Negative
SP 22	40	0–40: Light brown silty loam, friable, 35% angular pebbles and cobbles Probe terminated due to a cobble obstruction	Negative



# Appendix C: Oregon Archaeological Isolate Form

---

## State of Oregon Archaeological Site Record

Summary of Isolate Form#: 24797

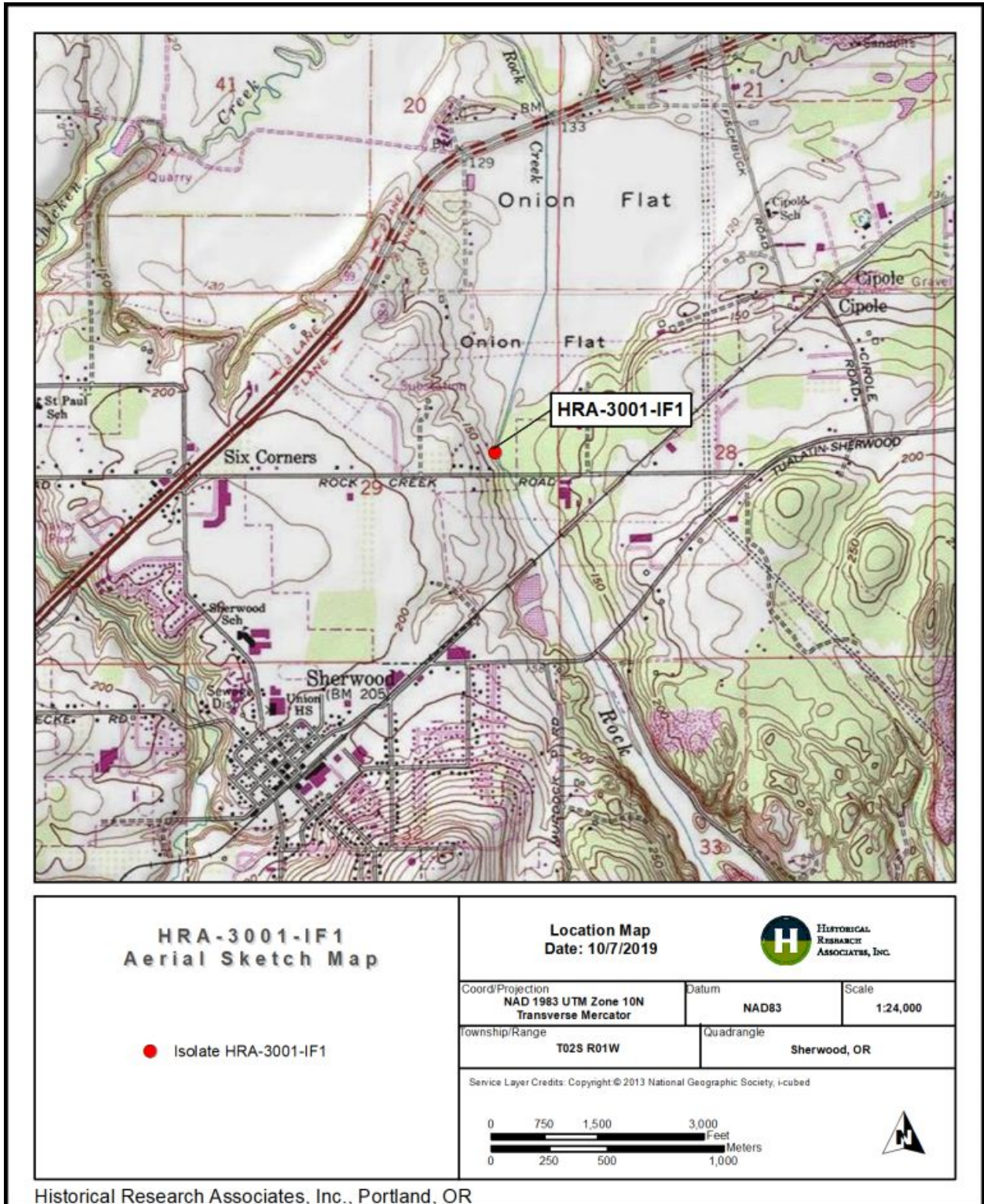
Form Type/Identification	
<b>Field Id:</b>	HRA-3001-IF1
<b>Isolate Description:</b>	Isolate HRA-3001-IF1 is located on the west bank of Rock Creek, just north of Tualatin-Sherwood Road in Washington County, Oregon. The isolate was identified in the upper 10 centimeters (cm) of sediment in a shovel probe (SP 8) excavated in 2019. The shovel probe was situated in an overgrown area with dense blackberry bushes. Four additional shovel probes excavated at 5-meter intervals around the isolate location did not contain cultural material. The isolate consists of a single complete obsidian flake that exhibits three flake scars, a complex platform, a maximum (max) length of 1 cm, a max width of 1 cm, and a max thickness of 0.1 cm. As the artifact was found on City of Sherwood property it was collected under SHPO AP-2702 (Hopt et al. 2019).
<b>Form Type:</b>	Isolate
<b>Recording Date:</b>	10/07/2019

Location	
<b>County</b>	Washington
<b>Cadastral Locations</b>	Township Range Section ¼ ¼ ¼ DLC Meridian 2 S 1 W 29 SE SE NE Willamette
<b>Map References</b>	Sherwood 7.5 1985
<b>Elevation</b>	From 135 To 135 ft
<b>UTM Coordinates</b>	Type East North Method Zone Datum Centerpoint 513354 5023926 GPS < 1m 10 83

Files Uploads	
<ul style="list-style-type: none"> <li>• <a href="#">Isolate 3001-IF1 Attachments.pdf</a></li> </ul>	

# State of Oregon Archaeological Isolate Record Attachments

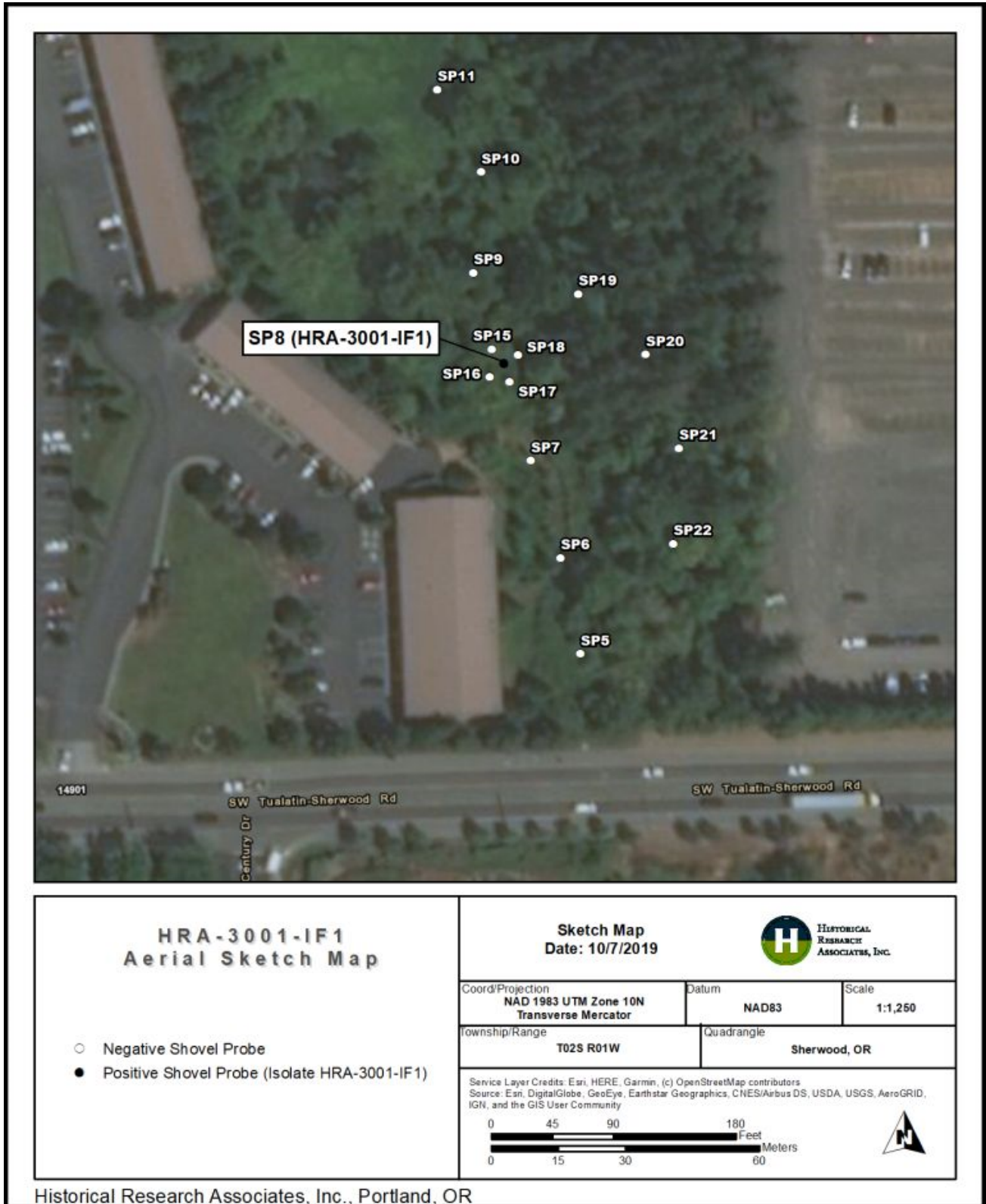
Temp. Number: HRA-3001-IF1



Topographic map showing location of Isolate HRA-3007-IF1.

# State of Oregon Archaeological Isolate Record Attachments

Temp. Number: HRA-3001-IF1



Aerial map of Isolate HRA-3007-IF1.

## State of Oregon Archaeological Isolate Record Attachments

Temp. Number: HRA-3001-IF1

Dorsal surface of obsidian flake



Ventral surface of obsidian flake



Artifact collected from the upper 10 cm of SP 8.



Overview of SP 8 and the isolate location, facing southeast.

### Reference:

Hopt, Justin, Libby Provost, and Catherin Bialas

2019 *Cultural Resources Investigations for the Rock Creek Trunk Upsizing Project, Sherwood, Washington County, Oregon*. Historical Research Associates, Inc., Portland, Oregon.

# Appendix D: Oregon SHPO Historic Property Inventory Clearance Form

---

# OREGON SHPO CLEARANCE FORM

Do not use this form for ODOT or Federal Highway projects or to record archaeological sites

This form is for: **federal** cultural resource reviews (Section 106); **state** cultural resource reviews (ORS 358.653)

## SECTION 1: PROPERTY INFORMATION

SHPO Case Number: A. P. No 2702

Property Name:

Street Address: 20555 SW Gerda Lane

City: Sherwood

County: Washington

Agency Project #

Project Name: Rock Creek Sanitary Sewer Upsizing Project

If there is not a street address, include the Township, Range, and Section, cross streets, or other address description

Owner:  Private  Local Gov  State Gov  Federal Gov  Other: \_\_\_\_\_

Are there one or more buildings or structures?  YES  NO – If no, skip to Section 2 and append photo(s)

Is the property listed in the National Register of Historic Places?  YES – Individually  YES – In a district  NO

Original Construction date: 1939  Check box if date is estimated

Siding Type(s) and Material(s): metal and horizontal board Window Type(s) and Material(s): wood frame

Has the property been physically altered?  No Alterations  Few Alterations  Major / Many Alterations

## SECTION 2: APPLICANT DETERMINATION OF ELIGIBILITY - Check the appropriate box

The purpose of this review is to avoid impacts to properties that are "eligible" (historic) or already listed in the National Register of Historic Places. Fully establishing historic significance can be very costly and time consuming. Therefore initial evaluations are based on age (50 years or greater) and integrity (historic appearance), which are the minimum qualifications for listing in the National Register. Additional documentation may be needed further in the process, but typically initial evaluations allow the review process to proceed expeditiously.

The property is considered **Eligible** at this time because it is already listed in the National Register **or**

- is at least 50 years old **and** retains its historic integrity (minimal alterations to key features)
- has potential significance (architectural or historical)

The property is considered **Not Eligible** at this time because it:

- is less than 50 years old **or** is 50 years or older but there have been major alterations to key features
- is known to have no significance, based on National Register-level documentation and evaluation

## SECTION 3: APPLICANT DETERMINATION OF EFFECT - Check the appropriate box

The project has **NO EFFECT** on historic properties, either because there is no eligible property involved or because the property will not be impacted physically or visually.

The project will have a minor impact on a property that is eligible or already listed in the National Register, and therefore there is **NO ADVERSE EFFECT**. Minor impacts include replacement of some, but not all, siding, doors, or windows, etc.

The project will have a major impact on a property that is eligible or already listed in the National Register, therefore there is an **ADVERSE EFFECT**. Major impacts include full or partial demolition, complete residing, full window replacement, etc.

## STATE HISTORIC PRESERVATION OFFICE COMMENTS – Official use only

**Eligibility:**  Concur with the eligibility determination above.  
 Do not concur with the eligibility determination above.

**Effect:**  Concur with the effect determination above.  
 Do not concur with the effect determination above.

RECEIVED STAMP

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

RLS	
ILS	

## CONTACT INFORMATION STAMP

Comments:

# OREGON SHPO CLEARANCE FORM

*Do not use this form for ODOT or Federal Highway projects or to record archaeological sites*

## SECTION 4: PREVIOUS ALTERATIONS TO THE BUILDING OR STRUCTURE

*Only complete this section for buildings that are 50 years old or older. Describe any alterations that have already occurred to the building, such as material replacement, including siding, windows, and doors; any additions, including garages; and any removal or addition of architectural details, such as brackets, columns, and trim. Provide estimated dates for the work. Attach additional pages as necessary.*

Approximately eight buildings are positioned in the southeast corner of the L-shaped, 45-acre parcel. Four buildings were visible at the time of survey—a barn (Barn 1, ca. 1952 with ca. 1970 addition), a three-sided barn (Barn 2, ca. 1952), and two outbuildings (Outbuildings 1 and 2, both ca. 1970). View of the other four buildings on the parcel was restricted due to fencing, mature foliage, and distance from the ROW. These buildings include a ca. 1939 residence converted as an office, a barn (Barn 3, ca. 1952), and two outbuildings (Outbuildings 3 and 4, both ca. 1990).

Barn 1 no longer retains integrity of design, materials, workmanship, or feeling, due to numerous alterations to form and materials, including changes to cladding, fenestration, and doors, all of which have been altered. Barn 2 features reduced integrity of design, materials, and workmanship due to alteration of siding and a lean-to addition. These alterations likely occurred ca. 1970.

## SECTION 5: PROJECT DESCRIPTION

*Describe what work is proposed, including what materials will be used and how they will be installed. Specifically identify what historic materials will be retained, restored, replaced, or covered. Include drawings, photos, cut sheets (product descriptions), additional sheets, and other materials as necessary. For vacant lots, please describe the intended use.*

The City of Sherwood (City) is planning a capital improvement to its sanitary sewer system as part of the Rock Creek Sanitary Sewer Upsizing Project (Project). The work will consist of upsizing approximately 1,370 feet (ft) of existing 18-inch-diameter sanitary trunk line with a 24-inch diameter trunk line (Appendix A). The Project is in Washington County in Section 29 of Township 2 South, Range 1 West, Willamette Meridian. Specifically, the Project is located in Sherwood, Oregon, to the north and south of Tualatin-Sherwood Road between SW Gerda Land and SW Century Drive.

## SECTION 6: FUNDING SOURCE

- ARRA     FCC     FERC     HUD     ODOE     USDARD     USFS  
 Other: City of Sherwood

## SECTION 7: AGENCY CONTACT INFORMATION

Name of Organization Submitting the Project: City of Sherwood

Project Contact Name and Title: Bob Galati

Street Address, City, Zip: 22560 SW Pine St., Sherwood, OR 97140

Phone: 503-925-2303

Email: galatib@sherwoodoregon.gov

Date of Submission:

## SECTION 8: ATTACHMENTS

<b>REQUIRED</b>	<input checked="" type="checkbox"/> 3 – 4, color, 4 x 5 photographs of the subject property, digital or print. One photo is sufficient for vacant property
<b>AS NEEDED</b> <i>Contact SHPO staff with questions</i>	<input checked="" type="checkbox"/> Project area map, for projects including more than one tax lot <input type="checkbox"/> Additional drawings, reports, or other relevant materials
	<input checked="" type="checkbox"/> Continuation sheet for sections 4 or 5, or additional context to determine National Register Eligibility.



# OREGON SHPO CLEARANCE FORM

*Do not use this form for ODOT or Federal Highway projects or to record archaeological sites*

**SHPO Mailing Address: Review and Compliance, Oregon SHPO, 725 Summer St. NE, Suite C, Salem, OR 97301**  
**Documents meeting all aspects of the digital submission policy may be submitted by email to**  
**ORSHPO.Clearance@oregon.gov**

# OREGON SHPO CLEARANCE FORM CONTINUATION SHEET

*Do not use this form for ODOT, Federal Highway projects or to record archaeological sites*

## CONTINUATION SHEET

- *Include additional documentation for Section 4 or 5 as necessary. Attach maps, drawings, and reports as needed to illustrate current conditions and the planned project. If submitting this form by email, photos and maps may be inserted into continuation sheets.*
- *If completing a complete Determination of Eligibility (DOE) or Finding of Effect (FOE), use continuation sheets as necessary or include appendixes.*

HRA identified two architectural resources (one transmission line and one government complex) on one parcel in the study area that are of an age to be evaluated for listing in the NRHP.

The right-of-way (ROW) of the Bonneville Power Administration's (BPA) Pearl-Keeler No. 1 (1961) transmission line intersects with the API southeast of the intersection of SW Tualatin-Sherwood Rd and SW Century Dr. Review of OHSD records and HRA's records indicate the Pearl-Keeler No. 1 Transmission Line was previously surveyed and determined not eligible by BPA (Tama Tochihara, personal communication, 2018, 2019). The transmission line was surveyed within the past 10 years so was not included in this work. No architectural resources within or bordering the API are recorded in the OHSD.

The agricultural complex at 20555 SW Gerda Ln. is located on taxlot 2S129A000100 in Sherwood, Washington County. Approximately eight buildings are positioned in the southeast corner of the L-shaped, 45-acre parcel. Four buildings were visible at the time of survey—a barn (Barn 1, ca. 1952 with ca. 1970 addition), a three-sided barn (Barn 2, ca. 1952), and two outbuildings (Outbuildings 1 and 2, both ca. 1970). View of the other four buildings on the parcel was restricted due to fencing, mature foliage, and distance from the ROW. These buildings include a ca. 1939 residence converted as an office, a barn (Barn 3, ca. 1952), and two outbuildings (Outbuildings 3 and 4, both ca. 1990).

All of the building dates are estimates based on review of the Washington County Tax Assessor data and various historic-period maps (USGS, Google Earth Pro). Washington County Tax Assessor reports the house construction date as 1940, however the house appears on maps by 1939 (USGS 1939). The three barns dated ca. 1952 appear on aerial photographs by 1952 (USGS 1952). Outbuildings 1 and 2, dated ca. 1970, first appear on maps in 1970 (USGS 1970). Outbuildings 3 and 4, dated ca. 1990, do not appear in a 1985 map but appear in aerial photographs by 1994 (Google Earth Pro 2019; USGS 1985).

Positioned near the center of the grouping of eight buildings is Barn 1, initially constructed ca. 1952 with a ca. 1970 addition that roughly doubled the size of the building. The building is L-shaped, with a lean-to addition on the west side of the original, rectangular massing. The addition extends to the south, past the facade of the original massing, creating the L shape. The building has a varied roofline and is clad in horizontal board on the ca. 1952 massing and corrugated metal on the ca. 1970 addition. Two sliding barn doors are located on the center of the original massing, and an open wall on the southeast corner of the addition provides access to the addition. Fenestration includes a single wood-frame window with no glazing centered above the sliding doors, and additional windows on the west face.

East of Barn 1 is Outbuilding 1, constructed ca. 1970 and rectangular in plan. The building is clad in corrugated metal and has a front-gabled roof with minimal eaves topped in metal. Sliding barn doors are located on the west side of the south face. Fenestration appears to include a single window opening near the roofline on the west face.

Positioned southwest of Barn 1 is Outbuilding 2, also constructed ca. 1970 and rectangular in plan. The building is clad in corrugated metal and has a front-gabled roof with minimal eaves topped in metal. The building is marked by sliding barn doors located on the center of the north face and center of the east face.

Adjacent to Outbuilding 2 to the east is Barn 2, a three-sided barn constructed ca. 1952. The building has a

# OREGON SHPO CLEARANCE FORM CONTINUATION SHEET

*Do not use this form for ODOT, Federal Highway projects or to record archaeological sites*

rectangular footprint; the original rectangular massing has a lean-to addition on the south face. The building has a side-gabled roof topped in metal. The north face is open, revealing three evenly-spaced wood beams extending from the ground to the roofline, where they are supported by wood brackets. At the time of survey, the barn appeared to house boat trailers, canoes, and kayaks.

## Integrity

The complex has four periods of construction; the house was built ca. 1939, three outbuildings were constructed ca. 1952, two more ca. 1970, and an additional two ca. 1990. The property, which houses facilities for the Oregon Department of Fish and Wildlife, appears to have been initially constructed as an agricultural complex due to the location of the house, the parcel size, and surrounding fields at the time of construction. The complex transferred to public ownership at an unknown date. HRA cannot accurately assess the integrity of the ca. 1939 house and Barn 4 (ca. 1952) because they were not visible at the time of survey. (The two outbuildings constructed ca. 1990 are not of age to be evaluated for listing in the NRHP.)

From its period of construction, Barn 1 no longer retains integrity of design, materials, workmanship, or feeling, due to numerous alterations to form and materials, including changes to cladding, fenestration, and doors, all of which have been altered. Outbuildings 1 and 2, which date to ca. 1970, appear to retain integrity of design, materials, workmanship, and feeling as they appear to have few, if any, alterations. Barn 2 (ca. 1952) features reduced integrity of design, materials, and workmanship due to alteration of siding and the lean-to addition. The assessed buildings retain integrity of location, as they remain on their original parcel. The complex does not retain integrity of association, as the property no longer serves as an agricultural complex and has been converted for use as a government office.

## Evaluation

HRA's view of the complex at 20555 SW Gerda Ln. was restricted due to mature foliage and building distance from the ROW. The complex does not appear to embody the distinctive characteristics of a type, period, or method of construction. The buildings do not appear to be the work of a master and do not possess high artistic value. From its initial period of construction (ca. 1939), the complex has reduced integrity due to remodeling of at least two of the original barns and construction of new outbuildings ca. 1970 and ca. 1990. However, due to restricted view from the ROW, the complex remains unevaluated. Though essentially unrecorded and unevaluated, for the purposes of this project, the complex at 20555 SW Gerda Ln. is assumed eligible for listing in the NRHP.

## Conclusions

HRA identified two architectural resources (one transmission lines and one former agricultural complex) within the API that are of an age to be evaluated for eligibility to the NRHP. BPA determined the Pearl–Keeler No. 1 Transmission Line (1961) not eligible (Tama Tochihara, personal communication, 2018, 2019). The former agricultural complex could not be adequately assessed for eligibility from the ROW; though essentially unrecorded and unevaluated, for the purpose of assessing potential affects HRA assumes 20555 SW Gerda Ln. is eligible for listing in the NRHP.

The nature of the undertaking—replacement of an existing underground pipe with a new pipe in the same alignment—means that any visible project actions will be temporary and will not impact the integrity of the transmission line or the complex. Additionally, the sewer alignment will not physically touch the 20555 SW Gerda Ln parcel. HRA recommends the Project will have no adverse effect on historic properties.

# OREGON SHPO CLEARANCE FORM CONTINUATION SHEET

*Do not use this form for ODOT, Federal Highway projects or to record archaeological sites*

## References

Google Earth Pro

2019 Historic imagery of 45.370058, -122.826348, May 22, 1994.

Oregon State Historic Preservation Office (SHPO)

2011 [Guidelines for Historic Resource Surveys in Oregon](https://www.oregon.gov/oprd/HCD/SHPO/docs/guidelines_for_historic_resource_surveys_2011.pdf). Electronic document, [https://www.oregon.gov/oprd/HCD/SHPO/docs/guidelines\\_for\\_historic\\_resource\\_surveys\\_2011.pdf](https://www.oregon.gov/oprd/HCD/SHPO/docs/guidelines_for_historic_resource_surveys_2011.pdf), accessed January 8, 2019.

United States Geological Survey (USGS)

1939 Tualatin Quadrangle, 1:62,500. Electronic document, <http://historicalmaps.arcgis.com/usgs/>, accessed August 2019.

1952 Aerial Photograph # AR1ZJ0000040023. Electronic document, <https://earthexplorer.usgs.gov/>, accessed August 2019.

1970 Sherwood Quadrangle, 1:24,000. Electronic document, <http://historicalmaps.arcgis.com/usgs/>, accessed August 2019.

1985 Sherwood Quadrangle, 1:24,000. Electronic document, <http://historicalmaps.arcgis.com/usgs/>, accessed August 2019.



Barn 1 at 20555 SW Gerda Ln. (ca. 1952; 1970); view northwest.

# OREGON SHPO CLEARANCE FORM CONTINUATION SHEET

*Do not use this form for ODOT, Federal Highway projects or to record archaeological sites*



Outbuilding 1 at 20555 SW Gerda Ln. (ca. 1970); view northeast.

# OREGON SHPO CLEARANCE FORM CONTINUATION SHEET

*Do not use this form for ODOT, Federal Highway projects or to record archaeological sites*



Barn 2 at 20555 SW Gerda Ln. (ca. 1952); view south.



# OREGON SHPO CLEARANCE FORM CONTINUATION SHEET

*Do not use this form for ODOT, Federal Highway projects or to record archaeological sites*

Outbuilding 2 at 20555 SW Gerda Ln. (ca. 1970); view southwest.



Barn 1 and Outbuilding 1 at 20555 SW Gerda Ln.; view northwest.

# OREGON SHPO CLEARANCE FORM CONTINUATION SHEET

*Do not use this form for ODOT, Federal Highway projects or to record archaeological sites*

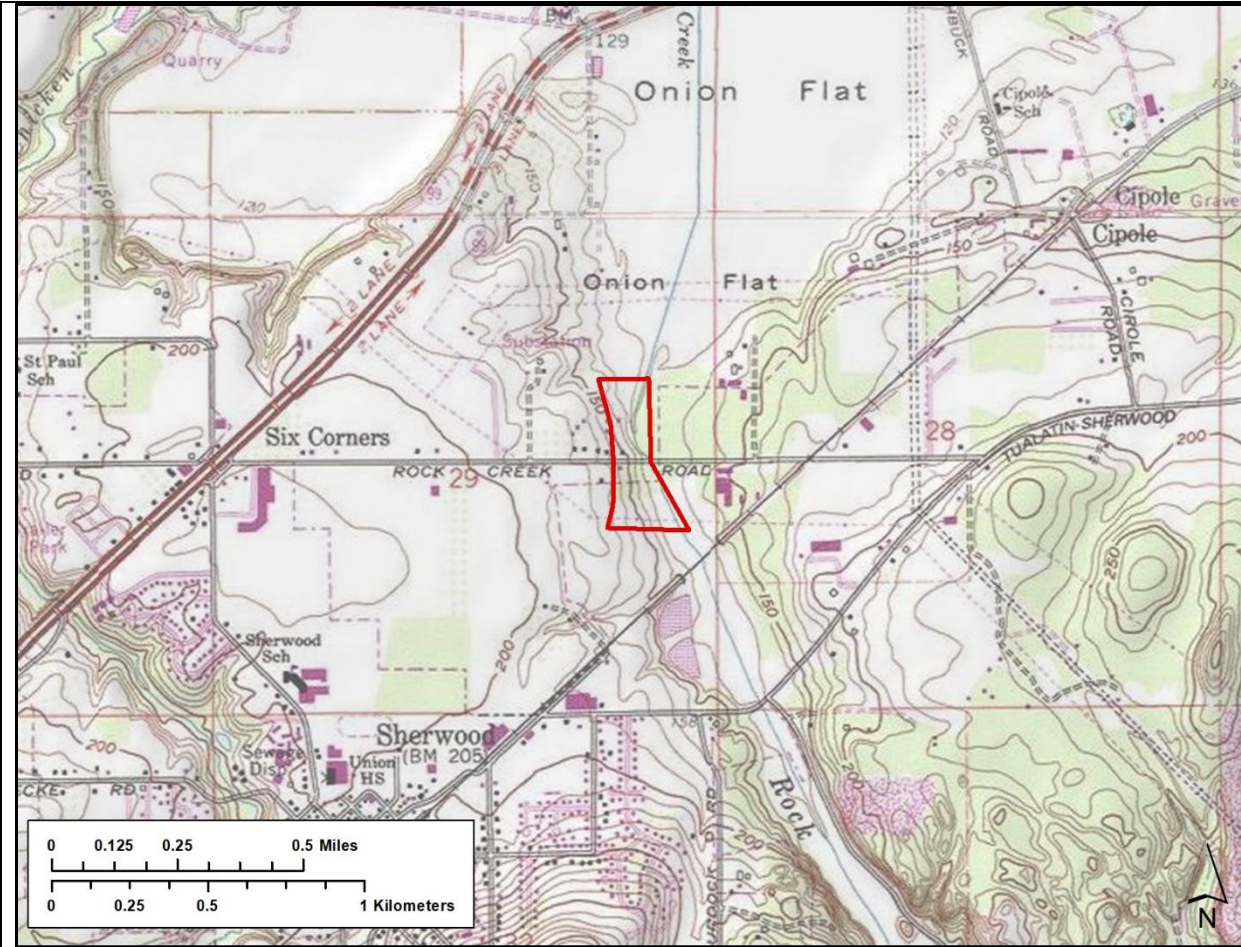


Barn 2 and Outbuilding 2 at 20555 SW Gerda Ln.; view northwest from adjacent parcel.



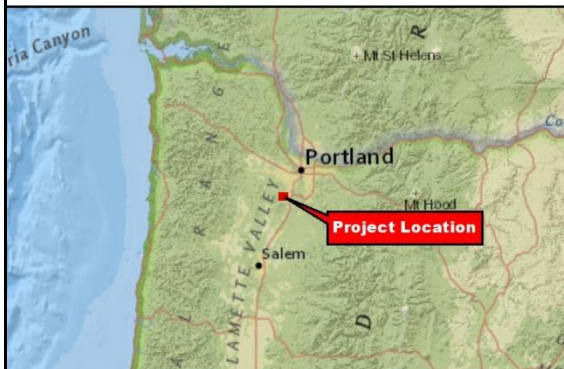
# OREGON SHPO CLEARANCE FORM CONTINUATION SHEET

*Do not use this form for ODOT, Federal Highway projects or to record archaeological sites*



Area of Potential Impacts (API)

## Rock Creek Sanitary Upsizing Project



HISTORICAL  
RESEARCH  
ASSOCIATES, INC.

**Date: 10/3/2019**

Coord./Project	Datum	Scale
<b>NAD 1983 UTM Zone 10N Transverse Mercator</b>	<b>NAD83</b>	<b>1:24,000</b>
Township/Range	Quadrangle	
<b>T2S R1W</b>	<b>Sherwood, OR</b>	

**Historical Research Associates, Inc.**  
 Service Layer Credits: Copyright: © 2013 National Geographic Society, i-cubed  
 Content may not reflect National Geographic's current map policy. Sources: National  
 Geographic, Esri, DeLorme, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN,  
 GEBCO, NOAA, increment P Corp.

Location identification map of API.

# OREGON SHPO CLEARANCE FORM CONTINUATION SHEET

*Do not use this form for ODOT, Federal Highway projects or to record archaeological sites*



## Rock Creek Sanitary Upsizing Project Architectural Inventory

- Inventoried Building
- Area of Potential Impacts (API)
- Taxlots

**Aerial Results**  
Date: 10/3/2019



Coord/Projection <b>NAD 1983 UTM Zone 10N Transverse Mercator</b>	Datum <b>NAD83</b>	Scale <b>1:2,500</b>
--	-----------------------	-------------------------

Township/Range <b>T02S R01W</b>	Quadrangle <b>Sherwood, OR</b>
------------------------------------	-----------------------------------

Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors  
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

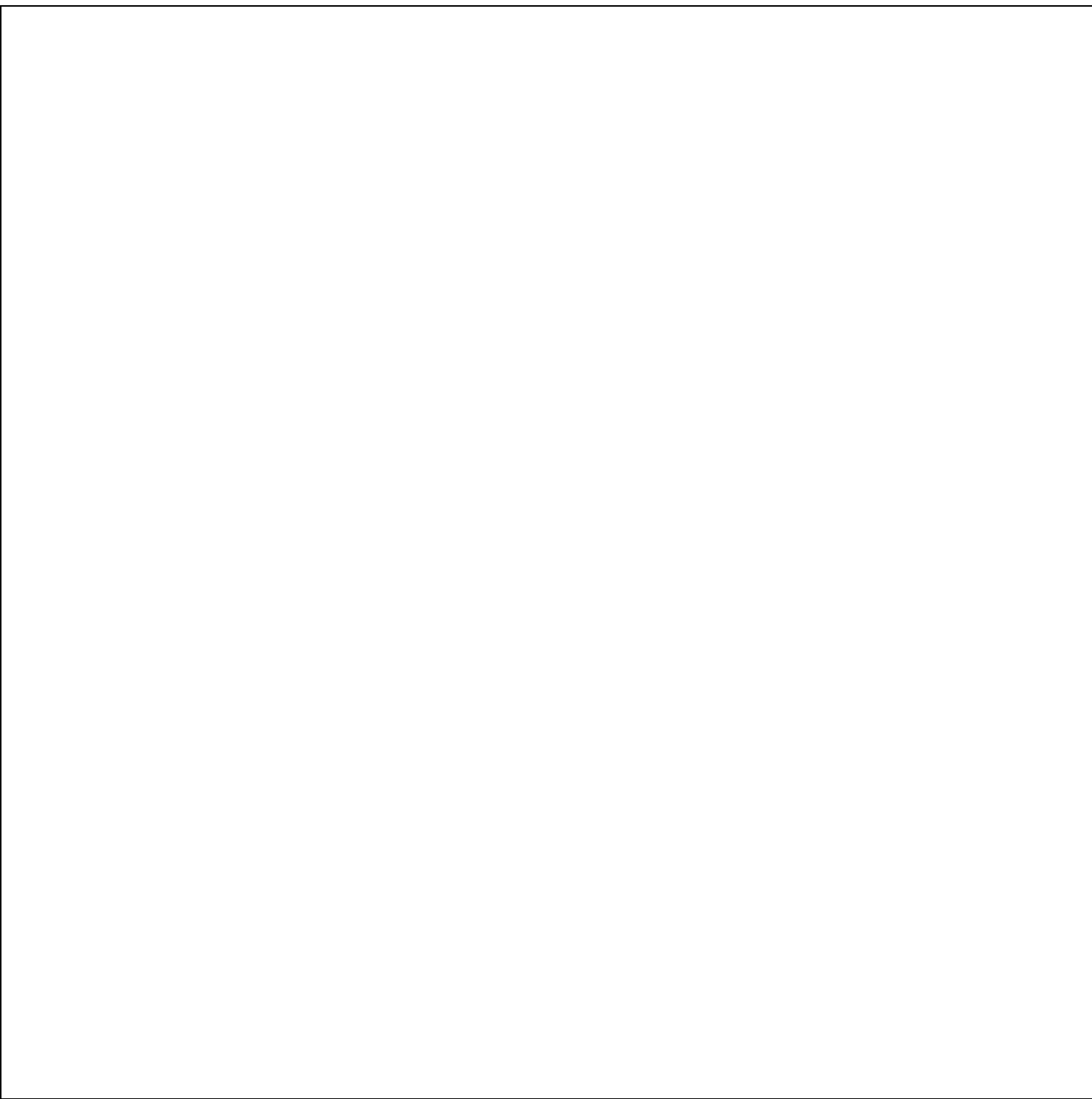


Historical Research Associates, Inc., Portland, OR

Map of architectural resources at 20555 SW Gerda Ln.

**OREGON SHPO CLEARANCE FORM  
CONTINUATION SHEET**

*Do not use this form for ODOT, Federal Highway projects or to record archaeological sites*



# OREGON SHPO CLEARANCE FORM INSTRUCTIONS

*Do not use this form for ODOT, Federal Highway projects or to record archaeological sites*

## **SECTION 1: PROPERTY INFORMATION:**

- Include complete address and agency project number and name, if applicable.
- Check YES if there are any buildings on the site. Check NO if it is a vacant parcel (in which case it will be evaluated for archaeology and the potential impact on surrounding buildings only.)
- Check YES if your research (look on our website at <http://heritagedata.prd.state.or.us/historic/> and/or call your local planning office) shows the property is listed. Check NO if you find that it is not listed.
- Fill in the construction date. Check box if date is estimated.
- Describe the siding and window types and materials. Examples: double hung wood windows; vertical wood siding.
- Check to what degree the property has been altered. Ask yourself, would the original owner recognize the building, or have there been many changes that obscure the historic features?

## **SECTION 2: APPLICANT DETERMINATION OF ELIGIBILITY:**

- Check the ELIGIBLE box if the building is listed (National Register OR Local landmarks register), has previously been evaluated as eligible, or is 50 years of age AND the majority of the exterior historic features are retained.
- Check the NOT ELIGIBLE box if the building is not yet 50 years old, or if in your opinion there have been many and/or major changes (e.g. additions, siding and/or window replacement, porch enclosures).
- Applicants who acknowledge that the property meets the minimum qualifications for listing in the National Register but choose to contest this determination must complete a Determination of Eligibility (DOE). The DOE must demonstrate that the property is not eligible for the National Register using the Criteria listed in National Register Bulletin 15, "How to Apply the National Register Criteria for Evaluation." The DOE may be submitted on continuation sheets or as a separate document.

## **SECTION 3: APPLICANT DETERMINATION OF EFFECT:**

- Check the NO EFFECT box if the property is NOT ELIGIBLE for listing in the National Register or if the work will not replace or alter the appearance of any of the building's exterior features.
- Check the NO ADVERSE EFFECT box if the property is ELIGIBLE for listing or is already listed in the National Register and the work is visible (e.g. re-roofing with same materials, window or siding repair, adding a vent) but will not remove or obscure historic features.
- Check ADVERSE EFFECT if the property is ELIGIBLE or listed in the National Register and the work includes major changes, such as replacing the siding or windows.

## **SECTION 4: PREVIOUS ALTERATIONS**

- List the changes that **already** occurred to the building, including siding, windows, doors, porches, additions including dormers, or if the property was moved. Include the approximate date of each alteration. The information can be provided in list format.

## **SECTION 5: PROJECT DESCRIPTION:**

- Clearly describe what is being repaired or replaced, and how that work will be done. What materials and installation process are proposed? Include sufficient information (e.g. close-up photos, product specification sheets) so we can compare what exists with what is proposed. The information can be provided in list format.

## **SECTION 6: FUNDING SOURCE:**

- Check the federal or state agency funding the project; or check "other" and fill in the agency name.

## **SECTION 7: AGENCY CONTACT INFORMATION:**

- List the name of the organization submitting the Clearance Form

## **SECTION 8: ATTACHMENTS:**

- Photos: Include photos of the entire building, especially the elevations that can be seen from the street. Include close-ups of features that will be impacted by the project.
- Additional Information: When applicable, include window specifications, plans or diagrams that illustrate pertinent existing conditions and/or proposed work
- Continuation sheets for additional Section 4 or 5 narrative or to append a formal Determination of Eligibility (DOE) or Finding of Effect (FOE). These materials may also be submitted as a separate document.



# Oregon

Kate Brown, Governor

## Parks and Recreation Department

State Historic Preservation Office

725 Summer St NE Ste C

Salem, OR 97301-1266

Phone (503) 986-0690

Fax (503) 986-0793

[www.oregonheritage.org](http://www.oregonheritage.org)

### STATE OF OREGON

#### ARCHAEOLOGICAL EXCAVATION PERMIT NO. AP-2702



The State of Oregon, acting by and through its Parks and Recreation Department, hereinafter called STATE, under authority of ORS 390.235, hereby grants to Catherin M Bialas, hereinafter called PERMITTEE, a permit for purposes of excavation and removal of archaeological, historical, prehistoric, or anthropological materials. This permit is granted subject to the following terms and conditions.

- 1. Term** PERMITTEE may conduct survey, excavation, and collection work from 7/12/2019 to 7/12/2020 provided that reasonable supervision, as provided hereinafter, is exercised.
- 2. Location** This permit shall apply to lands owned by the State of Oregon, a city, county, district, or municipal corporation in Oregon, or private property, more particularly described as follows:  
Rock Creek Sanitary Sewer Upsizing Project  
2S 1W 29  
Washington County
- 3. Supervision** The design and work in connection with the survey or excavation, including exploratory excavation and collection, shall be personally supervised by Catherin M Bialas, Emily Ragsdale, Michele Punke, Kelly M. Derr, Joshua Dinwiddie, Sara Davis, Bradley Bowden, Stephen C. Hamilton, Janna B. Tuck, Justin Hopt.
- 4. Compliance** PERMITTEE shall comply with all applicable federal, state and local laws, rules, regulations and ordinances.
- 5. Exploration shall consist of:**  
The proposed fieldwork methods include a combination of pedestrian survey and shovel probe excavations in order to determine if archaeological resources are present within the portion of the project on land owned by the City. HRA will conduct a pedestrian survey of the project area along transects spaced at intervals of a maximum of 20 meters (m). All soil exposures and disturbances, such as cut banks and rodent back dirt piles, will be examined for cultural remains.

Shovel probes will be utilized to determine if sub-surface archaeological deposits are present and to characterize the nature of the sediments in the area. HRA will conduct limited shovel probe testing in areas determined to be of higher probability for archaeological resources. Most of the project is considered a high probability area due to its location along Rock Creek. However, shovel probes will not be excavated in areas where thick deposits of fill are evident (e.g., the Tualatin-Sherwood Road right of way), paved or graveled areas, or areas where buried utilities are present.

A maximum of 40 shovel probes will be excavated. Shovel probes will be round, measure at least 30 centimeters (cm) in diameter, be excavated in 10-cm levels, and excavated to a depth of at least 50 cm below the surface and until culturally sterile soil is encountered for at two consecutive levels (assuming less than 10 artifacts are identified). Auger probes may be excavated to extend the depth of the shovel probes if variables related to buried deposits, such as the presence of soils containing buried parent materials or actively accruing landforms, are identified. Soils excavated from resource boundary delineation probes will be screened through 1/8-inch hardware mesh cloth; soils excavated from survey probes will be screened through 1/4-inch hardware mesh cloth.

Should archaeological materials be identified in shovel probes, the probe will continue until more than nine artifacts are identified. Once 10 items are identified, the excavation of additional shovel probes within the perceived site area will be avoided in favor of excavating shovel probes at its boundaries in an attempt to accurately define them. If archaeological materials are encountered in a boundary delineation shovel probe, the next shovel probe will be excavated in the direction away from the site. This process will be repeated until at least two negative probes are dug in each direction. However, HRA will not excavate or survey outside the project area.

Upon confirming the presence of precontact or historic-period cultural material within the project, HRA field personnel will document the cultural resources on field forms designed to capture the information required for Oregon State site and isolate forms. At each site or isolate, archaeologists will describe the environmental and cultural characteristics of the resource, including descriptions of cultural remains and boundaries, and prepare scaled sketch maps. Digital photographs of each resource will include overview photos. HRA will maintain a standardized photographic log. The location of artifacts, as well as all resource boundaries, surface features, and shovel probe locations will be recorded with a Trimble GeoExplorer 6000 GeoXH GPS unit Equipped with ArcPad 10 software. Archaeological artifacts, including precontact or diagnostic historic-period items and faunal remains identified in shovel probes, will be collected and catalogued by probe number and level. Other potential archaeological materials such as fire-modified-rock and charcoal will be described but not collected. Diagnostic artifacts identified on the surface will be recorded with the GPS unit, photographed, and collected. Archaeological resources will be recorded using the online Oregon State Historic Preservation Office (SHPO) resource form system.

Any human remains/skeletal materials, burial sites, or burial related materials that are discovered during the survey will at all times be treated with dignity and respect. Human remains include human skeletal materials, burial sites, funerary objects, sacred objects and/or objects of cultural patrimony as defined in ORS 358.905. If human remains are encountered during survey work, the SHPO will be notified and the protocols outlined in the Tribal Position Paper on the Treatment of Human Remains prepared by the Government to Government Cultural Resource Cluster Group in September 2006 will be followed.

6. **Indemnification** PERMITTEE agrees to defend and hold STATE, its officers, agents, and employees harmless, and shall require its contractors to do the same, from any and all claims, damages, or expenses of any kind suffered or alleged to be suffered on the lands described in paragraph 2 or arising out of or in connection with the activities of PERMITTEE or its contractors pursuant to this Permit.
7. **Insurance** PERMITTEE shall obtain at PERMITTEE's expense, and keep in effect during the term of the Permit, comprehensive or commercial general liability insurance covering personal injury and property damage. This insurance shall include contractual liability coverage for the indemnification provided under this Permit. Coverage limits shall not be less than the limits of liability set forth in the provisions of ORS 30.270(1) as now in effect or as hereinafter amended. Such provisions now require that the coverage limits not less than \$500,000 combined single limit per occurrence. The insurance shall be in a form and with compliance acceptable to STATE. Such insurance may be evidenced by certificates or copies of policies. Such evidence shall be provided to STATE prior to the commencement of any operations or activities under this Permit.
8. **Records** PERMITTEE shall submit a final excavation report by 7/12/2021 to the State Historic Preservation Office and the Oregon State Museum of Anthropology. If PERMITTEE is conducting an excavation associated with a prehistoric or historic American Indian archaeological site, then PERMITTEE shall also submit copies of the Final Report to the Commission on Indian Services and the following tribe(s):

**Conf Tribes of the Warm Springs Resv**  
**Confederated Tribes of Grand Ronde**  
**Confederated Tribes of Siletz Indians**  
**Confederated Tribes of Siletz Indians**

**9. Custody**

All archaeological, historical, prehistoric, or anthropological materials recovered under this permit shall remain under the stewardship of the State of Oregon and shall be curated by UOMNCH. Any change in custody must be approved by the Oregon State Museum of Anthropology in accordance with ORS 390.235. Prior to submitting the materials to the permanent curation facility, the appropriate tribe(s) must be given 30 days to view all archaeological materials to ensure that funerary objects, sacred objects, and objects of cultural patrimony are returned to tribal ownership per state law (ORS 97.740).

**10. Notification**

- a. If PERMITTEE is conducting an excavation associated with a prehistoric or historic American Indian archaeological site, PERMITTEE shall notify in writing the most appropriate Indian tribe. The notification shall include:
  - i. The location and schedule of the forthcoming excavation;
  - ii. A description of the nature of the of the investigation; and
- b. Upon discovery of an archaeological object which is demonstrably revered by any ethnic group, religious group, or Indian tribe as holy, which object was or is used in connection with a religious or spiritual service or worship of a deity or spirit power, i.e., a "sacred object", PERMITTEE shall notify in writing:
  - i. The State Historic Preservation Office; and
  - ii. The appropriate ethnic group, religious group, or Indian tribe with which the sacred object is associated.

- 11. Consultation** If PERMITTEE is conducting an excavation associated with a prehistoric or historic American Indian archaeological site, PERMITTEE shall consult with a representative of the appropriate tribe to establish a procedure for handling sacred objects recovered during the excavation.

**12. Conditions:**

*Confederated Tribes of Grand Ronde*

- If requested by our office, we are provided access to the site and opportunity to observe field work.
- A notification be received by our office at least two weeks prior to project start date.
- If requested by our office, we are provided access to the site and opportunity to observe field work.
- An inadvertent discovery plan for human remains be in place for the project.
- If suspected funerary or sacred items are identified, work be stopped and our office be notified immediately.
- If pre-contact resources are identified during the project, we are to be notified by the next business day.
- Photos with scale of all artifacts encountered be provided to the Tribes in an effort to identify to ensure that funerary objects, sacred objects, and objects of cultural patrimony are returned to Tribal ownership as per State Law.
- We are given a copy of the draft archaeological report with sufficient time to comment on the findings.

*Conf Tribes of the Warm Springs Resv*

Please provide this office with a copy of the draft archaeological report for our review, with ample time to comment.

*UO Museum of Natural & Cultural History*

Research design provides for curation of artifacts from probes but indicates also that "Diagnostic artifacts identified on the surface will be recorded with the GPS unit, photographed, and collected." These should be curated as well.

13. **Revocation** Failure to comply with all terms of this Permit, in addition to any agreed upon conditions, may lead to its immediate revocation.

OREGON PARKS AND RECREATION DEPARTMENT



*for Christine Curran*  
\_\_\_\_\_  
Christine Curran  
Deputy State Historic Preservation Officer

*Stan P. Johnson*  
\_\_\_\_\_  
Assec. Deputy SHPO

*7/12/19*  
\_\_\_\_\_  
Date:



6/12/19

**RE:** Archaeological Permit No. 2702

***Reviewer Evaluation***

I approve of the permit

I request conditions (*enter conditions below or attach document*)

conditions: Please see attached

I object to the permit (*enter explanation below or attach document*)

objection:

Additional comments **not** pertaining to the above conditions and/or objection:

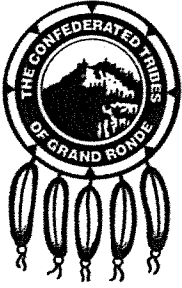
Reviewer Signature:



Date: 06/27/19

Organization: Confederated Tribes of Grand Ronde

Confederated Tribes of Grand Ronde



## The Confederated Tribes of the Grand Ronde Community of Oregon

Historic Preservation Department  
Phone (503) 879-2185  
1-800 422-0232  
Fax (503) 879-2126

8720 Grand Ronde Rd  
Grand Ronde, OR 97347

---

July 1, 2019

Jamie French,  
State Historic Preservation Office  
725 Summer St NE, Suite C  
Salem, OR 97301-1266

### **RE: Archaeological Permit 2702**

Jamie,

The Confederated Tribes of Grand Ronde have interest in this project and call upon the following conditions to be enacted:

- A notification be received our office at least two weeks prior to field work start date.
- If requested by our office, we are provided access to the site and opportunity to observe field work.
- An inadvertent discovery plan for human remains be in place for the project.
- If suspected funerary or sacred items are identified, work be stopped and our office be notified immediately.
- If pre-contact resources are identified during the project, we are to be notified by the next business day.
- Photos with scale of all artifacts encountered be provided to the Tribes in an effort to identify to ensure that funerary objects, sacred objects, and objects of cultural patrimony are returned to Tribal ownership as per State Law.
- We are given a copy of the draft archaeological report with sufficient time to comment on the findings.

Respectfully,

Christopher Bailey  
Cultural Protection Specialist  
Historic Preservation  
Confederated Tribes of the Grand Ronde Community of Oregon  
chris.bailey@grandronde.org  
503-879-1675



DEPARTMENT OF THE ARMY  
U.S. ARMY CORPS OF ENGINEERS, PORTLAND DISTRICT  
P.O. BOX 2946  
PORTLAND, OR 97208-2946

February 26, 2020

Regulatory Branch  
Corps No. NWP-2013-128-1

Bob Galati  
City of Sherwood  
22560 SW Pine Street  
Sherwood, OR 97410  
GalatiB@SherwoodOregon.gov

Dear Mr. Galati:

The U.S. Army Corps of Engineers (Corps) received your request for Department of the Army authorization to replace a trunk line. The project is in Rock Creek and wetlands on SW Tualatin-Sherwood Road in Sherwood, Washington County, Oregon at Latitude and Longitude 45.637302, -122.828534.

This letter verifies your project as depicted on the enclosed drawings (Enclosure 1) is authorized by Nationwide Permit (NWP) No. 12, Utility Line Activities (*Federal Register, January 6, 2017, Vol. 82, No. 4*) provided you obtain a 401 Water Quality Certification (WQC) decision from the Oregon Department of Environmental Quality (DEQ). You are not authorized to begin work in waters of the U.S. until you obtain and submit to our office a 401 WQC decision or waiver.

The project includes the total discharge of up to 2,180 cubic yards of fill over 0.74 of wetlands for the Rock Creek Sanitary Trunk Line Upsizing project. Permanent impacts include 26 cubic yards of fill over 37 square feet of Wetland A and 16 cubic yards of fill over 27 square feet of Wetland C. Temporary impacts include 1,711 cubic yards of fill over 0.67 acre of Wetland A, 427 cubic yards of fill over 0.07 acre of Wetland C, and 98 cubic yards of fill (sand bags) over 0.07 acre below the ordinary high water mark of Rock Creek. Temporary impacts in Rock Creek are for dewatering the stream.

The project consists of constructing a new 24-inch diameter PVC trunk line to replace the existing 18-inch trunk line. The new line segment would be approximately 1,097 linear feet and would be constructed parallel to the existing trunk line that parallels the west side of Rock Creek. The proposed trunk line would be located immediately east of the existing trunk line alignment. It would be constructed by open trenching, except where a trenchless crossing is required to construct the new trunk line under SW Tualatin-Sherwood Road.

The new trunk line would require seven manholes, and would result in the removal of three existing manholes associated with the existing trunk line. Three new manholes would be constructed in Wetlands A and C, and two existing manholes would be removed from Wetland A. Construction of the new manholes would not result in impacts to wetlands or waters. The sewer line's depth of cover would range from five to 20 feet (approximate depth of trench excavation would range from eight to 23 feet). Decommissioning the existing trunk line would be completed by removing three existing manholes and backfilling their voids with native soil. The decommissioned trunk line would be left in place, filled with controlled low strength material (CLSM) concrete and capped with grout at the existing pipe ends to avoid water seepage into the decommissioned line.

In order for this authorization to be valid, you must ensure the work is performed in accordance with the enclosed Nationwide Permit 12 Terms and Conditions (Enclosure 2); any 401 Water Quality Certification conditions, as applicable (see below); and the following special conditions:

a. Permittee shall fully plant and seed all disturbed areas with a broadcast of a native mix immediately following completion of construction and reseed as necessary to establish vegetation for erosion control. Permittee shall follow the Restoration and Planting Plan identified in Enclosure 1 Pages 31 and 32.

b. All in-water work shall be performed during the in-water work period of July 15 – September 30, to minimize impacts to aquatic species. Exceptions to this time period requires specific approval from the Corps and the National Marine Fisheries Service.

c. This Corps permit does not authorize you to take an endangered species in particular those species identified in Enclosure 3. In order to legally take a listed species, you must have separate authorization under the Endangered Species Act (ESA) (e.g., an ESA Section 10 permit, or a biological opinion under ESA Section 7, with "incidental take" provisions with which you must comply). The National Marine Fisheries Service (NMFS) Stormwater, Transportation and Utilities programmatic biological opinion dated March 14, 2014 (NMFS Reference Number NWR-2013-10411), contains the mandatory terms and conditions to implement the reasonable and prudent measures that are provided in the "incidental take" statement associated with the opinion. Your authorization under this Corps permit is conditional upon your compliance with all of the applicable mandatory terms and conditions associated with the incidental take statement. Failure to comply with the applicable terms and conditions associated with incidental take of this opinion, where a take of the listed species occurs, would constitute an unauthorized take, and it would also constitute noncompliance with your Corps permit. The NMFS is the appropriate authority to determine compliance with the terms and conditions of its opinion and with the ESA.

d. Permittee shall fully implement all applicable Project Design Criteria (PDC) of the SLOPES V Stormwater, Transportation and Utilities programmatic biological opinion. A detailed list of the PDCs are enclosed (Enclosure 3). The applicable PDCs for the project include numbers: 6-7, 13-14, 18, 20-23, 25-27, 30-31, 34, 37, and 38.

The requirements of the Endangered Species Act were met through a programmatic biological opinion as listed in the special condition above. The complete text of the biological opinion is available for your review at <https://www.nwp.usace.army.mil/environment/>. Please note, you must submit an *Action Completion Report, Fish Salvage Report, and Site Restoration/Compensatory Mitigation Report* form which are provided in Enclosure 3. Please submit the reports and any other reports associated with this permit to either the letterhead address above or by email to [cenwp.notify@usace.army.mil](mailto:cenwp.notify@usace.army.mil). For submittals by email, the email subject line shall include the Corps project number listed above and the name of the county where the project is located.

We have reviewed your project pursuant to the requirements of the Endangered Species Act, the Magnuson-Stevens Fishery Conservation and Management Act and the National Historic Preservation Act. We have determined the project complies with the requirements of these laws provided you comply with all of the permit general and special conditions.

At this time, the DEQ has not completed a 401 WQC decision for this project. Before proceeding with the work authorized by this NWP, you must obtain a 401 WQC or certification waiver from the DEQ. Please contact the DEQ regarding this requirement at: 401 Water Quality Permit Coordinator, Oregon Department of Environmental Quality, 700 NE Multnomah Street, Suite 600, Portland, Oregon, 97232, by telephone at (503) 229-5623, or visit <https://www.oregon.gov/deq/wq/wqpermits/Pages/Section-401-Nationwide.aspx>. After obtaining a 401 WQC or a waiver for certification, you must submit a copy of the 401 WQC or waiver to our office. The conditions of the 401 WQC will become conditions of this NWP verification. This NWP verification will become effective upon our receipt of the 401 WQC. You may then proceed with construction.

The proposed work is not authorized by this NWP if the DEQ denies the 401 WQC. Please contact us if the 401 WQC is denied.

If the DEQ has not provided you with a 401 WQC decision by April 16, 2020 or the DEQ has not coordinated with the Corps to establish a time extension to provide the 401 WQC, your requirement to obtain a 401 WQC becomes waived. You may then proceed with construction. We will notify you if the time period for DEQ to provide the 401 WQC is extended.

The verification of this NWP is valid until March 18, 2022, unless the NWP is modified, reissued, or revoked prior to that date. If the authorized work has not been completed by that date and you have commenced or are under contract to commence this activity before March 18, 2022, you will have until March 18, 2023, to complete the activity under the enclosed terms and conditions of this NWP. If the work cannot be completed by March 18, 2023, you will need to obtain a new NWP verification or authorization by another type of Department of the Army permit.

Our verification of this NWP is based on the project description and construction methods provided in your permit application. If you propose changes to the project, you must submit revised plans to this office and receive our approval of the revisions prior to performing the work. Failure to comply with all terms and conditions of this NWP verification invalidates this authorization and could result in a violation of Section 404 of the Clean Water Act. You must also obtain all local, state, and other federal permits that apply to this project.

Upon completing the authorized work, you must fill out and return the enclosed *Compliance Certification* form (Enclosure 4). We would like to hear about your experience working with the Portland District, Regulatory Branch. Please complete a customer service survey form at the following address:  
[http://corpsmapu.usace.army.mil/cm\\_apex/f?p=regulatory\\_survey](http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey).

If you have any questions regarding this NWP verification, please contact Ms. Carrie Bond by telephone at (503) 808-4387, or by email at [Carrie.L.Bond@usace.army.mil](mailto:Carrie.L.Bond@usace.army.mil).

FOR THE COMMANDER, AARON L. DORF, COLONEL, CORPS OF ENGINEERS,  
DISTRICT COMMANDER:

For: William D. Abadie  
Chief, Regulatory Branch

Enclosures

cc:

Mason, Bruce, and Girard, Inc. (Stuart Myers, [smyers@masonbruce.com](mailto:smyers@masonbruce.com))  
Oregon Department of State Lands (Huffman)  
Oregon Department of Environmental Quality ([401applications@deq.state.or.us](mailto:401applications@deq.state.or.us))

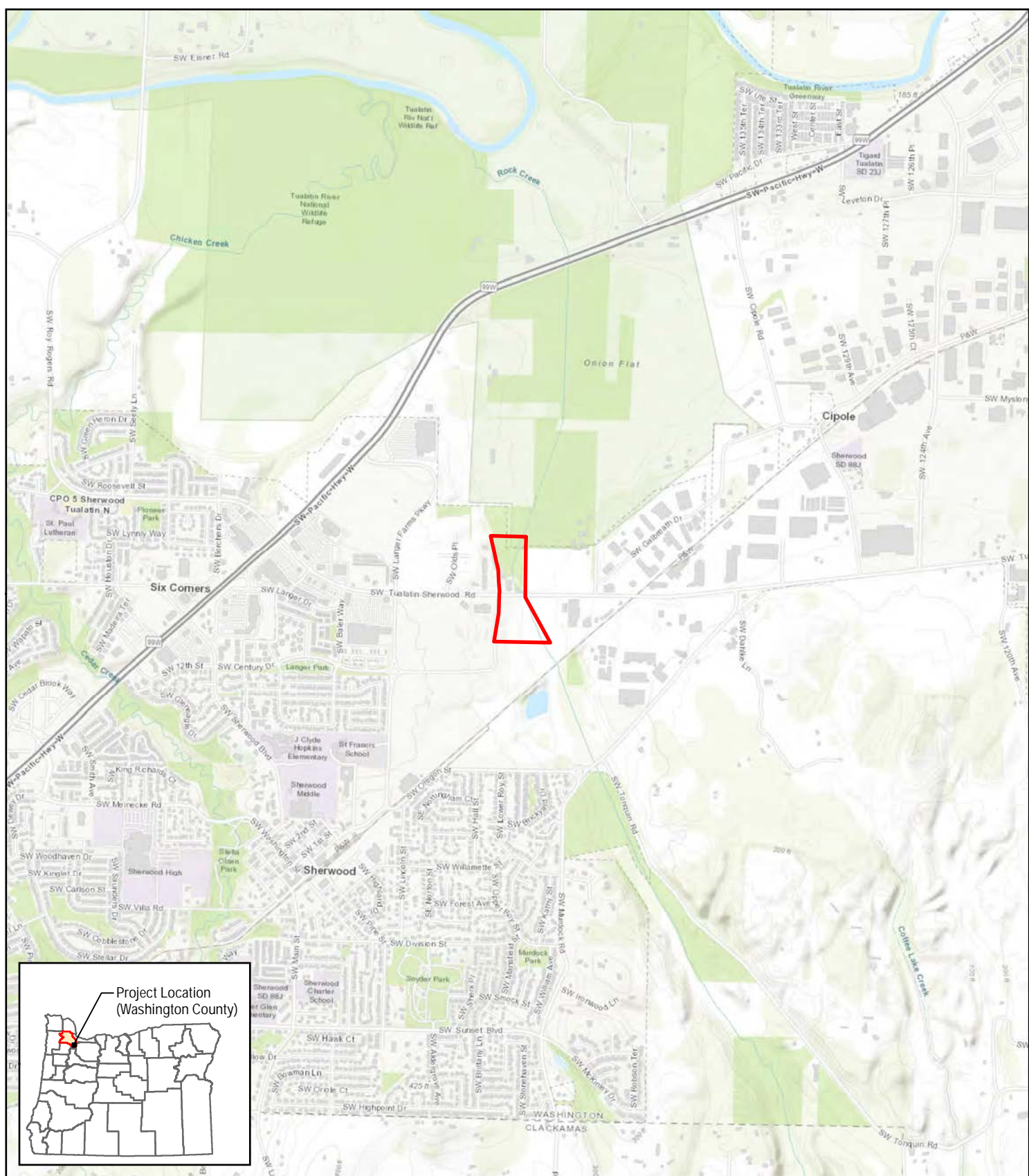


Figure 1.  
Vicinity Map



 Project Study Area (PSA)

Rock Creek Sanitary Trunk Upsizing Project  
City of Sherwood  
Washington County, Oregon

Source: Basemap from ESRI World Topographic Map; PSA from Murraysmith. Reproduced for informational purposes and may not be suitable for legal, engineering or surveying purposes. Conclusions drawn from such information are the responsibility of the user.

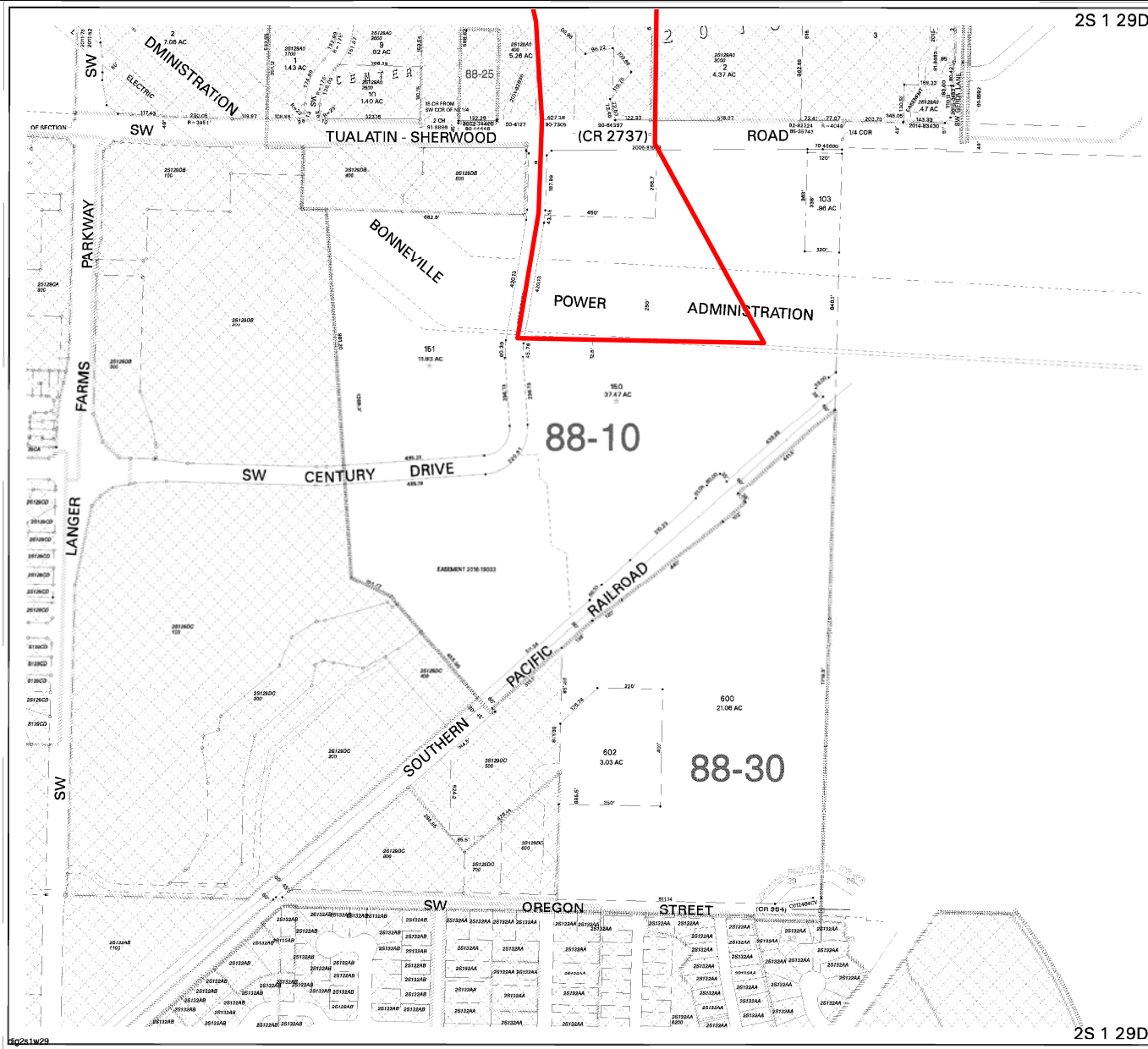


0 600 1,200 2,400 Feet

City of Sherwood Sewer upgrade Figure 1-7/11/2019







2S 1 29D

WASHINGTON COUNTY OREGON  
SE 1/4 SECTION 29 T2S R1W W.M.  
SCALE 1" = 200'

36	31	32	33	34	35	36	31
1	6	5	4	3	2	1	6
12	7	8	9	10	11	12	7
13	18	17	16	15	14	13	18
24	19	20	21	22	23	24	19
25	30	29	28	27	26	25	30
36	31	32	33	34	35	36	31
1	6	5	4	3	2	1	6

FOR ADDITIONAL MAPS VISIT OUR WEBSITE AT  
[www.co.washington.or.us](http://www.co.washington.or.us)

BB	BA	AB	AA
B			A
BC	BD	AC	AD
SECTION 29			
CB	CA	DB	DA
C			D
CC	CD	DC	DD

Cancelled Taxlots For: 2S129D  
401,000,000, 411,000,000, 421,000,000, 431,000,000, 441,000,000, 451,000,000, 461,000,000, 471,000,000, 481,000,000, 491,000,000, 501,000,000, 511,000,000, 521,000,000, 531,000,000, 541,000,000, 551,000,000, 561,000,000, 571,000,000, 581,000,000, 591,000,000, 600,000,000

SCALE 1" = 200'

ASSESSMENT  
CARTOGRAPHY  
INCORPORATED

PLOT DATE: August 02, 2016  
FOR ASSESSMENT PURPOSES  
ONLY - DO NOT RELY ON  
FOR OTHER USE

Map areas delineated by either grey shading or a cross-hatched pattern are for reference only and may not indicate the most current property boundaries. Please consult the appropriate map for the most current information.

SHERWOOD  
2S 1 29D

Figure 2b.  
Tax Lot Map

Rock Creek Sanitary Trunk Upsizing Project  
City of Sherwood  
Washington County, Oregon

Project Study Area (PSA)

Source: Tax lot map from ORMAP; PSA from Murraysmith. Reproduced for informational purposes and may not be suitable for legal, engineering or surveying purposes. Conclusions drawn from such information are the responsibility of the user.



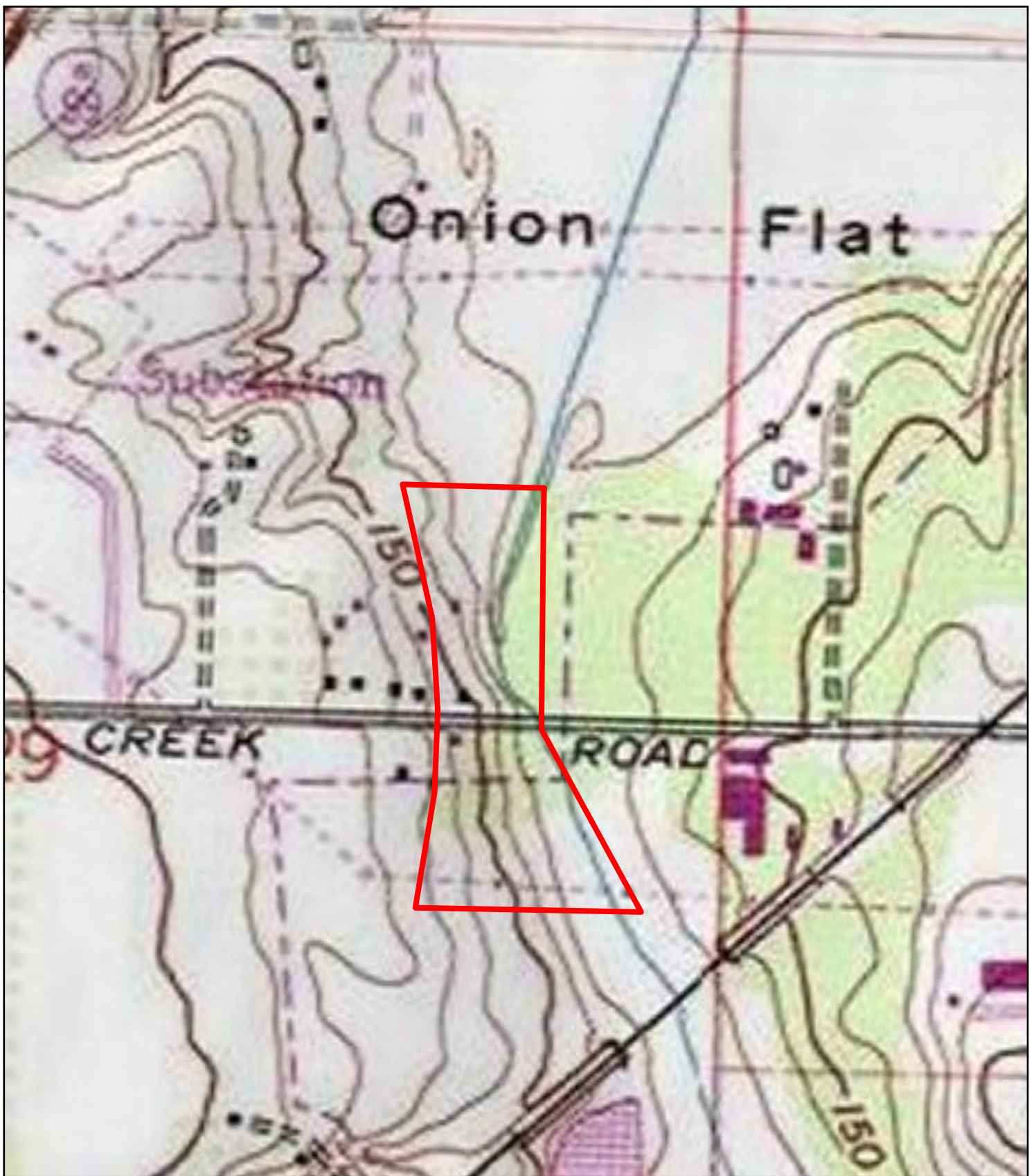



Figure 3.  
USGS Topographic Map  
Sherwood Quadrangle

 Project Study Area (PSA)

Rock Creek Sanitary Trunk Upsizing Project  
City of Sherwood  
Washington County, Oregon

**MB&G**

Source: Basemap from ESRI World Topographic Map; PSA from MurraySmith. Reproduced for informational purposes and may not be suitable for legal, engineering or surveying purposes. Conclusions drawn from such information are the responsibility of the user.



0 150 300 600 Feet

City of Sherwood Sewer Upgrade Top. IPA - 12/16/2018

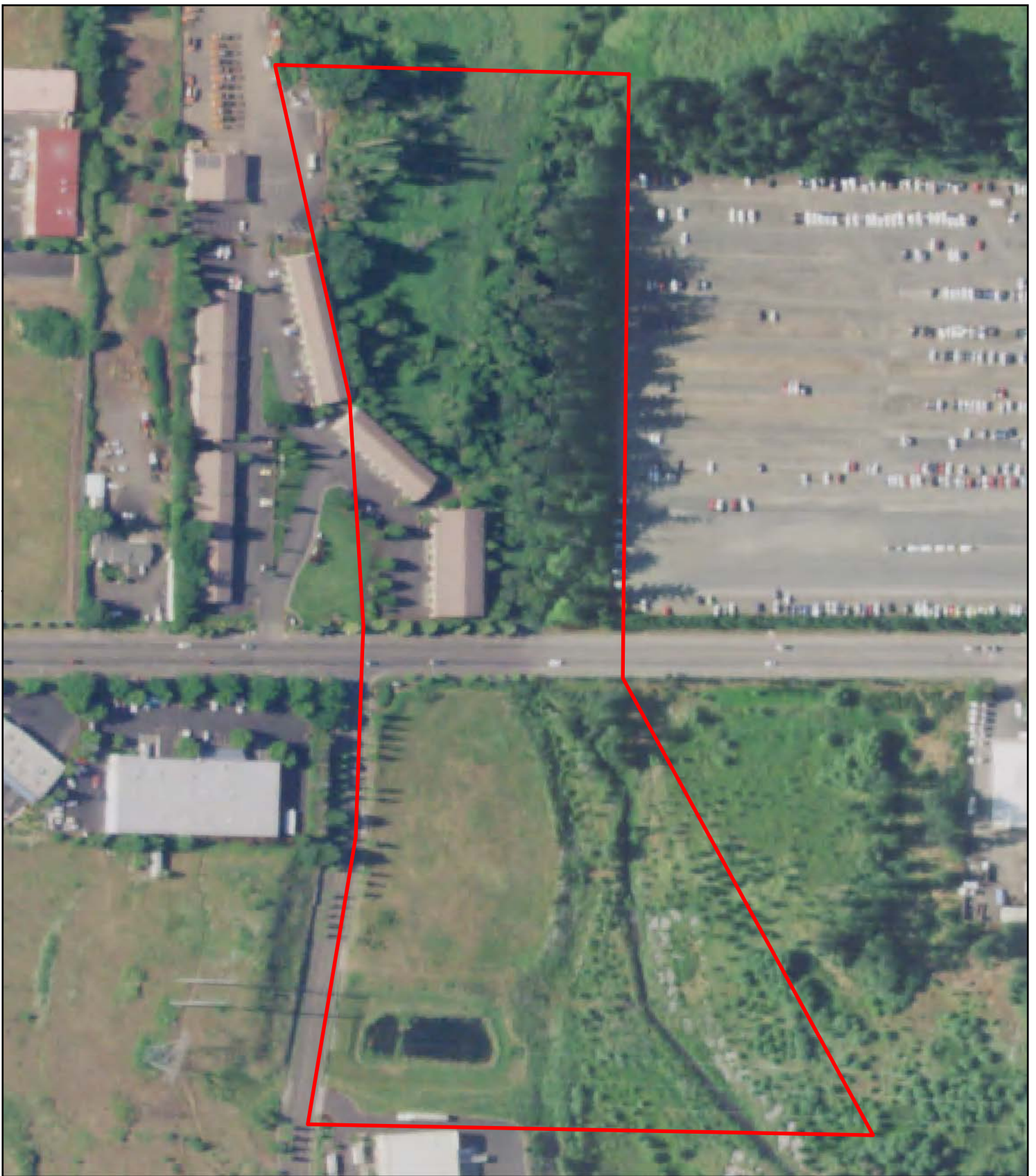


Figure 4.  
Aerial Imagery (NAIP)

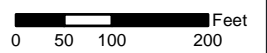
Imagery acquisition date: June 5, 2016

 Project Study Area (PSA)

Rock Creek Sanitary Trunk Upsizing Project  
City of Sherwood  
Washington County, Oregon



Source: Aerial imagery from NAIP, acquired on June 5, 2016; PSA from MB&G. Reproduced for informational purposes and may not be suitable for legal, engineering, or surveying purposes. Conclusions drawn from such information are the responsibility of the user.



City of Sherwood Sewer upgrade Figure 5-7/11/2019

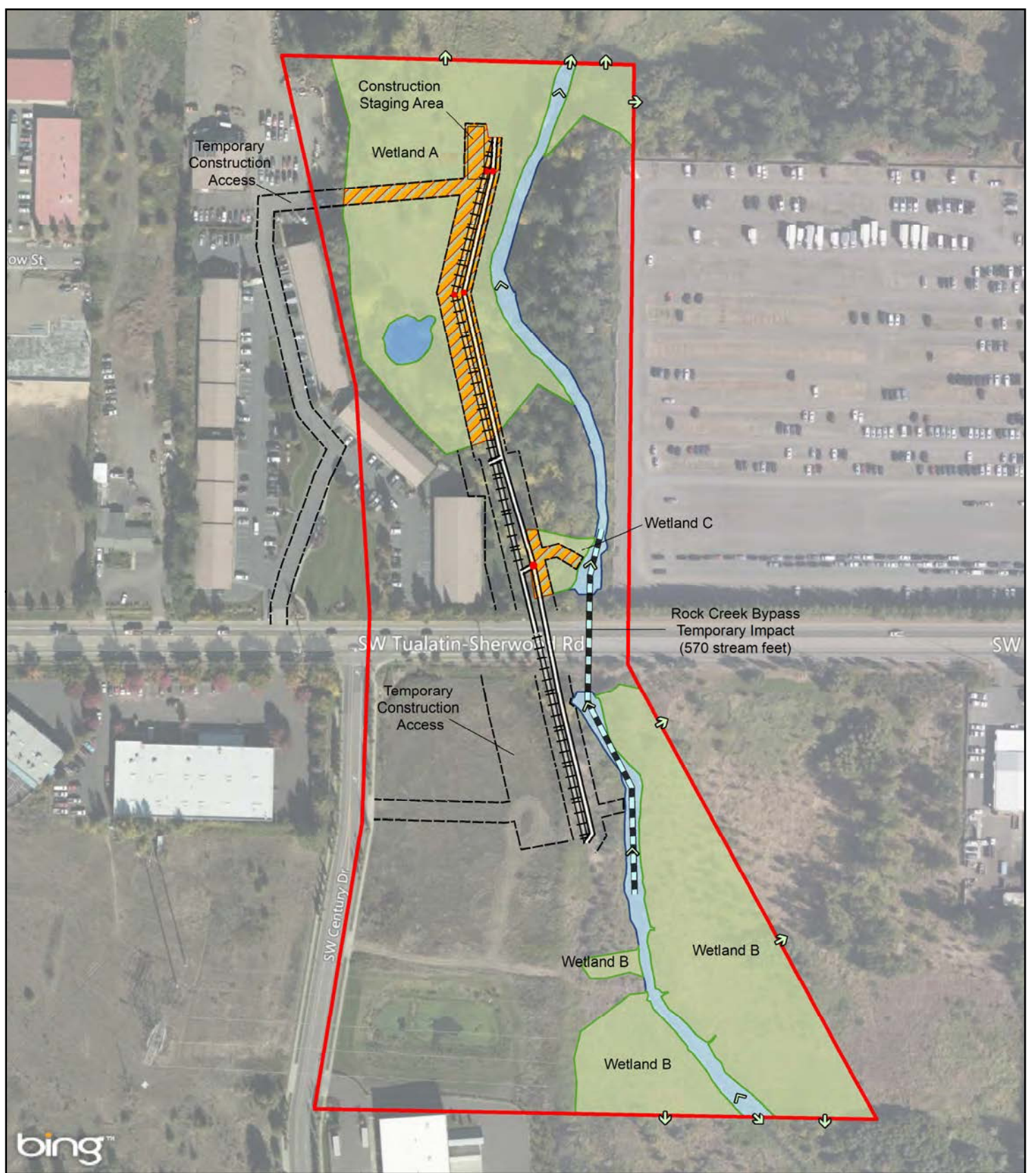













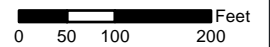
Figure 5.  
Impacts to Wetlands/Waters

Rock Creek Sanitary Trunk Upsizing Project  
City of Sherwood  
Washington County, Oregon

- |   |                                      |   |                        |
|---|--------------------------------------|---|------------------------|
|  | Project Study Area (PSA)             |  | Rock Creek             |
|  | Proposed Sewer Alignment             |  | Small Pond             |
|  | Decommissioning Existing Sewer Lines |  | Wetland                |
|  | Construction Limits / API            |  | Flow Direction         |
|  | Temporary Wetland Impact             |  | Extends Outside of PSA |
|  | Permanent Wetland Impacts (Manholes) |   |                        |

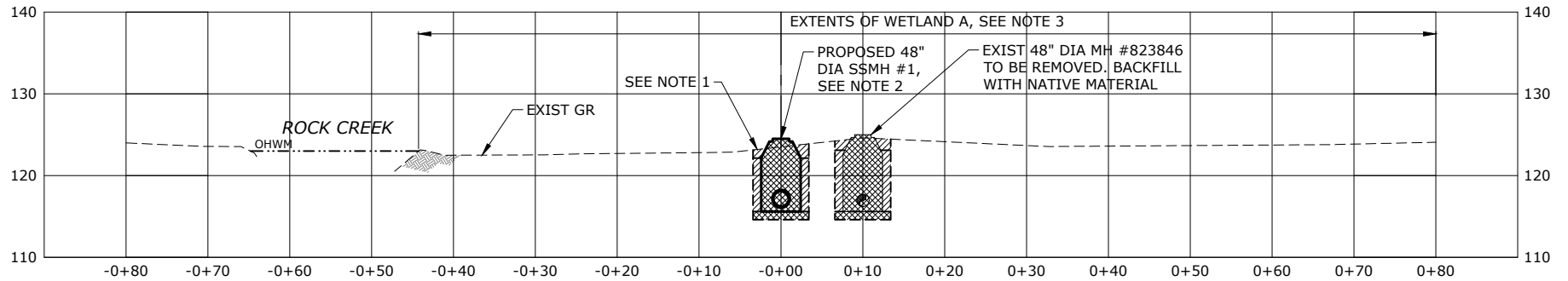
**MB&G**

Source: Aerial imagery from Microsoft Bing; PSA and Wetlands/Waters from MB&G; design data from Murraysmith. Reproduced for informational purposes and may not be suitable for legal, engineering, or surveying purposes. Conclusions drawn from such information are



JPA Impacts Figure - 12/30/2019

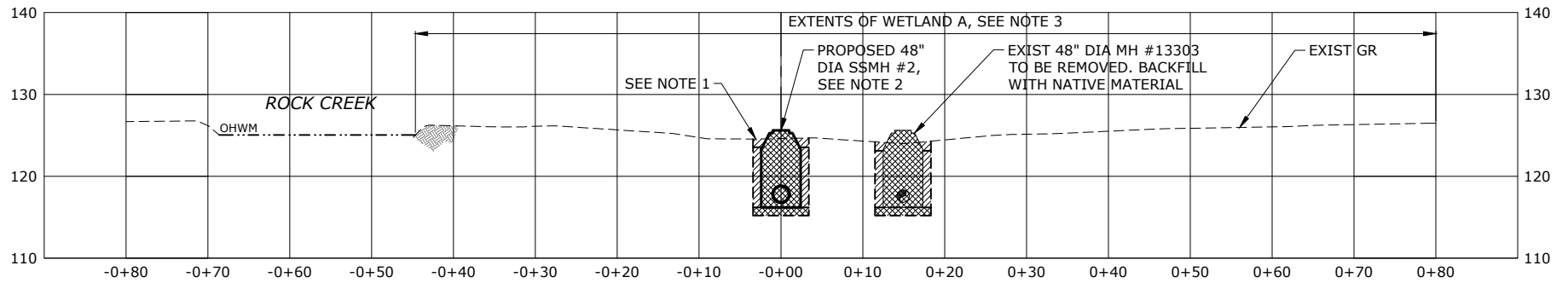




**SECTION - EXISTING MANHOLE 823846 REMOVAL AND SSMH 1 INSTALLATION**

SCALE: 1"=20'

A  
JPA-1



**SECTION - EXISTING MANHOLE 13303 REMOVAL AND SSMH2 INSTALLATION**

SCALE: 1"=20'

B  
JPA-1

**NOTES:**

1. CONTRACTOR TO REMOVE AND PRESERVE TOP 12" OF EXISTING TOPSOIL TO BE REPLACED IN KIND AFTER CONSTRUCTION OF PROPOSED SANITARY SEWER.
2. EXCAVATION FOR PROPOSED SANITARY SEWER MANHOLES TO BE BACKFILLED WITH STOCKPILED NATIVE MATERIAL. 1' THICK LAYER OF IMPORTED GRANULAR FILL TO BE PLACED AS BASE MATERIAL PER CWS STANDARDS.
3. EXTENTS OF WETLAND A CONTINUE PAST RIGHT STATION SHOWN IN SECTION VIEW. SEE FIGURE JPA-1. IMPACTS ARE NOT ANTICIPATED IN THIS AREA OF WETLAND A.

**LEGEND**



-  PERMANENT FILL/REMOVAL
-  TEMPORARY FILL/REMOVAL



Figure JPA-2

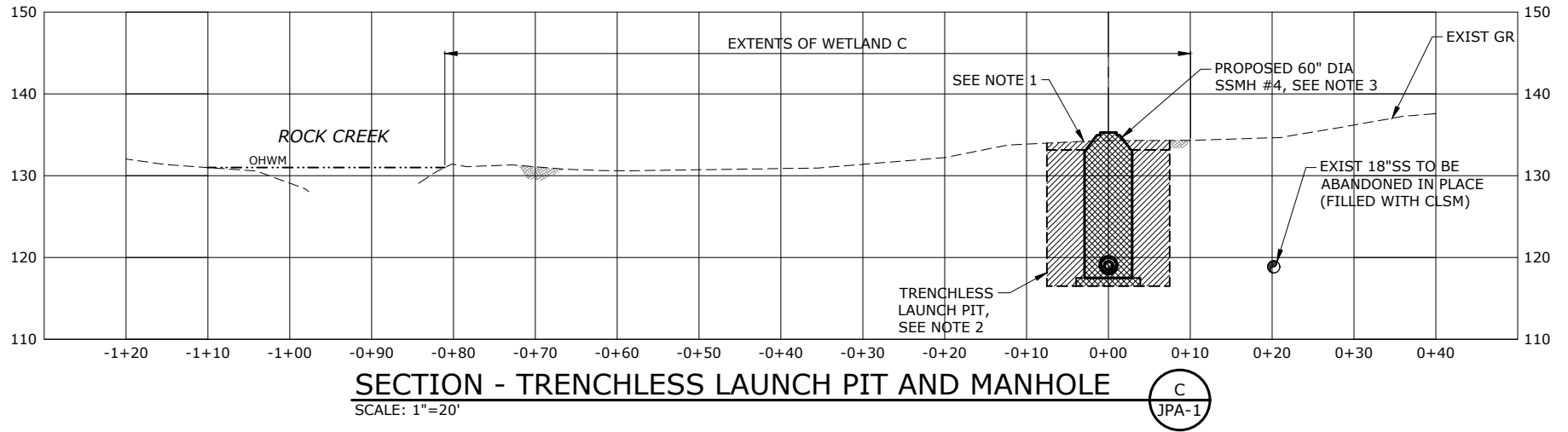
**Rock Creek Sanitary Trunk Line  
Upsizing Project - Phase 1**

**Wetland A  
Site Sections - A and B**

January 2020



19-2481.402



**NOTES:**

1. CONTRACTOR TO REMOVE AND PRESERVE TOP 12" OF EXISTING TOPSOIL TO BE REPLACED IN KIND AFTER CONSTRUCTION OF PROPOSED SANITARY SEWER.
2. TRENCHLESS LAUNCH PIT TO BE BACKFILLED WITH STOCKPILED NATIVE MATERIAL.
3. EXCAVATION FOR PROPOSED SANITARY SEWER MANHOLES TO BE BACKFILLED WITH STOCKPILED NATIVE MATERIAL. 1' THICK LAYER OF IMPORTED GRANULAR FILL, TO BE PLACED AS BASE MATERIAL PER CWS STANDARDS.

**LEGEND**

- PERMANENT FILL/REMOVAL
- TEMPORARY FILL/REMOVAL

Figure JPA-3

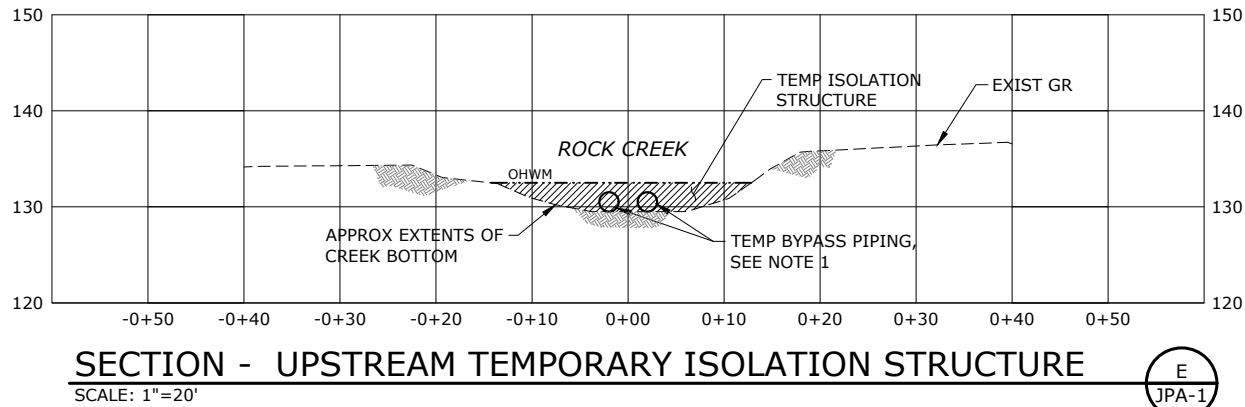
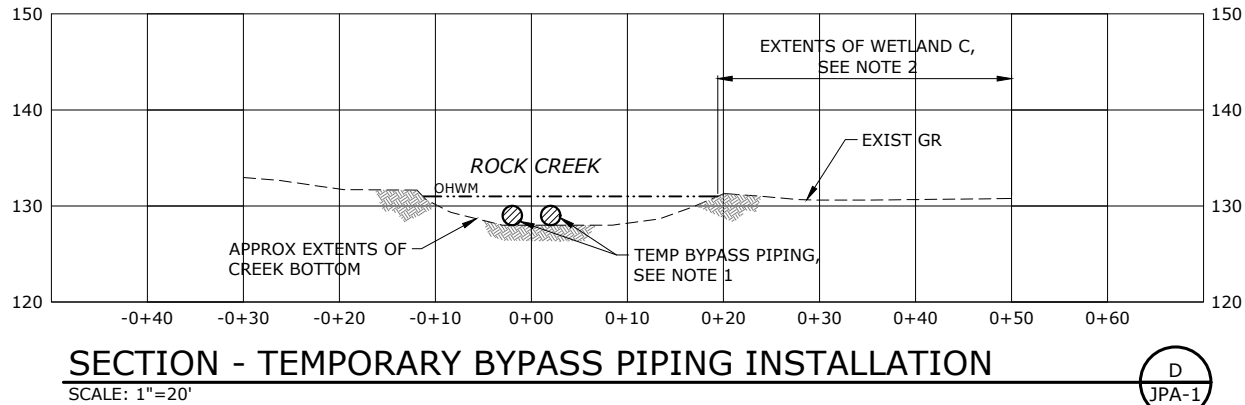
**City of  
Sherwood  
Oregon**

**Rock Creek Sanitary Trunk Line  
Upsizing Project - Phase 1**

---

**Wetland C** January 2020  
**Site Section - C**

19-2481.402



**NOTES:**

1. CONTRACTOR TO INSTALL TEMPORARY BYPASS PIPING ON NATIVE MATERIAL AT BOTTOM OF EXISTING CREEK.
2. EXTENTS OF WETLAND C CONTINUE PAST RIGHT STATION SHOWN IN SECTION VIEW. SEE FIGURE JPA-1.

**LEGEND**

 TEMPORARY FILL/REMOVAL



Figure JPA-4

**Rock Creek Sanitary Trunk Line  
Upsizing Project - Phase 1**

Rock Creek Dewatering January 2020  
Site Section - D and E



19-2481.402

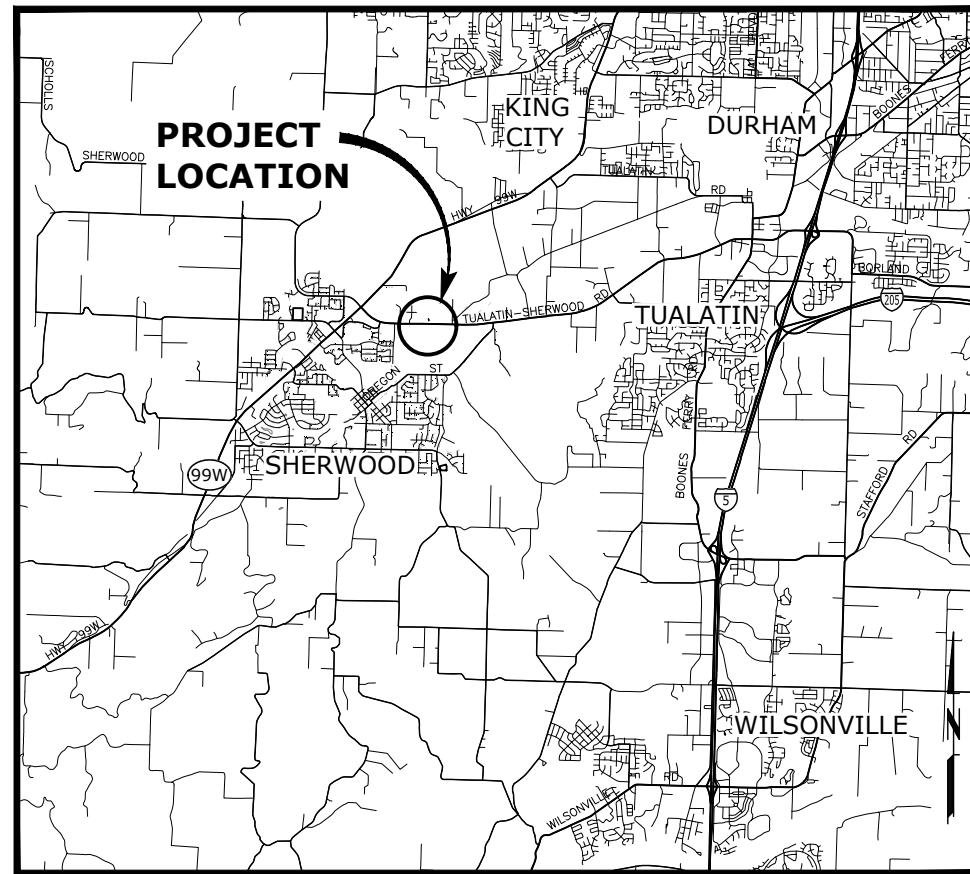




# CITY OF SHERWOOD ROCK CREEK SANITARY TRUNK LINE UPSIZING PROJECT - PHASE I

**DECEMBER 2019**

**60% SUBMITTAL**



**VICINITY MAP**  
SCALE: 1"=5,000'

## INDEX OF DRAWINGS

### GENERAL

- 1 G-1 COVER, INDEX OF DRAWINGS, VICINITY AND LOCATION MAPS
- 2 G-2 GENERAL NOTES
- 3 G-3 ABBREVIATIONS
- 4 G-4 SYMBOLS AND LEGEND
- 5 G-5 SITE/SHEET LAYOUT

### TRAFFIC CONTROL

- 6 TC-1 TRAFFIC CONTROL PLAN SW TUALATIN-SHERWOOD RD
- 7 TC-2 PEDESTRIAN DETOUR PLAN SW TUALATIN-SHERWOOD RD

### EROSION AND SEDIMENT CONTROL

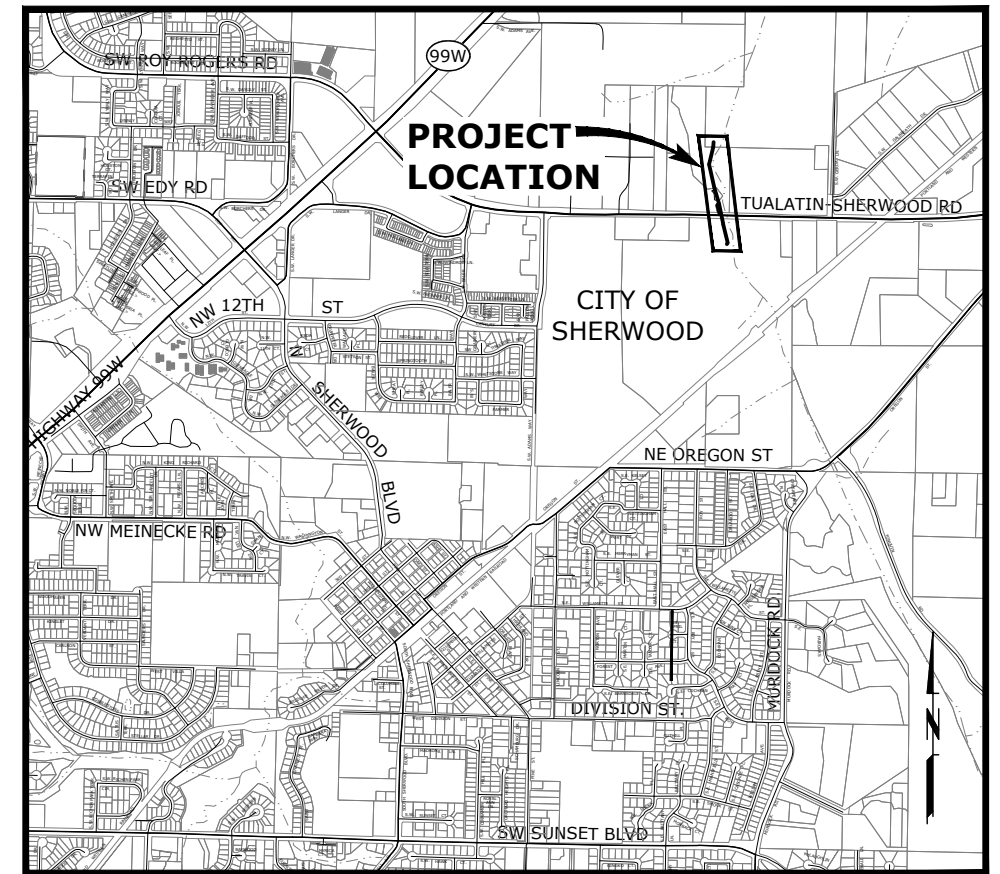
- 8 ESC-1 EROSION AND SEDIMENT CONTROL COVER SHEET AND GENERAL NOTES
- 9 ESC-2 EROSION AND SEDIMENT CONTROL PLAN - 1
- 10 ESC-3 EROSION AND SEDIMENT CONTROL PLAN - 2
- 11 ESC-4 EROSION AND SEDIMENT CONTROL DETAILS - 1
- 12 ESC-5 EROSION AND SEDIMENT CONTROL DETAILS - 2
- 13 ESC-6 DEWATERING PLAN
- 14 ESC-7 DEWATERING DETAILS

### CIVIL

- 15 C-1 TREE PROTECTION AND REMOVAL PLAN - 1
- 16 C-2 TREE PROTECTION AND REMOVAL PLAN - 2
- 17 C-3 SEWER PLAN AND PROFILE STA 1+00 TO STA 5+00
- 18 C-4 SEWER PLAN AND PROFILE STA 5+00 TO STA 10+00
- 19 C-5 SEWER PLAN AND PROFILE STA 10+00 TO STA 14+54
- 20 C-6 SEWER PLAN AND PROFILE STA A1+00 TO STA A2+18 AND SLOPE DETAIL
- 21 C-7 SW TUALATIN-SHERWOOD RD TRENCHLESS CROSSING PLAN AND PROFILE
- 22 C-8 TRENCHLESS & SETTLEMENT INSTRUMENTATION SECTIONS & DETAILS
- 23 C-9 EARTH PRESSURE DIAGRAM <TO FOLLOW>
- 24 C-10 SITE GRADING PLAN
- 25 C-11 CIVIL DETAILS - 1
- 26 C-12 CIVIL DETAILS - 2 <TO FOLLOW>
- 27 C-13 CLEAN WATER SERVICES STANDARD DETAILS - 1
- 28 C-14 CLEAN WATER SERVICES STANDARD DETAILS - 2

### LANDSCAPING / SURFACE RESTORATION

- 29 L-1 RESTORATION AND PLANTING PLAN
- 30 L-2 RESTORATION AND PLANTING DETAILS



**LOCATION MAP**  
SCALE: 1"=1,000'

**murraysmith**

888 SW 5TH AVENUE, SUITE 1170  
PORTLAND, OREGON 97204  
P 503.225.9010



Know what's below.  
Call before you dig.

THIS DESIGN COMPLIES WITH ORS 92.044 (7) IN THAT NO UTILITY INFRASTRUCTURE IS DESIGNED TO BE WITHIN ONE (1) FOOT OF A SURVEY MONUMENT LOCATION SHOWN ON A SUBDIVISION OR PARTITION PLAT. NO DESIGN EXCEPTION NOR FINAL FIELD LOCATION CHANGES SHALL BE PERMITTED IF THAT CHANGE WOULD CAUSE ANY UTILITY INFRASTRUCTURE TO BE PLACED WITHIN THE PROHIBITED AREA.

ATTENTION: OREGON LAW REQUIRES THE CONTRACTOR TO FOLLOW THE RULES ADOPTED BY THE OREGON UTILITY NOTIFICATION CENTER. THOSE RULES ARE SET FORTH IN OAR 952-001-0010 THROUGH OAR 952-001-0090. THE CONTRACTOR MAY OBTAIN COPIES OF THE RULES BY CALLING THE UTILITY NOTIFICATION CENTER. (NOTE: THE TELEPHONE NUMBER FOR THE OREGON UTILITY NOTIFICATION CENTER IS 503-246-6699.)

## GENERAL NOTES

- CONTRACTOR SHALL OBTAIN ALL NECESSARY LOCAL, COUNTY, STATE, AND UTILITY CONSTRUCTION PERMITS, AND SHALL CONTACT EACH PERMITTING AGENCY AT LEAST TWO (2) BUSINESS DAYS PRIOR TO STARTING WORK. CONTRACTOR SHALL OBTAIN ALL REQUIRED LICENSES BEFORE STARTING CONSTRUCTION.
- THE LOCATIONS OF ALL EXISTING UNDERGROUND FACILITIES SHOWN ON THE PLANS ARE BASED ON A FIELD SURVEY AND INFORMATION SUPPLIED BY UTILITY COMPANIES. LOCATIONS ARE NOT GUARANTEED TO BE COMPLETE OR ACCURATE. THE CONTRACTOR SHALL VERIFY LOCATIONS, ELEVATIONS, TYPE AND SIZES OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTING NEW PIPING/CONDUITS AND SHALL ADJUST NEW PIPING/CONDUITS AS REQUIRED. POTHOLING AND TRENCH EXCAVATION SHALL SUFFICIENTLY PRECEDE LAYING OF PIPE TO ALLOW REQUIRED ELEVATION AND ALIGNMENT ADJUSTMENTS TO BE ACCOMPLISHED WITHOUT REWORK. ADJUSTMENTS SHALL BE EXPECTED AND CONSIDERED INCIDENTAL. CONTRACTOR SHALL NOTIFY ENGINEER IMMEDIATELY OF ANY CONFLICTS NOT SHOWN ON THE PLANS AND SHALL KEEP EXISTING UTILITIES IN SERVICE AND PROTECT THEM DURING CONSTRUCTION. WHERE INTERRUPTION OF EXISTING FACILITIES IS REQUIRED, CONTRACTOR SHALL PROVIDE 72 HOUR NOTICE TO ENGINEER AND THE AFFECTED UTILITY. CONTRACTOR SHALL ARRANGE FOR THE RELOCATION OF ANY IN CONFLICT WITH THE PROPOSED CONSTRUCTION.
- THE CONTRACTOR SHALL COMPLY WITH ALL REQUIREMENTS OF ORS 757.541 TO 757.571. THE CONTRACTOR SHALL NOTIFY EACH UNDERGROUND UTILITY AT LEAST 48 BUSINESS-DAY HOURS, BUT NOT MORE THAN 10 BUSINESS DAYS, PRIOR TO EXCAVATING, BORING, OR POTHOLING.
- NO ADDITIONAL PAYMENT SHALL BE MADE FOR UTILITY RELOCATION COORDINATION OR DELAYS CAUSED BY UTILITY CONFLICTS. ALL COSTS RELATED TO UTILITY COORDINATION AND RELOCATION, INCLUDING ADDITIONAL POTHOLING, ARE TO BE CONSIDERED INCIDENTAL AND INCLUDED IN THE UNIT PRICES OF THE BID. NO ADDITIONAL PAYMENT SHALL BE MADE FOR REWORK AND DELAYS RESULTING FROM FAILURE TO POTHOLE FOR UTILITIES SUFFICIENTLY IN ADVANCE OF WORK.
- NOT USED
- SURVEY DATA COMPILED BY AKS ENGINEERING & FORESTRY. ALL ELEVATIONS SHOWN ARE BASED ON VERTICAL DATUM NAVD 88. CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTION SURVEYS. SEE CONTRACT DOCUMENT FOR SURVEY REQUIREMENTS.
- A LOCAL DATUM PLANE SCALED FROM OREGON STATE PLANE NORTH 3601 NAD83(2011) EPOCH 2010.0000 HAS BEEN ESTABLISHED BY AKS BY HOLDING A PROJECT MEAN GROUND COMBINED SCALE FACTOR OF 1.0001033898 AT A CALCULATED CENTRAL PROJECT POINT WITH GRID VALUES OF (NORTH 453397.31, EAST 7552849.06). THE MERIDIAN CONVERGENCE ANGLE AT THE CALCULATED CENTRAL POINT IS -1°39'09". THE STATE PLANE COORDINATES WERE DERIVED FROM THE TRIMBLE VRS NOW NETWORK.
- ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO THE PLANS AND PROJECT SPECIFICATIONS.
- CONTRACTOR SHALL KEEP AND MAINTAIN A CURRENT SET OF DRAWINGS ON SITE. CONTRACTOR TO KEEP ACCURATE "AS-BUILT" RECORD COPY OF PLANS INDICATING ALL CHANGES IN GRADE, ALIGNMENT, FITTINGS AND MATERIALS INSTALLED AND ANY OTHER UTILITIES OR OBSTACLES NOT SO INDICATED ON THESE PLANS. "AS-BUILT" PLANS TO BE RETURNED TO ENGINEER AT COMPLETION OF PROJECT.
- CONTRACTOR SHALL MAINTAIN ACCESS TO ALL HOMES AND BUSINESSES AT ALL TIMES. CONTRACTOR SHALL MAINTAIN ACCESS FOR MAIL, TRASH COLLECTION AND SCHOOL BUS SERVICES AT ALL TIMES. PROVIDE WRITTEN NOTICE TO ALL PROPERTY OWNERS AT LEAST TWO BUSINESS DAYS IN ADVANCE OF WORK IN AND/OR CROSSING OF DRIVEWAYS.
- CONTRACTOR SHALL NOTIFY THE ENGINEER AND OWNER 48 HOURS BEFORE STARTING CONSTRUCTION, AND 24 HOURS BEFORE RESUMING WORK AFTER SHUTDOWNS EXCEPT FOR NORMAL RESUMPTION OF WORK FOLLOWING SATURDAYS, SUNDAYS, OR HOLIDAYS. CONTRACTOR SHALL PROVIDE WRITTEN NOTICE TO THE ENGINEER A MINIMUM OF 48 HOURS PRIOR TO ANY TESTING OR REQUIRED INSPECTION.
- ANY ALTERATION OR VARIANCE FROM THESE PLANS, EXCEPT MINOR FIELD ADJUSTMENT NEEDED TO MEET EXISTING FIELD CONDITIONS, SHALL FIRST BE APPROVED BY THE ENGINEER. ANY ALTERATIONS OR VARIANCE FROM THESE PLANS SHALL BE DOCUMENTED ON CONSTRUCTION FIELD PRINTS AND TRANSMITTED TO THE ENGINEER. ANY PROPOSED CHANGES IN CONSTRUCTION PLANS MUST BE SUBMITTED IN WRITING AND APPROVED BY ENGINEER PRIOR TO COMMENCING WORK.
- CONTRACTOR SHALL PROTECT ALL PROPERTY CORNERS, SURVEY MONUMENTS AND CONTROL POINTS. SURVEY MONUMENTS OF THIS TYPE DISTURBED DURING CONSTRUCTION SHALL BE REPLACED AT CONTRACTOR'S EXPENSE, WITH APPROPRIATE SURVEYS FILED WITH THE COUNTY SURVEYOR.
- THE CONTRACTOR SHALL DISPOSE OF ALL REMOVED OR REPLACED MATERIAL AND EQUIPMENT IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS.
- ALL STRUCTURES, LOTS, LANDSCAPING, SWALES, DITCHES, SPEED BUMPS, FENCES, WALLS, MAILBOXES, SIGNS, POLES, GUY WIRES, PIPING, AND UTILITIES DISTURBED DURING CONSTRUCTION TO BE RESTORED TO EXISTING CONDITION UNLESS OTHERWISE SPECIFIED. CONTRACTOR SHALL REPAIR ALL UTILITY SERVICES DAMAGED DURING CONSTRUCTION. ALL SUCH REPAIRS SHALL BE CONSIDERED INCIDENTAL TO PIPELINE INSTALLATION.
- CONTRACTOR SHALL PROTECT TRAFFIC AT ALL TIMES DURING CONSTRUCTION. ALL TRAFFIC CONTROL MEASURES SHALL BE APPROVED BY CITY, COUNTY AND STATE AS REQUIRED AND IN PLACE PRIOR TO ANY CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL PLANS TO THE ENGINEER PRIOR TO COMMENCING ANY WORK WITHIN THE PUBLIC RIGHT-OF-WAY. SEE SPECIAL SPECIFICATIONS FOR DETAILS. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING EMERGENCY VEHICLE ACCESS TO ALL PROPERTIES AT ALL TIMES.

- CONSTRUCTION SHALL BE CONFINED TO PERMANENT EASEMENTS, TEMPORARY CONSTRUCTION EASEMENTS, OR PUBLIC RIGHT-OF-WAY ONLY. WORK SHALL NOT ENCR OACH BEYOND THE RIGHT-OF-WAY WITHOUT APPROVAL. IF AREAS OR FEATURES OUTSIDE DESIGNATED CONSTRUCTION ZONES SUSTAIN IMPACT FROM CONTRACTORS ACTIVITIES, CONTRACTOR SHALL RESTORE TO PRECONSTRUCTION CONDITION AT NO COST TO THE CITY.
- CONTRACTOR TO INSTALL PERIMETER FENCE AROUND THE WORK ZONE AND LIMIT ALL CONSTRUCTION ACTIVITY INSIDE THE WORK ZONE. NO EQUIPMENT OR SOIL DISTURBANCE ALLOWED OUTSIDE THE WORK ZONE.
- ALL CONCRETE SHALL BE A MINIMUM OF 3300 PSI STRENGTH.
- NOT USED
- NOT USED
- COMPLY WITH OREGON ADMINISTRATION RULE (OAR) CHAPTER 333 RULES FOR REQUIRED WATERLINE - SEWER LINE SEPARATION AND CROSSING REQUIREMENTS.
- ALL PIPING SHALL HAVE A MINIMUM OF 3 FEET OF COVER FROM TOP OF PIPE TO STREET GRADE OR OTHER FINISH GRADE.
- AT THE END OF EACH WORK DAY, ALL OPEN TRENCHES SHALL BE BACKFILLED OR ADEQUATELY FENCED AND PROTECTED FROM THE PUBLIC, AND ALL TRENCHES WITHIN STREETS SHALL BE TEMPORARILY PAVED OR AC COLD PATCHED TO THE SATISFACTION OF THE ENGINEER.
- THE CONTRACTOR SHALL COMPLY WITH ALL CITY OF SHERWOOD REQUIREMENTS FOR WORK IN AND RESTORATION OF CITY STREETS AND RIGHT-OF-WAYS. SEE CURRENT REVISION OF CITY OF SHERWOOD ENGINEERING DESIGN AND STANDARD DETAILS MANUAL FOR DETAILS.
- CONTRACTOR SHALL INSTALL TEMPORARY CONSTRUCTION ZONE SIGNS AT LOCATIONS TO BE DETERMINED BY ENGINEER 10 DAYS PRIOR TO BEGINNING OF CONSTRUCTION. TEMPORARY SIGNS SHALL BE CONSTRUCTED AS SPECIFIED WITHIN THE SPECIAL SPECIFICATIONS. TEMPORARY SIGNS SHALL BE LOCATED BY ENGINEER.
- NO UNDERGROUND WORK SHALL BE "BURIED" UNTIL INSPECTED AND APPROVED BY THE CITY OR OWNER'S REPRESENTATIVE.
- NOT USED
- ALL WORK SHALL BE CONDUCTED BETWEEN THE HOURS OF 7:00AM AND 6:00PM ON NON-HOLIDAY WEEKDAYS. LANE CLOSURES WILL ONLY BE ALLOWED BETWEEN THE HOURS OF 8:00AM AND 6:00PM ON NON-HOLIDAY WEEKDAYS. NO SUNDAY WORK WILL BE ALLOWED. SATURDAY WORK MAY BE ALLOWED VIA A CITY APPROVED SATURDAY WORK REQUEST. SATURDAY WORK REQUESTS MUST BE SUBMITTED AT LEAST 72 HOURS IN ADVANCE OF DESIRED WORK DAY.
- ALL WORK AND MATERIALS SHALL COMPLY WITH ALL APPLICABLE CITY CODES AND STANDARDS, THE OREGON STATE HEALTH DIVISION ADMINISTRATION RULES, A.P.W.A. STANDARDS, AND CITY OF SHERWOOD ENGINEERING DESIGN AND DETAILS MANUAL.
- NOT USED
- CONTRACTOR SHALL RESTORE ALL EASEMENT AREAS ASSOCIATED WITH CONSTRUCTION AS STIPULATED IN EASEMENT AND CONTRACT DOCUMENTS. CITY OR OWNER'S REPRESENTATIVE SHALL PROVIDE CONTRACTOR WITH REFERENCE COPY OF ALL EASEMENT AGREEMENT CONDITIONS.
- CONTRACTOR TO PROTECT AND MAINTAIN ALL STORM WATER FACILITIES AND STRUCTURES INCLUDING OUTFALLS, PIPES, RIPRAP, AND INLETS. ANY DAMAGE TO STORM WATER FACILITIES SHALL BE REPLACED AT CONTRACTORS EXPENSE.

## EROSION AND SEDIMENT CONTROL NOTES

- CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION AND SEDIMENTATION CONTROL DURING CONSTRUCTION (ANY TIME OF YEAR) PER THE REQUIREMENTS OF THE CITY OF SHERWOOD, WASHINGTON COUNTY AND THE OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY.
- EFFECTIVE EROSION, DUST, SEDIMENTATION AND DRAINAGE CONTROL IS REQUIRED AT ALL TIMES. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROTECTION OF ALL WORK, ADJACENT PROPERTIES AND DOWNSTREAM FACILITIES FROM EROSION AND SILTATION DURING THE COURSE OF THE WORK. ANY DAMAGE RESULTING FROM SUCH EROSION AND SILTATION SHALL BE CORRECTED AT THE SOLE EXPENSE OF THE CONTRACTOR. SEE SPECIFICATIONS.


## ABANDONMENT NOTES

- AFTER SUCCESSFUL COMPLETION, TESTING, ACCEPTANCE AND UTILIZATION OF THE NEW SEWER, THE EXISTING SEWER SHALL BE ABANDONED IN PLACE.
- ALL EXISTING SEWER TO BE ABANDONED IN PLACE SHALL BE FILLED WITH CONTROLLED LOW STRENGTH MATERIAL (CLSM) AS SPECIFIED WITHIN THE SPECIAL SPECIFICATIONS. CLSM SHALL BE PUMPED IN AND VOLUME MEASURED TO ENSURE NO VOIDS ARE REMAINING. CLSM SHALL BE FINISHED FLUSH WITH INSIDE FACE OF WALL FOR ALL EXISTING MANHOLES TO REMAIN.
- MANHOLES NOTED TO BE REMOVED SHALL BE REMOVED IN THEIR ENTIRETY, INCLUDING BASES, SECTIONS, CONES, TOPS AND COVERS. ALL MANHOLE MATERIALS SHALL BE REMOVED FROM THE SITE AND PROPERLY DISPOSED. THE BOTTOM THREE FEET OF MANHOLE EXCAVATION SHALL BE BACKFILLED WITH BENTONITE TO CREATE AN IMPERVIOUS ZONE, THE REMAINING VOID LEFT FROM THE MANHOLE SHALL BE BACKFILLED WITH NATIVE WETLAND SPOILS FROM THE SITE.
- MANHOLES NOTED TO BE ABANDONED SHALL HAVE THEIR CONES, TOPS AND COVERS REMOVED FROM THE SITE AND PROPERLY DISPOSED. THE EXISTING BASE MAY REMAIN AND EITHER BE FILLED WITH LOW DENSITY GROUT (MAXIMUM STRENGTH OF 150 PSI) OR PEA GRAVEL. IF THE CONTRACTOR ELECTS TO UTILIZE PEA GRAVEL, THE MANHOLE BASE SHALL HAVE HOLES DRILLED THROUGH THE BOTTOM TO ALLOW DRAINAGE. THE VOID ABOVE THE MANHOLE BASE SHALL BE BACKFILLED WITH NATIVE WETLAND SPOILS FROM THE SITE.

G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-G.dwg G-2 12/9/2019 6:07 PM MATT. ESTEP 23.0s (LMS Tech)

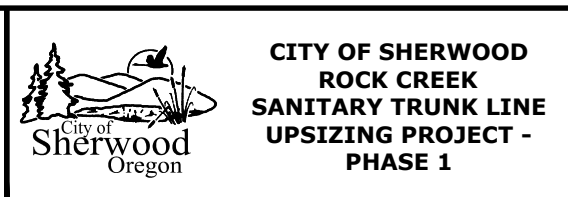
# 60% SUBMITTAL

NO.	DATE	BY	REVISION

NOTICE  
  
 IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JJU  
DESIGNED  
 CAD  
DRAWN  
 BVO  
CHECKED

**PRELIMINARY ONLY**  
 DO NOT USE FOR CONSTRUCTION  
 DECEMBER 2019  
**Murraysmith**  
 www.murraysmith.us



<b>GENERAL NOTES</b>			
PROJECT NO.:	19-2481.402	SCALE:	AS SHOWN
DATE:	DECEMBER 2019		

SHEET  
 G-2  
 2 of X

G:\PDX\_Projects\1912481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-G.dwg G-3 12/9/2019 6:07 PM MATT. ESTEP 23.0s (LMS Tech)

@ AASHTO  AB ABAN(D) ABS ABV AC ACP ADJ ADJC AFF AFG AHR AL ALT AMP ANSI  APPROX APPVD APWA ARCH ARV ASCE  ASSN ASSY ASTM  ATM AUTO AUX AVE AVG AWWA  B&S BC BD BETW BF BFD BFILL BFV BHP BKGD BLDG BLK BLVD BM BMP BO BOC BS BSMT BTF BTU BV BW  C C TO C CARV CATV CB CCP CCW CFM CFS CHAN CHEM CHFR CHKV CI CIP CIPC CISP CJ CL OR C/L CL2 CLG CLJ CLR CLSM CMP CMU CND CO	AT AMERICAN ASSOCIATION OF STATE HIGHWAY & TRANSPORTATION OFFICIALS ANCHOR BOLT ABANDON(ED) ACRYLONITRILE BUTADIENE STYRENE ABOVE / ALCOHOL BY VOLUME ASPHALTIC CONCRETE ASPHALTIC CONCRETE PAVING ADJUSTABLE ADJACENT ABOVE FINISHED FLOOR ABOVE FINISHED GRADE ANCHOR ALUMINUM ALTERNATE AMPERE AMERICAN NATIONAL STANDARDS INSTITUTE APPROXIMATE APPROVED AMERICAN PUBLIC WORKS ASSOCIATION ARCHITECTURAL AIR RELEASE VALVE AMERICAN SOCIETY OF CIVIL ENGINEERS ASSOCIATION ASSEMBLY AMERICAN SOCIETY FOR TESTING & MATERIALS ATMOSPHERE AUTOMATIC AUXILIARY AVENUE AVERAGE AMERICAN WATER WORKS ASSOCIATION  BELL & SPIGOT BOLT CIRCLE BOARD BETWEEN BOTH FACE BACKFLOW PREVENTION DEVICE BACKFILL BUTTERFLY VALVE BRAKE HORSEPOWER BACKGROUND BUILDING BLOCK BOULEVARD BENCHMARK / BEAM BEST MANAGEMENT PRACTICES BLOW-OFF BACK OF CURB BOTH SIDES BASEMENT BOTTOM FACE BRITISH THERMAL UNIT BALL VALVE BOTH WAYS  CELSIUS CENTER TO CENTER COMBINATION AIR RELEASE VALVE CABLE TELEVISION CATCH BASIN CONCRETE CYLINDER PIPE COUNTER CLOCKWISE CUBIC FEET PER MINUTE CUBIC FEET PER SECOND CHANNEL CHEMICAL CHAMFER CHECK VALVE CAST IRON CAST IRON PIPE CAST IN PLACE CONCRETE CAST IRON SOIL PIPE CONSTRUCTION JOINT CENTER LINE CHLORINE CEILING CONTROL JOINT CLEAR CONTROLLED LOW STRENGTH MATERIAL CORRUGATED METAL PIPE CONCRETE MASONRY UNIT CONDUIT CLEANOUT	COL COMB CONC CONN CONST CONT CONTR COORD COP CORP CORR CP CPLG CPVC CR CS CSP CT CTR CU CULV CV CW CWS CY CYL  D DC DEFL DET DI DIA DIM DIR DIST DN DR DS DWG DWN DRIVE DOWNSPOUT DRAWING DOWEL DRAIN WASTE AND VENT DRIVEWAY  E OR ELEC EA ECC EF EL ELB ENCL EOP EQ EQL SP EQUIP ESMT EW EXC EXIST EXP EXP BT EXP JT EXT  F F TO F FAB FB FCA FCO FD FDN FEXT FF FGL FH FIN FIPT FITG FL FLEX FLG FLL FLR FM FO FOC FOF FOM	COLUMN COMBINATION CONCRETE CONNECTION CONSTRUCTION CONTINUOUS / CONTINUATION CONTRACT(OR) COORDINATE COPPER CORPORATION CORRUGATED CONTROL POINT COUPLING CHLORINATED POLYVINYL CHLORIDE CRUSHED ROCK COMBINED SEWER CONCRETE SEWER PIPE COURT CENTER CUBIC CULVERT CONTROL VALVE CLOCKWISE / COLD WATER CLEAN WATER SERVICES CUBIC YARDS CYLINDER LOCK  DRAIN DIRECT CURRENT DEFLECTION DETAIL DUCTILE IRON DIAMETER DIMENSION DIRECTION DISTANCE DOWN DRIVE DOWNSPOUT DRAWING DOWEL DRAIN WASTE AND VENT DRIVEWAY  ELECTRICAL EACH ECCENTRIC EACH FACE ELEVATION ELBOW ENCLOSURE EDGE OF PAVEMENT EQUAL EQUALLY SPACED EQUIPMENT EASEMENT EACH WAY EXCAVATE EXISTING EXPANSION EXPANSION BOLT EXPANSION JOINT EXTERIOR  FAHRENHEIT FACE TO FACE FABRICATE FLAT BAR FLANGED COUPLING ADAPTER FLOOR CLEANOUT FLOOR DRAIN FOUNDATION FIRE EXTINGUISHER FAR FACE FIBERGLASS FIRE HYDRANT FINISH(ED) FEMALE IRON PIPE THREAD FITTING FLOOR LINE FLEXIBLE FLANGE FLOW LINE FLOOR FORCE MAIN FIBER OPTIC FACE OF CONCRETE FACE OF FINISH FACE OF MASONRY	FOS FPM FPS FRP FT FTG FUT FXTR  G GA GAL GALV GC GFA GI GIP GJ GL GLV GND GPD GPH GPM GPS GR GR LN GRTG GV GRVL GYP  HB HC HDPE HDR HDWE HGR HGT HH HM HMAC HNDRL HOA HOR HORIZ HP HPG HPT HR HSB HV HVAC  HWL HWY HYD HYDR  I&C IAW ID IE IF IMPVT IN INCC INFL INJ INSTL INSUL INTER INTR INV IP IPT IR IRRIG  JT JUNC  KPL KVA KW KWY L LAB LAV	FACE OF STUDS FEET PER MINUTE FEET PER SECOND FIBERGLASS REINFORCED PLASTIC FEET / FOOT FOOTING FUTURE FIXTURE  GAS GAUGE GALLON GALVANIZED GROOVED COUPLING GROOVED FLANGE ADAPTER GALVANIZED IRON GALVANIZED IRON PIPE GRIP JOINT GLASS GLOBE VALVE GROUND GALLONS PER DAY GALLONS PER HOUR GALLONS PER MINUTE GALLONS PER SECOND GRADE GRADE LINE GRATING GATE VALVE GRAVEL GYPSUM  HOSE BIBB HOLLOW CORE HIGH DENSITY POLYETHYLENE HEADER HARDWARE HANGER HEIGHT HANDHOLD HOLLOW METAL HOT MIX ASPHALT CONCRETE HANDRAIL HAND-OFF-AUTO HAND-OFF-REMOTE HORIZONTAL HIGH PRESSURE / HORSEPOWER HIGH PRESSURE GAS HIGH POINT HOUR HIGH STRENGTH BOLT HOSE VALVE HEATING, VENTILATION, AIR CONDITIONING HIGH WATER LINE HIGHWAY HYDRANT HYDRAULIC  INSTRUMENTATION & CONTROL IN ACCORDANCE WITH INSIDE DIAMETER INVERT ELEVATION INSIDE FACE IMPROVEMENT INCH INCLUDE(D)(ING) INFLUENT INJECTION INSTALLATION / INSTALL INSULATION INTERCEPTOR INTERIOR INVERT IRON PIPE IRON PIPE THREAD IRON ROD IRRIGATION  JOINT JUNCTION  KICK PLATE KILOVOLT AMPERE KILOWATT KEYWAY LENGTH LABORATORY LAVATORY	LB LF LIN LN LOC LONG LP LPT LRG LS LT LVL LWL  MAN MAT MAX MCC MCP MECH MET MFR MGD MH MIN MIPT MISC MJ MON MOT MP MSL MTD  NA NC NF NIC NO / NO. NOM NORM NRS NTS  O TO O OC OD ODOT  OF OPNG OPP ORIG OVHD  P&ID  PC PCC PCVC  PE PERF PERM PERP PG PH PI PIVC  PL OR P/L PLBG PNL POC POLY PP PRC PRCST PREP PRESS PRKG PROP PRV PS PSIG PSL PSPT PT PTVC	POUND LINEAR FOOT LINEAL LANE LOCATION LONGITUDINAL LOW PRESSURE LOW POINT LARGE LONG SLEEVE / LUMP SUM LEFT LEVEL LOW WATER LINE  MANUAL MATERIAL MAXIMUM MOTOR CONTROL CENTER MASTER CONTROL PANEL MECHANICAL METAL MANUFACTURER MILLION GALLONS PER DAY MANHOLE MINIMUM MALE IRON PIPE THREAD MISCELLANEOUS MECHANICAL JOINT MONUMENT / MONOLITHIC MOTOR MILEPOST MEAN SEAL LEVEL MOUNTED  NOT APPLICABLE NORMALLY CLOSED NEAR FACE NOT IN CONTRACT NORMALLY OPEN / NUMBER NOMINAL NORMAL NON-RISING STEM NOT TO SCALE  OUT TO OUT ON CENTER OUTSIDE DIAMETER OREGON DEPARTMENT OF TRANSPORTATION OVERFLOW / OUTSIDE FACE OPENING OPPOSITE ORIGINAL OVERHEAD  PROCESS & INSTRUMENTATION DIAGRAM POINT OF CURVE POINT OF COMPOUND CURVE POINT OF CURVATURE ON VERTICAL CURVE PLAIN END PERFORATED PERMANENT PERPENDICULAR PRESSURE GAUGE PIPE HANGER POINT OF INTERSECTION POINT OF INTERSECTION ON VERTICAL CURVE PROPERTY LINE / PLATE / PLASTIC PLUMBING PANEL POINT OF CURVATURE POLYETHYLENE POWER POLE POINT OF REVERSE CURVATURE PRECAST PREPARATION PRESSURE PARKING PROPERTY PRESSURE REDUCING VALVE PUMP STATION POUNDS PER SQUARE INCH GAUGE PIPE SLEEVE PIPE SUPPORT POINT OF TANGENCY POINT OF TANGENCY ON VERTICAL	PV PVC PVMT PWR  QTY  RAD RC RCP RD RDCR REF REINF REQ'D RESTR RFCA  RM RND RO R/W RBPBD  RPM RR RST RT  SALV SAN SC SCHD SD SDL SDR SECT SHLDR SHT SIM SLP SLV SOLN SP SPCL SPEC(S) SPG SPL SPRT SQ SQ FT SQ IN SQ YD SS SST ST STA STD STL STOR STR STRUCT SUBMG SUCTION SV S/W SWD SWGR SYMM SYS  T OR TEL T&B TAN TB TBM TC TCE TDH TEMP T&G THK THRD THRU TP TRANS TSP	CURVE PLUG VALVE POLYVINYL CHLORIDE PAVEMENT POWER  QUANTITY  RADIUS REINFORCED CONCRETE REINFORCED CONCRETE PIPE ROAD / ROOF DRAIN REDUCER REFERENCE REINFORCE(D)(ING)(MENT) REQUIRED RESTRAINED RESTRAINED FLANGE COUPLING ADAPTER ROOM ROUND ROUGH OPENING RIGHT-OF-WAY REDUCED PRESSURE BACKFLOW PREVENTION DEVICE REVOLUTIONS PER MINUTE RAILROAD REINFORCED STEEL RIGHT  SALVAGE SANITARY SOLID CORE SCHEDULE STORM DRAIN SADDLE STANDARD DIMENSION RATIO SECTION SHOULDER SHEET SIMILAR SLOPE SLEEVE SOLUTION SOIL PIPE / SEWER PIPE SPECIAL SPECIFICATION(S) SPACING SPOOL SUPPORT SQUARE SQUARE FOOT SQUARE INCH SQUARE YARD SANITARY SEWER STAINLESS STEEL STREET STATION STANDARD STEEL STORAGE STRAIGHT STRUCTURE / STRUCTURAL SUBMERGED SUCTION SOLENOID VALVE SIDEWALK SIDEWATER DEPTH SWITCH GEAR SYMMETRICAL SYSTEM  TELEPHONE TOP & BOTTOM TANGENCY THRUST BLOCK TEMPORARY BENCHMARK TOP OF CONCRETE / TOP OF CURB TEMPORARY CONSTRUCTION EASEMENT TOTAL DYNAMIC HEAD TEMPERATURE / TEMPORARY TONGUE & GROOVE THICK / THICKNESS THREAD (ED) THROUGH TEST PIT / TOP OF PAVEMENT / TURNING POINT TRANSITION TRI-SODIUM PHOSPHATE	TST TW TYP  UG UH UN UON USGS  V VAC VB VBOX VC VERT VFD VOL VCP VTR  W W/ W/IN W/O W/W WD WF WH WI WM WP WS WSDOT  WT WTP WTRT WWF WWTF WWTP  X SECT XFMR  YD YH YR  ZN	TOP OF STEEL TOP OF WALL TYPICAL  UNDERGROUND UNIT HEATER UNION UNLESS OTHERWISE NOTED UNITED STATES GEOLOGIC SURVEY  VENT / VOLT VACUUM VACUUM BREAKER VALVE BOX VERTICAL CURVE VERTICAL VARIABLE FREQUENCY DRIVE VOLUME VITRIFIED CLAY PIPE VENT THROUGH ROOF  WATER WITH WITHIN WITHOUT WALL TO WALL WOOD WIDE FLANGE WATER HEATER WROUGHT IRON WATER METER WORKING POINT / WATERPROOFING WATER SERVICE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION WEIGHT WATER TREATMENT PLANT WATERTIGHT WELDED WIRE FABRIC WASTEWATER TREATMENT FACILITY WASTEWATER TREATMENT PLANT  CROSS SECTION TRANSFORMER  YARD DRAIN / YARD YARD HYDRANT YEAR  ZINC
---	---	---	---	---	---	---	---	---	---	---	--

**60% SUBMITTAL**

NO.	DATE	BY	REVISION

NOTICE

0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JJU  
DESIGNED

CAD  
DRAWN

BVO  
CHECKED

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION

DECEMBER 2019

**Murraysmith**  
www.murraysmith.us



**CITY OF SHERWOOD**  
**ROCK CREEK**  
**SANITARY TRUNK LINE**  
**UPSIZING PROJECT -**  
**PHASE 1**

**ABBREVIATIONS**

PROJECT NO.: 19-2481.402 | SCALE: AS SHOWN | DATE: DECEMBER 2019

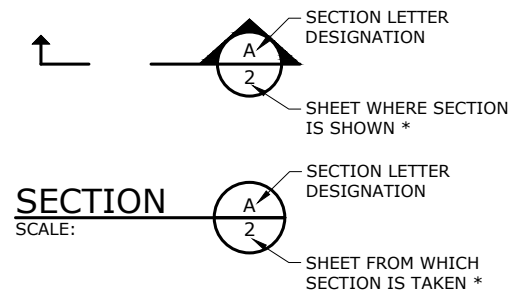
SHEET

G-3

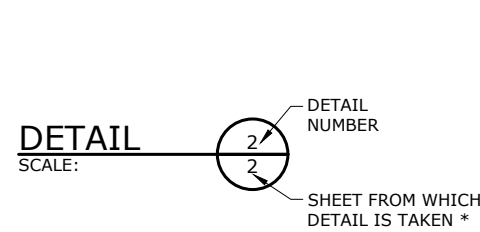
3 of X

# SECTION AND DETAIL DESIGNATIONS

## SECTION DESIGNATIONS

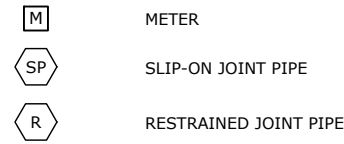


## DETAIL DESIGNATIONS



\* NOTE: IF PLAN AND SECTION FOR DETAIL CALL-OUT AND DETAIL ARE SHOWN ON THE SAME DRAWING, DRAWING NUMBER IS REPLACED WITH A DASH.

# MISCELLANEOUS PIPING SYMBOLS



METER  
SLIP-ON JOINT PIPE  
RESTRAINED JOINT PIPE

# TOPOGRAPHIC LEGEND

	EXISTING	PROPOSED
WATERLINE	--- 10"W ---	— 12"DI W —
ELECTRICITY	--- E ---	— E —
GAS	--- 4"G ---	— 4"G —
TELEPHONE/TELEMETRY	--- T ---	— T —
CABLE TELEVISION	--- CATV ---	— CATV —
SANITARY SEWER LINE	--- 8"SS ---	— 8"SS —
SANITARY SEWER FORCE MAIN	--- 6"FM ---	— 6"FM —
STORM DRAIN	--- 8"SD ---	— 8"SD —
CULVERT	===	— 18"D —
ABANDON PIPE		+++++
DRAINAGE DITCH/FLOODWAY BOUNDARY	.....	.....
WETLAND BOUNDARY	~v~	~v~
BARBED WIRE FENCE	-x-x-x-	-x-x-x-
CHAINLINK FENCE	-o-o-o-	-o-o-o-
GUARDRAIL	.....	.....
CENTERLINE	-----	-----
PROPERTY LINE	-----	-----
EASEMENT	-----	-----
RIGHT-OF-WAY	-----	-----
EDGE OF PAVEMENT/AC	-----	-----
EDGE OF GRAVEL	-----	-----
CURB	=====	=====
SIDEWALK	----- S/W -----	----- S/W -----
STRUCTURE OR FACILITY	=====	=====
CONTOUR MINOR	-----	-----
CONTOUR MAJOR	----- 200 -----	----- 200 -----
MANHOLE	○	●
CLEAN-OUT	○	●
CATCH BASIN/FIELD INLET	⊞	⊞
VALVE	⊗	⊗
GEOTECHNICAL BORING W/ ID NO.	●	●
FIRE HYDRANT ASSEMBLY	⊙	⊙
WATER METER	⊞	⊞
PULL BOX/JUNCTION BOX	⊞	⊞
UTILITY POLE	○	○
GUY WIRE	←	←
LIGHT POST	☆	☆
MAILBOX	⊞	⊞
SIGN	⊞	⊞
BENCHMARK	⊙	⊙
TREE DECIDUOUS	☁	☁
TREE CONIFEROUS	☀	☀
TREE TO BE REMOVED	☀	☀
SURFACE ELEVATION	+ 176.63	+ 176.63

G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-G.dwg G-4 12/9/2019 6:07 PM MATT.ESSTEP 23.0s (LMS Tech)

**60% SUBMITTAL**

NO.	DATE	BY	REVISION

NOTICE  
0 1/2 1  
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JJU  
DESIGNED  
CAD  
DRAWN  
BVO  
CHECKED

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION  
DECEMBER 2019  
Murraysmith  
www.murraysmith.us

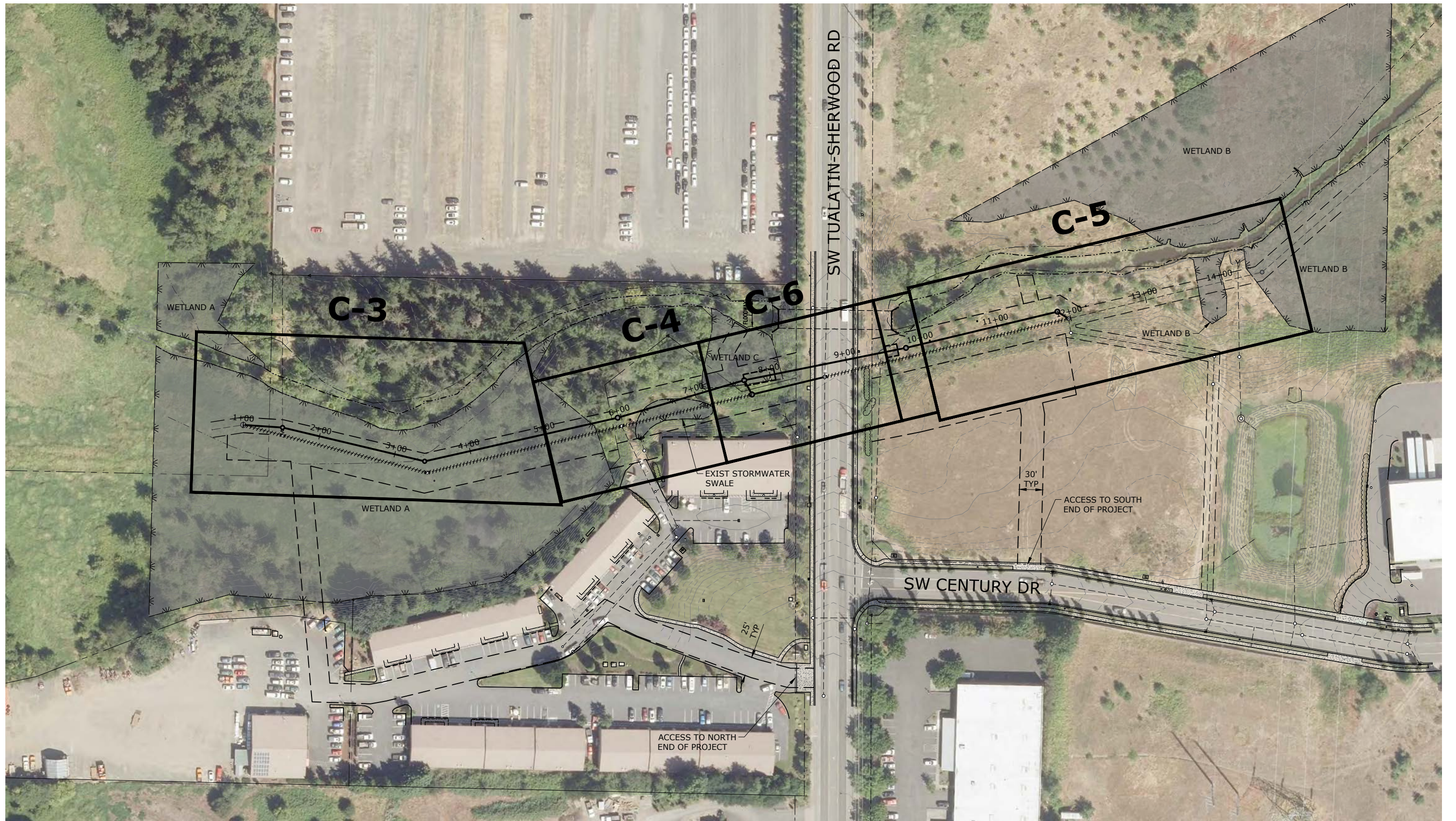


**CITY OF SHERWOOD  
ROCK CREEK  
SANITARY TRUNK LINE  
UPSIZING PROJECT -  
PHASE 1**

**SYMBOLS AND LEGEND**  
PROJECT NO.: 19-2481.402 SCALE: AS SHOWN DATE: DECEMBER 2019

SHEET  
G-4  
4 of X

G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-G.dwg G-5 12/9/2019 6:07 PM MATT. ESTEP 23.0s (LMS Tech)



PLAN  
SCALE: 1"=60'

**60% SUBMITTAL**

NO.	DATE	BY	REVISION

NOTICE  
0 1/2 1  
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JJU DESIGNED  
CAD DRAWN  
BVO CHECKED

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION  
DECEMBER 2019  
Murraysmith  
www.murraysmith.us

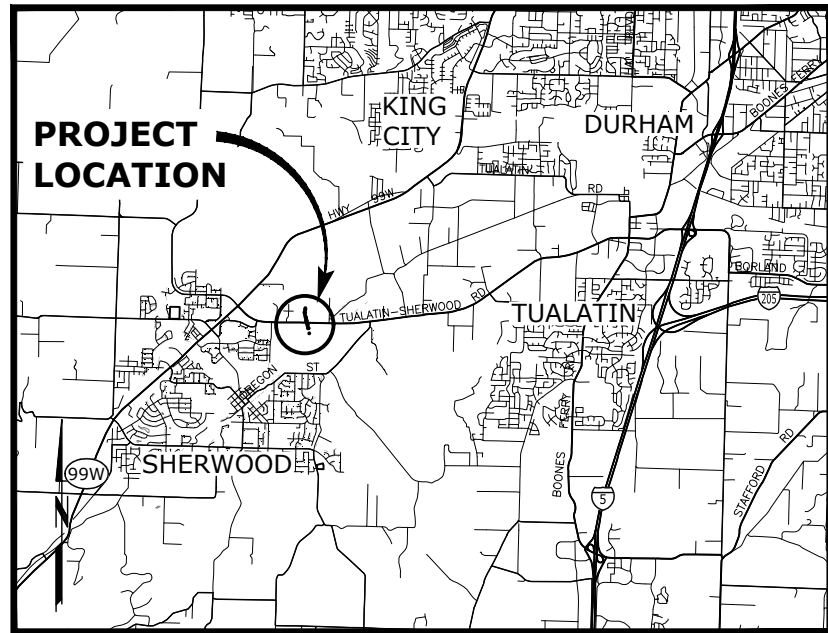


**CITY OF SHERWOOD  
ROCK CREEK  
SANITARY TRUNK LINE  
UPSIZING PROJECT -  
PHASE 1**

**SITE/SHEET LAYOUT**  
PROJECT NO.: 19-2481.402 SCALE: AS SHOWN DATE: DECEMBER 2019

SHEET  
G-5  
5 of X

# EROSION AND SEDIMENT CONTROL PLANS



**VICINITY MAP**  
SCALE: 1"=5,000'



**LOCATION MAP**  
SCALE: 1"=1,000'

**PROPERTY DESCRIPTIONS:**

TAXLOTS 25129A000100, 25129A000301, AND 25129D000150, AND SW TUALATIN-SHERWOOD RD R/W, LOCATED IN THE NORTHWEST AND SOUTHEAST 1/4'S OF SECTION 29, TOWNSHIP 2 SOUTH, RANGE 1 WEST, WILLAMETTE MERIDIAN, WASHINGTON COUNTY, OREGON.

**PROJECT LOCATIONS:**

NORTH AND SOUTH OF SW TUALATIN-SHERWOOD RD, APPROXIMATELY 375 FEET EAST OF SW CENTURY DR, SHERWOOD, WASHINGTON COUNTY, OREGON.

**ASSOCIATED PERMITS**

N/A

**LAND USE CASE FILE #**

N/A

**DEVELOPER NAME**

DEVELOPER: CITY OF SHERWOOD  
CONTACT: BOB GALATI, PE  
ADDRESS: 22560 SW PINE ST  
CITY/STATE: SHERWOOD, OR 97140  
PHONE/FAX: (503) 925-2308

**PLANNING / ENGINEERING / SURVEYING FIRM**

COMPANY: MURRAYSMITH, INC  
CONTACT: BRENDAN O'SULLIVAN, P.E.  
ADDRESS: 888 SW 5TH AVE, SUITE 1170  
CITY/STATE: PORTLAND, OR 97204  
PHONE: (503) 225-9010 FAX: (866) 274-9807

**NARRATIVE DESCRIPTIONS**

**EXISTING SITE CONDITIONS**

CITY OF SHERWOOD UNDEVELOPED LAND CONTAINING WETLANDS AND FLOODPLAINS ASSOCIATED WITH ROCK CREEK; WASHINGTON COUNTY PAVED ROADWAY SURFACES AND RIGHT-OF-WAY

**DEVELOPED CONDITIONS**

PAVEMENT AND NATIVE RESTORATION FOLLOWING CONSTRUCTION OF NEW 24" DIAMETER SANITARY SEWER LINE AND ASSOCIATED APPURTENANCES AND ABANDONMENT OF EXISTING 18" DIAMETER SANITARY SEWER LINE

**NATURE OF CONSTRUCTION ACTIVITY AND ESTIMATED TIME TABLE**

- \* CLEARING (FROM JUNE 1, 2020 TO NOVEMBER 11, 2020)
- \* MASS GRADING (FROM JUNE 1, 2020 TO SEPTEMBER 30, 2020)
- \* UTILITY INSTALLATION (FROM JUNE 1, 2020 TO NOVEMBER 11, 2020)
- \* FINAL STABILIZATION (FROM NOVEMBER 12, 2020 TO DECEMBER 31, 2022)

**TOTAL SITE AREA:**  
3.9 ACRES (169,300 SQ FT)

**TOTAL DISTURBED AREA:**  
2.0 ACRES (85,800 SQ FT)

**IMPERVIOUS SURFACE AREA:**  
EXISTING IMPERVIOUS AREA = 24,100 SQ FT  
PROPOSED IMPERVIOUS AREA = 0 SQ FT

**SITE SOIL CLASSIFICATION:**  
5B - BRIEDWELL STONY SILT LOAM  
14 - COVE CLAY  
27 - LABISH MUCKY CLAY  
37B, 37C - QUATAMA LOAM  
43 - WAPATO SILTY CLAY LOAM

**RECEIVING WATER BODIES:**  
ROCK CREEK AND TUALATIN RIVER DRAINAGE BASINS

**ATTENTION EXCAVATORS:**  
OREGON LAW REQUIRES YOU TO FOLLOW RULES ADOPTED BY THE OREGON UTILITY NOTIFICATION CENTER. THESE RULES ARE SET FORTH IN OAR 952-001-0010 THROUGH OAR 952-001-0090. YOU MAY OBTAIN COPIES OF THESE RULES FROM THE CENTER BY CALLING 503-232-1987. IF YOU HAVE ANY QUESTIONS ABOUT THE RULES, YOU MAY CONTACT THE CENTER. YOU MUST NOTIFY THE CENTER AT LEAST TWO BUSINESS DAYS, BEFORE COMMENCING AN EXCAVATION. CALL 503-246-6699.

**INSPECTION FREQUENCY**

SITE CONDITION	MINIMUM FREQUENCY
1. ACTIVE PERIOD	DAILY WHEN STORMWATER RUNOFF, INCLUDING RUNOFF FROM SNOWMELT, IS OCCURRING. AT LEAST ONCE EVERY FOURTEEN (14) CALENDAR DAYS, REGARDLESS OF WHETHER OR NOT STORMWATER RUNOFF IS OCCURRING.
2. PRIOR TO THE SITE BECOMING INACTIVE OR IN ANTICIPATION OF SITE INACCESSIBILITY.	ONCE TO ENSURE THAT EROSION AND SEDIMENT CONTROL MEASURES ARE IN WORKING ORDER. ANY NECESSARY MAINTENANCE AND REPAIR MUST BE MADE PRIOR TO LEAVING THE SITE.
3. INACTIVE PERIODS GREATER THAN FOURTEEN (14) CONSECUTIVE CALENDAR DAYS.	ONCE EVERY MONTH
4. PERIODS DURING WHICH THE SITE IS INACCESSIBLE DUE TO INCLEMENT WEATHER.	IF PRACTICAL, INSPECTIONS MUST OCCUR DAILY AT A RELEVANT AND ACCESSIBLE DISCHARGE POINT OR DOWNSTREAM LOCATION.
5. PERIODS DURING WHICH DISCHARGE IS UNLIKELY DUE TO FROZEN CONDITIONS.	MONTHLY. RESUME MONITORING IMMEDIATELY UPON MELT, OR WHEN WEATHER CONDITIONS MAKE DISCHARGES LIKELY.

- \* HOLD A PRE-CONSTRUCTION MEETING OF PROJECT CONSTRUCTION PERSONNEL THAT INCLUDES THE INSPECTOR TO DISCUSS EROSION AND SEDIMENT CONTROL MEASURES AND CONSTRUCTION LIMITS.
- \* ALL INSPECTIONS MUST BE MADE IN ACCORDANCE WITH DEQ'S 1200-C PERMIT REQUIREMENTS.
- \* INSPECTION LOGS MUST BE KEPT IN ACCORDANCE WITH DEQ'S 1200-C PERMIT REQUIREMENTS.
- \* RETAIN A COPY OF THE ESCP AND ALL REVISIONS ON SITE AND MAKE IT AVAILABLE ON REQUEST TO DEQ, AGENT, OR THE LOCAL MUNICIPALITY. DURING INACTIVE PERIODS OF GREATER THAN SEVEN (7) CONSECUTIVE CALENDAR DAYS, RETAIN THE ESCP AT THE CONSTRUCTION SITE OR AT ANOTHER LOCATION.

**STANDARD EROSION AND SEDIMENT CONTROL PLAN DRAWING NOTES:**

- HOLD A PRE-CONSTRUCTION MEETING OF PROJECT CONSTRUCTION PERSONNEL THAT INCLUDES THE INSPECTOR TO DISCUSS EROSION AND SEDIMENT CONTROL MEASURES AND CONSTRUCTION LIMITS. (SCHEDULE A.8.C.I.(3))
- ALL INSPECTIONS MUST BE MADE IN ACCORDANCE WITH DEQ 1200-C PERMIT REQUIREMENTS. (SCHEDULE A.12.B AND SCHEDULE 8.1)
- INSPECTION LOGS MUST BE KEPT IN ACCORDANCE WITH DEQ'S 1200-C PERMIT REQUIREMENTS. (SCHEDULE A.1.C AND B.2)
- RETAIN A COPY OF THE ESCP AND ALL REVISIONS ON SITE AND MAKE IT AVAILABLE ON REQUEST TO DEQ, AGENT, OR THE LOCAL MUNICIPALITY. DURING INACTIVE PERIODS OF GREATER THAN SEVEN (7) CONSECUTIVE CALENDAR DAYS, THE ABOVE RECORDS MUST BE RETAINED BY THE PERMIT REGISTRANT BUT DO NOT NEED TO BE AT THE CONSTRUCTION SITE. (SCHEDULE B.2.C)
- ALL PERMIT REGISTRANTS MUST IMPLEMENT THE ESCP. FAILURE TO IMPLEMENT ANY OF THE CONTROL MEASURES OR PRACTICES DESCRIBED IN THE ESCP IS A VIOLATION OF THE PERMIT. (SCHEDULE A.8.A)
- THE ESCP MUST BE ACCURATE AND REFLECT SITE CONDITIONS. (SCHEDULE A.12.C.I)
- SUBMISSIONS OF ALL ESCP REVISIONS IS NOT REQUIRED. SUBMITTAL OF THE ESCP REVISIONS IS ONLY UNDER SPECIFIC CONDITIONS. SUBMIT ALL NECESSARY REVISION TO DEQ OR AGENT WITHIN 10 DAYS. (SCHEDULE A.12.C.IV AND V)
- PHASE CLEARING AND GRADING TO THE MAXIMUM EXTENT PRACTICAL TO PREVENT EXPOSED INACTIVE AREAS FROM BECOMING A SOURCE OF EROSION. (SCHEDULE A.7.A.III)
- IDENTIFY, MARK, AND PROTECT (BY CONSTRUCTION FENCING OR OTHER MEANS) CRITICAL RIPARIAN AREAS AND VEGETATION INCLUDING IMPORTANT TREES AND ASSOCIATED ROOTING ZONES, AND VEGETATION AREAS TO BE PRESERVED. IDENTIFY VEGETATIVE BUFFER ZONES BETWEEN THE SITE AND SENSITIVE AREAS (E.G., WETLANDS), AND OTHER AREAS TO BE PRESERVED, ESPECIALLY IN PERIMETER AREAS. (SCHEDULE A.8.C.I.(1) AND (2))
- PRESERVE EXISTING VEGETATION WHEN PRACTICAL AND RE-VEGETATE OPEN AREAS. RE-VEGETATE OPEN AREAS WHEN PRACTICABLE BEFORE AND AFTER GRADING OR CONSTRUCTION. IDENTIFY THE TYPE OF VEGETATIVE SEED MIX USED. (SCHEDULE A.7.A.V)
- MAINTAIN AND DELINEATE ANY EXISTING NATURAL BUFFER WITHIN THE 50-FEET OF WATERS OF THE STATE. (SCHEDULE A.7.B.I AND (2)(A)(B))
- INSTALL PERIMETER SEDIMENT CONTROL, INCLUDING STORM DRAIN INLET PROTECTION AS WELL AS ALL SEDIMENT BASINS, TRAPS, AND BARRIERS PRIOR TO LAND DISTURBANCE. (SCHEDULE A.8.C.I.(5))
- CONTROL BOTH PEAK FLOW RATES AND TOTAL STORMWATER VOLUME, TO MINIMIZE EROSION AT OUTLETS AND DOWNSTREAM CHANNELS AND STREAMBANKS. (SCHEDULE A.7.C)
- CONTROL SEDIMENT AS NEEDED ALONG THE SITE PERIMETER AND AT ALL OPERATIONAL INTERNAL STORM DRAIN INLETS AT ALL TIMES DURING CONSTRUCTION, BOTH INTERNALLY AND AT THE SITE BOUNDARY. (SCHEDULE A.7.D.I)
- ESTABLISH CONCRETE TRUCK AND OTHER CONCRETE EQUIPMENT WASHOUT AREAS BEFORE BEGINNING CONCRETE WORK. (SCHEDULE A.8.C.I.(6))
- APPLY TEMPORARY AND/OR PERMANENT SOIL STABILIZATION MEASURES IMMEDIATELY ON ALL DISTURBED AREAS AS GRADING PROGRESSES. TEMPORARY OR PERMANENT STABILIZATIONS MEASURES ARE NOT REQUIRED FOR AREAS THAT ARE INTENDED TO BE LEFT UNVEGETATED, SUCH AS DIRT ACCESS ROADS OR UTILITY POLE PADS. (SCHEDULE A.8.C.II.(3))
- ESTABLISH MATERIAL AND WASTE STORAGE AREAS, AND OTHER NON-STORMWATER CONTROLS. (SCHEDULE A.8.C.I.(7))
- PREVENT TRACKING OF SEDIMENT ONTO PUBLIC OR PRIVATE ROADS USING BMP'S SUCH AS: CONSTRUCTION ENTRANCE, GRAVELED (OR PAVED) EXITS AND PARKING AREAS, GRAVEL ALL UNPAVED ROADS LOCATED ON SITE, OR USE AN EXIT TIRE WASH. THESE BMP'S MUST BE IN PLACE PRIOR TO LAND-DISTURBING ACTIVITIES. (SCHEDULE A.7.D.II AND A.8.C.I.(4))
- WHEN TRUCKING SATURATED SOILS FROM THE SITE, EITHER USE WATER-TIGHT TRUCKS OR DRAIN LOADS ON SITE. (SCHEDULE A.7.D.II.(5))
- CONTROL PROHIBITED DISCHARGES FROM LEAVING THE CONSTRUCTION SITE, I.E., CONCRETE WASH-OUT, WASTEWATER FROM CLEAN OUT OF STUCCO, PAINT AND CURING COMPOUNDS. (SCHEDULE A.6)
- USE BMP'S TO PREVENT OR MINIMIZE STORMWATER EXPOSURE TO POLLUTANTS FROM SPILLS; VEHICLE AND EQUIPMENT FUELING, MAINTENANCE, AND STORAGE; OTHER CLEANING AND MAINTENANCE ACTIVITIES; AND WASTE HANDLING ACTIVITIES. THESE POLLUTANTS INCLUDE FUEL, HYDRAULIC FLUID, AND OTHER OILS FROM VEHICLES AND MACHINERY, AS WELL AS DEBRIS, FERTILIZER, PESTICIDES AND HERBICIDES, PAINTS, SOLVENTS, CURING COMPOUNDS AND ADHESIVES FROM CONSTRUCTION OPERATIONS. (SCHEDULE A.7.E.I.(2))
- IMPLEMENT THE FOLLOWING BMP'S WHEN APPLICABLE: WRITTEN SPILL PREVENTION AND RESPONSE PROCEDURES, EMPLOYEE TRAINING ON SPILL PREVENTION AND PROPER DISPOSAL PROCEDURES, SPILL KITS IN ALL VEHICLES, REGULAR MAINTENANCE SCHEDULE FOR VEHICLES AND MACHINERY, MATERIAL DELIVERY AND STORAGE CONTROLS, TRAINING AND SIGNAGE, AND COVERED STORAGE AREAS FOR WASTE AND SUPPLIES. (SCHEDULE A.7.E.III.)
- USE WATER, SOIL-BINDING AGENT OR OTHER DUST CONTROL TECHNIQUE AS NEEDED TO AVOID WIND-BLOWN SOIL. (SCHEDULE A.7.A.IV)
- THE APPLICATION RATE OF FERTILIZERS USED TO REESTABLISH VEGETATION MUST FOLLOW MANUFACTURER'S RECOMMENDATIONS TO MINIMIZE NUTRIENT RELEASES TO SURFACE WATERS. EXERCISE CAUTION WHEN USING TIME-RELEASE FERTILIZERS WITHIN ANY WATERWAY RIPARIAN ZONE. (SCHEDULE A.9.B.III)
- IF AN ACTIVE TREATMENT SYSTEM (FOR EXAMPLE, ELECTRO-COAGULATION, FLOCCULATION, FILTRATION, ETC.) FOR SEDIMENT OR OTHER POLLUTANT REMOVAL IS EMPLOYED, SUBMIT AN OPERATION AND MAINTENANCE PLAN (INCLUDING SYSTEM SCHEMATIC, LOCATION OF SYSTEM, LOCATION OF INLET, LOCATION OF DISCHARGE, DISCHARGE DISPERSION DEVICE DESIGN, AND A SAMPLING PLAN AND FREQUENCY) BEFORE OPERATING THE TREATMENT SYSTEM. OBTAIN PLAN APPROVAL BEFORE OPERATING THE SYSTEM. OPERATE AND MAINTAIN THE TREATMENT SYSTEM ACCORDING TO MANUFACTURER'S SPECIFICATIONS. (SCHEDULE A.9.D)
- TEMPORARILY STABILIZE SOILS AT THE END OF THE SHIFT BEFORE HOLIDAYS AND WEEKENDS, IF NEEDED. THE REGISTRANT IS RESPONSIBLE FOR ENSURING THAT SOILS ARE STABLE DURING RAIN EVENTS AT ALL TIMES OF THE YEAR. (SCHEDULE A.7.B)
- AS NEEDED BASED ON WEATHER CONDITIONS, AT THE END OF EACH WORKDAY SOIL STOCKPILES MUST BE STABILIZED OR COVERED, OR OTHER BMP'S MUST BE IMPLEMENTED TO PREVENT DISCHARGES TO SURFACE WATERS OR CONVEYANCE SYSTEMS LEADING TO SURFACE WATERS. (SCHEDULE A.7.E.II.(2))
- CONSTRUCTION ACTIVITIES MUST AVOID OR MINIMIZE EXCAVATION AND BARE GROUND ACTIVITIES DURING WET WEATHER. (SCHEDULE A.7.A.I)
- SEDIMENT FENCE: REMOVE TRAPPED SEDIMENT BEFORE IT REACHES ON THIRD OF THE ABOVE GROUND FENCE HEIGHT AND BEFORE FENCE REMOVAL. (SCHEDULE A.9.C.I)
- OTHER SEDIMENT BARRIERS (SUCH AS BIOBAGS): REMOVE SEDIMENT BEFORE IT REACHES TWO INCHES DEPTH ABOVE GROUND HEIGHT AND BEFORE BMP REMOVAL. (SCHEDULE A.9.C.I)
- CATCH BASINS: CLEAN BEFORE RETENTION CAPACITY HAS BEEN REDUCED BY FIFTY PERCENT. SEDIMENT BASINS AND SEDIMENT TRAPS: REMOVE TRAPPED SEDIMENTS BEFORE DESIGN CAPACITY HAS BEEN REDUCED BY FIFTY PERCENT AND AT COMPLETION OF PROJECT. (SCHEDULE A.9.C.III&IV)
- WITHIN 24 HOURS, SIGNIFICANT SEDIMENT THAT HAS LEFT THE CONSTRUCTION SITE, MUST BE REMEDIATED. INVESTIGATE THE CAUSE OF THE SEDIMENT RELEASE AND IMPLEMENT STEPS TO PREVENT A RECURRENCE OF THE DISCHARGE WITHIN THE SAME 24 HOURS. ANY IN-STREAM CLEAN-UP OF SEDIMENT SHALL BE PERFORMED ACCORDING TO THE OREGON DIVISION OF STATE LANDS REQUIRED TIMFRAME. (SCHEDULE A.9.B.I)
- THE INTENTIONAL WASHING OF SEDIMENT INTO STORM SEWERS OR DRAINAGE WAYS MUST NOT OCCUR. VACUUMING OR DRY SWEEPING AND MATERIAL PICKUP MUST BE USED TO CLEANUP RELEASED SEDIMENTS (SCHEDULE A.9.B.II)
- THE ENTIRE SITE MUST BE TEMPORARILY STABILIZED USING VEGETATION OR A HEAVY MULCH LAYER, TEMPORARY SEEDING, OR OTHER METHOD SHOULD ALL CONSTRUCTION ACTIVITIES CEASE FOR 30 DAYS OR MORE. (SCHEDULE A.7.F.I)
- PROVIDE TEMPORARY STABILIZATION FOR THAT PORTION OF THE SITE WHERE CONSTRUCTION ACTIVITIES CEASE FOR 14 DAYS OR MORE WITH A COVERING OF BLOWN STRAW AND A TACKIFIER, LOOSE STRAW, OR AN ADEQUATE COVERING OF COMPOST MULCH UNTIL WORK RESUMES ON THAT PORTION OF THE SITE. (SCHEDULE A.7.F.II)
- DO NOT REMOVE TEMPORARY SEDIMENT CONTROL PRACTICES UNTIL PERMANENT VEGETATION OR OTHER COVER OF EXPOSED AREAS IS ESTABLISHED. ONCE CONSTRUCTION IS COMPLETE AND THE SITE IS STABILIZED, ALL TEMPORARY EROSION CONTROLS AND RETAINED SOILS MUST BE REMOVED AND DISPOSED OF PROPERLY, UNLESS DOING SO CONFLICTS WITH LOCAL REQUIREMENTS. (SCHEDULE A.8.C.II.(1) AND D.3.C.II AND III)

**PERMITTEE'S SITE INSPECTOR:** ANDY STIRLING

COMPANY/AGENCY: CITY OF SHERWOOD  
PHONE: 503.925.2307  
FAX: N/A  
E-MAIL: stirlinga@sherwoodoregon.gov  
DESCRIPTION OF EXPERIENCE:

**RATIONALE STATEMENT**

A COMPREHENSIVE LIST OF AVAILABLE BEST MANAGEMENT PRACTICES (BMP) OPTIONS BASED ON DEQ'S GUIDANCE MANUAL HAS BEEN REVIEWED TO COMPLETE THIS EROSION AND SEDIMENT CONTROL PLAN. SOME OF THE ABOVE LISTED BMP'S WERE NOT CHOSEN BECAUSE THEY WERE DETERMINED TO NOT EFFECTIVELY MANAGE EROSION PREVENTION AND SEDIMENT CONTROL FOR THIS PROJECT BASED ON SPECIFIC SITE CONDITIONS, INCLUDING SOIL CONDITIONS TOPOGRAPHIC CONSTRAINTS, ACCESSIBILITY TO THE SITE, AND OTHER RELATED CONDITIONS, AS THE PROJECT PROGRESSES AND THERE IS A NEED TO REVISE THE ESC PLAN, AN ACTION PLAN WILL BE SUBMITTED.

INITIAL \_\_\_\_\_

THE PERMITTEE IS REQUIRED TO MEET ALL THE CONDITIONS OF THE 1200-C PERMIT. THIS ESCP AND GENERAL CONDITIONS HAVE BEEN DEVELOPED TO FACILITATE COMPLIANCE WITH THE 1200-C PERMIT REQUIREMENTS. IN CASES OF DISCREPANCIES OR OMISSIONS, THE 1200-C PERMIT REQUIREMENTS SUPERCEDE REQUIREMENTS OF THIS PLAN.

**BMP MATRIX FOR CONSTRUCTION PHASES**  
REFER TO DEQ GUIDANCE MANUAL FOR A COMPREHENSIVE LIST OF AVAILABLE BMP'S.

	CLEARING	MASS GRADING	UTILITY INSTALLATION	STREET CONSTRUCTION	FINAL STABILIZATION	WET WEATHER (OCT. 1 - MAY 31ST)
<b>EROSION PREVENTION</b>						
PRESERVE NATURAL VEGETATION	** X	X	X		X	X
GROUND COVER			X		X	X
HYDRAULIC APPLICATIONS					X	
PLASTIC SHEETING						
MATTING						
DUST CONTROL	X	X	X		X	X
TEMPORARY/PERMANENT SEEDING					X	X
BUFFER ZONE	** X	X	X		X	X
OTHER:						
<b>SEDIMENT CONTROL</b>						
SEDIMENT FENCE (PERIMETER)	** X	** X	X		X	X
SEDIMENT FENCE (INTERIOR)	** X	** X	X		X	X
STRAW WATTLE			X		X	X
FILTER BERM	** X	X	X		X	X
INLET PROTECTION	** X	** X	X		X	X
DEWATERING			X		X	X
SEDIMENT TRAP			X		X	X
NATURAL BUFFER ENCROACHMENT	* X	* X	* X		* X	* X
COMPOST SOCK					X	X
OTHER:						
<b>RUN OFF CONTROL</b>						
CONSTRUCTION ENTRANCE	** X	X	X		X	X
PIPE SLOPE DRAIN					X	X
OUTLET PROTECTION					X	X
SURFACE ROUGHENING					X	X
CHECK DAMS					X	X
OTHER:						
<b>POLLUTION PREVENTION</b>						
PROPER SIGNAGE	X	X	X		X	X
HAZ WASTE MGMT	X	X	X		X	X
SPILL KIT ON-SITE	X	X	X		X	X
CONCRETE WASHOUT AREA					X	X
OTHER:						

\* SIGNIFIES ADDITIONAL BMP'S REQUIRED FOR WORK WITHIN 50' OF WATER OF THE STATE.  
\*\* SIGNIFIES BMP THAT WILL BE INSTALLED PRIOR TO ANY GROUND DISTURBING ACTIVITY.

**LOCAL AGENCY-SPECIFIC EROSION CONTROL NOTES**

- IF VEGETATIVE SEED MIXES ARE SPECIFIED, SEEDING MUST TAKE PLACE NO LATER THAT SEPTEMBER 1; THE TYPE AND PERCENTAGES OF SEED IN THE MIX IS ON SHEET ECO.2(A).
- ALL PUMPING OF SEDIMENT LADEN WATER SHALL BE DISCHARGED OVER AN UNDISTURBED, PREFERABLY VEGETATED AREA, AND THROUGH A SEDIMENT CONTROL BMP I.E. (FILTER BAG).
- ALL EXPOSED SOILS MUST BE COVERED DURING THE WET WEATHER PERIOD, OCTOBER 01 - MAY 31.

**SHEET INDEX**  
**EROSION AND SEDIMENT CONTROL PLANS**

- ESC-1 EROSION AND SEDIMENT CONTROL COVER SHEET AND GENERAL NOTES
- ESC-2 EROSION AND SEDIMENT CONTROL PLAN - 1
- ESC-3 EROSION AND SEDIMENT CONTROL PLAN - 2
- ESC-4 EROSION AND SEDIMENT CONTROL DETAILS - 1
- ESC-5 EROSION AND SEDIMENT CONTROL DETAILS - 2
- ESC-6 DEWATERING PLAN
- ESC-7 DEWATERING DETAILS

**60% SUBMITTAL**

G:\PDX\_Projects\1912481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-ESC-1.dwg ESC-1 12/3/2019 2:05 PM MATT. ESTEP 23.0s (LMS Tech)

NO.	DATE	BY	REVISION

NOTICE  
0 1/2 1  
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JJU DESIGNED  
CAD DRAWN  
BVO CHECKED

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION

DECEMBER 2019

**Murraysmith**  
www.murraysmith.us



**CITY OF SHERWOOD**  
**ROCK CREEK**  
**SANITARY TRUNK LINE**  
**UPSIZING PROJECT -**  
**PHASE 1**

**EROSION AND SEDIMENT CONTROL**  
**COVER SHEET AND GENERAL NOTES**

PROJECT NO.: 19-2481.402 SCALE: AS SHOWN DATE: DECEMBER 2019

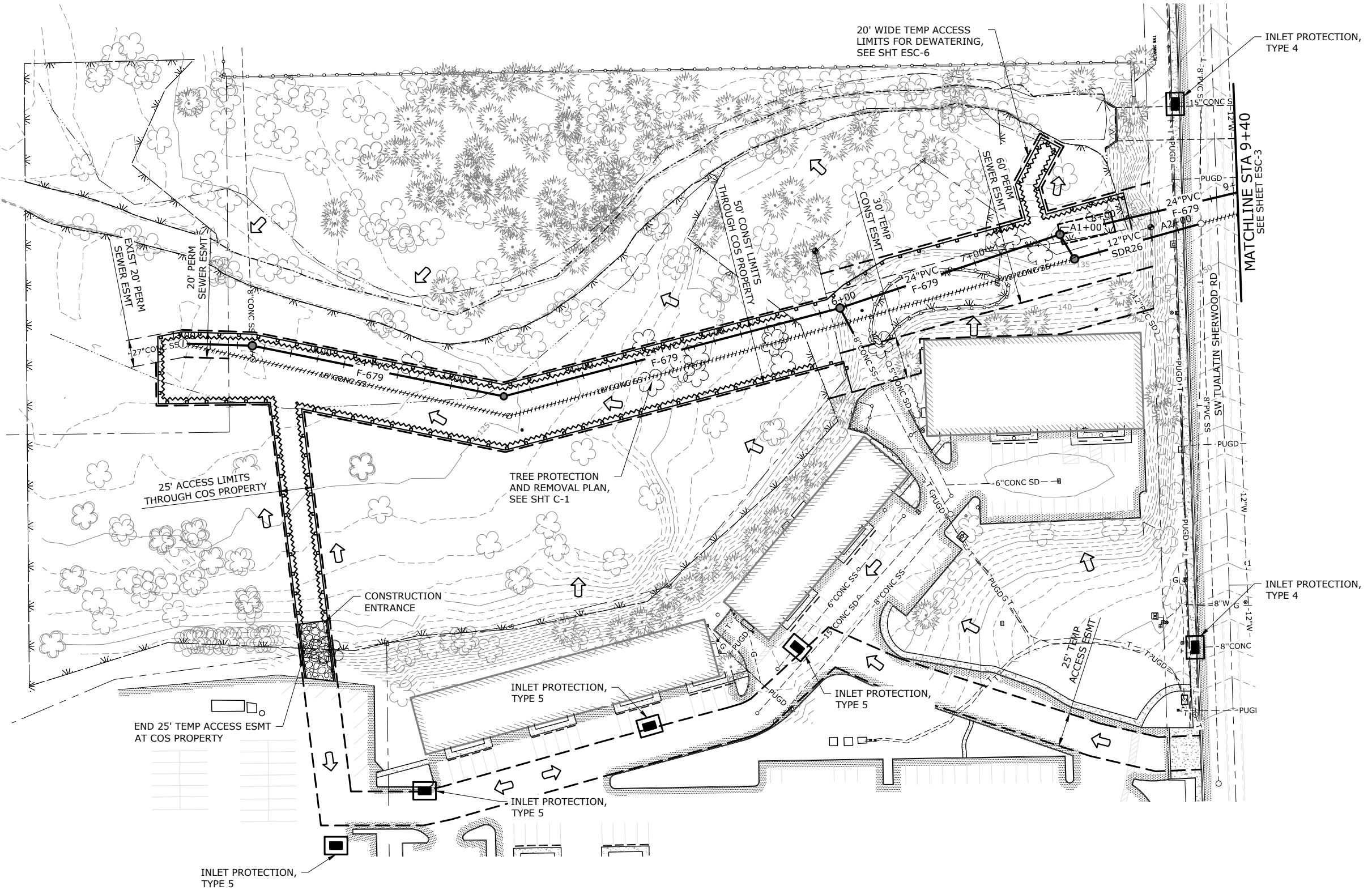
SHEET  
ESC-1  
8 of X

**LEGEND**

- DRAINAGE FLOW DIRECTION
- SEDIMENT FENCING
- COMPOST FILTER BERM
- CONSTRUCTION ENTRANCE
- INLET PROTECTION

**NOTES:**

1. ALL BASE ESC MEASURES (INLET PROTECTION, PERIMETER SEDIMENT CONTROL, GRAVEL CONSTRUCTION ENTRANCES, ETC.) MUST BE IN PLACE, FUNCTIONAL, AND APPROVED IN AN INITIAL INSPECTION, PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
2. SEED USED FOR TEMPORARY OR PERMANENT SEEDING SHALL ADHERE TO THE SPECIFICATIONS, UNLESS OTHERWISE AUTHORIZED.
3. STOCKPILED SOIL SHALL BE COVERED WITH PLASTIC SHEETING OR STRAW MULCH. SEDIMENT FENCE IS REQUIRED AROUND THE PERIMETER OF THE STOCKPILE.
4. AREAS SUBJECT TO WIND EROSION SHALL USE APPROPRIATE DUST CONTROL MEASURES INCLUDING THE APPLICATION OF A FINE SPRAY OF WATER, PLASTIC SHEETING, STRAW MULCHING, OR OTHER APPROVED MEASURES.
5. CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES INCLUDING, BUT NOT LIMITED TO, TIRE WASHES, STREET SWEEPING, AND VACUUMING MAY BE REQUIRED TO INSURE THAT ALL PAVED AREAS IN THE VICINITY OF THE SITE USED FOR HAULING SOIL ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.
6. ACTIVE INLETS TO STORM WATER SYSTEMS SHALL BE PROTECTED THROUGH THE USE OF APPROVED INLET PROTECTION MEASURES. ALL INLET PROTECTION MEASURES ARE TO BE REGULARLY INSPECTED AND MAINTAINED AS NEEDED.
7. CONTRACTOR SHALL INSTALL INLET PROTECTION ON ALL INLETS WITHIN AREA OF PROJECT IMPROVEMENTS AS SHOWN ON SHEET ESC-2 AND ESC-3. ADDITIONAL INLETS NOT SHOWN ON THIS PLAN MAY BE PRESENT.
8. LIMIT SPEED OF VEHICLES ON SITE AND MOISTEN HAUL ROADS AS NECESSARY TO CONTROL DUST.



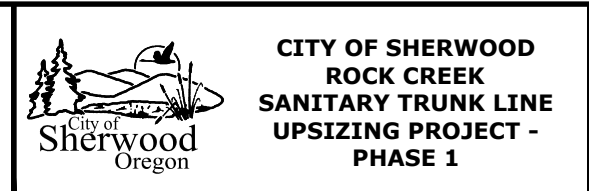
**PLAN**  
SCALE: 1"=40'

**60% SUBMITTAL**

NO.	DATE	BY	REVISION

NOTICE
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE
JJU DESIGNED
CAD DRAWN
BVO CHECKED

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION  
DECEMBER 2019  
**Murraysmith**  
www.murraysmith.us



**CITY OF SHERWOOD  
ROCK CREEK  
SANITARY TRUNK LINE  
UPSIZING PROJECT -  
PHASE 1**


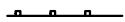



**EROSION AND SEDIMENT CONTROL  
PLAN - 1**

PROJECT NO.: 19-2481.402 SCALE: AS SHOWN DATE: DECEMBER 2019

SHEET  
**ESC-2**  
9 of X

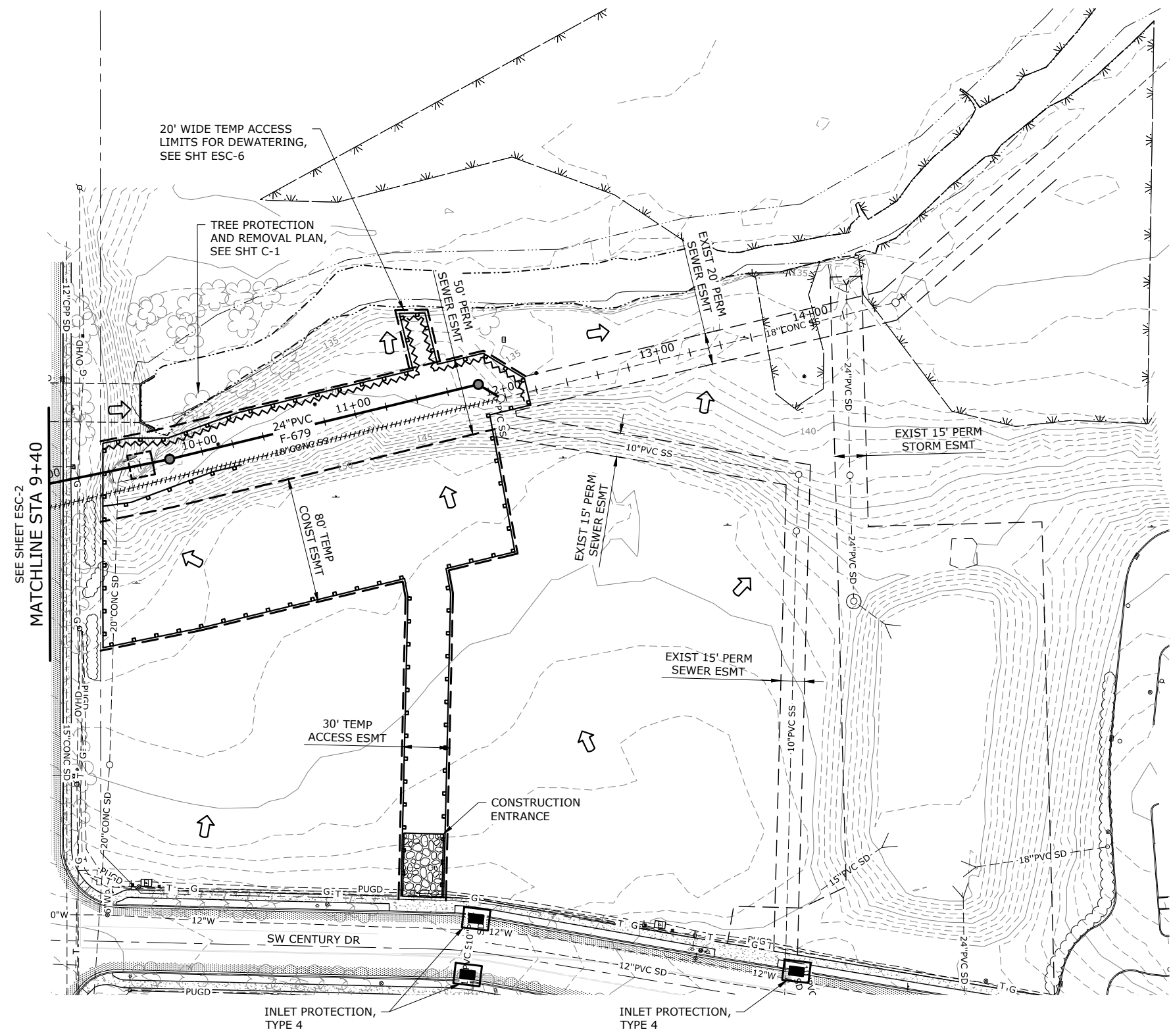
G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-ESC.dwg ESC-2 12/13/2019 3:44 PM MATT. ESTEP 23.0s (LMS Tech)

**LEGEND**

- DRAINAGE FLOW DIRECTION 
- SEDIMENT FENCING 
- COMPOST FILTER BERM 
- CONSTRUCTION ENTRANCE 
- INLET PROTECTION 

**NOTES:**

1. ALL BASE ESC MEASURES (INLET PROTECTION, PERIMETER SEDIMENT CONTROL, GRAVEL CONSTRUCTION ENTRANCES, ETC.) MUST BE IN PLACE, FUNCTIONAL, AND APPROVED IN AN INITIAL INSPECTION, PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
2. SEED USED FOR TEMPORARY OR PERMANENT SEEDING SHALL ADHERE TO THE SPECIFICATIONS, UNLESS OTHERWISE AUTHORIZED.
3. STOCKPILED SOIL SHALL BE COVERED WITH PLASTIC SHEETING OR STRAW MULCH. SEDIMENT FENCE IS REQUIRED AROUND THE PERIMETER OF THE STOCKPILE.
4. AREAS SUBJECT TO WIND EROSION SHALL USE APPROPRIATE DUST CONTROL MEASURES INCLUDING THE APPLICATION OF A FINE SPRAY OF WATER, PLASTIC SHEETING, STRAW MULCHING, OR OTHER APPROVED MEASURES.
5. CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES INCLUDING, BUT NOT LIMITED TO, TIRE WASHES, STREET SWEEPING, AND VACUUMING MAY BE REQUIRED TO INSURE THAT ALL PAVED AREAS IN THE VICINITY OF THE SITE USED FOR HAULING SOIL ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.
6. ACTIVE INLETS TO STORM WATER SYSTEMS SHALL BE PROTECTED THROUGH THE USE OF APPROVED INLET PROTECTION MEASURES. ALL INLET PROTECTION MEASURES ARE TO BE REGULARLY INSPECTED AND MAINTAINED AS NEEDED.
7. CONTRACTOR SHALL INSTALL INLET PROTECTION ON ALL INLETS WITHIN AREA OF PROJECT IMPROVEMENTS AS SHOWN ON SHEET ESC-2 AND ESC-3. ADDITIONAL INLETS NOT SHOWN ON THIS PLAN MAY BE PRESENT.
8. LIMIT SPEED OF VEHICLES ON SITE AND MOISTEN HAUL ROADS AS NECESSARY TO CONTROL DUST.



**PLAN**  
SCALE: 1"=40'

**60% SUBMITTAL**

NO.	DATE	BY	REVISION

NOTICE	JJU DESIGNED
0 1/2 1	CAD DRAWN
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE	BVO CHECKED

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION  
DECEMBER 2019  
**Murraysmith**  
www.murraysmith.us



**CITY OF SHERWOOD**  
**ROCK CREEK**  
**SANITARY TRUNK LINE**  
**UPSIZING PROJECT -**  
**PHASE 1**

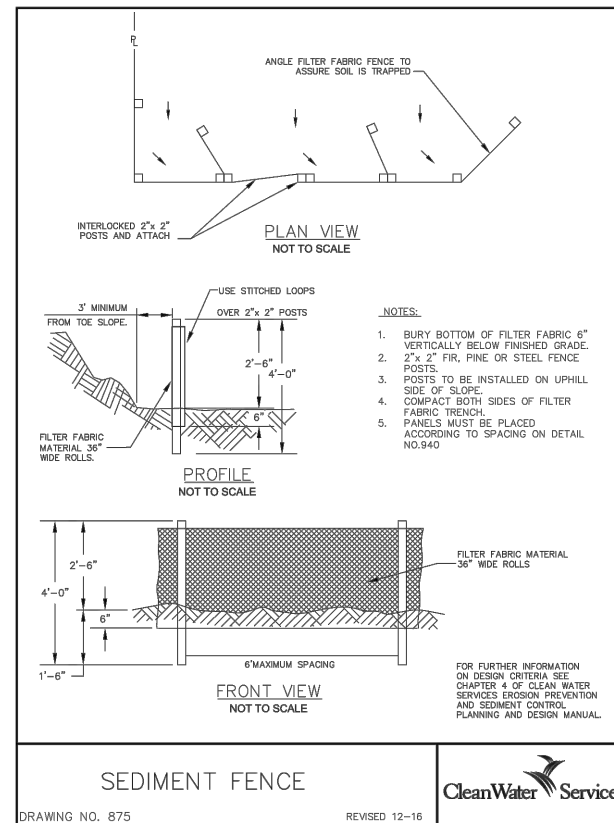
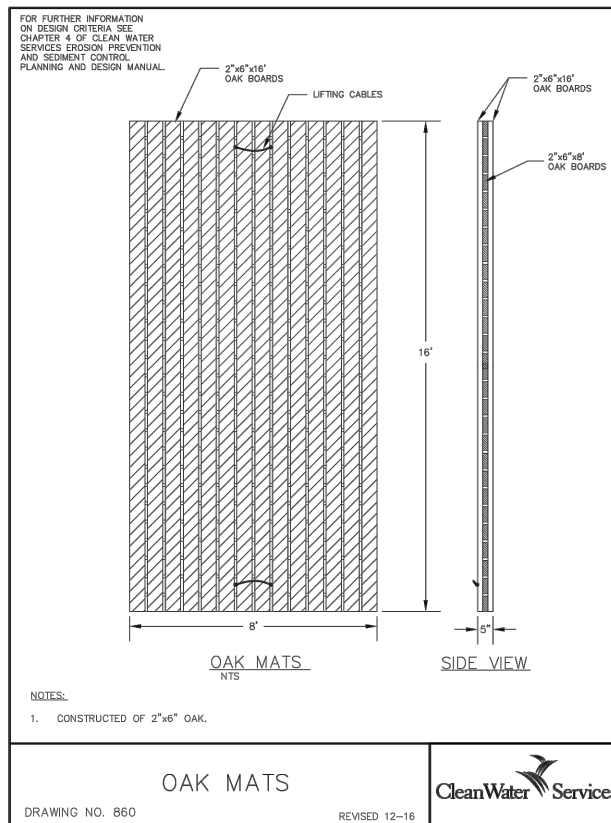
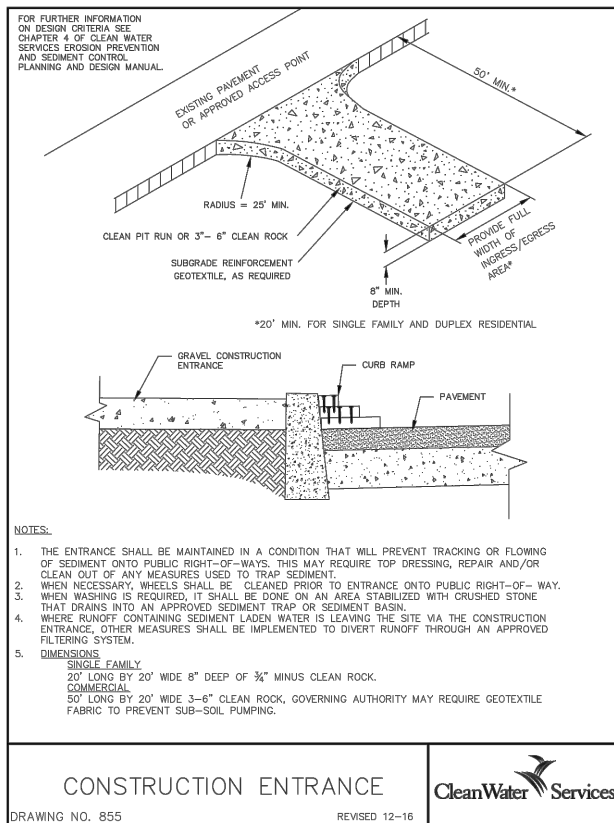
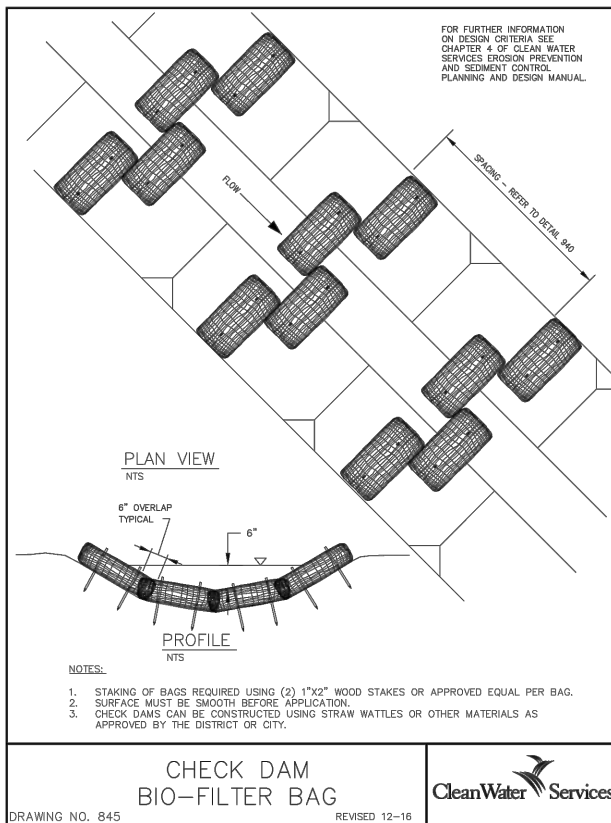
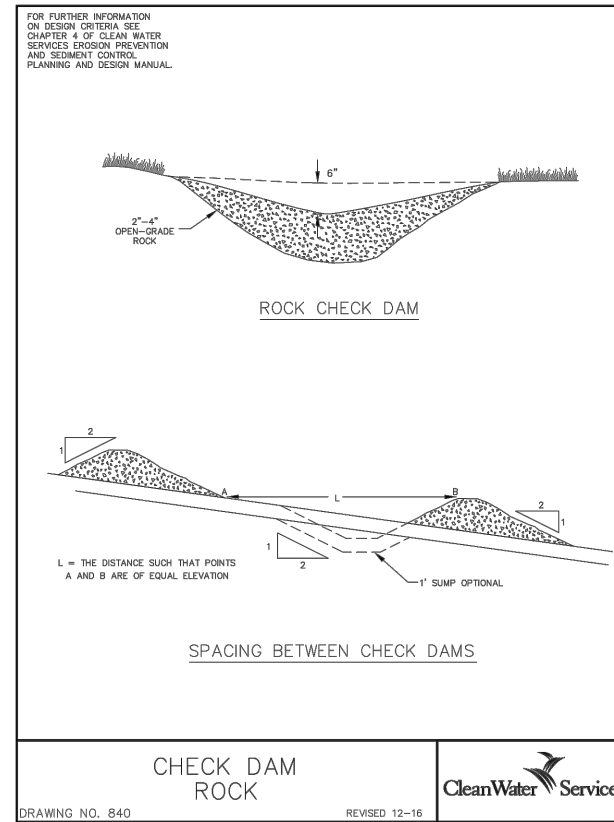
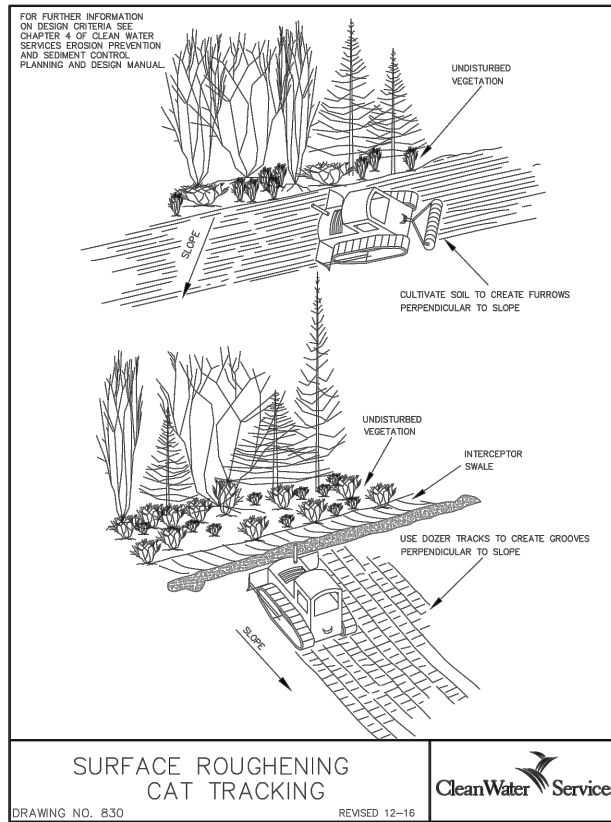
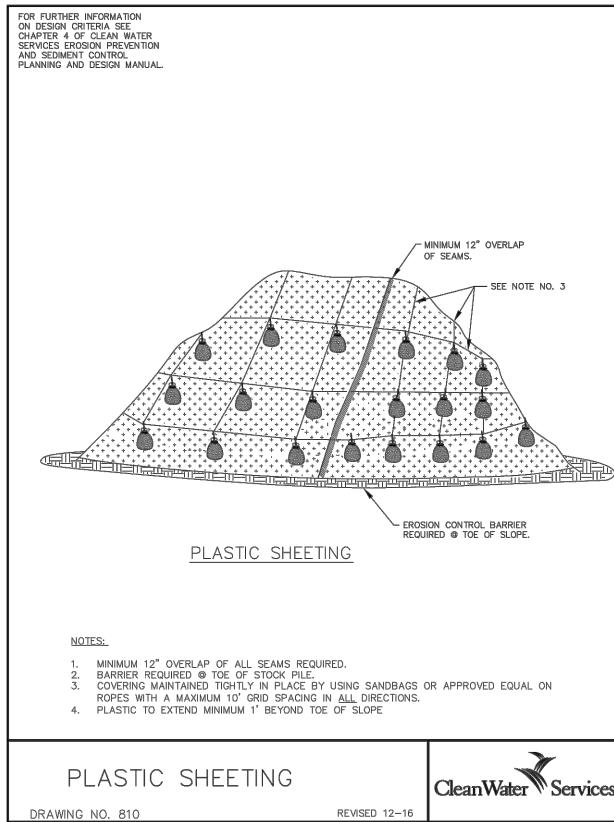
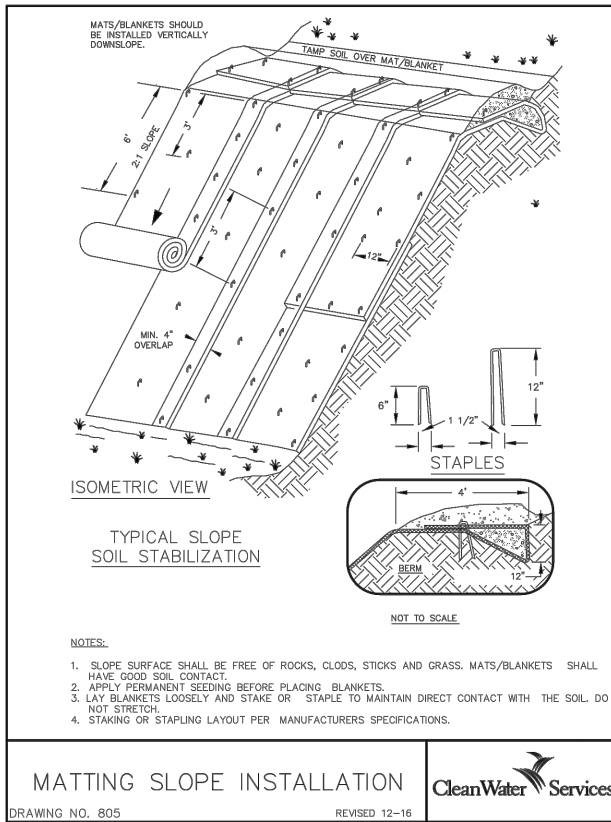
**EROSION AND SEDIMENT CONTROL**  
**PLAN - 2**  
PROJECT NO.: 19-2481.402 SCALE: AS SHOWN DATE: DECEMBER 2019

SHEET  
**ESC-3**  
10 of X

G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-ESC.dwg ESC-3 12/13/2019 3:44 PM MATT. ESTEP 23.0s (LMS Tech)



G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-ESC.dwg ESC-4 12/13/2019 3:44 PM MATT. ESTEP 23.0s (LMS Tech)



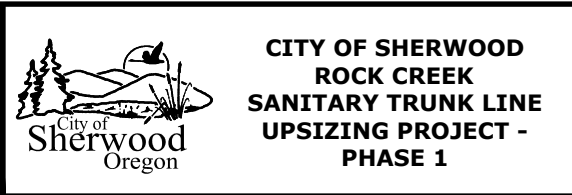
**60% SUBMITTAL**

NO.	DATE	BY	REVISION

NOTICE  
0 1/2 1  
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JJU  
DESIGNED  
CAD  
DRAWN  
BVO  
CHECKED

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION  
DECEMBER 2019  
**Murraysmith**  
www.murraysmith.us



**EROSION AND SEDIMENT CONTROL  
DETAILS - 1**

PROJECT NO.: 19-2481.402 SCALE: AS SHOWN DATE: DECEMBER 2019

SHEET  
ESC-4  
11 of X

G:\PDX\_Projects\1912481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-ESC.dwg ESC-5 12/13/2019 3:44 PM MATT. ESTEP 23.0s (LMS Tech)

FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.

**NOTES:**

- DIRECT THE OUTLET SIDE OF THE ROCK/COMPOST FILTER BERMS ONTO A STABILIZED AREA, SUCH AS VEGETATION AND/OR ROCK.
- EMBED ROCK FILTER BERM A MIN. OF 4" INTO THE EXISTING GROUND/EMBANKMENT.
- USE ROCK FILTER BERM ON 3:1 OR FLATTER SIDE SLOPES. WITHIN THE SAFETY CLEAR ZONE. USE 6:1 OR FLATTER ON SIDE SLOPES.
- PLACE COMPOST FILTER BERMS ALONG OR ON THE GROUND CONTOUR WITH THE ENDS TURNED UP SLOPE.
- PRIOR TO INSTALLING A COMPOST FILTER BERM IN A VEGETATED AREA, ENSURE THAT THE VEGETATION IS CUT TO A HEIGHT OF NO GREATER THAN 3" PRIOR TO INSTALLATION.
- COMPOST HAS NOT BEEN CHEMICALLY TREATED AND IS WEED-FREE, PLASTIC-FREE, DECOMPOSED, NON-WOODY PLANT MATERIAL. ANIMAL WASTE IS NOT ALLOWED.

**ROCK FILTER BERM**

**COMPOST FILTER BERM**

**FILTER BERMS  
ROCK/COMPOST**

DRAWING NO. 890 REVISED 12-16

**NOTES:**

- WASHOUT FACILITIES SHALL BE MAINTAINED TO PROVIDE ADEQUATE HOLDING CAPACITY WITH A MINIMUM FREEBOARD OF 12 INCHES.
- WASHOUT FACILITIES MUST BE CLEANED, OR NEW FACILITIES MUST BE CONSTRUCTED AND READY FOR USE ONCE THE WASHOUT IS 75% FULL.
- IF THE WASHOUT IS NEARING CAPACITY, VACUUM AND DISPOSE OF THE WASTE MATERIAL IN AN APPROVED MANNER.
- TEMPORARY CONCRETE WASHOUT FACILITIES SHALL BE LOCATED A MINIMUM OF 50 FT FROM SENSITIVE AREAS INCLUDING OPEN DRAINAGE FACILITIES AND WATERSOURCES.
- CONCRETE WASHOUT FACILITIES SHALL BE CONSTRUCTED AND MAINTAINED IN SUFFICIENT QUANTITY AND SIZE TO CONTAIN ALL LIQUID AND CONCRETE WASTE GENERATED BY WASHOUT OPERATIONS.
- INSTALL CONCRETE WASHOUT SIGN WITHIN 30 FEET OF TEMPORARY CONCRETE WASHOUT FACILITY.
- TEMPORARY CONCRETE WASHOUTS MAY BE A PREFABRICATED CONTAINER THAT IS PORTABLE AND REUSABLE.

**CONCRETE WASHOUT**

DRAWING NO. 900 REVISED 12-16

**INLET PROTECTION  
TYPE 4**

DRAWING NO. 915 REVISED 12-16

**INLET PROTECTION  
TYPE 5**

DRAWING NO. 920 REVISED 12-16

**SEDIMENT BASIN**

DRAWING NO. 935 REVISED 12-16

FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.

SPACING FOR CHECK DAMS			
DITCH GRADE	6 INCH	12 INCH	18 INCH
6%	NOT ALLOWED	16 FT O.C.	26 FT O.C.
5%	NOT ALLOWED	20 FT	30 FT
4%	NOT ALLOWED	26 FT	40 FT
3%	15 FT	33 FT	50 FT
2%	25 FT	50 FT	80 FT

BARRIER SPACING FOR GENERAL APPLICATION		
INSTALL PARALLEL ALONG CONTOURS AS FOLLOWS		
% SLOPE	SLOPE	MAXIMUM SPACING ON SLOPE
10% OR FLATTER	10:1 OR FLATTER	300 FT
>10% OR <15%	>10:1 OR <7.5:1	150 FT
>15% OR <20%	>7.5:1 OR <5:1	100 FT
>20% OR <30%	>5:1 OR <3.5:1	50 FT
>30% OR <50%	>3.5:1 OR <2:1	25 FT

**SPACING TABLES**

DRAWING NO. 940 REVISED 12-16

**60% SUBMITTAL**

NO.	DATE	BY	REVISION

**NOTICE**

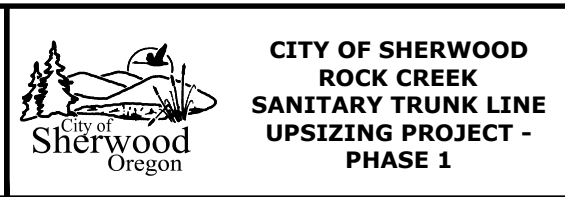
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JJU  
DESIGNED  
CAD  
DRAWN  
BVO  
CHECKED

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION

DECEMBER 2019

**Murraysmith**  
www.murraysmith.us

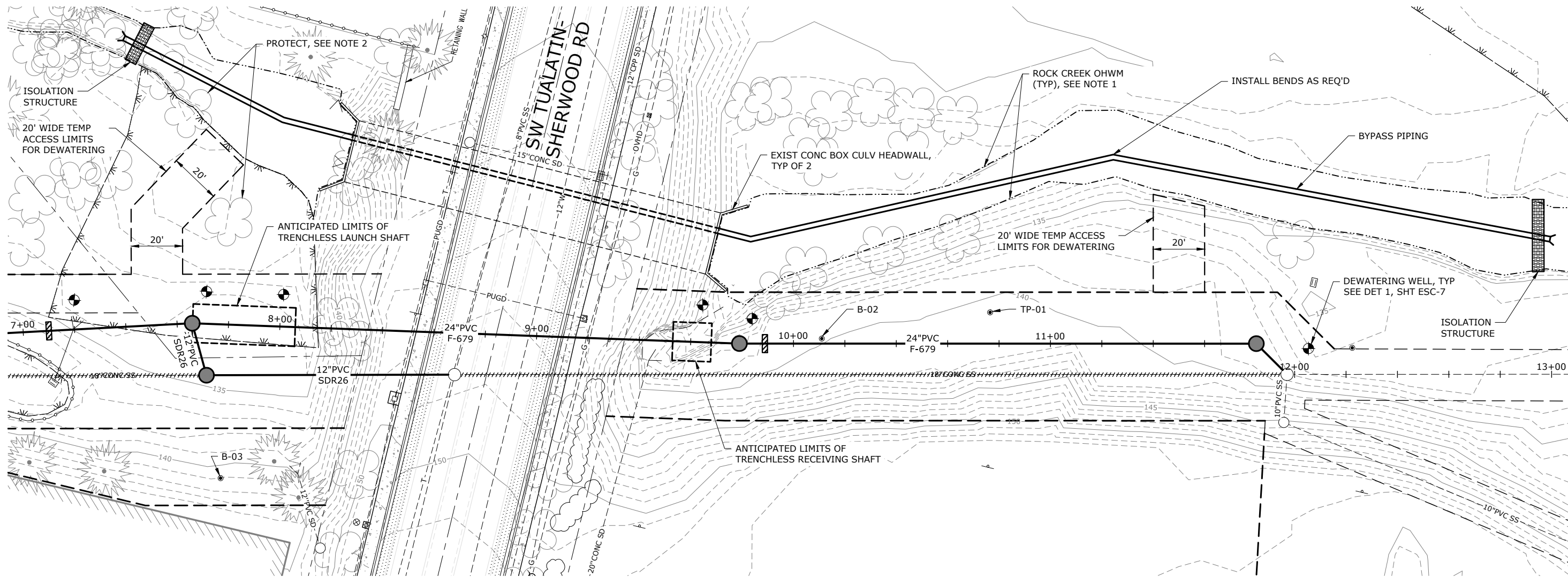


**EROSION AND SEDIMENT CONTROL  
DETAILS - 2**

PROJECT NO.: 19-2481.402 SCALE: AS SHOWN DATE: DECEMBER 2019

SHEET  
ESC-5  
12 of X

G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-ESC-6.dwg ESC-6 12/13/2019 3:44 PM MATT. ESTEP 23.0s (LMS Tech)



**PLAN**  
SCALE: 1"=20'

**NOTES:**

1. ALL WORK PERFORMED WITHIN EXTENTS OF ROCK CREEK ORDINARY HIGH WATER MARK TO BE COMPLETED WITHOUT THE USE OF MECHANICAL MEANS.
2. ALL TREES SHOWN TO BE PROTECTED IN PLACE. SEE SHEET C-1 FOR TREE PROTECTION AND REMOVAL PLAN.

**60% SUBMITTAL**

NO.	DATE	BY	REVISION

**NOTICE**  
0 1/2 1  
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JJU  
DESIGNED  
CAD  
DRAWN  
BVO  
CHECKED

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION  
DECEMBER 2019  
**Murraysmith**  
www.murraysmith.us

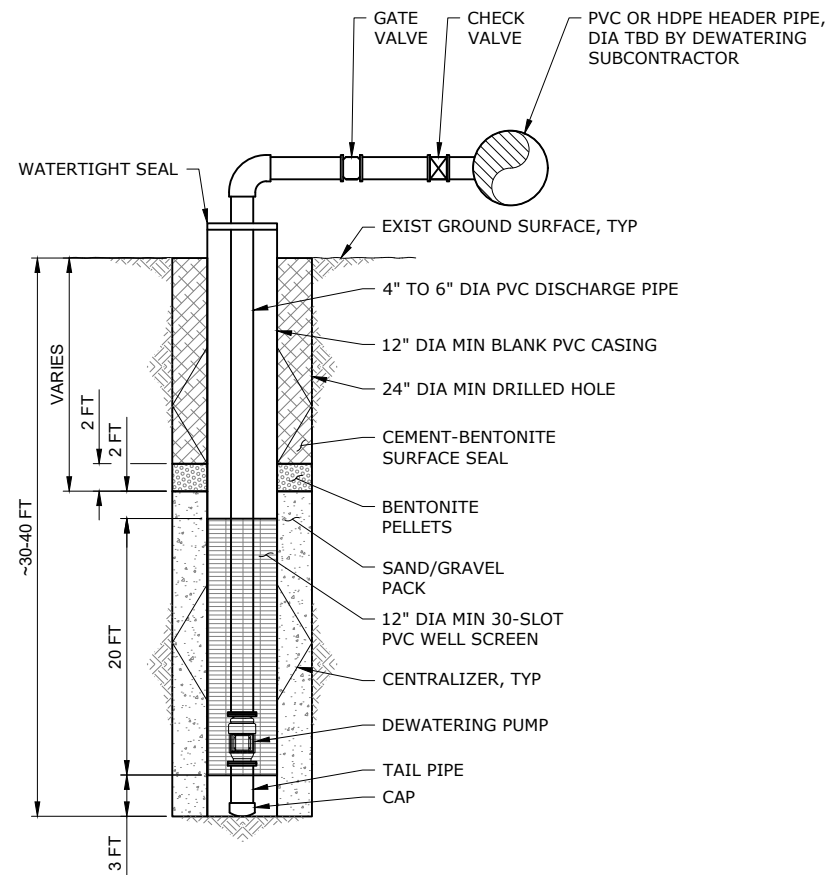


**CITY OF SHERWOOD  
ROCK CREEK  
SANITARY TRUNK LINE  
UPSIZING PROJECT -  
PHASE 1**

**DEWATERING PLAN**  
PROJECT NO.: 19-2481.402 SCALE: AS SHOWN DATE: DECEMBER 2019

SHEET  
**ESC-6**  
13 of X

G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-ESC-6.dwg ESC-7 12/13/2019 3:44 PM MATT.ESSTEP 23.0s (LMS Tech)



**DEWATERING WELL DETAIL**  
SCALE: NTS



**60% SUBMITTAL**

NO.	DATE	BY	REVISION

NOTICE  
0 1/2 1  
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JJU  
DESIGNED  
CAD  
DRAWN  
BVO  
CHECKED

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION  
DECEMBER 2019  
**Murraysmith**  
www.murraysmith.us





**CITY OF SHERWOOD  
ROCK CREEK  
SANITARY TRUNK LINE  
UPSIZING PROJECT -  
PHASE 1**

**DEWATERING DETAILS**  
PROJECT NO.: 19-2481.402 SCALE: AS SHOWN DATE: DECEMBER 2019

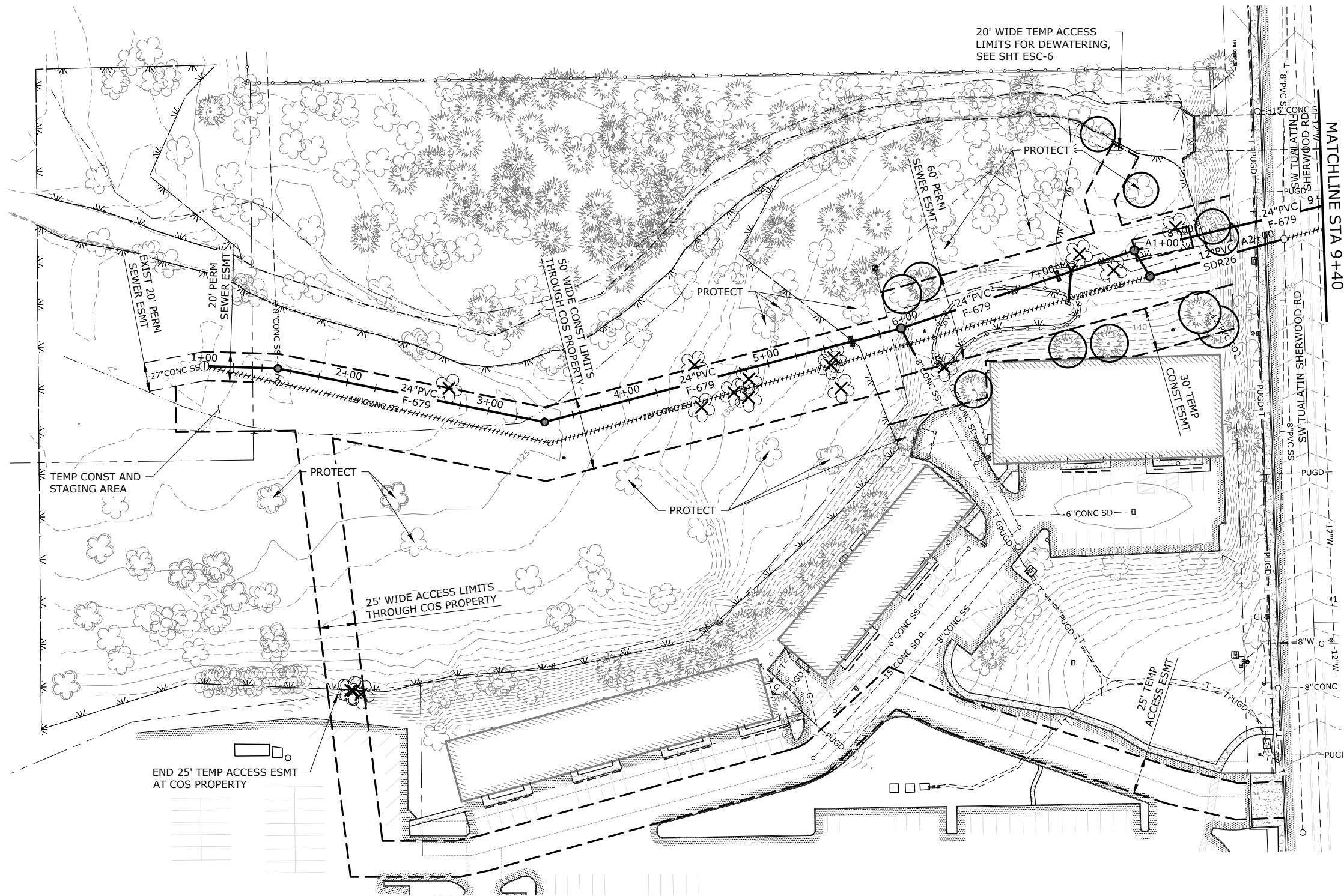
SHEET  
ESC-7  
14 of X

**LEGEND**

-  REMOVE TREE
-  TREE PROTECTION FENCING

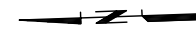
**NOTES:**

1. TREE PROTECTION FENCING SHALL BE PLACED AT OR OUTSIDE OF DRIPLINE.



MATCHLINE STA 9+40  
SEE SHEET ESC-3

**PLAN**  
SCALE: 1"=40'



**60% SUBMITTAL**

G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-C.dwg C-1 12/13/2019 3:44 PM MATT. ESTEP 23.0s (LMS Tech)

NO.	DATE	BY	REVISION

**NOTICE**

0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JJU  
DESIGNED

CAD  
DRAWN

BVO  
CHECKED

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION

DECEMBER 2019

**Murraysmith**  
www.murraysmith.us



**CITY OF SHERWOOD  
ROCK CREEK  
SANITARY TRUNK LINE  
UPSIZING PROJECT -  
PHASE 1**

**TREE PROTECTION AND  
REMOVAL PLAN - 1**

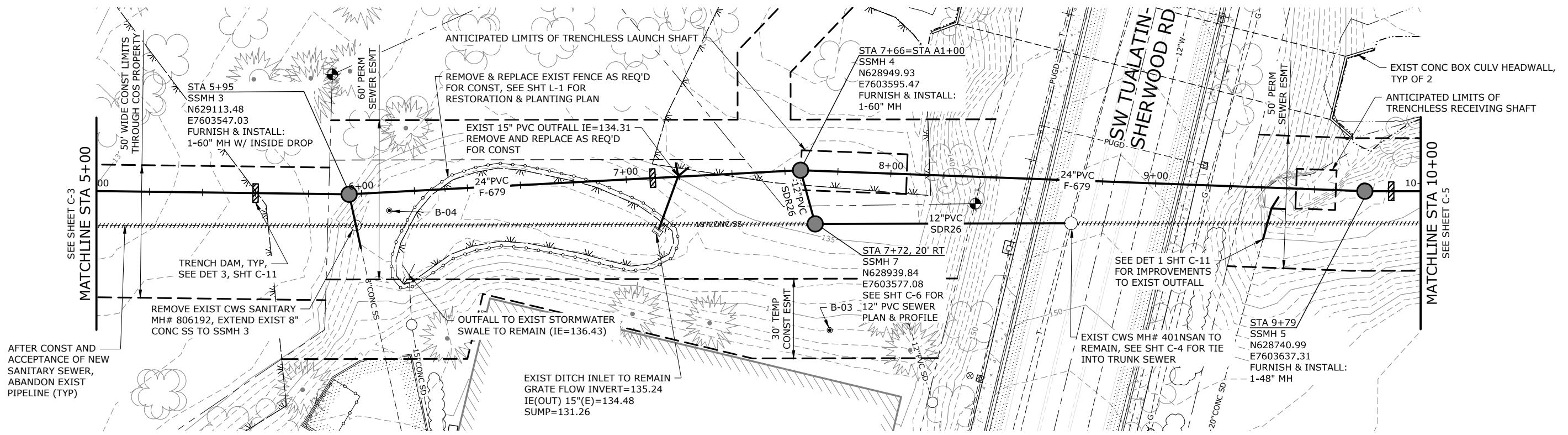
PROJECT NO.: 19-2481.402 SCALE: AS SHOWN DATE: DECEMBER 2019

SHEET  
**C-1**  
15 of X

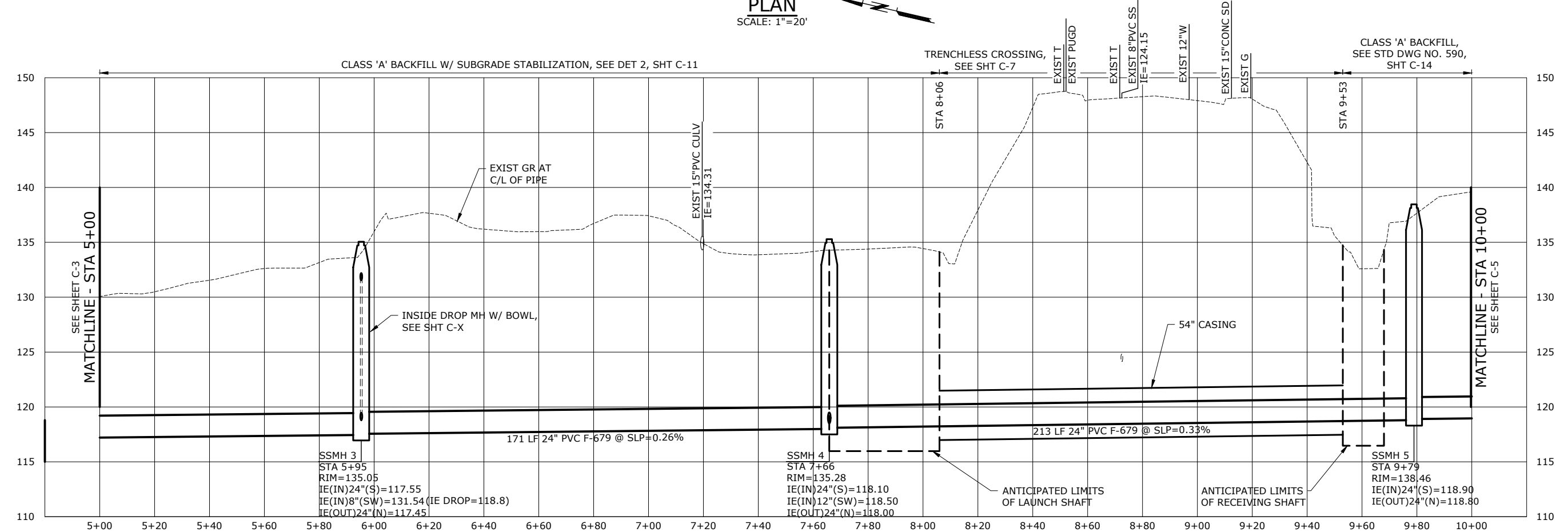




G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-C.dwg C-4 12/13/2019 3:44 PM MATT. ESTEP 23.0s (LMS Tech)



**PLAN**  
SCALE: 1"=20'



**PROFILE**  
SCALE: 1"=20' HORIZ, 1"=5' VERT

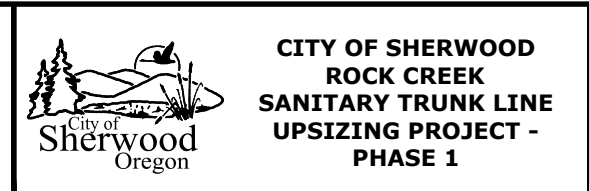
**60% SUBMITTAL**

NO.	DATE	BY	REVISION

**NOTICE**  
0 1/2 1  
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JJU  
DESIGNED  
CAD  
DRAWN  
BVO  
CHECKED

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION  
DECEMBER 2019  
**Murraysmith**  
www.murraysmith.us



**CITY OF SHERWOOD  
ROCK CREEK  
SANITARY TRUNK LINE  
UPSIZING PROJECT -  
PHASE 1**

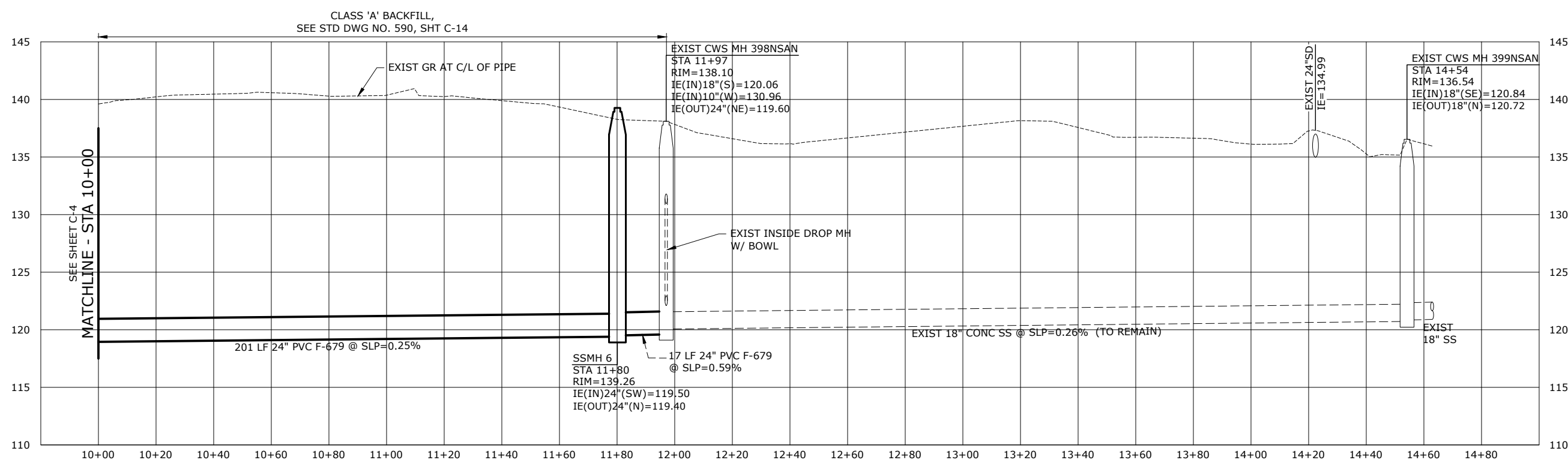
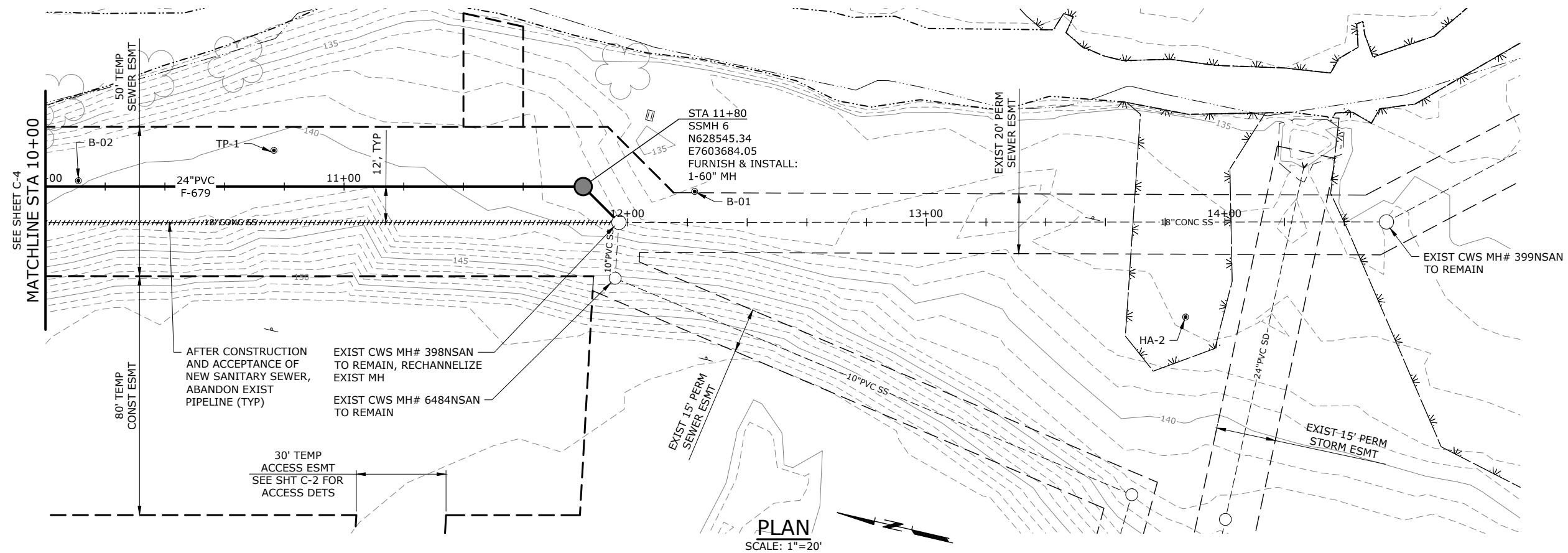
**SEWER PLAN AND PROFILE  
STA 5+00 TO STA 10+00**

PROJECT NO.: 19-2481.402 SCALE: AS SHOWN DATE: DECEMBER 2019

SHEET  
**C-4**  
18 of X



G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-C.dwg C-5 12/13/2019 3:44 PM MATT. ESTEP 23.0s (LMS Tech)



**PROFILE**  
SCALE: 1"=20' HORIZ, 1"=5' VERT

**60% SUBMITTAL**

NO.	DATE	BY	REVISION

**NOTICE**

0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JJU  
DESIGNED

CAD  
DRAWN

BVO  
CHECKED

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION

DECEMBER 2019

**Murraysmith**  
www.murraysmith.us



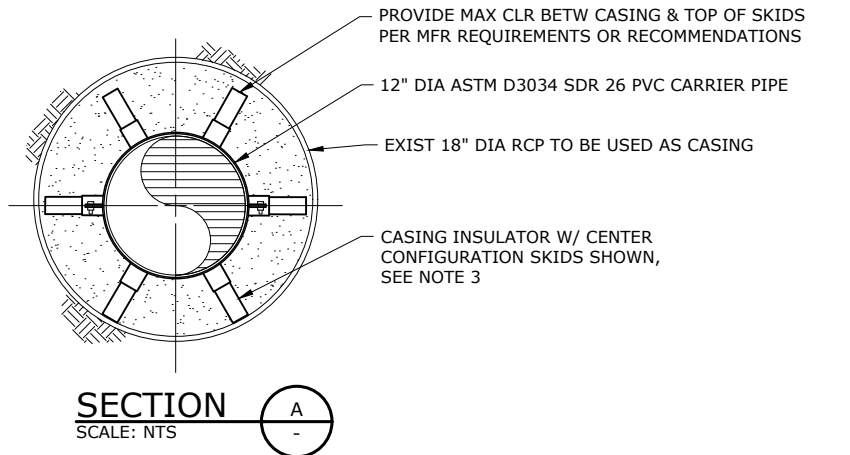
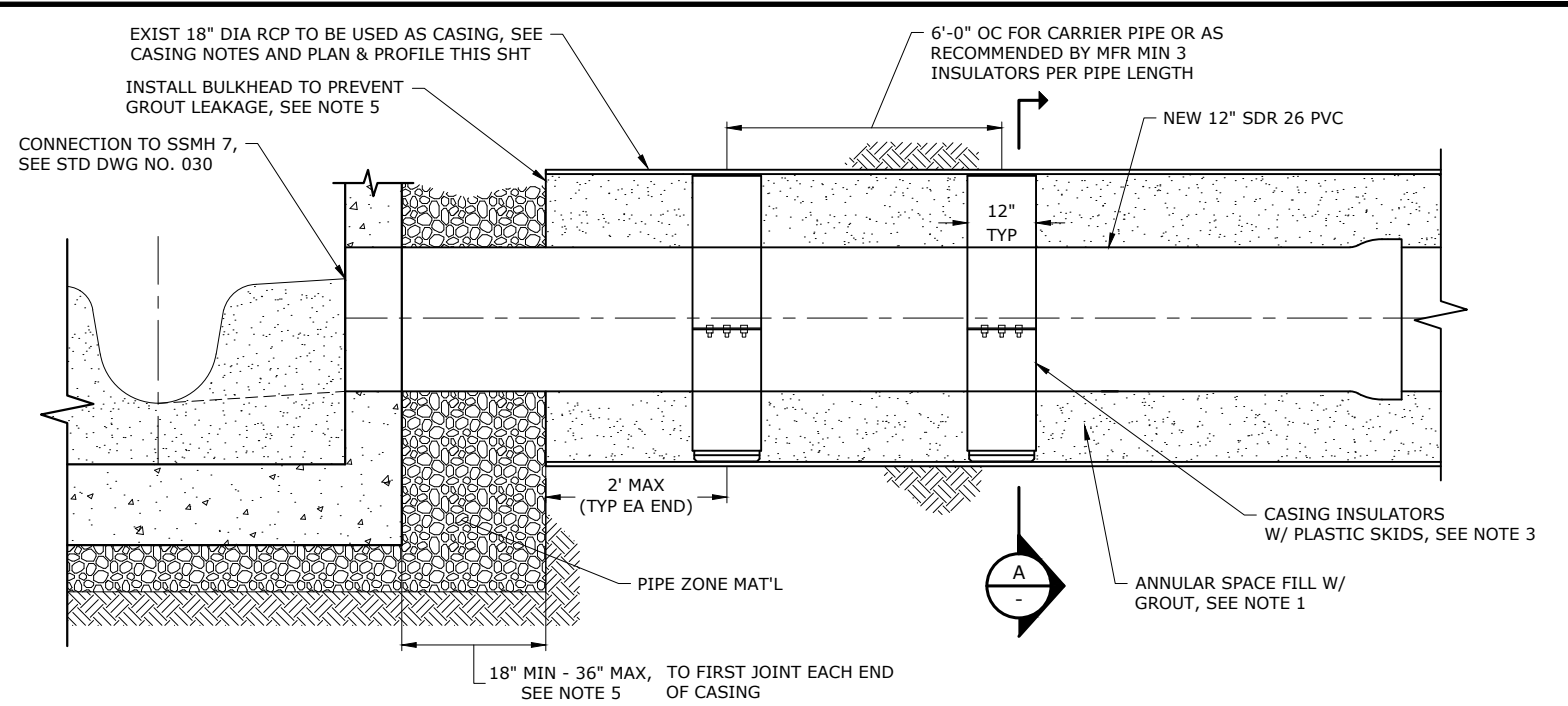
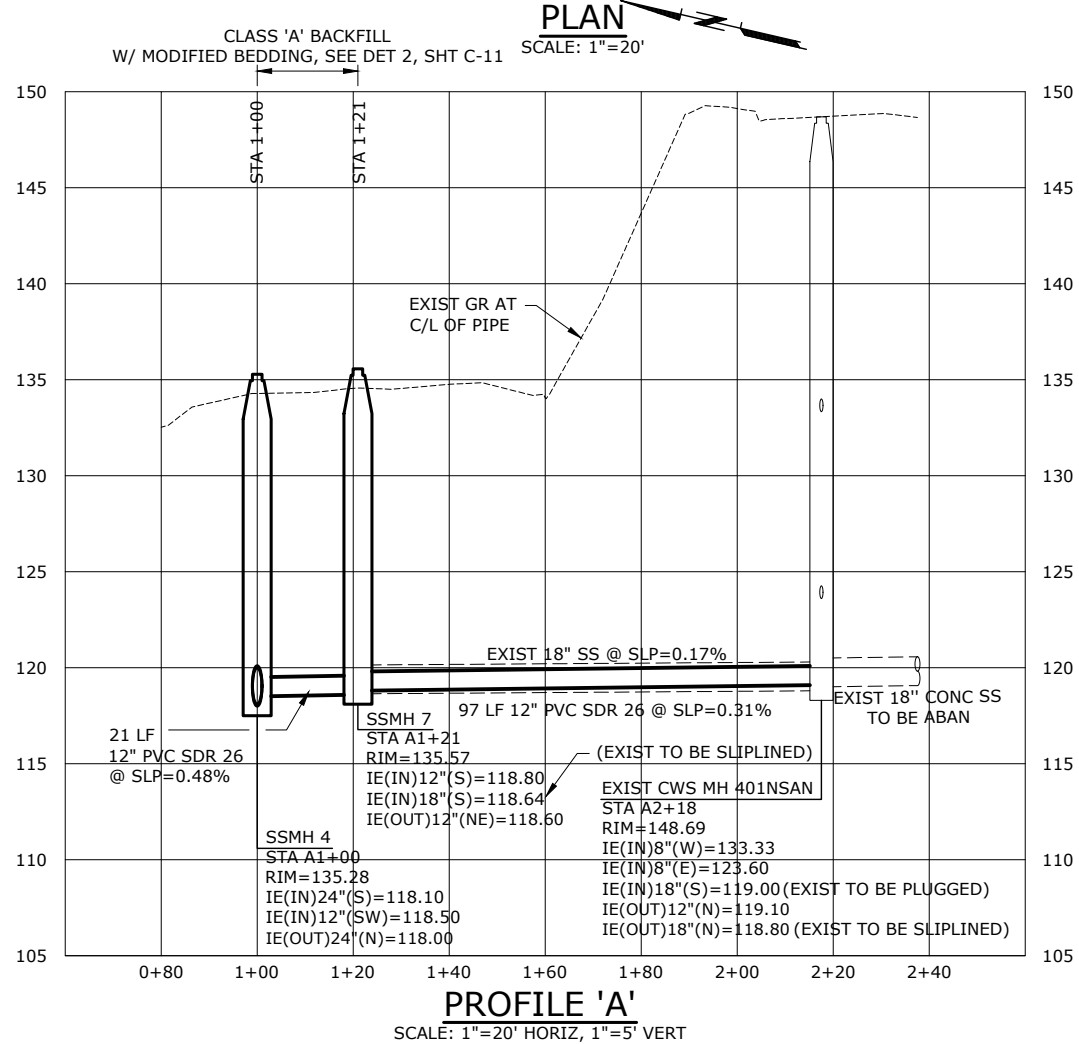
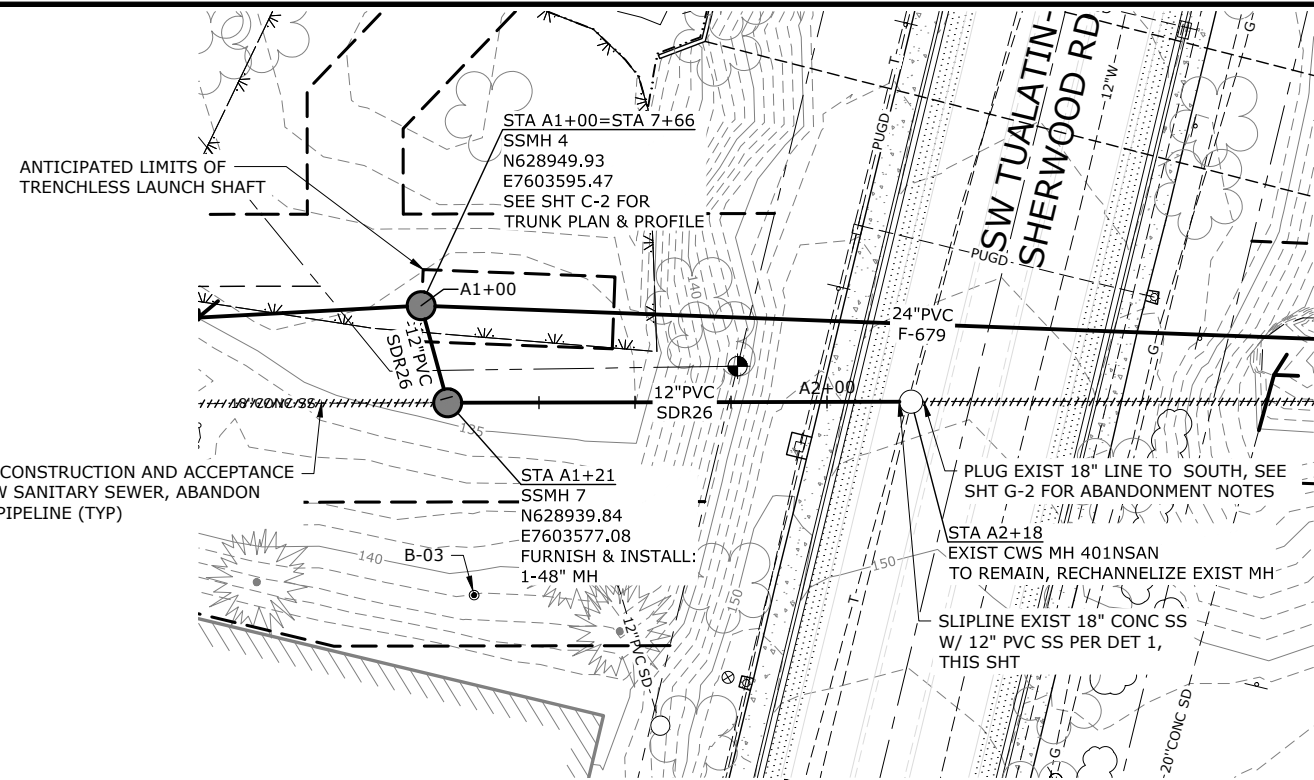
**CITY OF SHERWOOD**  
**ROCK CREEK**  
**SANITARY TRUNK LINE**  
**UPSIZING PROJECT -**  
**PHASE 1**

**SEWER PLAN AND PROFILE**  
**STA 10+00 TO STA 14+54**

PROJECT NO.: 19-2481.402 SCALE: AS SHOWN DATE: DECEMBER 2019

SHEET  
**C-5**  
19 of X

G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-C.dwg C-6 12/13/2019 3:44 PM MATT. ESTEP 23.0s (LMS Tech)



- CASING NOTES:**
1. ANNULAR SPACE BETWEEN 18" DIAMETER RCP AND 12" DIAMETER PVC CARRIER PIPE TO BE FILLED WITH GROUT PER SPECIFICATIONS. GROUT TO BE FINISHED FLUSH WITH EXISTING MANHOLE WALL AT CONNECTION TO CWS MANHOLE 401 NSAN TO PROVIDE A WATERTIGHT SEAL.
  2. PROVIDE 2" MINIMUM CLEARANCE BETWEEN CASING AND CARRIER PIPE BELLS AND APPURTENANCES.
  3. CONTRACTOR TO VERIFY CASING SIZES PRIOR TO SIZING AND ORDERING CASING INSULATORS. CUSTOM CASING INSULATORS WILL BE REQUIRED TO ACHIEVE SPECIFIED GRADE, SEE SPECIFICATIONS.
  4. MANHOLE BENCH AND CHANNEL TO BE CONSTRUCTED FOR NEW SEWER INVERT ELEVATIONS, SEE DET X, SHT C-X <TO FOLLOW>.
  5. INSTALL 3/4"-0 CRUSHED ROCK WITHIN PIPE ZONE BETWEEN BULKHEAD AND MANHOLE WALL.

**60% SUBMITTAL**

NO.	DATE	BY	REVISION

**NOTICE**

0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JJU DESIGNED  
CAD DRAWN  
BVO CHECKED

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION

DECEMBER 2019

**Murraysmith**  
www.murraysmith.us



**CITY OF SHERWOOD**  
ROCK CREEK  
SANITARY TRUNK LINE  
UPSIZING PROJECT -  
PHASE 1

**SEWER PLAN AND PROFILE**  
STA A1+00 TO STA A2+18  
AND SLIPLINE DETAIL

PROJECT NO.: 19-2481.402 SCALE: AS SHOWN DATE: DECEMBER 2019

SHEET  
C-6  
20 of X

G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-C DETS.dwg C-10 12/6/2019 11:00 AM MATT. ESTEP 23.0s (LMS Tech)

STORMWATER OUTFALL  
PLAN, SEE DET 1, SHT C-11

CLASS 200 RIPRAP

SEE SHTS C-4 AND C-5 FOR  
SEWER PLAN AND PROFILE

50' PERM  
SEWER ESMT

24" PVC  
F-679

80' TEMP  
CONST ESMT

10" PVC SS

PLAN  
SCALE: 1"=10'

NOTES:  
1. INSTALL JUTE MATTING ON DISTURBED SLOPES  
GREATER THAN 2H:1V.

**60% SUBMITTAL**

NO.	DATE	BY	REVISION

NOTICE  
0 1/2 1  
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JJU  
DESIGNED  
CAD  
DRAWN  
BVO  
CHECKED

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION  
DECEMBER 2019  
**Murraysmith**  
www.murraysmith.us

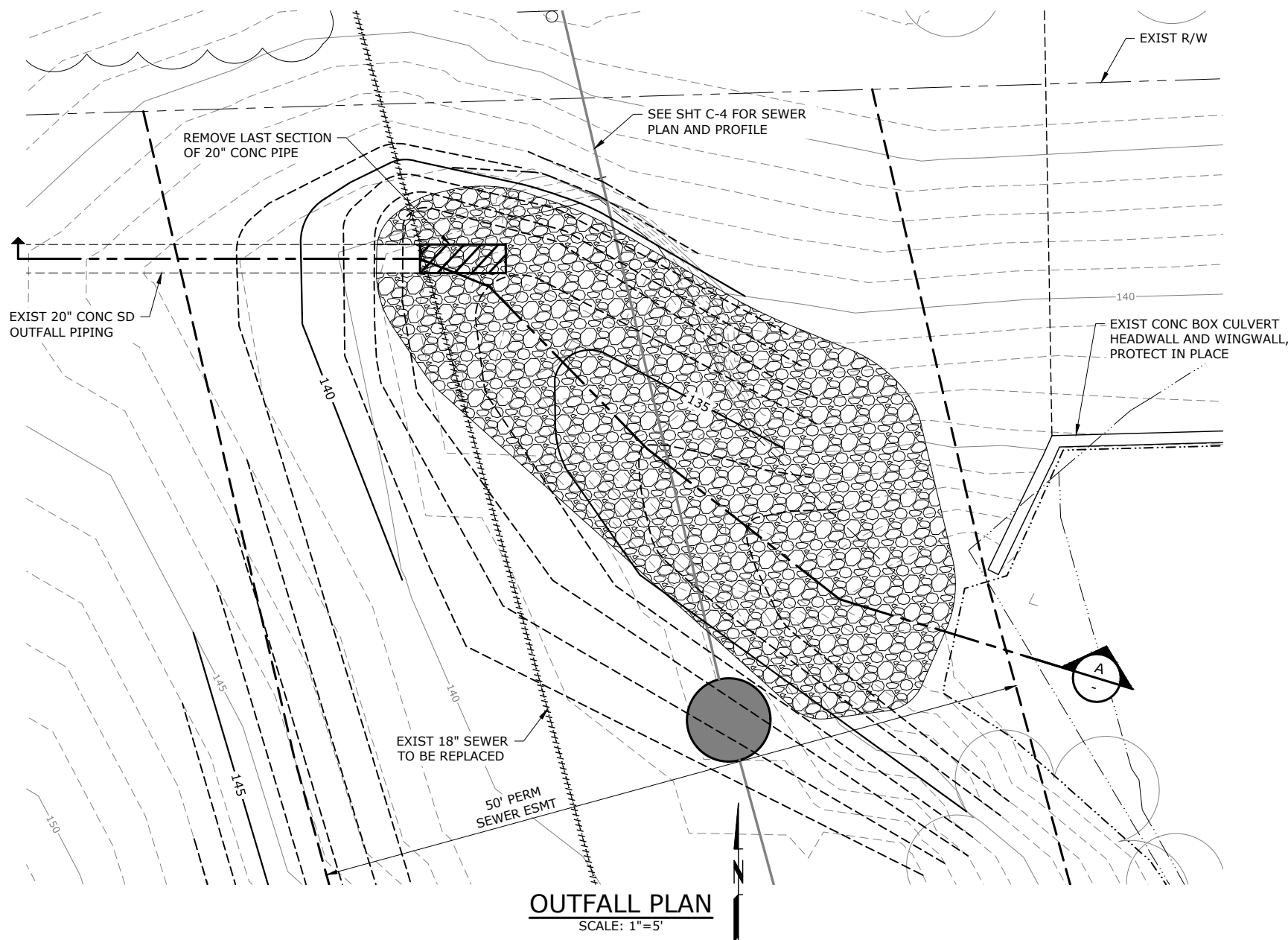


**CITY OF SHERWOOD  
ROCK CREEK  
SANITARY TRUNK LINE  
UPSIZING PROJECT -  
PHASE 1**

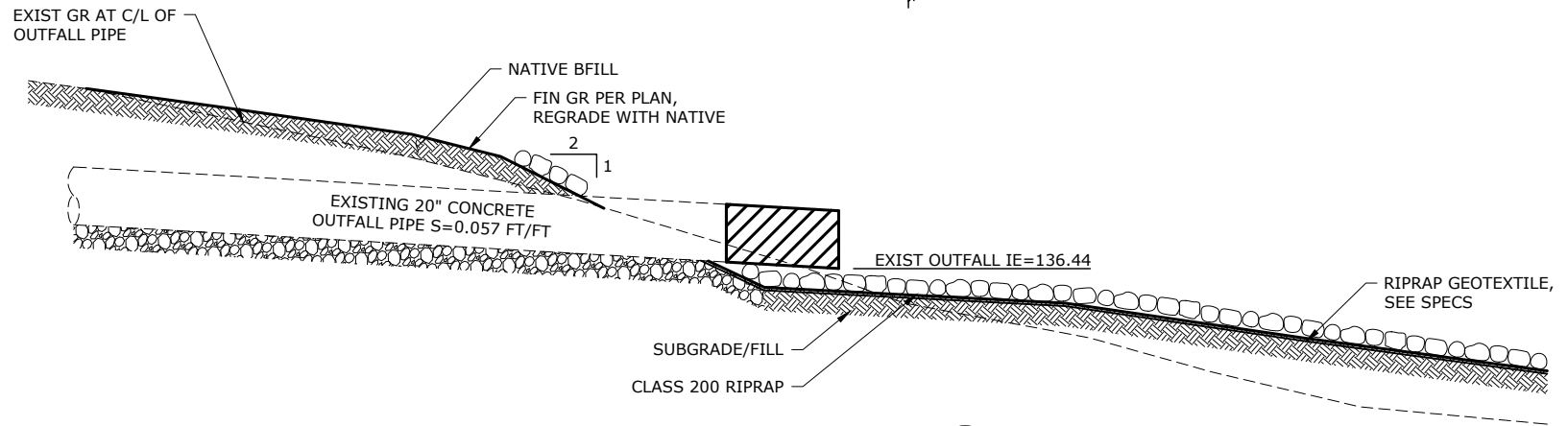
**SITE GRADING PLAN**  
PROJECT NO.: 19-2481.402 SCALE: AS SHOWN DATE: DECEMBER 2019

SHEET  
C-10  
24 of X

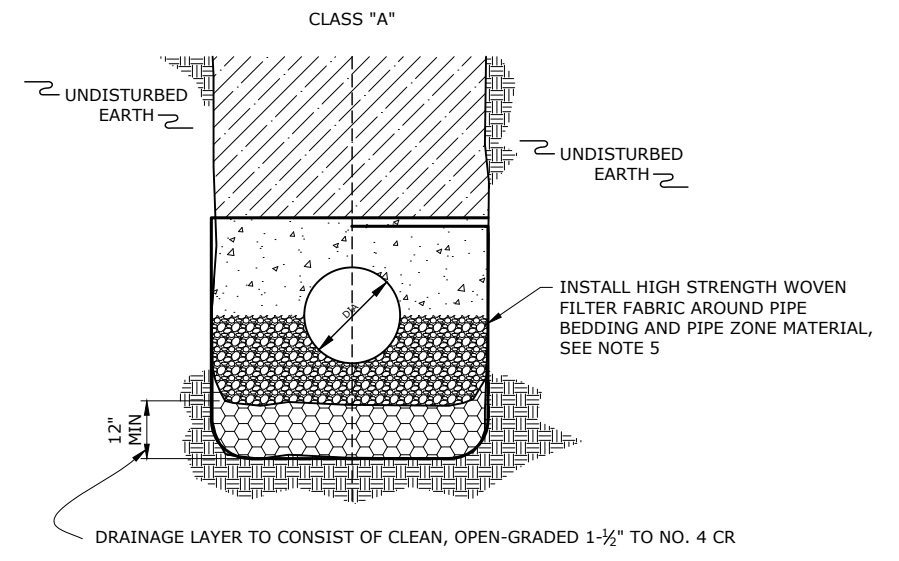
G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-C DETS.dwg C-11 12/6/2019 11:00 AM MATT.ESSTEP 23.0s (LMS Tech)



**OUTFALL PLAN**  
SCALE: 1"=5'

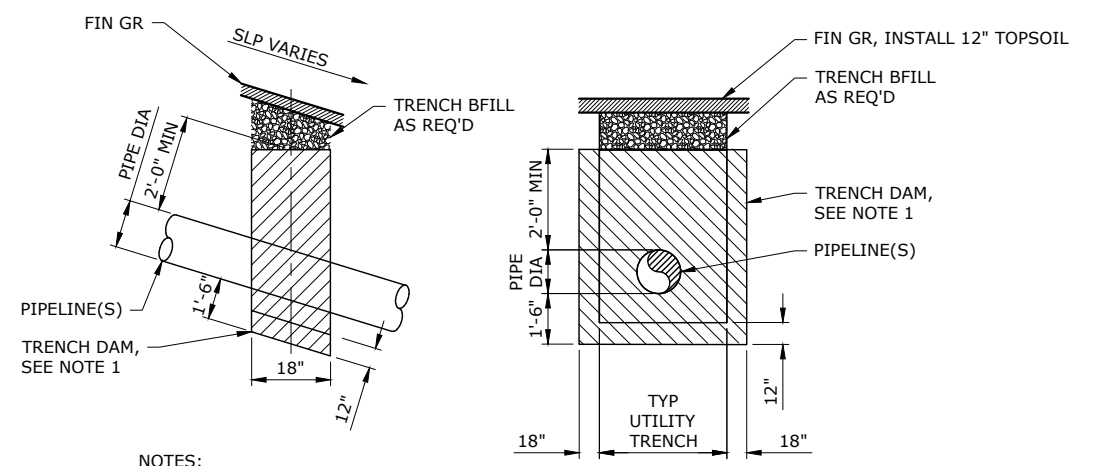


**OUTFALL SECTION**  
SCALE: NTS



1. BEDDING AND PIPE ZONE MATERIAL SHALL BE COMPACTED TO 90% OF THE MODIFIED PROCTOR DRY DENSITY VALUE (ASTM D1557). COMPACTION OF BEDDING MATERIAL SHALL BE ACCOMPLISHED WITHOUT VIBRATORY COMPACTION METHODS.
2. THE TRENCH WIDTH AT THE SURFACE OF THE GROUND SHALL BE KEPT TO A MINIMUM NECESSARY TO INSTALL THE PIPE IN A SAFE MANNER.
3. THE MINIMUM TRENCH WIDTH IN THE PIPE ZONE SHALL PROVIDE A CLEAR WORKING SPACE OF SIX INCHES OUTSIDE THE MAXIMUM OUTSIDE DIAMETER OF THE PIPE BEING INSTALLED.
4. IN ALL CASES, TRENCHES SHALL BE OF SUFFICIENT WIDTH TO ALLOW FOR SHORING, PROPER JOINING OF PIPE, AND BACKFILLING OF MATERIAL ALONG THE SIDES OF THE PIPE.
5. HIGH STRENGTH WOVEN FILTER FABRIC SHALL BE MIRAFT RS5280i OR APPROVED EQUAL.

**TRENCH WITH SUBGRADE STABILIZATION**  
SCALE: NTS



- NOTES:**
1. CONSTRUCT TRENCH DAMS WITH BENTONITE, DO NOT USE TOPSOIL FOR FILLING BENTONITE.
  2. TRENCH DAMS SHALL BE INSTALLED IN PIPELINE TRENCH ON SLOPED GRADES. APPROX LOCATION OF TRENCH DAMS ARE SHOWN ON PLAN SHEETS. COORDINATE EXACT LOCATION W/ FIELD ENGINEER.

**TYPICAL TRENCH DAM**  
SCALE: NTS

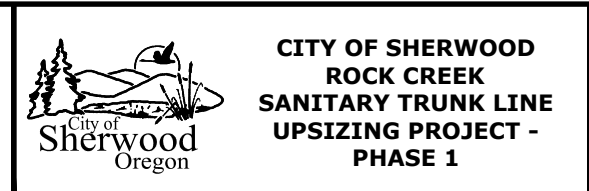
**60% SUBMITTAL**

NO.	DATE	BY	REVISION

**NOTICE**  
0 1/2 1  
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JJU  
DESIGNED  
CAD  
DRAWN  
BVO  
CHECKED

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION  
DECEMBER 2019  
**Murraysmith**  
www.murraysmith.us

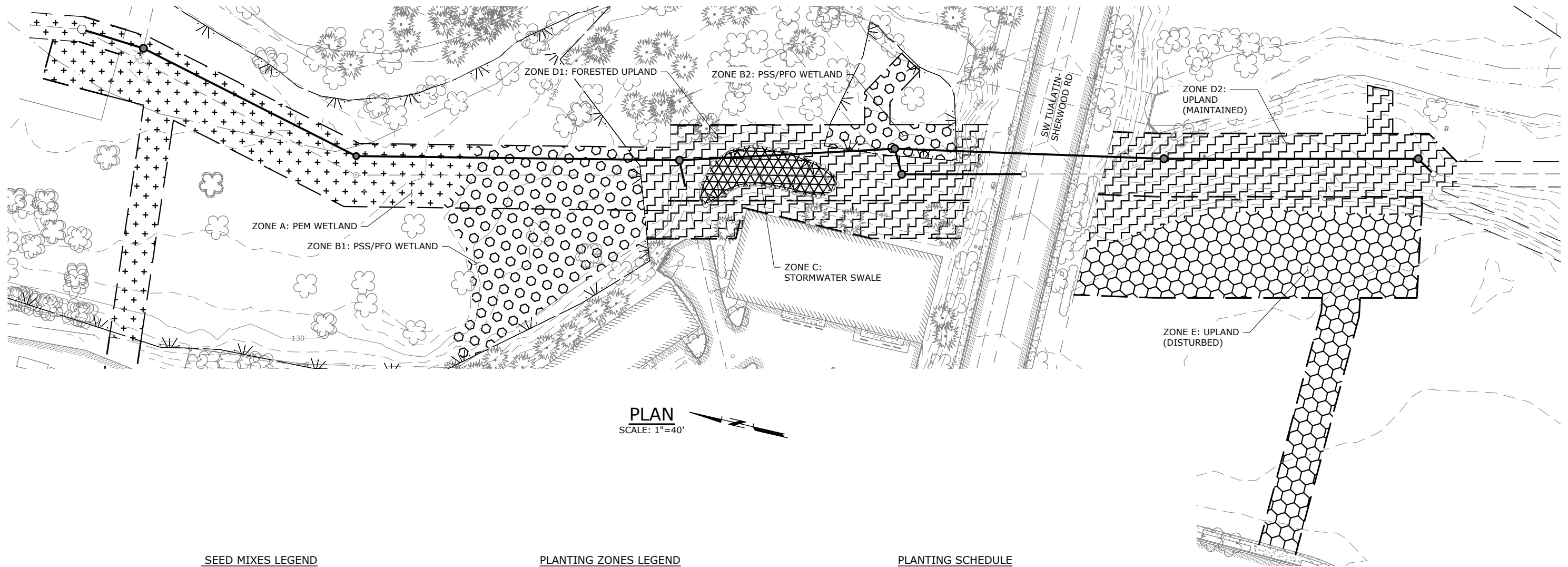


**CIVIL DETAILS - 1**

PROJECT NO.: 19-2481.402 SCALE: AS SHOWN DATE: DECEMBER 2019

SHEET  
**C-11**  
25 of X

G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-L.dwg L-1 12/13/2019 3:59 PM MATT. ESTEP 23.0s (LMS Tech)



**SEED MIXES LEGEND**

SEED MIX	COMMON NAME (BOTANICAL NAME)	QUANTITY (LBS/ACRE)	QUANTITY (LBS SEEDS/ LBS SEED MIX)
WETLAND	TUFTED HAIRGRASS (DESCHAMPSIA CESPITOSA)	1.67	0.29
	SLENDER HAIRGRASS (DESCHAMPSIA ELONGATA)	1.00	0.18
	SLENDER RUSH (JUNCUS TENUIIS)	1.39	0.24
	SPIKE BENTGRASS (AGROSTIC EXARATA)	1.67	0.29
UPLAND	WESTERN YARROW (ACHILLEA MILLEFOLIUM)	0.47	0.02
	CALIFORNIA OATGRASS (DANTHONIA CALIFORNICA)	4.65	0.18
	BLUE WILDRYE (ELYMUS GLAUCUS)	9.30	0.38
	MEADOW BARLEY (HORDEUM BRACHYANTHERUM)	9.30	0.38
	MEADOW CHECKERBLOOM (SIDALCEA CAMPESTRIS)	0.93	0.04

**PLANTING ZONES LEGEND**

PLANTING ZONE	AREA (ACRES)	SYMBOL
A	0.521	[Cross-hatch symbol]
B1	0.403	[Dotted symbol]
B2	0.083	[Hexagonal symbol]
C	0.070	[Diagonal line symbol]
D1	0.382	[Wavy line symbol]
D2	0.441	[Staggered line symbol]
E	0.520	[Hexagonal symbol]

**PLANTING SCHEDULE**

PLANTING ZONE	QUANTITY										
	SEED MIX (LBS)		SHRUB (EA)				TREE (EA)				
	WETLAND	UPLAND	DOUGLAS SPIRAEA (SPIRAEA DOUGLASII)	RED OSTER DOGWOOD (CORNUS ALBA)	PACIFIC NINEBARK (PHYSOCARPUS CAPITATUS)	SNOWBERRY (SYMPHORICARPOS ALBUS)	OREGON ASH (FRAXINUS LATIFOLIA)	BLACK HAWTHORN (CRATAEGUS DOUGLASII)	PACIFIC WILLOW (SALIX LUCIDA)	BIG LEAF MAPLE (ACER MACROPHYLLUM)	OREGON WHITE OAK (QUERCUS GARRYANA)
A	3.0	--	0	0	0	--	0	0	0	--	--
B1	2.3	--	50	50	50	--	4	4	4	--	--
B2	0.5	--	3	3	3	--	1	1	1	--	--
C	0.4	--	4	4	4	--	0	0	0	--	--
D1	--	9.4	--	--	--	120	--	--	--	2	1
D2	--	10.9	--	--	--	90	--	--	--	0	0
E	--	12.8	--	--	--	0	--	--	--	0	0

**NOTES:**

1. PLANT SEED MIX, SHRUBS, AND TREES PER QUANTITIES PROVIDED IN PLANTING SCHEDULE. PLANT ALL SHRUBS AND TREES PER DETAILS ON SHEET L-2.
2. MINIMUM 10' CLEAR SPACE FROM TREE PLANTING TO PROPOSED SANITARY SEWER INFRASTRUCTURE.

**60% SUBMITTAL**

NO.	DATE	BY	REVISION

NOTICE  
0 1/2 1  
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JJU DESIGNED  
CAD DRAWN  
BVO CHECKED

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION  
DECEMBER 2019  
**Murraysmith**  
www.murraysmith.us



**CITY OF SHERWOOD**  
**ROCK CREEK**  
**SANITARY TRUNK LINE**  
**UPSIZING PROJECT -**  
**PHASE 1**

**RESTORATION & PLANTING PLAN**

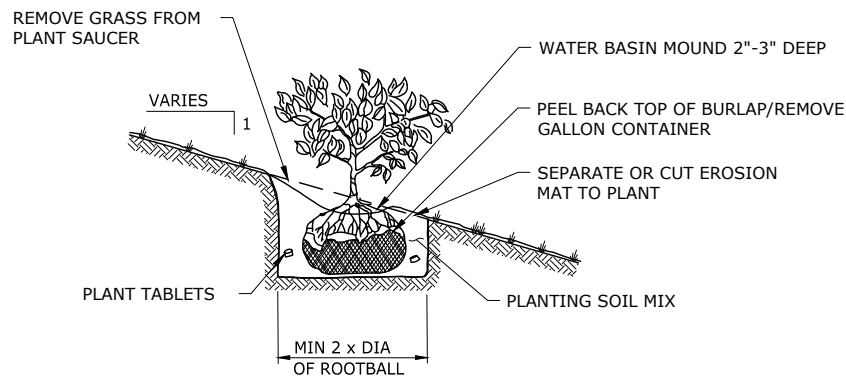
SHEET

L-1

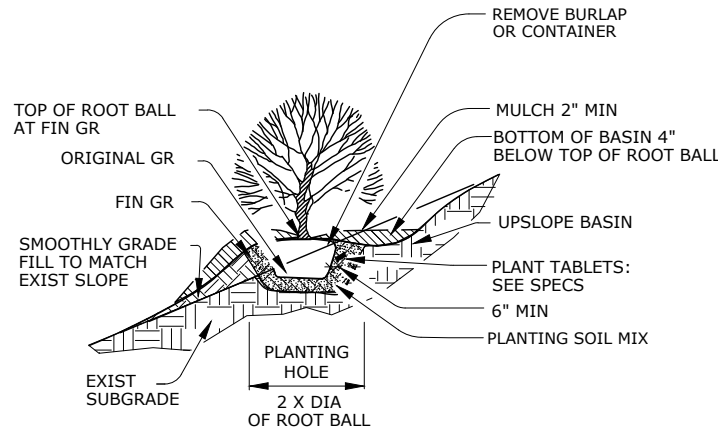
29 of X

PROJECT NO.: 19-2481.402 SCALE: 8 DATE: DECEMBER 2019

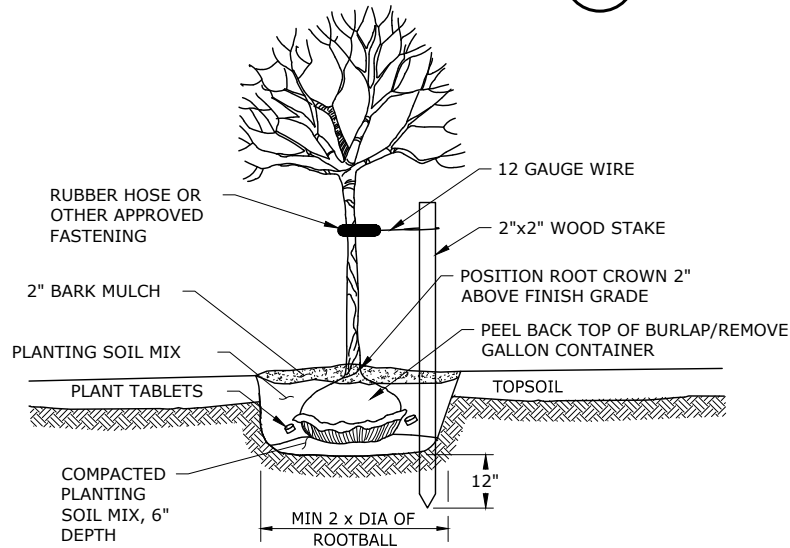
G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-L.dwg L-2 12/13/2019 3:59 PM MATT. ESTEP 23.0s (LMS Tech)



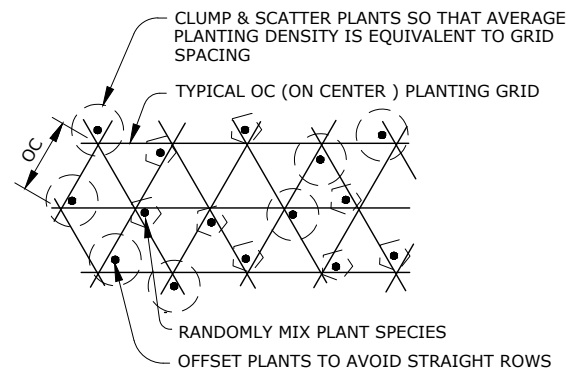
**SMALL SHRUB PLANTING** (1)  
SCALE: NTS



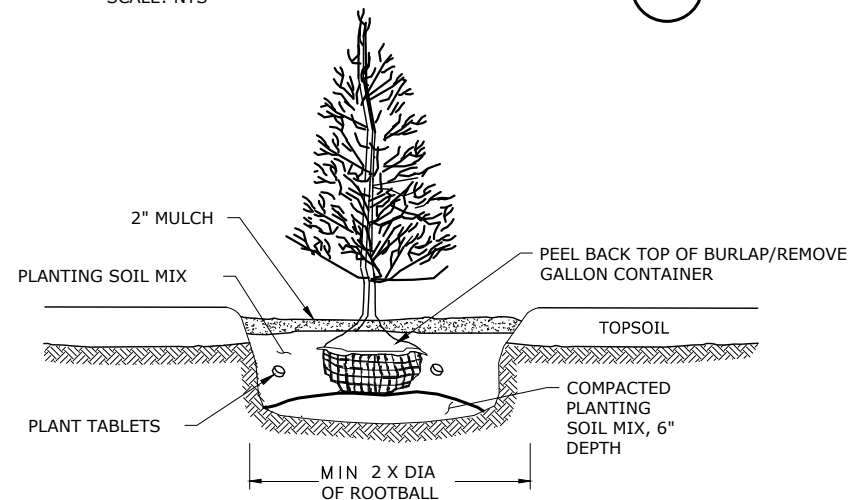
**SLOPED AREA SHRUB PLANTING** (4)  
SCALE: NTS



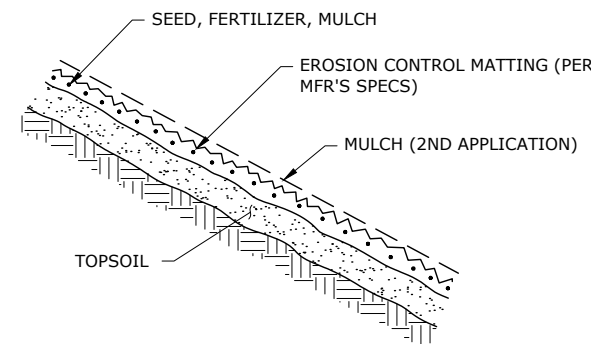
**DECIDUOUS TREE PLANTING** (2)  
SCALE: NTS



**RANDOM PLANTING PATTERN** (5)  
SCALE: NTS



**EVERGREEN TREE PLANTING** (3)  
SCALE: NTS



**EROSION CONTROL MATTING INSTALLATION** (6)  
SCALE: NTS

**GENERAL LANDSCAPE NOTES:**

1. THE CONTRACTOR SHALL EXAMINE FINISH SURFACE, GRADES, TOPSOIL QUALITY AND DEPTH. DO NOT START ANY WORK UNTIL UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED. VERIFY LIMITS OF WORK BEFORE STARTING.
2. CONTRACTOR TO REPORT ALL DAMAGES TO EXISTING CONDITIONS AND INCONSISTENCIES WITH PLANS TO THE ENGINEER.
3. IMPROVE EXISTING SOIL WITH ORGANIC MATTER BY ADDING 4" COMPOST AND TILL INTO TOP 12" OF TOPSOIL PRIOR TO PLANTING AT LOCATIONS DETERMINED BY ENGINEER.
4. REMOVE EXISTING WEEDS AND INVASIVE SPECIES FROM RESTORATION EXTENTS PRIOR TO BEGINNING SITE RESTORATION AND PLANTING.
5. TREES AND SHRUBS PLANTED IN UPLAND AREAS SHALL BE MULCHED A MINIMUM OF THREE INCHES IN DEPTH AND 18 INCHES IN DIAMETER.
7. BACKFILL MATERIAL FOR TREE AND SHRUB PLANTING SHALL CONTAIN: ONE-PART FINE GRADE COMPOST TO ONE-PART TOPSOIL BY VOLUME, BONE MEAL PER MANUFACTURER'S RECOMMENDATION, AND SLOW RELEASE FERTILIZER PER MANUFACTURER'S RECOMMENDATION.
8. CONTRACTOR SHALL OBTAIN WRITTEN APPROVAL FOR ALL PLANT MATERIAL SUBSTITUTIONS FROM THE ENGINEER PRIOR TO INSTALLATION. PLANT SUBSTITUTIONS WITHOUT PRIOR WRITTEN APPROVAL THAT DO NOT COMPLY WITH THE DRAWINGS AND SPECIFICATIONS MAY BE REJECTED AT NO COST TO THE OWNER. THESE ITEMS MAY BE REQUIRED TO BE REPLACED WITH PLANT MATERIALS THAT ARE IN COMPLIANCE WITH THE DRAWINGS.
9. ALL PLANT MATERIALS SHALL BE NURSERY GROWN WITH HEALTHY ROOT SYSTEMS AND FULL BRANCHING, DISEASE AND INSECT FREE AND WITHOUT DEFECTS SUCH AS SUN SCALD, ABRASIONS, INJURIES AND DISFIGUREMENT.
10. ALL PLANT MATERIAL SHALL BE INSTALLED AT THE SIZE AND QUANTITY SPECIFIED. WITHOUT APPROVAL, THE ENGINEER IS NOT RESPONSIBLE FOR SUB-STANDARD RESULTS CAUSED BY REDUCTION IN SIZE AND/OR QUANTITY OF PLANT MATERIALS.
11. NEW TREES THAT ARE PLANTED TO MEET THE EFFECTIVE CANOPY REQUIREMENTS SHALL CONFORM TO THE APPLICABLE STANDARDS OF CLEAN WATER SERVICES. THEY SHALL BE PLANTED IN ACCORDANCE WITH THE AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) STANDARDS FOR TREE PLANTING (A300, PART 6) AND ADDITIONAL STANDARDS ADOPTED BY THE OREGON LANDSCAPE CONTRACTORS BOARD. NURSERY STOCK SHALL MEET THE REQUIREMENTS OF THE AMERICAN ASSOCIATION OF NURSERYMEN FOR NURSERY STOCK (ANSI Z60.1) FOR GRADE NO. 1 OR BETTER. DOUBLE STAKE TREES IF NEEDED FOR STABILITY DURING THE ESTABLISHMENT PERIOD.
12. CONTRACTOR SHALL PROVIDE TWO-YEAR PLANT ESTABLISHMENT PERIOD TO MAINTAIN PLANTS IN A VIGOROUS GROWING CONDITION. INSURE PLANTING AREAS ARE FREE OF INVASIVE WEEDS. PLANTS SHALL BE FREE OF INSECTS AND DISEASES WHILE SHOWING SIGNS OF CONTINUING HEALTH. THE PLANT ESTABLISHMENT PERIOD BEGINS IMMEDIATELY AFTER THE COMPLETION OF ALL PLANTING OPERATION AND WRITTEN NOTIFICATION TO THE ENGINEER.

**60% SUBMITTAL**

NO.	DATE	BY	REVISION

**NOTICE**

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JJU  
DESIGNED

CAD  
DRAWN

BVO  
CHECKED

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION

DECEMBER 2019

**Murraysmith**  
www.murraysmith.us



**CITY OF SHERWOOD  
ROCK CREEK  
SANITARY TRUNK LINE  
UPSIZING PROJECT -  
PHASE 1**

**RESTORATION & PLANTING DETAILS**

PROJECT NO.: 19-2481.402 | SCALE: AS SHOWN | DATE: DECEMBER 2019

SHEET  
**L-2**  
30 of X



US Army Corps  
of Engineers®  
Portland District

# Nationwide Permit 12

## Terms and Conditions

Effective Date: March 19, 2017

- 
- A. Description of Activities Authorized by Nationwide Permit 12
  - B. Nationwide Permit General Conditions
  - C. District Engineer's Decision
  - D. Further Information
  - E. Portland District Regional Conditions
  - F. Portland District Nationwide Permit Specific Conditions
- 

In addition to any special conditions that may be required on a case-by-case basis by the District Engineer, the following terms and conditions must be met, as applicable, for a Nationwide Permit authorization to be valid in Oregon.

### **A. Description of Activities Authorized by Nationwide Permit (NWP) 12**

12. *Utility Line Activities.* Activities required for the construction, maintenance, repair, and removal of utility lines and associated facilities in waters of the United States, provided the activity does not result in the loss of greater than 1/2-acre of waters of the United States for each single and complete project.

*Utility lines:* This NWP authorizes discharges of dredged or fill material into waters of the United States and structures or work in navigable waters for crossings of those waters associated with the construction, maintenance, or repair of utility lines, including outfall and intake structures. There must be no change in pre-construction contours of waters of the United States. A "utility line" is defined as any pipe or pipeline for the transportation of any gaseous, liquid, liquescent, or slurry substance, for any purpose, and any cable, line, or wire for the transmission for any purpose of electrical energy, telephone, and telegraph messages, and internet, radio, and television communication. The term "utility line" does not include activities that drain a water of the United States, such as drainage tile or french drains, but it does apply to pipes conveying drainage from another area.

Material resulting from trench excavation may be temporarily sidecast into waters of the United States for no more than three months, provided the material is not placed in such a manner that it is dispersed by currents or other forces. The district engineer may extend the period of temporary side casting for no more than a total of 180 days, where appropriate. In wetlands, the top 6 to 12 inches of the trench should normally be backfilled with topsoil from the trench. The trench cannot be constructed or backfilled in such a manner as to drain waters of the United States (e.g., backfilling with extensive gravel layers, creating a french drain effect). Any exposed slopes and stream banks must be stabilized immediately upon completion of the utility line crossing of each waterbody.

*Utility line substations:* This NWP authorizes the construction, maintenance, or expansion of substation facilities associated with a power line or utility line in non-tidal waters of the United States, provided the activity, in combination with all other activities included in one single and complete project, does not result in the loss of greater than 1/2-acre of waters of the United States. This NWP does not authorize discharges into non-tidal wetlands adjacent to tidal waters of the United States to construct, maintain, or expand substation facilities.

*Foundations for overhead utility line towers, poles, and anchors:* This NWP authorizes the construction or maintenance of foundations for overhead utility line towers, poles, and anchors in all waters of the United States, provided the foundations are the minimum size necessary and separate footings for each tower leg (rather than a larger single pad) are used where feasible.

*Access roads:* This NWP authorizes the construction of access roads for the construction and maintenance of utility lines, including overhead power lines and utility line substations, in non-tidal waters of the United States, provided the activity, in combination with all other activities included in one single and complete project, does not cause the loss of greater than 1/2-acre of non-tidal waters of the United States. This NWP does not authorize discharges into non-tidal wetlands adjacent to tidal waters for access roads. Access roads must be the minimum width necessary (see Note 2, below). Access roads must be constructed so that the length of the road minimizes any adverse effects on waters of the United States and must be as near as possible to pre-construction contours and elevations (e.g., at grade corduroy roads or geotextile/gravel roads). Access roads constructed above pre-construction contours and elevations in waters of the United States must be properly bridged or culverted to maintain surface flows.

This NWP may authorize utility lines in or affecting navigable waters of the United States even if there is no associated discharge of dredged or fill material (See 33 CFR part 322). Overhead utility lines constructed over section 10 waters and utility lines that are routed in or under section 10 waters without a discharge of dredged or fill material require a section 10 permit.

This NWP authorizes, to the extent that Department of the Army authorization is required, temporary structures, fills, and work necessary for the remediation of inadvertent returns of drilling fluids to waters of the United States through sub-soil fissures or fractures that might occur during horizontal directional drilling activities conducted for the purpose of installing or replacing utility lines. These remediation activities must be done as soon as practicable, to restore the affected waterbody. District engineers may add special conditions to this NWP to require a remediation plan for addressing inadvertent returns of drilling fluids to waters of the United States during horizontal directional drilling activities conducted for the purpose of installing or replacing utility lines.

This NWP also authorizes temporary structures, fills, and work, including the use of



temporary mats, necessary to conduct the utility line activity. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. After construction, temporary fills must be removed in their entirety and the affected areas returned to pre- construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

*Notification:* The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if any of the following criteria are met: (1) The activity involves mechanized land clearing in a forested wetland for the utility line right-of-way; (2) a section 10 permit is required; (3) the utility line in waters of the United States, excluding overhead lines, exceeds 500 feet; (4) the utility line is placed within a jurisdictional area (i.e., water of the United States), and it runs parallel to or along a stream bed that is within that jurisdictional area; (5) discharges that result in the loss of greater than 1/10- acre of waters of the United States; (6) permanent access roads are constructed above grade in waters of the United States for a distance of more than 500 feet; or (7) permanent access roads are constructed in waters of the United States with impervious materials. (See general condition 32.)

(Authorities: Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act)

**Note 1:** Where the utility line is constructed or installed in navigable waters of the United States (i.e., section 10 waters) within the coastal United States, the Great Lakes, and United States territories, a copy of the NWP verification will be sent by the Corps to the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), for charting the utility line to protect navigation.

**Note 2:** For utility line activities crossing a single waterbody more than one time at separate and distant locations, or multiple waterbodies at separate and distant locations, each crossing is considered a single and complete project for purposes of NWP authorization. Utility line activities must comply with 33 CFR 330.6(d).

**Note 3:** Utility lines consisting of aerial electric power transmission lines crossing navigable waters of the United States (which are defined at 33 CFR part 329) must comply with the applicable minimum clearances specified in 33 CFR 322.5(i).

**Note 4:** Access roads used for both construction and maintenance may be authorized, provided they meet the terms and conditions of this NWP. Access roads used solely for construction of the utility line must be removed upon completion of the work, in accordance with the requirements for temporary fills.

**Note 5:** Pipes or pipelines used to transport gaseous, liquid, liquescent, or slurry substances over navigable waters of the United States are considered to be bridges, not utility lines, and may require a permit from the U.S. Coast Guard pursuant to section 9 of the Rivers and Harbors Act of 1899. However, any discharges of dredged or fill material into waters of the United States associated with such pipelines will require a section 404 permit (see NWP 15).

**Note 6:** This NWP authorizes utility line maintenance and repair activities that do not qualify for the Clean Water Act section 404(f) exemption for maintenance of currently serviceable fills or fill structures.

**Note 7:** For overhead utility lines authorized by this NWP, a copy of the PCN and NWP verification will be provided to the Department of Defense Siting Clearinghouse, which will evaluate potential effects on military activities.

**Note 8:** For NWP 12 activities that require pre-construction notification, the PCN must include any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings that require Department of the Army authorization but do not require pre-construction notification (see paragraph (b) of general condition 32). The district engineer will evaluate the PCN in accordance with Section D, "District Engineer's Decision." The district engineer may require mitigation to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see general condition 23).

## **B. NWP General Conditions**

**Note:** To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as applicable, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/ or Coastal Zone Management Act consistency for an NWP. Every person who may wish to obtain permit authorization under one or more NWPs, or who is currently relying on an existing or prior permit authorization under one or more NWPs, has been and is on notice that all of the provisions of 33 CFR 330.1 through 330.6 apply to every NWP authorization. Note especially 33 CFR 330.5 relating to the modification, suspension, or revocation of any NWP authorization.

### **1. Navigation.**

(a) No activity may cause more than a minimal adverse effect on navigation.

(b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.

(c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

**2. Aquatic Life Movements.** No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably

culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species. If a bottomless culvert cannot be used, then the crossing should be designed and constructed to minimize adverse effects to aquatic life movements.

3. *Spawning Areas.* Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. *Migratory Bird Breeding Areas.* Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. *Shellfish Beds.* No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWP 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. *Suitable Material.* No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).

7. *Water Supply Intakes.* No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. *Adverse Effects From Impoundments.* If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. *Management of Water Flows.* To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization, storm water management activities, and temporary and permanent road crossings, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. *Fills Within 100-Year Floodplains.* The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. *Equipment.* Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. *Soil Erosion and Sediment Controls.* Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow, or during low tides.

13. *Removal of Temporary Fills.* Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. *Proper Maintenance.* Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. *Single and Complete Project.* The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

16. *Wild and Scenic Rivers.*

(a) No NWP activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a “study river” for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status.

(b) If a proposed NWP activity will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a “study river” for possible inclusion in the system while the river is in an official study status, the permittee must submit a pre-construction notification (see general condition 32). The district engineer will coordinate the PCN with the Federal agency with direct management responsibility for that river. The permittee shall not begin the NWP activity until notified by the district engineer that the Federal agency with direct management responsibility for that river has determined in writing that the proposed NWP activity will not adversely affect the Wild and Scenic River designation or study status.

(c) Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service). Information on these rivers is also available at: <http://www.rivers.gov/>.

17. *Tribal Rights.* No NWP activity may cause more than minimal adverse effects on tribal rights (including treaty rights), protected tribal resources, or tribal lands.

## 18. *Endangered Species.*

(a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which “may affect” a listed species or critical habitat, unless ESA section 7 consultation addressing the effects of the proposed activity has been completed. Direct effects are the immediate effects on listed species and critical habitat caused by the NWP activity. Indirect effects are those effects on listed species and critical habitat that are caused by the NWP activity and are later in time, but still are reasonably certain to occur.

(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. If pre- construction notification is required for the proposed activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation has not been submitted, additional ESA section 7 consultation may be necessary for the activity and the respective federal agency would be responsible for fulfilling its obligation under section 7 of the ESA.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that might be affected by the proposed activity or that utilize the designated critical habitat that might be affected by the proposed activity. The district engineer will determine whether the proposed activity “may affect” or will have “no effect” to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps’ determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the activity, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification that the proposed activity will have “no effect” on listed species or critical habitat, or until ESA section 7 consultation has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species-specific permit conditions to the NWPs.

(e) Authorization of an activity by an NWP does not authorize the “take” of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with “incidental take” provisions, etc.) from the FWS or the NMFS, the Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where “take” means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word “harm” in the definition of “take”

means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

(f) If the non-federal permittee has a valid ESA section 10(a)(1)(B) incidental take permit with an approved Habitat Conservation Plan for a project or a group of projects that includes the proposed NWP activity, the non-federal applicant should provide a copy of that ESA section 10(a)(1)(B) permit with the PCN required by paragraph (c) of this general condition. The district engineer will coordinate with the agency that issued the ESA section 10(a)(1)(B) permit to determine whether the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation conducted for the ESA section 10(a)(1)(B) permit. If that coordination results in concurrence from the agency that the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation for the ESA section 10(a)(1)(B) permit, the district engineer does not need to conduct a separate ESA section 7 consultation for the proposed NWP activity. The district engineer will notify the non-federal applicant within 45 days of receipt of a complete pre-construction notification whether the ESA section 10(a)(1)(B) permit covers the proposed NWP activity or whether additional ESA section 7 consultation is required.

(g) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the FWS and NMFS or their world wide Web pages at <http://www.fws.gov/> or [http:// www.fws.gov/ipac](http://www.fws.gov/ipac) and [http:// and www.nmfs.noaa.gov/pr/species/esa/](http://www.nmfs.noaa.gov/pr/species/esa/) respectively.

19. *Migratory Birds and Bald and Golden Eagles.* The permittee is responsible for ensuring their action complies with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The permittee is responsible for contacting appropriate local office of the U.S. Fish and Wildlife Service to determine applicable measures to reduce impacts to migratory birds or eagles, including whether “incidental take” permits are necessary and available under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act for a particular activity.

#### 20. *Historic Properties.*

(a) In cases where the district engineer determines that the activity may have the potential to cause effects to properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(b) Federal permittees should follow their own procedures for complying with the requirements of section 106 of the National Historic Preservation Act. If pre-construction notification is required for the proposed NWP activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation is not submitted, then additional consultation under section 106 may be necessary. The respective federal agency is responsible for fulfilling its obligation to comply with section 106.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if the NWP activity might have the potential to cause effects to any historic

properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre- construction notification must state which historic properties might have the potential to be affected by the proposed NWP activity or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of, or potential for, the presence of historic properties can be sought from the State Historic Preservation Officer, Tribal Historic Preservation Officer, or designated tribal representative, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted in the PCN and these identification efforts, the district engineer shall determine whether the proposed NWP activity has the potential to cause effects on the historic properties. Section 106 consultation is not required when the district engineer determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR 800.3(a)). Section 106 consultation is required when the district engineer determines that the activity has the potential to cause effects on historic properties. The district engineer will conduct consultation with consulting parties identified under 36 CFR 800.2(c) when he or she makes any of the following effect determinations for the purposes of section 106 of the NHPA: no historic properties affected, no adverse effect, or adverse effect. Where the non-Federal applicant has identified historic properties on which the activity might have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects to historic properties or that NHPA section 106 consultation has been completed.

(d) For non-federal permittees, the district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA section 106 consultation is required. If NHPA section 106 consultation is required, the district engineer will notify the non-Federal applicant that he or she cannot begin the activity until section 106 consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(e) Prospective permittees should be aware that section 110k of the NHPA (54 U.S.C. 306113) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include

any views obtained from the applicant, SHPO/ THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. *Discovery of Previously Unknown Remains and Artifacts.* If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal, and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. *Designated Critical Resource Waters.* Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment.

(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, and 52 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, 38, and 54, notification is required in accordance with general condition 32, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

23. *Mitigation.* The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse environmental effects of the proposed activity are no more than minimal, and provides an activity-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require pre-construction



notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects.

(d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation to ensure that the activity results in no more than minimal adverse environmental effects. Compensatory mitigation for losses of streams should be provided, if practicable, through stream rehabilitation, enhancement, or preservation, since streams are difficult-to-replace resources (see 33 CFR 332.3(e)(3)).

(e) Compensatory mitigation plans for NWP activities in or near streams or other open waters will normally include a requirement for the restoration or enhancement, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, the restoration or maintenance/protection of riparian areas may be the only compensatory mitigation required. Restored riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to restore or maintain/protect a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or maintaining/protecting a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of minimization or compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

(f) Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332.

(1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in no more than minimal adverse environmental effects. For the NWPs, the preferred mechanism for providing compensatory mitigation is mitigation bank credits or in-lieu fee program credits (see 33 CFR 332.3(b)(2) and (3)). However, if an appropriate number and type of mitigation bank or in-lieu credits are not available at the time the PCN is submitted to the district engineer, the district engineer may approve the use of permittee-responsible mitigation.

(2) The amount of compensatory mitigation required by the district engineer must be sufficient to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see 33 CFR 330.1(e)(3)). (See also 33 CFR 332.3(f)).

(3) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, aquatic resource restoration should be the first compensatory mitigation option considered for permittee-responsible mitigation.

(4) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed

mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) through (14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)).

(5) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan only needs to address the baseline conditions at the impact site and the number of credits to be provided.

(6) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan (see 33 CFR 332.4(c)(1)(ii)).

(g) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any NWP activity resulting in the loss of greater than 1/2-acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that an NWP activity already meeting the established acreage limits also satisfies the no more than minimal impact requirement for the NWPs.

(h) Permittees may propose the use of mitigation banks, in-lieu fee programs, or permittee-responsible mitigation. When developing a compensatory mitigation proposal, the permittee must consider appropriate and practicable options consistent with the framework at 33 CFR 332.3(b). For activities resulting in the loss of marine or estuarine resources, permittee-responsible mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee-responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management.

(i) Where certain functions and services of waters of the United States are permanently adversely affected by a regulated activity, such as discharges of dredged or fill material into waters of the United States that will convert a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse environmental effects of the activity to the no more than minimal level.

**24. *Safety of Impoundment Structures.*** To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. *Water Quality.* Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. *Coastal Zone Management.* In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. *Regional and Case-By-Case Conditions.* The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. *Use of Multiple Nationwide Permits.* The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

29. *Transfer of Nationwide Permit Verifications.* If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

\_\_\_\_\_  
(Transferee)

\_\_\_\_\_  
(Date)

30. *Compliance Certification.* Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and implementation of any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include:

(a) A statement that the authorized activity was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions;

(b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and

(c) The signature of the permittee certifying the completion of the activity and mitigation.

The completed certification document must be submitted to the district engineer within 30 days of completion of the authorized activity or the implementation of any required compensatory mitigation, whichever occurs later.

31. *Activities Affecting Structures or Works Built by the United States.* If an NWP activity also requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers (USACE) federally authorized Civil Works project (a "USACE project"), the prospective permittee must submit a pre-construction notification. See paragraph (b)(10) of general condition 32. An activity that requires section 408 permission is not authorized by NWP until the appropriate Corps office issues the section 408 permission to alter, occupy, or use the USACE project, and the district engineer issues a written NWP verification.

32. *Pre-Construction Notification.*

(a) *Timing.* Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

(1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

(2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or are in the vicinity of the activity, or to notify the Corps pursuant to general condition 20 that the activity might have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)) has been completed. Also, work cannot begin under NWP's 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) *Contents of Pre-Construction Notification:* The PCN must be in writing and include the following information:

- (1) Name, address and telephone numbers of the prospective permittee;
- (2) Location of the proposed activity;
- (3) Identify the specific NWP or NWP(s) the prospective permittee wants to use to authorize the proposed activity;
- (4) A description of the proposed activity; the activity's purpose; direct and indirect adverse environmental effects the activity would cause, including the anticipated amount of loss of wetlands, other special aquatic sites, and other waters expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; a description of any proposed mitigation measures intended to reduce the adverse environmental effects caused by the proposed activity; and any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings for linear projects that require Department of the Army authorization but do not require pre-construction notification. The description of the proposed activity and any proposed mitigation measures should be sufficiently detailed to allow the district engineer to determine that the adverse environmental effects of the activity will be no more than minimal and to determine the need for compensatory mitigation or other mitigation measures. For single and complete linear projects, the PCN must include the quantity of anticipated losses of wetlands, other special aquatic sites, and other waters for each single and complete crossing of those wetlands, other special aquatic sites, and other waters. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the activity and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans);

(5) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many wetlands, other special aquatic sites, and other waters. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate;

(6) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse environmental effects are no more than minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(7) For non-Federal permittees, if any listed species or designated critical habitat might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat, the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed activity or utilize the designated critical habitat that might be affected by the proposed activity. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with the Endangered Species Act;

(8) For non-Federal permittees, if the NWP activity might have the potential to cause effects to a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, the PCN must state which historic property might have the potential to be affected by the proposed activity or include a vicinity map indicating the location of the historic property. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with section 106 of the National Historic Preservation Act;

(9) For an activity that will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, the PCN must identify the Wild and Scenic River or the "study river" (see general condition 16); and

(10) For an activity that requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers federally authorized civil works project, the pre-construction notification must include a statement confirming that the project proponent has submitted a written request for section 408 permission from the Corps office having jurisdiction over that USACE project.

(c) *Form of Pre-Construction Notification:* The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is an NWP PCN and must include all of the applicable information required in paragraphs (b)(1) through (10) of this general condition. A letter containing the required information may also be used. Applicants may provide electronic files of PCNs and supporting materials if the district engineer has established tools and procedures for electronic submittals.

(d) *Agency Coordination:*

(1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWP's and the need for mitigation to reduce the activity's adverse environmental effects so that they are no more than minimal.

(2) Agency coordination is required for: (i) All NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States; (ii) NWP 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 activities that require pre-construction notification and will result in the loss of greater than 300 linear feet of stream bed; (iii) NWP 13 activities in excess of 500 linear feet, fills greater than one cubic yard per running foot, or involve discharges of dredged or fill material into special aquatic sites; and (iv) NWP 54 activities in excess of 500 linear feet, or that extend into the waterbody more than 30 feet from the mean low water line in tidal waters or the ordinary high water mark in the Great Lakes.

(3) When agency coordination is required, the district engineer will immediately provide (e.g., via email, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (FWS, state natural resource or water quality agency, EPA, and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to notify the district engineer via telephone, facsimile transmission, or email that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse environmental effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the preconstruction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWP's, including the need for mitigation to ensure the net adverse environmental effects of the proposed activity are no more than minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

(4) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

(5) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of preconstruction notifications to expedite agency coordination.

### **C. District Engineer's Decision**

1. In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or

cumulative adverse environmental effects or may be contrary to the public interest. If a project proponent requests authorization by a specific NWP, the district engineer should issue the NWP verification for that activity if it meets the terms and conditions of that NWP, unless he or she determines, after considering mitigation, that the proposed activity will result in more than minimal individual and cumulative adverse effects on the aquatic environment and other aspects of the public interest and exercises discretionary authority to require an individual permit for the proposed activity. For a linear project, this determination will include an evaluation of the individual crossings of waters of the United States to determine whether they individually satisfy the terms and conditions of the NWP(s), as well as the cumulative effects caused by all of the crossings authorized by NWP. If an applicant requests a waiver of the 300 linear foot limit on impacts to streams or of an otherwise applicable limit, as provided for in NWPs 13, 21, 29, 36, 39, 40, 42, 43, 44, 50, 51, 52, or 54, the district engineer will only grant the waiver upon a written determination that the NWP activity will result in only minimal individual and cumulative adverse environmental effects. For those NWPs that have a waivable 300 linear foot limit for losses of intermittent and ephemeral stream bed and a 1/2-acre limit (i.e., NWPs 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52), the loss of intermittent and ephemeral stream bed, plus any other losses of jurisdictional waters and wetlands, cannot exceed 1/2- acre.

2. When making minimal adverse environmental effects determinations the district engineer will consider the direct and indirect effects caused by the NWP activity. He or she will also consider the cumulative adverse environmental effects caused by activities authorized by NWP and whether those cumulative adverse environmental effects are no more than minimal. The district engineer will also consider site specific factors, such as the environmental setting in the vicinity of the NWP activity, the type of resource that will be affected by the NWP activity, the functions provided by the aquatic resources that will be affected by the NWP activity, the degree or magnitude to which the aquatic resources perform those functions, the extent that aquatic resource functions will be lost as a result of the NWP activity (e.g., partial or complete loss), the duration of the adverse effects (temporary or permanent), the importance of the aquatic resource functions to the region (e.g., watershed or ecoregion), and mitigation required by the district engineer. If an appropriate functional or condition assessment method is available and practicable to use, that assessment method may be used by the district engineer to assist in the minimal adverse environmental effects determination. The district engineer may add case-specific special conditions to the NWP authorization to address site-specific environmental concerns.

3. If the proposed activity requires a PCN and will result in a loss of greater than 1/10-acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for NWP activities with smaller impacts, or for impacts to other types of waters (e.g., streams). The district engineer will consider any proposed compensatory mitigation or other mitigation measures the applicant has included in the proposal in determining whether the net adverse environmental effects of the proposed activity are no more than minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse environmental effects are no more than minimal, after considering mitigation, the district engineer will notify the permittee and include any activity-specific



conditions in the NWP verification the district engineer deems necessary. Conditions for compensatory mitigation requirements must comply with the appropriate provisions at 33 CFR 332.3(k). The district engineer must approve the final mitigation plan before the permittee commences work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the proposed compensatory mitigation plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure the NWP activity results in no more than minimal adverse environmental effects. If the net adverse environmental effects of the NWP activity (after consideration of the mitigation proposal) are determined by the district engineer to be no more than minimal, the district engineer will provide a timely written response to the applicant. The response will state that the NWP activity can proceed under the terms and conditions of the NWP, including any activity-specific conditions added to the NWP authorization by the district engineer.

4. If the district engineer determines that the adverse environmental effects of the proposed activity are more than minimal, then the district engineer will notify the applicant either: (a) That the activity does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (b) that the activity is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal; or (c) that the activity is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse environmental effects, the activity will be authorized within the 45-day PCN period (unless additional time is required to comply with general conditions 18, 20, and/or 31, or to evaluate PCNs for activities authorized by NWPs 21, 49, and 50), with activity-specific conditions that state the mitigation requirements. The authorization will include the necessary conceptual or detailed mitigation plan or a requirement that the applicant submit a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal. When compensatory mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan or has determined that prior approval of a final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation.

#### **D. Further Information**

1. District Engineers have authority to determine if an activity complies with the terms and conditions of an NWP.
2. NWPs do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law.
3. NWPs do not grant any property rights or exclusive privileges.
4. NWPs do not authorize any injury to the property or rights of others.
5. NWPs do not authorize interference with any existing or proposed Federal project (see general condition 31).

## **E. Portland District Regional Conditions**

**Note:** The following Nationwide Permit (NWP) regional conditions are for the State of Oregon. Regional conditions are placed on NWPs to ensure projects result in no more than minimal adverse impacts to the aquatic environment and to address local resource concerns.

1. *Notification:* For permittees that received written NWP approval, upon starting the authorized activities, you shall notify the U.S. Army Corps of Engineers, Portland District, Regulatory Branch that the work has started. Notification shall be provided by e-mail to [cenwp.notify@usace.army.mil](mailto:cenwp.notify@usace.army.mil) and the email subject line shall include: Corps project number and the project location by county.

2. *Aquatic Resources of Special Concern:* Pre-construction notification to the District Engineer is required for all activities proposed in waters of the U.S. within an aquatic resource of special concern. Aquatic resources of special concern are resources that are difficult to replace, unique, and/or have high ecological function. For the purpose of this regional condition, aquatic resources of special concern are native eel grass (*Zostera marina*) beds, mature forested wetlands, bogs, fens, vernal pools, alkali wetlands, wetlands in dunal systems along the Oregon coast, estuarine wetlands, Willamette Valley wet prairie wetlands, marine gardens, marine reserves, kelp beds, and rocky substrate in tidal waters.

In addition to the content requirements of NWP General Condition (GC) 32, the pre-construction notification must include a statement explaining why the effects of the proposed activity are no more than minimal. Written approval from the District Engineer must be obtained prior to commencing work.

**Note:** If the District Engineer determines that the adverse effects of the proposed activity are more than minimal, then the District Engineer will notify the applicant that either:

(a) the activity does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (b) the activity is authorized under the NWP subject to submission of a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level; or (c) the activity is authorized under the NWP with specific modifications or conditions.

3. *Cultural Resources and Human Burials-Inadvertent Discovery Plan:* In addition to the requirements in NWP GCs 20 and 21, the permittee shall immediately notify the District Engineer if, at any time during the course of the work authorized, human burials, cultural items, or historic properties, as defined by the National Historic Preservation Act and Native American Graves Protection and Repatriation Act, are discovered. The permittee shall implement the following procedures:

a. Immediately cease all ground disturbing activities.

b. Notify the Portland District Engineer as soon as possible following discovery but in no case later than 24 hours. Notification may be sent by fax (503-808-4375) or

electronically (cenwp.notify@usace.army.mil) and shall identify the Corps project number and clearly specify the purpose is to report a cultural resource discovery. The permittee shall also notify the Corps representative (by email and telephone) identified in the verification letter.

c. Notify the Oregon State Historic Preservation Office by telephone at (503) 986-0690.

Failure to stop work immediately and until such time as the District Engineer has coordinated with all appropriate agencies and Native American tribes, and complied with the provisions of 33 CFR 325 (Appendix C), the National Historic Preservation Act, Native American Graves Protection and Repatriation Act, and other pertinent regulations could result in violation of state and federal laws. Violators may be subject to civil and criminal penalties.

4. *In-water Work:* To minimize potential impacts to aquatic species and habitat, in-water work will be limited by the following timing considerations:

a. Permittee shall complete all in-water work, to the maximum extent practicable, within the preferred time period (i.e., work window) specified in Oregon Department of Fish and Wildlife's (ODFW) "Oregon Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources," June 2008, or most current version, available at: <http://www.dfw.state.or.us/lands/inwater/>.

b. If work cannot be completed within the preferred timing window, despite every attempt to do so, permittee shall submit a written request to work outside of the preferred window to the District Engineer. The request can be made by means of the joint-agency In-water Work Period Variance Request for Previously Permitted Authorizations form which can be found at <http://www.oregon.gov/dsl/WW/Pages/WWforms.aspx>. Permittee shall not begin any in-water work outside of the preferred window until they have received written approval from the District Engineer.

**Note:** The final specified in-water work period will be based on a project-specific evaluation and may supersede these guidelines through special conditions of the permit verification.

5. *Essential Fish Habitat:* Activities which may adversely affect essential fish habitat, as defined under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), are not authorized by NWP until essential fish habitat requirements have been met by the applicant and the Corps. Non-federal permittees must submit a pre-construction notification to the District Engineer if essential fish habitat may be affected by, or is in the vicinity of, a proposed activity and shall not begin work until notified by the District Engineer that the requirements of the essential fish habitat provisions of the MSA have been satisfied and the activity is authorized. The notification must identify the type(s) of essential fish habitat (e.g., Pacific coast salmon, Pacific coast groundfish, and/or Coastal-pelagic species) managed by a Fishery Management Plan that may be

affected. Information about essential fish habitat is available at NOAA's website: <http://www.westcoast.fisheries.noaa.gov/>.

6. *Bank Stabilization*: Permittee shall include the use of bioengineering techniques and natural materials in the project design to the maximum extent practicable and shall minimize the use of rock. Bioengineering bank stabilization techniques are those that increase the strength and structure of soils with a combination of biological and mechanical elements (e.g., vegetation, root wads and woody debris, rock structures). Riparian plantings shall be included in all project designs unless the permittee can demonstrate that such plantings are not practicable.

7. *Fish Screening*: To prevent injury or mortality to fish due to entrainment, the permittee shall ensure that all intake pipes include adequately sized screens.

**Note:** Fish passage and screening criteria can be obtained from the National Marine Fisheries Service (NMFS) at [http://www.westcoast.fisheries.noaa.gov/fish\\_passage/solutions/index.html](http://www.westcoast.fisheries.noaa.gov/fish_passage/solutions/index.html). Information regarding Oregon's fish passage laws can be obtained from ODFW at <http://www.dfw.state.or.us/fish/passagelinks.asp>.

8. *Work Area Isolation and Dewatering*: Appropriate best management practices shall be implemented to prevent erosion and to prevent sediments from entering waters of the U.S.

a. All in-water work shall be isolated from the active channel or conducted during low seasonal stream flows to the maximum extent practicable.

b. Cofferdams shall be constructed of non-erosive material, such as concrete jersey barriers, sand and gravel bag dams, or water bladders. Constructing a cofferdam by pushing material from the streambed or sloughing material from the streambanks is not authorized.

c. Sand and gravel bag dams shall be lined with a plastic liner or geotextile fabric to reduce permeability and prevent sediments and/or construction materials from entering waters of the U.S.

d. Upstream and downstream flows shall be maintained by routing flows around the construction site.

e. When dewatering is necessary for construction, a sediment basin, or other applicable method, shall be used to settle sediments prior to releasing the water back into the waterbody. Settled water shall be returned to the waterbody in such a manner as to avoid erosion. Sediment basins shall be placed in uplands.

f. Fish and other aquatic species must be salvaged (i.e., safely captured and relocated away from the project or development site) prior to dewatering.

**Note:** The ODFW requires a Scientific Take Permit be obtained to salvage fish and wildlife. Further information from ODFW is available at [http://www.dfw.state.or.us/fish/license\\_permits\\_apps/scientific\\_taking\\_permit.asp](http://www.dfw.state.or.us/fish/license_permits_apps/scientific_taking_permit.asp).

9. *Dredging:* For NWP-authorized activities that involve removal of sediment from waters of the U.S., the permittee shall ensure that any necessary sediment characterization regarding size, composition, and potential contaminants is conducted prior to dredging. Sediment characterization must be conducted per the Sediment Evaluation Framework for the Pacific Northwest (available at: <http://www.nwp.usace.army.mil/Missions/Environment/DMM.aspx>).

**Note 1:** The return water from a contained disposal area is defined as a discharge of dredged material by 33 CFR Part 323.2(d) and requires separate authorization from the District Engineer (e.g., by NWP 16).

**Note 2:** The Oregon Department of Environmental Quality (DEQ) requires removed material placed in an upland site to meet the definitions of clean fill as provided in OAR 340-093-0030 or the use must be specifically allowed by DEQ by rule, permit, or other authorization.

10. *Mechanized Equipment:* In addition to the requirements in NWP GC 11, permittee shall implement the following practices to prevent or minimize impacts to the aquatic environment from mechanized equipment:

a. Use existing roads, paths, and construction pads where available. Temporary mats or pads, when required to provide access onto wetlands or tidal flats, shall be removed within 30 days of completing the authorized work.

b. Operate equipment from the top of a streambank and conduct work outside of the active stream channel, unless specifically authorized by the District Engineer.

c. Equipment shall not be staged, fueled, or maintained within waters of the U.S.

d. Spill prevention and containment materials shall be maintained and be readily accessible at vehicle staging areas. The amount of spill response materials (such as straw matting/bales, geotextiles, booms, diapers, and other absorbent materials, shovels, brooms, and containment bags) maintained on-site must be appropriate for the size of the authorized activity.

11. *Stormwater Management:* Pre-construction notification to the District Engineer is required for all activities resulting in the creation of new impervious surfaces if any species or designated critical habitat listed under the Endangered Species Act (ESA) might be affected or are in the vicinity of the activity. The Corps may require a post-construction stormwater management plan (SWMP) and completion of a supplemental Stormwater Information Form to assist in the determination of the activity's affects to listed species or designated critical habitat and to be used in ESA consultation as necessary.

**Note 1:** The Corps considers impervious surfaces to include roof tops, walkways, patios, driveways, parking or storage areas, concrete or asphalt paving, gravel roads, packed earthen material, and oiled surfaces.

**Note 2:** Under the DEQ 401 Water Quality Certification Program, the DEQ evaluates post-construction stormwater pollution for any project resulting in new, an increase in, or redevelopment of impervious surfaces. DEQ may require the applicant to submit a post-construction SWMP for review and approval prior to the start of construction. DEQ provides information on preparing a SWMP at <http://www.deq.state.or.us/wq/sec401cert/docs/stormwaterGuidelines.pdf>. DEQ requires applicants to first consider low impact development options. If these options can't be implemented, a narrative must be provided explaining why.

12. *Erosion Control:* During construction and until the site is stabilized, the permittee shall ensure all practicable measures are implemented and maintained to prevent erosion and runoff. Temporary stockpiles of excavated or dredged material shall be stabilized to prevent erosion. Once soils or slopes have been stabilized, permittee shall completely remove and properly dispose of or re-use all non-biodegradable components of installed control measures.

**Note:** DEQ provides information on erosion and sediment control measures at <http://www.deq.state.or.us/wq/wqpermit/docs/general/npdes1200c/ErosionSedimentControl.pdf>. Details on best management practices are found at <http://www.deq.state.or.us/wq/wqpermit/docs/general/npdes1200c/BMPManual.pdf>.

13. *Temporary Fills and Impacts:* To ensure no more than minimal adverse environmental effects from temporary fills and impacts to waters of the U.S:

a. Temporary fills and/or impacts to waters of the U.S. shall not exceed six months unless otherwise approved by the District Engineer.

b. No more than one-half (½) acre of waters of the U.S. may be temporarily filled or impacted unless otherwise approved by the District Engineer (temporary fills and impacts do not affect specified limits for loss of waters associated with specific nationwide permits).

c. Native soils and/or sediments removed from waters of the U.S. for project construction shall be stockpiled and used for site restoration to the maximum extent practicable.

d. Site restoration of temporarily filled or impacted areas shall include returning the area to pre-project ground surface contours. The permittee shall appropriately revegetate temporarily filled or impacted areas with native, noninvasive herbs, shrubs, and/or tree species sufficient in number, spacing, and diversity to replace affected aquatic functions.

**Note:** The Corps will determine compensatory mitigation requirements for temporary fills and impacts on a case-by-case basis depending on the duration and nature of the temporary fill or impact and the type of aquatic resource affected.

14. *Contractor Notification of Permit Requirements:* The permittee must provide a copy of the nationwide permit verification letter, conditions, and permit drawings to all contractors and any other parties performing the authorized work, prior to the commencement of any work in waters of the U.S.

15. *Inspection of the Project Site:* The permittee shall allow representatives of the District Engineer to inspect the authorized activity to confirm compliance with nationwide permit terms and conditions. A request for access to the site will normally be made sufficiently in advance to allow a property owner or representative the option to be on site during the inspection.

#### **F. Portland District NWP 12 Specific Conditions**

**Note:** The following NWP 12 specific condition is for the State of Oregon. NWP-specific conditions are placed on NWPs to ensure projects result in no more than minimal adverse impacts to the aquatic environment and to address local resource concerns.

1. Manholes placed in streams or other waterways require specific approval by the District Engineer.

**Note:** To ensure there are no impacts to native shellfish beds, agency coordination by the Corps of Engineers is required where utility lines are proposed in estuaries.





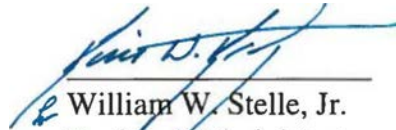
\*Critical habitat has been proposed for LCR Coho salmon.

Fishery Management Plan that Describes	Would the action adversely affect	Are EFH conservation recommendations
Coastal Pelagic Species	Yes	Yes
Pacific Coast Groundfish	Yes	Yes
Pacific Coast Salmon	Yes	Yes

Consultation

Conducted By:

National Marine Fisheries Service  
West Coast Region



Issued by:

William W. Stelle, Jr.  
Regional Administrator

Date Issued:

March 14, 2014

## **Excerpt from SLOPES for Stormwater, Transportation, or Utilities General Construction March 14, 2014**

**Natural hazard response** to complete an unplanned, immediate, or short-term repair of a stormwater facility, road, culvert, bridge, or utility line without federal assistance. These include in-water repairs that must be made before the next in-water work period to resolve critical conditions that, unless corrected, are likely to cause loss of human life, unacceptable loss of property, or natural resources. Natural hazards may include, but are not limited to, a flood that causes scour erosion and significantly weakens the foundation of a road or bridge; culvert failure due to blockage by fluvial debris, overtopping, or crushing; and ground saturation that causes a debris slide, earth flow, or rock fall to cover a road. This category of actions is only included to the extent that they require Corps permits or are undertaken by the Corps, but otherwise do not require federal authorization, funding, or federal agency involvement.. The response will include an assessment of its effects to listed species and critical habitats and a plan to bring the response into conformance with all other applicable PDC in this opinion, including compensatory mitigation based on the baseline conditions prior to the natural hazard.

**Streambank and channel stabilization** to ensure that roads, culverts, bridges and utility lines do not become hazardous due to the long-term effects of toe erosion, scour, subsurface entrainment, or mass failure. This action includes installation and maintenance of scour protection, such as at a footing, facing, or headwall, to prevent scouring or down-cutting of an existing culvert, road foundation, or bridge support. It does not include scour protection for bridge approach fills. Proposed streambank stabilization methods include alluvium placement, vegetated riprap with large wood (LW), log or roughened rock toe, woody plantings, herbaceous cover, deformable soil reinforcement, coir logs, bank reshaping and slope grading, floodplain flow spreaders, floodplain roughness, and engineered log jams (ELJs), alone or in combination. Any action that requires additional excavation or structural changes to a road, culvert, or bridge foundation is covered under road, culvert and bridge maintenance, rehabilitation, and replacement.

**Road surface, culvert and bridge maintenance, rehabilitation and replacement.** Maintenance, rehabilitation, and replacement to ensure that roads, culverts and bridges remain safe and reliable for their intended use without impairing fish passage, to extend their service life, and to withdraw temporary access roads from service in a way that promotes watershed restoration when their usefulness has ended. This includes actions necessary to complete geotechnical surveys, such as access road construction, drill pad preparation, mobilization and set up, drilling and sampling operations, demobilization, boring abandonment, and access road and drill pad reclamation. It also includes, excavation, grading, and filling necessary to maintain, rehabilitate, or replace existing roads, culverts, and bridges. This type of action does not include significant channel realignment, installation of fish passage (e.g., fish ladders, juvenile fish bypasses, culvert baffles, roughened chutes, step weirs), tidegate maintenance or replacements other than full removal, construction of new permanent roads within the riparian zone that are not a bridge approach, or construction of a new bridge where a culvert or other road stream crossing did not previously exist, or any project which will result in or contribute to other land use changes that trigger effects, including indirect effects not considered in this opinion.

**Stormwater facilities and utility line stream crossings** to install, maintain, rehabilitate, or replace stormwater facilities, or pipes or pipelines used to transport gas or liquids, including new or upgraded stormwater outfalls, and cables, or lines or wires used to transmit electricity or communication. Construction, maintenance or improvement of stormwater facilities include surveys, access road construction, excavation, grading, and filling necessary to maintain, rehabilitate, or replace existing stormwater treatment or flow control best management practices (BMPs). Utility line actions involve excavation, temporary side casting of excavated material, backfilling of the trench, and restoration of the work site to preconstruction contours and vegetation. This type of action does not include construction or enlargement of gas, sewer, or water lines to support a new or expanded service area for which effects, including indirect effects from interrelated or interdependent activities, have not been analyzed in this opinion. This opinion also does not include construction of any line that transits the bed of an estuary or saltwater area at depths less than -10.0 feet (mean lower low water).

### **1.3.1.2 Project Design Criteria - General Construction Measures**

#### **13. Project Design**

- a. Use the best available scientific information regarding the likely impacts of climate change on resources in the project area to design the project so that it will be resilient to those impacts, including projections of local stream flow, water temperature, and extreme events.
- b. Assess whether the project area is contaminated by chemical substances that may cause harm if released by the project. The assessment will be commensurate with site history and may include the following:
  - i. Review available records, *e.g.*, the history of existing structures and contamination events.
  - ii. If the project area was used for industrial processes, inspect to determine the environmental condition of the property.
  - iii. Interview people who are knowledgeable about the site, *e.g.*, site owners, operators, and occupants, neighbors, or local government officials.
  - iv. If contamination is found or suspected, consult with a suitably qualified and experienced contamination professional and NMFS before carrying out ground disturbing activities.
- c. Obtain all applicable regulatory permits and authorizations before starting construction.
- d. Minimize the extent and duration of earthwork, *e.g.*, compacting, dredging, drilling, excavation, and filling.

#### **14. In-Water Work Timing**

- a. Unless the in-water work is part of a natural hazard response, complete all work within the wetted channel during dates listed in the most recent version of Oregon In-water Work Guidelines (ODFW 2008), except that that in-water work in the Willamette River below Willamette Falls is not approved between December 1 and January 31.
- b. Hydraulic and topographic measurements and placement of LW or gravel may be completed anytime, provided the affected area is not occupied by adult fish congregating for spawning, or redds containing eggs or pre-emergent alevins.

**15. Pile Installation.** Pile may be concrete, or steel round pile 24 inches in diameter or smaller, steel H-pile designated as HP24 or smaller, or wood that has not been treated with preservatives or pesticides. Any proposal to use treated wood pilings is not covered by this consultation and will require individual consultation.

- a. NMFS will review and approve pile installation plans.
- b. When practical, use a vibratory hammer for in-water pile installation. In the lower Columbia River only a vibratory hammer may be used in October.
- c. Jetting may be used to install pile in areas with coarse, uncontaminated sediments that meet criteria for unconfined in-water disposal (USACE Northwest Division 2009).
- d. When using an impact hammer to drive or proof a steel pile, one of the following sound attenuation methods will be used:
  - i. Completely isolate the pile from flowing water by dewatering the area around the pile.
  - ii. If water velocity is 1.6 feet per second or less, surround the pile being driven by a confined or unconfined bubble curtain that will distribute small air bubbles around 100% of the pile perimeter for the full depth of the water column. See, *e.g.*, NMFS and USFWS (2006), Wursig *et al.* (2000), and Longmuir and Lively (2001).
  - iii. If water velocity is greater than 1.6 feet per second, surround the pile being driven with a confined bubble curtain (*e.g.*, surrounded by a fabric or non-metallic sleeve) that will distribute air bubbles around 100% of the pile perimeter for the full depth of the water column.
  - iv. Provide NMFS information regarding the timing of in-water work, the number of impact hammer strikes per pile and the estimated time required to drive piles, hours per day pile driving will occur, depth of water, and type of substrate, hydroacoustic assumptions, and the pile type, diameter, and spacing of the piles.

**16. Pile Removal.** The following steps will be used to minimize creosote release, sediment disturbance and total suspended solids:

- a. Install a floating surface boom to capture floating surface debris.
- b. Keep all equipment (*e.g.*, bucket, steel cable, vibratory hammer) out of the water, grip piles above the waterline, and complete all work during low water and low current conditions.
- c. Dislodge the pile with a vibratory hammer, when possible; never intentionally break a pile by twisting or bending.
- d. Slowly lift the pile from the sediment and through the water column.
- e. Place the pile in a containment basin on a barge deck, pier, or shoreline without attempting to clean or remove any adhering sediment. A containment basin for the removed piles and any adhering sediment may be constructed of durable plastic sheeting with sidewalls supported by hay bales or another support structure to contain all sediment and return flow which may otherwise be directed back to the waterway.
- f. Fill the hole left by each pile with clean, native sediments immediately after removal.
- g. Dispose of all removed piles, floating surface debris, any sediment spilled on work surfaces, and all containment supplies at a permitted upland disposal site.

**17. Broken or Intractable Pile.** If a pile breaks above the surface of uncontaminated sediment, or less than 2 feet below the surface, make every attempt short of excavation to remove it entirely. If the pile cannot be removed without excavation, drive the pile deeper if possible.

- a. If a pile in contaminated sediment is intractable or breaks above the surface, cut the pile or stump off at the sediment line.
- b. If a pile breaks within contaminated sediment, make no further effort to remove it and cover the hole with a cap of clean substrate appropriate for the site.
- c. If dredging is likely where broken piles are buried, use a global positioning system (GPS) device to note the location of all broken piles for future use in site debris characterization.

**18. Fish Capture and Release**

- a. If practicable, allow listed fish species to migrate out of the work area or remove fish before dewatering; otherwise remove fish from an exclusion area as it is slowly dewatered with methods such as hand or dip-nets, seining, or trapping with minnow traps (or gee-minnow traps).
- b. Fish capture will be supervised by a qualified fisheries biologist, with experience in work area isolation and competent to ensure the safe handling of all fish.
- c. Conduct fish capture activities during periods of the day with the coolest air and water temperatures possible, normally early in the morning to minimize stress and injury of species present.
- d. Monitor the nets frequently enough to ensure they stay secured to the banks and free of organic accumulation.
- e. Electrofishing will be used during the coolest time of day, only after other means of fish capture are determined to be not feasible or ineffective.
  - i. Do not electrofish when the water appears turbid, e.g., when objects are not visible at depth of 12 inches.
  - ii. Do not intentionally contact fish with the anode.
  - iii. Follow NMFS (2000) electrofishing guidelines, including use of only direct current (DC) or pulsed direct current within the following ranges:<sup>11</sup>
    1. If conductivity is less than 100  $\mu$ s, use 900 to 1100 volts.
    2. If conductivity is between 100 and 300  $\mu$ s, use 500 to 800 volts.
    3. If conductivity greater than 300  $\mu$ s, use less than 400 volts.
  - iv. Begin electrofishing with a minimum pulse width and recommended voltage, then gradually increase to the point where fish are immobilized.
  - v. Immediately discontinue electrofishing if fish are killed or injured, i.e., dark bands visible on the body, spinal deformations, significant de-scaling, torpid or inability to maintain upright attitude after sufficient recovery time. Recheck machine settings, water temperature and conductivity, and adjust or postpone procedures as necessary to reduce injuries.

<sup>11</sup> National Marine Fisheries Service. 2000. Guidelines for electrofishing waters containing Salmonid listed under the Endangered Species Act. Portland, Oregon and Santa Rose, California  
[http://swr.nmfs.noaa.gov/sr/Electrofishing\\_Guidelines.pdf](http://swr.nmfs.noaa.gov/sr/Electrofishing_Guidelines.pdf)

- f. If buckets are used to transport fish:
  - i. Minimize the time fish are in a transport bucket.
  - ii. Keep buckets in shaded areas or, if no shade is available, covered by a canopy.
  - iii. Limit the number of fish within a bucket; fish will be of relatively comparable size to minimize predation.
  - iv. Use aerators or replace the water in the buckets at least every 15 minutes with cold clear water.
  - v. Release fish in an area upstream with adequate cover and flow refuge; downstream is acceptable provided the release site is below the influence of construction.
  - vi. Be careful to avoid mortality counting errors.
- g. Monitor and record fish presence, handling, and injury during all phases of fish capture and submit a fish salvage report (Appendix A, Part 1 with Part 3 completed) to the Corps and the SLOPES mailbox (slopes.nwr@noaa.gov) within 60 days.

## 19. Fish Passage

- a. Provide fish passage for any adult or juvenile ESA-listed fish likely to be present in the action area during construction, unless passage did not exist before construction or the stream is naturally impassable at the time of construction.
- b. After construction, provide fish passage for any adult or juvenile ESA-listed fish that meets NMFS's fish passage criteria (NMFS 2011a) for the life of the action.

## 20. Fish Screens

- a. Submit to NMFS for review and approval fish screen designs for surface water diverted by gravity or by pumping at a rate that exceeds 3 cubic feet per second (cfs).
- b. All other diversions will have a fish screen that meets the following specifications:
  - i. An automated cleaning device with a minimum effective surface area of 2.5 square feet per cubic foot per second, and a nominal maximum approach velocity of 0.4 feet per second, or no automated cleaning device, a minimum effective surface area of 1 square foot per cubic foot per second, and a nominal maximum approach rate of 0.2 foot per second; and
  - ii. A round or square screen mesh that is no larger than 2.38 millimeters (mm) (0.094") in the narrow dimension, or any other shape that is no larger than 1.75 mm (0.069") in the narrow dimension.
- c. Each fish screen will be installed, operated, and maintained according to NMFS's fish screen criteria.

## 21. Surface Water Withdrawal

- a. Surface water may be diverted to meet construction needs, including dust abatement, only if water from developed sources (e.g., municipal supplies, small ponds, reservoirs, or tank trucks) are unavailable or inadequate; and
- b. Diversions may not exceed 10% of the available flow and will have a juvenile fish exclusion device that is consistent with NMFS's criteria (NMFS 2011a).<sup>12</sup>

<sup>12</sup> National Marine Fisheries Service 2011. Anadromous Salmonid passage facility design. Northwest Region. <http://www.nwr.noaa.gov/publications/hydropower/ferc/fish-passage-design.pdf>

**22. Construction Discharge Water.** Treat all discharge water using best management practices to remove debris, sediment, petroleum products, and any other pollutants likely to be present (e.g., green concrete, contaminated water, silt, welding slag, sandblasting abrasive, grout cured less than 24 hours, drilling fluids), to avoid or minimize pollutants discharged to any perennial or intermittent water body. Pump seepage water from the de-watered work area to a temporary storage and treatment site or into upland areas and allow water to filter through vegetation prior to reentering the stream channel. Treat water used to cure concrete until pH stabilizes to background levels.

**23. Temporary Access Roads and Paths**

- a. Whenever reasonable, use existing access roads and paths preferentially.
- b. Minimize the number and length of temporary access roads and paths through riparian areas and floodplains.
- c. Minimize removal of riparian vegetation.
- d. When it is necessary to remove vegetation, cut at ground level (no grubbing).
- e. Do not build temporary access roads or paths where grade, soil, or other features suggest slope instability.
- f. Any road on a slope steeper than 30% will be designed by a civil engineer with experience in steep road design.
- g. After construction is complete, obliterate all temporary access roads and paths, stabilize the soil, and revegetate the area.
- h. Temporary roads and paths in wet areas or areas prone to flooding will be obliterated by the end of the in-water work window. Decompact road surfaces and drainage areas, pull fill material onto the running surface, and reshape to match the original contours.

**24. Temporary Stream Crossings**

- a. No stream crossing may occur at active spawning sites, when holding adult listed fish are present, or when eggs or alevins are in the gravel.
- b. Do not place temporary crossings in areas that may increase the risk of channel re-routing or avulsion, or in potential spawning habitat, e.g., pools and pool tailouts.
- c. Minimize the number of temporary stream crossings; use existing stream crossings whenever reasonable.
- d. Install temporary bridges and culverts to allow for equipment and vehicle crossing over perennial streams during construction.
- e. Wherever possible, vehicles and machinery will cross streams at right angles to the main channel.
- f. Equipment and vehicles may cross the stream in the wet only where the streambed is bedrock, or where mats or off-site logs are placed in the stream and used as a crossing.
- g. Obliterate all temporary stream crossings as soon as they are no longer needed, and restore any damage to affected stream banks or channel.

## 25. Equipment, Vehicles and Power Tools

- a. Select, operate and maintain all heavy equipment, vehicles, and power tools to minimize adverse effects on the environment, *e.g.*, low pressure tires, minimal hard-turn paths for track vehicles, use of temporary mats or plates to protect wet soils.
- b. Before entering wetlands or working within 150 feet of a water body:
  - i. Power wash all heavy equipment, vehicles and power tools, allow them to fully dry, and inspect them for fluid leaks, and to make certain no plants, soil, or other organic material are adhering to the surface.
  - ii. Replace petroleum-based hydraulic fluids with biodegradable products<sup>13</sup> in hydraulic equipment, vehicles, and power tools.
- c. Repeat cleaning as often as necessary during operation to keep all equipment, vehicles, and power tools free of external fluids and grease, and to prevent a leak or spill from entering the water.
- d. Avoid use of heavy equipment, vehicles or power tools below ordinary high water (OHW) unless project specialists determine such work is necessary, or would result in less risk of sedimentation or other ecological damage than work above that elevation.
- e. Before entering the water, inspect any watercraft, waders, boots, or other gear to be used in or near water and remove any plants, soil, or other organic material adhering to the surface.
- f. Ensure that any generator, crane or other stationary heavy equipment that is operated, maintained, or stored within 150 feet of any water body is also protected as necessary to prevent any leak or spill from entering the water.

## 26. Site Layout and Flagging

- a. Before any significant ground disturbance or entry of mechanized equipment or vehicles into the construction area, clearly mark with flagging or survey marking paint the following areas:
  - i. Sensitive areas, *e.g.*, wetlands, water bodies, OHW, spawning areas.
  - ii. Equipment entry and exit points.
  - iii. Road and stream crossing alignments.
  - iv. Staging, storage, and stockpile areas.
- b. Before the use of herbicides, clearly flag no-application buffer zones.

## 27. Staging, Storage, and Stockpile Areas

- a. Designate and use staging areas to store hazardous materials, or to store, fuel, or service heavy equipment, vehicles and other power equipment with tanks larger than 5 gallons, that are at least 150 feet from any natural water body or wetland, or on an established paved area, such that sediment and other contaminants from the staging area cannot be deposited in the floodplain or stream.
- b. Natural materials that are displaced by construction and reserved for restoration, *e.g.*, LW, gravel, and boulders, may be stockpiled within the 100-year floodplain.
- c. Dispose of any material not used in restoration and not native to the floodplain outside of the functional floodplain.

<sup>13</sup> For additional information and suppliers of biodegradable hydraulic fluids, motor oil, lubricant, or grease, see, Environmentally Acceptable Lubricants by the U.S. EPA (2011a); *e.g.*, mineral oil, polyglycol, vegetable oil, synthetic ester; Mobil® biodegradable hydraulic oils, Total® hydraulic fluid, Terresolve Technologies Ltd.® bio-based biodegradable lubricants, Cougar Lubrication® 2XT Bio engine oil, Series 4300 Synthetic Bio-degradable Hydraulic Oil, 8060-2 Synthetic Bio-Degradable Grease No. 2, *etc.* The use of trade, firm, or corporation names in this opinion is for the information and convenience of the action agency and applicants and does not constitute an official endorsement or approval by the U.S. Department of Commerce or NMFS of any product or service to the exclusion of others that may be suitable.



d. After construction is complete, obliterate all staging, storage, or stockpile areas, stabilize the soil, and revegetate the area.<sup>14</sup>

## 28. Drilling and Boring

- a. If drilling or boring are used, isolate drilling operations in wetted stream channels using a steel casing or other appropriate isolation method to prevent drilling fluids from contacting water.
- b. If drilling through a bridge deck is necessary, use containment measures to prevent drilling debris from entering the channel.
- c. Sampling and directional drill recovery/recycling pits, and any associated waste or spoils will be completely isolated from surface waters, off-channel habitats and wetlands.
- d. All waste or spoils will be covered if precipitation is falling or imminent.
- e. All drilling fluids and waste will be recovered and recycled or disposed to prevent entry into flowing water.
- f. If a drill boring case breaks and drilling fluid or waste is visible in water or a wetland, make all possible efforts to contain the waste and contact NMFS within 48 hours.
- g. Waste containment
  - i. All drilling equipment, drill recovery and recycling pits, and any waste or spoil produced, will be contained and then completely recovered and recycled or disposed of as necessary to prevent entry into any waterway. Use a tank to recycle drilling fluids.
  - ii. When drilling is completed, remove as much of the remaining drilling fluid as possible from the casing (e.g., by pumping) to reduce turbidity when the casing is removed.

## 29. Pesticide and Preservative-Treated Wood<sup>15</sup>

- a. Treated wood may not be used in a structure that will be in or over water or permanently or seasonally flooded wetlands, except to maintain or repair an existing wood bridge. The following criteria in b, c, and d below apply to the use of treated wood for maintenance or repair of existing wood bridges.
- b. No part of the treated wood may be exposed to leaching by precipitation, overtopping waves, or submersion (e.g., no treated wood piles (per PDC#10, and stringers or decking of a timber bridge can be made from treated wood only if they will be covered by a non-treated wood wearing surface that covers the entire roadway width), and all elements of the structure using the treated wood are designed to avoid or minimize impacts or abrasion that could create treated wood debris or dust.
- c. Installation of treated wood
  - i. Treated wood shipped to the project area will be stored out of contact with standing water and wet soil, and protected from precipitation.
  - ii. Each load and piece of treated wood will be visually inspected and rejected for use in or above aquatic environments if visible residue, bleeding of preservative, preservative-saturated sawdust, contaminated soil, or other matter is present.

<sup>14</sup> Road and path obliteration refers to the most comprehensive degree of decommissioning and involves decompacting the surface and ditch, pulling the fill material onto the running surface, and reshaping to match the original contour.

<sup>15</sup> Treated woods may contain chromated copper arsenate (CCA), ammoniacal copper zinc arsenate (ACZA), alkaline copper quat (ACQ-B and ACQ-D), ammoniacal copper citrate (CC), copper azole (CBA-A), copper dimethyldithiocarbamate (CDDC), borate preservatives, and oil-type wood preservatives, such as creosote, pentachlorophenol, and copper naphthenate.

- iii. Prefabrication will be used whenever possible to minimize cutting, drilling and field preservative treatment.
- iv. When field fabrication is necessary, all cutting, drilling, and field preservative treatment of exposed treated wood will be done above OHW to minimize discharge of sawdust, drill shavings, excess preservative and other debris.
- v. Tarps, plastic tubs or similar devices will be used to contain the bulk of any fabrication debris, and any excess field preservative will be removed from the treated wood by wiping and proper disposal.
- d. Removal of treated wood
  - i. Evaluate all wood construction debris removed during a project, including pile, to ensure proper disposal of treated wood.
  - ii. Ensure that no treated wood debris falls into the water or, if debris does fall into the water, remove it immediately.
  - iii. After removal, place treated wood debris in an appropriate dry storage site until it can be removed from the project area.
  - iv. Do not leave any treated wood debris in the water or stacked on the streambank at or below OHW.

### **30. Erosion Control**

- a. Use site planning and site erosion control measures commensurate with the scope of the project to prevent erosion and sediment discharge from the project site.
- b. Before significant earthwork begins, install appropriate, temporary erosion controls downslope to prevent sediment deposition in the riparian area, wetlands, or water body.
- c. During construction,
  - i. Complete earthwork in wetlands, riparian areas, and stream channels as quickly as possible.
  - ii. Cease project operations when high flows may inundate the project area, except for efforts to avoid or minimize resource damage.
  - iii. If eroded sediment appears likely to be deposited in the stream during construction, install additional sediment barriers as necessary.
  - iv. Temporary erosion control measures may include fiber wattles, silt fences, jute matting, wood fiber mulch and soil binder, or geotextiles and geosynthetic fabric.
  - v. Soil stabilization using wood fiber mulch and tackifier (hydro-applied) may be used to reduce erosion of bare soil, if the materials are free of noxious weeds and nontoxic to aquatic and terrestrial animals, soil microorganisms, and vegetation.
  - vi. Remove sediment from erosion controls if it reaches 1/3 of the exposed height of the control.
  - vii. Whenever surface water is present, maintain a supply of sediment control materials and an oil-absorbing floating boom at the project site.
  - viii. Stabilize all disturbed soils following any break in work unless construction will resume within four days.
- d. Remove temporary erosion controls after construction is complete and the site is fully stabilized.

### 31. Hazardous Material Safety

- a. At the project site:
  - i. Post written procedures for notifying environmental response agencies, including an inventory and description of all hazardous materials present, and the storage and handling procedures for their use.
  - ii. Maintain a spill containment kit, with supplies and instructions for cleanup and disposal, adequate for the types and quantity of hazardous materials present.
  - iii. Train workers in spill containment procedures, including the location and use of the spill containment kits.
  - iv. Temporarily contain any waste liquids generated under an impervious cover, such as a tarpaulin, in the staging area until the wastes can be properly transported to, and disposed of, at an approved receiving facility.

### 32. Barge Use. Any barge used as a work platform to support construction will be:

- a. Large enough to remain stable under foreseeable loads and adverse conditions.
- b. Inspected before arrival to ensure vessel and ballast are free of invasive species.
- c. Secured, stabilized and maintained as necessary to ensure no loss of balance, stability, anchorage, or other condition that can result in the release of contaminants or construction debris.

### 33. Dust Abatement

- a. Use dust abatement measures commensurate with soil type, equipment use, wind conditions, and the effects of other erosion control measures.
- b. Sequence and schedule work to reduce the exposure of bare soil to wind erosion.
- c. Maintain spill containment supplies on-site whenever dust abatement chemicals are applied.
- d. Do not use petroleum-based products.
- e. Do not apply dust-abatement chemicals, *e.g.*, magnesium chloride, calcium chloride salts, lignin sulfonate, within 25 feet of a water body, or in other areas where they may runoff into a wetland or water body.
- f. Do not apply lignin sulfonate at rates exceeding 0.5 gallons per square yard of road surface, assuming a 50:50 solution of lignin sulfonate to water.

### 34. Work Area Isolation

- a. Isolate any work area within the wetted channel from the active stream whenever ESA-listed fish are reasonably certain to be present, or if the work area is less than 300 feet upstream from known spawning habitats.
- b. Engineering design plans for work area isolation will include all isolation elements and fish release areas.
- c. Dewater the shortest linear extent of work area practicable, unless wetted in-stream work is deemed to be minimally harmful to fish, and is beneficial to other aquatic species.<sup>16</sup>

<sup>16</sup> For instructions on how to dewater areas occupied by lamprey, see *Best management practices to minimize adverse effects to Pacific lamprey (Entosphenus tridentatus)* (USFWS 2010).

- i. Use a coffer dam and a by-pass culvert or pipe, or a lined, non-erodible diversion ditch to divert flow around the dewatered area. Dissipate flow energy to prevent damage to riparian vegetation or stream channel and provide for safe downstream reentry of fish, preferably into pool habitat with cover.
  - ii. Where gravity feed is not possible, pump water from the work site to avoid rewatering. Maintain a fish screen on the pump intake to avoid juvenile fish entrainment.
  - iii. Pump seepage water to a temporary storage and treatment site, or into upland areas, to allow water to percolate through soil or to filter through vegetation before reentering the stream channel with a treatment system comprised of either a hay bale basin or other sediment control device.
  - iv. Monitor below the construction site to prevent stranding of aquatic organisms.
  - v. When construction is complete, re-water the construction site slowly to prevent loss of surface flow downstream, and to prevent a sudden increase in stream turbidity.
- d. Whenever a pump is used to dewater the isolation area and ESA-listed fish may be present, a fish screen will be used that meets the most current version of NMFS's fish screen criteria (NMFS 2011a). NMFS approval is required for pumping at a rate that exceeds 3 cfs.

### 35. Invasive and Non-Native Plant Control

- a. **Non-herbicide methods.** Limit vegetation removal and soil disturbance within the riparian zone by limiting the number of workers there to the minimum necessary to complete manual, mechanical, or hydro-mechanical plant control (e.g., hand pulling, bending<sup>17</sup>, clipping, stabbing, digging, brush-cutting, mulching, radiant heat, portable flame burner, super-heated steam, pressurized hot water, or hot foam (Arsenault *et al.* 2008; Donohoe *et al.* 2010))<sup>18</sup>. Do not allow cut, mowed, or pulled vegetation to enter waterways.
- b. **Herbicide Label.** Herbicide applicators will comply with all label instructions
- c. **Power equipment.** Refuel gas-powered equipment with tanks larger than 5 gallons in a vehicle staging area placed 150 feet or more from any natural water body, or in an isolated hazard zone such as a paved parking lot.
- d. **Maximum herbicide treatment area.** Do not exceed treating 1.0% of the acres of riparian habitat within a 6<sup>th</sup>-field HUC with herbicides per year.
- e. **Herbicide applicator qualifications.** Herbicides may only be applied by an appropriately licensed applicator using an herbicide specifically targeted for a particular plant species that will cause the least impact. The applicator will be responsible for preparing and carrying out the herbicide transportation and safety plan, as follows.
- f. **Herbicide transportation and safety plan.** The applicator will prepare and carry out an herbicide safety/spill response plan to reduce the likelihood of spills or misapplication, to take remedial actions in the event of spills, and to fully report the event.

<sup>17</sup> Knotweed treatment pre-treatment; See Nickelson (2013).

<sup>18</sup> See <http://ahmct.ucdavis.edu/limtask/equipmentdetails.html>

g. **Herbicides.** The only herbicides proposed for use under this opinion are (some common trade names are shown in parentheses):<sup>19</sup>

- i. aquatic imazapyr (e.g., Habitat)
- ii. aquatic glyphosate (e.g., AquaMaster, AquaPro, Rodeo)
- iii. aquatic triclopyr-TEA (e.g., Renovate 3)
- iv. chlorsulfuron (e.g., Telar, Glean, Corsair)
- v. clopyralid (e.g., Transline)
- vi. imazapic (e.g., Plateau)
- vii. imazapyr (e.g., Arsenal, Chopper)
- viii. metsulfuron-methyl (e.g., Escort)
- ix. picloram (e.g., Tordon)
- x. sethoxydim (e.g., Poast, Vantage)
- xi. sulfometuron-methyl (e.g., Oust, Oust XP)

h. **Herbicide adjuvants.** When recommended by the label, an approved aquatic surfactant or drift retardant can be used to improve herbicidal activity or application characteristics. Adjuvants that contain alky amine ethoxylates, *i.e.*, polyethoxylated tallow amine (POEA), alkylphenol ethoxylates (including alkyl phenol ethoxylate phosphate esters), or herbicides that contain these compounds are **not** covered by this opinion. The following product names are covered by this opinion:

- |                       |                  |
|-----------------------|------------------|
| i. Agri-Dex           | ii. AquaSurf     |
| iii. Bond             | iv. Bronc Max    |
| v. Bronc Plus Dry-EDT | vi. Class Act NG |
| vii. Competitor       | viii. Cut Rate   |
| ix. Cygnet Plus       | x. Destiny HC    |
| xi. Exciter           | xii. Fraction    |
| xiii. InterLock       | xiv. Kinetic     |
| xv. Level 7           | xvi. Liberate    |
| xvii. Magnify         | xviii. One-AP XL |
| xix. Pro AMS Plus     | xx. Spray-Rite   |
| xxi. Superb HC        | xxii. Tactic     |
| xxiii. Tronic         |                  |

i. **Herbicide carriers.** Herbicide carriers (solvents) are limited to water or specifically labeled vegetable oil. Use of diesel oil as an herbicide carrier is not covered by this opinion.

j. **Dyes.** Use a non-hazardous indicator dye (e.g., Hi-Light or Dynamark™) with herbicides within 100 feet of water. The presence of dye makes it easier to see where the herbicide has been applied and where or whether it has dripped, spilled, or leaked. Dye also makes it easier to detect missed spots, avoid spraying a plant or area more than once, and minimize over-spraying (SERA 1997).

k. **Herbicide mixing.** Mix herbicides and adjuvants, carriers, and/or dyes more than 150 feet from any perennial or intermittent water body to minimize the risk of an accidental discharge.

<sup>19</sup> The use of trade, firm, or corporation names in this opinion is for the information and convenience of the action agency and applicants and does not constitute an official endorsement or approval by the U.S. Department of Commerce or NMFS of any product or service to the exclusion of others that may be suitable.

- i. **Tank Mixtures.** The potential interactive relationships that exist among most active ingredient combinations have not been defined and are uncertain. Therefore, combinations of herbicides in a tank mix are not covered by this opinion.
- m. **Spill Cleanup Kit.** Provide a spill cleanup kit whenever herbicides are used, transported, or stored. At a minimum, cleanup kits will include material safety data sheets, the herbicide label, emergency phone numbers, and absorbent material such as cat litter to contain spills.
- n. **Herbicide application rates.** Apply herbicides at the lowest effective label rates.
- o. **Herbicide application methods.** Apply liquid or granular forms of herbicides as follows:
  - i. Broadcast spraying – hand held nozzles attached to back pack tanks or vehicles, or by using vehicle mounted booms.
  - ii. Spot spraying – hand held nozzles attached to back pack tanks or vehicles, hand-pumped spray, or squirt bottles to spray herbicide directly onto small patches or individual plants.
  - iii. Hand/selective – wicking and wiping, basal bark, fill (“hack and squirt”), stem injection, cut-stump.
  - iv. Triclopyr – will not be applied by broadcast spraying.
  - v. Keep the spray nozzle within four feet of the ground when applying herbicide. If spot or patch spraying tall vegetation more than 15 feet away from the high water mark (HWM), keep the spray nozzle within 6 feet of the ground.
  - vi. Apply spray in swaths parallel towards the project area, away from the creek and desirable vegetation, *i.e.*, the person applying the spray will generally have their back to the creek or other sensitive resource.
  - vii. Avoid unnecessary run off during cut surface, basal bark, and hack-squirt/injection applications.
- p. **Washing spray tanks.** Wash spray tanks 300 feet or more away from any surface water.
- q. **Minimization of herbicide drift and leaching.** Minimize herbicide drift and leaching as follows:
  - i. Do not spray when wind speeds exceed 10 miles per hour, or are less than 2 miles per hour.
  - ii. Be aware of wind directions and potential for herbicides to affect aquatic habitat area downwind.
  - iii. Keep boom or spray as low as possible to reduce wind effects.
  - iv. Increase spray droplet size whenever possible by decreasing spray pressure, using high flow rate nozzles, using water diluents instead of oil, and adding thickening agents.
  - v. Do not apply herbicides during temperature inversions, or when air temperature exceeds 80 degrees Fahrenheit.
  - vi. Wind and other weather data will be monitored and reported for all broadcast applications.

r. **Rain.** Do not apply herbicides when the soil is saturated or when a precipitation event likely to produce direct runoff to salmon bearing waters from the treated area is forecasted by the NOAA National Weather Service or other similar forecasting service within 48 hours following application. Soil-activated herbicides may follow label instructions. Do not conduct hack-squirt/injection applications during periods of heavy rainfall.

s. **Herbicide buffer distances.** Observe the following no-application buffer-widths, measured in feet, as map distance perpendicular to the bankfull elevation for streams, the upland boundary for wetlands, or the upper bank for roadside ditches. Widths are based on herbicide formula, stream type, and application method, during herbicide applications (Table 3). Before herbicide application begins, flag or mark the upland boundary of each applicable herbicide buffer to ensure that all buffers are in place and functional during treatment.

**Table 3.** Herbicide buffer distances by herbicide formula, stream type, and application method.

Herbicide	No Application Buffer Width (feet)					
	Streams and Roadside Ditches with flowing or standing water present and Wetlands			Dry Streams, Roadside Ditches, and Wetlands		
	Broadcast Spraying	Spot Spraying	Hand Selective	Broadcast Spraying	Spot Spraying	Hand Selective
Labeled for Aquatic Use						
Aquatic Glyphosate	100	waterline	waterline	50	None	none
Aquatic Imazapyr	100	15	waterline	50	None	none
Aquatic Triclopyr-TEA	<b>Not Allowed</b>	15	waterline	<b>Not Allowed</b>	None	none
Low Risk to Aquatic Organisms						
Imazapic	100	15	bankfull elevation	50	None	none
Clopyralid	100	15	bankfull elevation	50	None	none
Metsulfuron-methyl	100	15	bankfull elevation	50	None	none
Moderate Risk to Aquatic Organisms						
Imazapyr	100	50	bankfull elevation	50	15	bankfull elevation
Sulfometuron-methyl	100	50	5	50	15	bankfull elevation
Chlorsulfuron	100	50	bankfull elevation	50	15	bankfull elevation
High Risk to Aquatic Organisms						
Picloram	100	50	50	100	50	50
Sethoxydim	100	50	50	100	50	50

### 36. Actions Requiring Stormwater Management<sup>20</sup>

- a. Provide stormwater management for any project that will:
  - i. Increase the contributing impervious area within the project area
  - ii. Construct new pavement that increases capacity or widens the road prism.
  - iii. Reconstructs pavement down to subgrade.
  - iv. Rehabilitate or restore a bridge to repair structural or functional deficiencies that are too complicated to be corrected through normal maintenance, except for seismic retrofits that make a bridge more resistant to earthquake damage (e.g., external post-tensioning, supplementary dampening) but do not affect the bridge deck or drainage.
  - v. Replace a stream crossing
  - vi. Change stormwater conveyance
- b. Stormwater management is not required for the following pavement actions: minor repairs, patching, chip seal, grind/inlay, overlay or resurfacing (i.e., nonstructural pavement preservation, a single lift or inlay).
- c. Stormwater management plans will consist of:
  - i. Low impact development.
  - ii. Water quality (pollution reduction) treatment for post-construction stormwater runoff from all contributing impervious area.
  - iii. Water quantity treatment (retention or detention facilities), unless the outfall discharges directly into a major water body (e.g., mainstem Columbia River, Willamette River (downstream of Eugene), large lakes, reservoir, ocean, or estuary). Retention or detention facilities must limit discharge to match pre-developed discharge rates (i.e., the discharge rate of the site based on its natural groundcover and grade before any development occurred) using a continuous simulation for flows between 50% of the 2-year event and the 10-year flow event (annual series).
- d. Stormwater management plans will:
  - i. Explain how runoff from all contributing impervious area that is within or contiguous with the project area will be managed using site sketches, drawings, specifications, calculations, or other information commensurate with the scope of the action.
  - ii. Identify the pollutants of concern.
  - iii. Identify all contributing and non-contributing impervious areas that are within and contiguous with the project area.
  - iv. Describe the BMPs that will be used to treat the identified pollutants of concern, and the proposed maintenance activities and schedule for the treatment facilities.

<sup>20</sup> The most efficient way for an applicant or the Corps to prepare and submit a stormwater management plan for NMFS' review is to attach a completed *Checklist for Submission of a Stormwater Management Plan* (the *Checklist*, ODEQ updated 2012, or the most recent version) with the electronic notification when it is sent to the SLOPES mailbox. However, stormwater conveyance to a DEQ permitted Municipal Separate Storm Sewer System (MS4) or consistency with any other program acknowledged by DEQ as adequate for stormwater management will not meet the requirements of this opinion unless NMFS determines that the facility accepting the stormwater will provide a level of treatment that is equivalent to that called for in this opinion. The *Checklist* and guidelines for its use are available from NMFS or the ODEQ in Portland Oregon. The latest version of the *Checklist* is also available online in a portable document format (pdf) through the ODEQ Water Quality Section 401 certification webpage (ODEQ 2014) at <http://www.deq.state.or.us/wq/sec401cert/process.htm#add> (see "Post Construction Stormwater Management Plan").



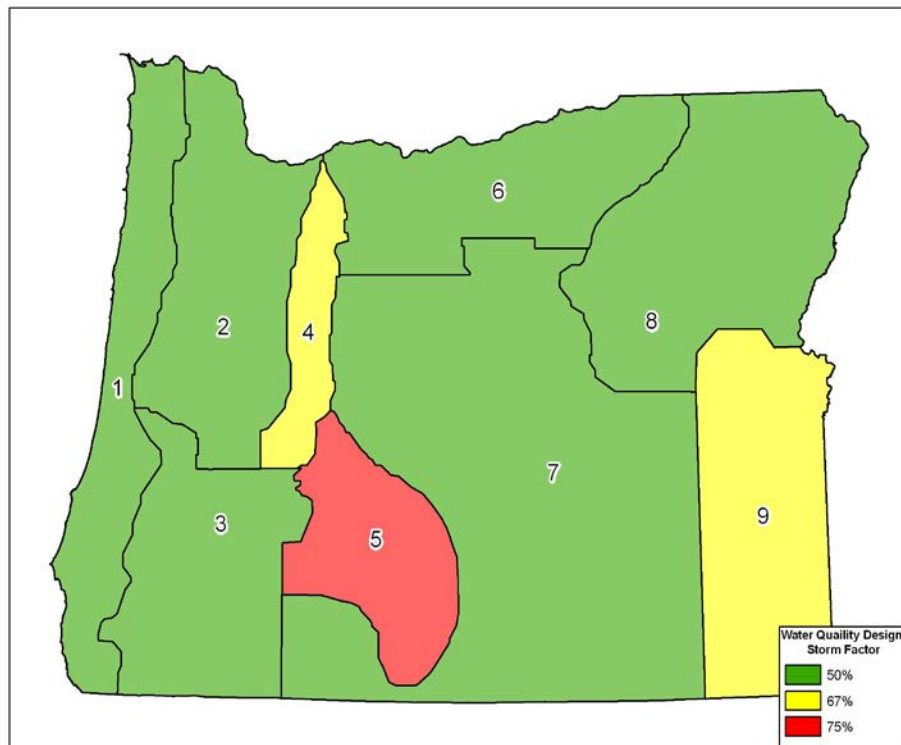
v. Provide a justification for the capacity of the facilities provided based on the expected runoff volume, including, e.g., the design storm, BMP geometry, analyses of residence time, as appropriate.

vi. Include the name, email address, and telephone number of the person responsible for designing the stormwater management facilities that NMFS may contact if additional information is necessary to complete the effects analysis.

vii. The proposed action will include a maintenance, repair, and component replacement plan that details what needs to be done, when, and by whom for each facility.

e. All stormwater quality treatment practices and facilities will be designed to accept and fully treat the volume of water equal to 50% of the cumulative rainfall from the 2-year, 24-hour storm for that site, except as follows: climate zone 4 – 67%; climate zone 5 – 75%; and climate zone 9 – 67% (Figure 1). (ESA-listed species considered in this opinion are unlikely to occur in Zones 5 or 9.) A continuous rainfall/runoff model may be used instead of runoff depths to calculate water quality treatment depth.

**Figure 1.** Water Quality Design Storm Factor – Oregon Climate Regions (Oregon Department of Transportation 2008)



f. Use low impact development practices to infiltrate or evaporate runoff to the maximum extent feasible. For runoff that cannot be infiltrated or evaporated and therefore will discharge into surface or subsurface waters, apply one or more of the following specific primary treatment practices, supplemented with appropriate soil amendments:

- i. Bioretention cell
- ii. Bioslope, also known as an “ecology embankment”
- iii. Bioswale
- iv. Constructed wetlands
- v. Infiltration pond
- vi. Media filter devices with demonstrated effectiveness. Proprietary devices should be on a list of “Approved Proprietary Stormwater Treatment Technologies” *i.e.*, City of Portland (2008) Stormwater Management Manual. Bureau of Environmental Services.
- vii. Porous pavement, with no soil amendments and appropriate maintenance
- viii. All stormwater flow control treatment practices and facilities will be designed to maintain the frequency and duration of instream flows generated by storms within the following end-points:

1. Lower discharge endpoint, by U.S. Geological Survey (USGS) flood frequency zone:

- a. Western Region = 42% of 2-year event
- b. Eastern Region
  - i. Southeast, Northeast, North Central = 48% of 2-year event
  - ii. Eastern Cascade = 56% of 2-year event

2. Upper discharge endpoint

- a. Entrenchment ratio  $<2.2$  = 10-year event, 24-hour storm
- b. Entrenchment ratio  $>2.2$  = bank overtopping event

g. When conveyance is necessary to discharge treated stormwater directly into surface water or a wetland, the following requirements apply:

- i. Maintain natural drainage patterns.
- ii. To the maximum extent feasible, ensure that water quality treatment for contributing impervious area runoff is completed before commingling with offsite runoff for conveyance.
- iii. Prevent erosion of the flow path from the project to the receiving water and, if necessary, provide a discharge facility made entirely of manufactured elements (*e.g.*, pipes, ditches, discharge facility protection) that extends at least to OHW.

h. **NMFS review and approval.** NMFS will review proposed stormwater treatment and new or upgraded stormwater outfalls plans.

### 37. Site Restoration

- a. Restore any significant disturbance of riparian vegetation, soils, stream banks or stream channel.
- b. Remove all project related waste; *e.g.*, pick up trash, sweep roadways in the project area to avoid runoff-containing sediment, *etc.*
- c. Obliterate all temporary access roads, crossings, and staging areas.
- d. Loosen compacted areas of soil when necessary for revegetation or infiltration.
- e. Although no single criterion is sufficient to measure restoration success, the intent is that the following features should be present in the upland parts of the project area, within reasonable limits of natural and management variation:
  - i. Human and livestock disturbance, if any, are confined to small areas necessary for access or other special management situations.
  - ii. Areas with signs of significant past erosion are completely stabilized and healed, bare soil spaces are small and well-dispersed.
  - iii. Soil movement, such as active rills and soil deposition around plants or in small basins, is absent or slight and local.
  - iv. Native woody and herbaceous vegetation, and germination microsites, are present and well distributed across the site; invasive plants are absent.
  - v. Plants have normal, vigorous growth form, and a high probability of remaining vigorous, healthy and dominant over undesired competing vegetation.
  - vi. Plant litter is well distributed and effective in protecting the soil with little or no litter accumulated against vegetation as a result of active sheet erosion ("litter dams").
  - vii. A continuous corridor of shrubs and trees appropriate to the site are present to provide shade and other habitat functions for the entire streambank.

### 38. Revegetation

- a. Plant and seed disturbed areas before or at the beginning of the first growing season after construction.
- b. Use a diverse assemblage of vegetation species native to the action area or region, including trees, shrubs, and herbaceous species. Vegetation, such as willow, sedge and rush mats, may be gathered from abandoned floodplains, stream channels, *etc.* When feasible, use vegetation salvaged from local areas scheduled for clearing due to development.
- c. Use species native to the project area or region that will achieve shade and erosion control objectives, including forb, grass, shrub, or tree species that are appropriate for the site.
- d. Short-term stabilization measures may include use of non-native sterile seed mix if native seeds are not available, weed-free certified straw, jute matting, and similar methods.
- e. Do not apply surface fertilizer within 50 feet of any wetland or water body.
- f. Install fencing as necessary to prevent access to revegetated sites by livestock or unauthorized persons.
- g. Do not use invasive or non-native species for site restoration.
- h. Conduct post-construction monitoring and treatment to remove or control invasive plants until native plant species are well-established.

### 39. Actions That Require Compensatory Mitigation

- a. The Corps will rely on 33 CFR 332.3 when considering appropriate mitigation. The first option for an applicant is to purchase credits from an appropriate mitigation bank. The second option is to purchase credits from an approved in-lieu-fee sponsor. The third option is Permittee-responsible mitigation. The fourth option is a combination of some or all of the above options that collectively satisfies the mitigation requirements.
- b. NMFS will review and approve compensatory mitigation plans.
- c. The following actions require compensatory mitigation:
  - i. Any stormwater management facility that requires a new or enlarged structure within the riparian zone; or that has insufficient capacity to infiltrate and retain the volume of stormwater called for by this opinion.
  - ii. Any riprap revetment that extends rock above the streambank toe extends the use of riprap laterally into an area that was not previously revetted, or revetment that does not include adequate vegetation and LW.
  - iii. Any bridge rehabilitation or replacement that does not span the functional floodplain, or causes a net increase in fill within the functional floodplain.
- d. The electronic notification (Appendix A, Part 1 with Part 4 completed) for an action that requires compensatory mitigation will explain how the Corps or applicant will complete the mitigation, including site sketches, drawings, specifications, calculations, or other information commensurate with the scope of the action.
- e. Include the name, address, and telephone number of a person responsible for designing this part of the action that NMFS may contact if additional information is necessary to complete the effects analysis.
- f. Describe practices that will be used to ensure:
  - i. No net loss of habitat function
  - ii. Completion before, or concurrent with, construction whenever possible
  - iii. Achieve a mitigation ratio that is greater than one-to-one and larger (e.g., 1.5 to 1.0 when necessary to compensate for time lags between the loss of conservation value in the project area and replacement of conservation value in the mitigation area, uncertainty of conservation value replacement in the mitigation area, or when the affected area has demonstrably higher conservation value than the mitigation area.<sup>21</sup>
  - iv. When practicable and environmentally sound, mitigation should be near the project impact site, or within the same local watershed and area occupied by the affected population(s) and age classes. Mitigation should be completed prior to or concurrent with the adverse impacts, or have an increased ratio as noted above.

<sup>21</sup> For additional information on compensatory mitigation, see Compensatory Mitigation for Losses of Aquatic Resources (33CFR332) at [www.poa.usace.army.mil/Portals/34/docs/regulatory/33cfr332.pdf](http://www.poa.usace.army.mil/Portals/34/docs/regulatory/33cfr332.pdf). More information is available from the U.S. Army Corps of Engineers, Portland District, Portland, Oregon. See: <http://www.nwp.usace.army.mil/Missions/Regulatory/Mitigation.aspx>

- v. To minimize delays and objections during the review process, applicants are encouraged to seek the advice of NMFS during the planning and design of mitigation plans. For complex mitigation projects, such consultation may improve the likelihood of mitigation success and reduce permit-processing time.
- g. For stormwater management:
  - i. The primary habitat functions of concern are related to the physical and biological features essential to the long-term conservation of listed species, *i.e.*, water quality, water quantity, channel substrate, floodplain connectivity, forage, natural cover (such as submerged and overhanging LW, aquatic vegetation, large rocks and boulders, side channels and undercut banks), space, and free passage.
  - ii. Acceptable mitigation for riparian habitat displaced by a stormwater treatment facility is restoration of shallow-water or off-channel habitat
  - iii. Acceptable mitigation for inadequate stormwater treatment includes providing adequate stormwater treatment where it did not exist before, and retrofitting an existing but substandard stormwater facility to provide capacity necessary to infiltrate and retain the proper volume of stormwater. Such mitigation can be measured in terms of deficit stormwater treatment capacity.
- h. For riprap:
  - i. The primary habitat functions of concern are related to floodplain connectivity, forage, natural cover, and free passage.
  - ii. Acceptable mitigation for those losses include removal of existing riprap; retrofit existing riprap with vegetated riprap and LW, or one or more other streambank stabilization methods described in this opinion, and restoration of shallow water or off-channel habitats.
- i. For a bridge replacement:
  - i. The primary habitat functions of concern are floodplain connectivity, forage, natural cover, and free passage.
  - ii. Acceptable mitigation is removing fill from elsewhere in the floodplain – native channel material, soil and vegetation may not be counted as fill.
- j. Mitigation actions will meet general construction criteria and other appropriate minimization measures (dependent on the type of proposed mitigation).

### 1.3.1.3 Project Design Criteria - Types of Actions

#### 40. Natural Hazard Response

a. A manager of a state, regional, county, or municipal stormwater facility, public transportation feature, or utility must initiate a natural hazard response by notifying the Corps.<sup>22</sup> The Corps will encourage the applicant to:

- i. Act as necessary to resolve the initial natural hazard.
- ii. Without endangering human life or contributing to further loss of property or natural resources, apply all proposed design criteria from this opinion which are applicable to the response to the maximum extent possible.

b. The Corps will also contact NMFS as part of the natural hazard response.

- i. As soon as possible after the onset of the natural hazard, the Corps will require the applicant to contact the Corps and NMFS to describe the nature and location of the natural hazard, review design criteria from this opinion that are applicable to the situation, and determine whether additional steps may be taken to further minimize the effects of the initial response action on listed species or their critical habitat.

- ii. For the Oregon Coast contact Ken Phippen (541-957-3385), for the Willamette Basin contact Marc Liverman (503-231-2336), and Lower Columbia River up to and including Oregon tributaries contact Jeff Fisher (360-534-9342), and for eastern Oregon contact Dale Bambrick (509-962-8911x221).

#### 41. Streambank and Channel Stabilization

a. The following streambank stabilization methods may be used individually or in combination:

- i. Alluvium placement
- ii. Large wood placement
- iii. Vegetated riprap with large wood
- iv. Roughened toe
- v. Woody plantings
- vi. Herbaceous cover, in areas where the native vegetation does not include trees or shrubs.
- vii. Bank reshaping and slope grading
- viii. Coir logs
- ix. Deformable soil reinforcement
- x. Engineered log jams (ELJ)
- xi. Floodplain flow spreaders
- xii. Floodplain roughness

<sup>22</sup> Natural hazard response actions do not include federal assistance following a gubernatorial, county or local declaration of emergency or disaster with a request for federal assistance; a federal declaration of emergency or disaster; or any response to an emergency or disaster that takes place on federal property or to a federal asset because those actions are subject to emergency consultation provisions of 50 CFR 402.05

b. For more information on the above methods see Federal Emergency Management Agency (2009)<sup>23</sup> or Cramer *et al.* (2003).<sup>24</sup> Other than those methods relying solely upon woody and herbaceous plantings, streambank stabilization projects should be designed by a qualified engineer that is appropriately registered in the state where the work is performed.

c. Stream barbs and full-spanning weirs are not allowed for stream bank stabilization under this opinion.

d. Alluvium Placement can be used as a method for providing bank stabilization using imported gravel/cobble/boulder-sized material of the same composition and size as that in the channel bed and banks, to halt or attenuate streambank erosion, and stabilize riffles. This method is predominantly for use in small to moderately sized channels and is not appropriate for application in mainstem systems. These structures are designed to provide roughness, redirect flow, and provide stability to adjacent streambed and banks or downstream reaches, while providing valuable fish and wildlife habitat.

i. **NMFS fish passage review and approval.** NMFS will review alluvium placement projects that would occupy more than 25% of the channel bed or more than 25% of the bankfull cross sectional area.

ii. This design method is only approved in those areas where the natural sediment supply has been eliminated, significantly reduced through anthropogenic disruptions, or used to initiate or simulate sediment accumulations in conjunction with other structures, such as LW placements and ELJs.

iii. Material used to construct the toe should be placed in a manner that mimics attached longitudinal bars or point bars.

iv. Size distribution of toe material will be diverse and predominately comprised of  $D_{84}$  to  $D_{max}$  size class material.

v. Spawning gravels will constitute at least one-third of the total alluvial material used in the design.

vi. Spawning gravels are to be placed at or below an elevation consistent with the water surface elevation of a bankfull event.

vii. Spawning size gravel can be used to fill the voids within toe and bank material and placed directly onto stream banks in a manner that mimics natural debris flows and erosion.

viii. All material will be clean alluvium with similar angularity as the natural bed material. When possible use material of the same lithology as found in the watershed. Reference *Stream Simulation: An Ecological Approach to Providing Passage for Aquatic Organisms at Road-Stream Crossings* (USDA-Forest Service 2008) to determine gravel sizes appropriate for the stream.

ix. Material can be mined from the floodplain at elevations above bankfull, but not in a manner that will cause stranding during future flood events.

x. Crushed rock is not permitted.

xi. After placement in areas accessible to higher stream flow, allow the stream to naturally sort and distribute the material.

<sup>23</sup> [http://www.fema.gov/pdf/about/regions/regionx/Engineering\\_With\\_Nature\\_Web.pdf](http://www.fema.gov/pdf/about/regions/regionx/Engineering_With_Nature_Web.pdf)

<sup>24</sup> <http://wdfw.wa.gov/publications/00046/wdfw00046.pdf>

xii. Do not place material directly on bars and riffles that are known spawning areas, which may cause fish to spawn on the unsorted and unstable gravel, thus potentially resulting in redd destruction.

xiii. Imported material will be free of invasive species and non-native seeds. If necessary, wash prior to placement.

e. **Large Wood Placements** are defined as structures composed of LW that do not use mechanical methods as the means of providing structure stability (*i.e.*, large rock, rebar, rope, cable, *etc.*). The use of native soil, alluvium with similar angularity as the natural bed material, large wood, or buttressing with adjacent trees as methods for providing structure stability are authorized. This method is predominantly for use in small to moderately sized channels and is not appropriate for application in mainstem systems. These structures are designed to provide roughness, redirect flow, and provide stability to adjacent streambed and banks or downstream reaches, while providing valuable fish and wildlife habitat.

i. **NMFS fish passage review and approval.** NMFS will review LW placement projects that would occupy greater than 25% of the bankfull cross section area.

ii. Structure shall simulate disturbance events to the greatest degree possible and include, but not be limited to, log jams, debris flows, wind-throw, and tree breakage.

iii. Structures may partially or completely span stream channels or be positioned along stream banks.

iv. Where structures partially or completely span the stream channel LW should be comprised of whole conifer and hardwood trees, logs, and rootwads. LW size (diameter and length) should account for bankfull width and stream discharge rates.

v. Structures will incorporate a diverse size (diameter and length) distribution of rootwad or non-rootwad, trimmed or untrimmed, whole trees, logs, snags, slash, *etc.*

vi. For individual logs that are completely exposed, or embedded less than half their length, logs with rootwads should be a minimum of 1.5 times bankfull channel width, while logs without rootwads should be a minimum of 2.0 times bankfull width.

vii. Consider orienting key pieces such that the hydraulic forces upon the LW increase stability.

f. Vegetated riprap with large wood (LW)

i. NMFS will review and approve bank stabilization projects that use vegetated riprap with LW.

ii. When this method is necessary, limit installation to the areas identified as most highly erodible, with highest shear stress, or at greatest risk of mass-failure, and provide compensatory mitigation. The greatest risk of mass-failure will usually be at the toe of the slope and will not extend above OHW elevation except in incised streams.

iii. Do not use invasive or non-native species for site restoration.

iv. Remove or control invasive plants until native plant species are well-established.

v. Do not apply surface fertilizer within 50-feet of any stream channel.



- vi. Install fencing as necessary to prevent access to revegetated sites by livestock or unauthorized persons.
- vii. Vegetated riprap with LW will be installed as follows:
  1. When present, use natural hard points, such as large, stable trees or rock outcrops, to begin or end the toe of the revetment.
  2. Develop rock size gradations for elevation zones on the bank, especially if the rock will extend above OHW – the largest rock should be placed at the toe of the slope, while small rock can be used higher in the bank where the shear stress is generally lower. Most upper bank areas will not require the use of any rock but can depend on the vegetation for erosion protection.
  3. For bank areas above OHW where rock is still deemed necessary, mix rock with soil to provide a better growing medium for plants.
  4. Minimum amount of wood incorporated into the treated area, for mitigation of riprap, is equal to the number of whole trees whose cumulative summation of rootwad diameters is equal to 80% of linear-feet of treated streambank or 20% of the treated area (square feet) of streambank, whichever is greater.
  5. Where whole trees are not used (*i.e.*, snags, logs, and partial trees) designers are required to estimate the dimensions of parent material based on rootwad diameter, and calculating a cumulative equivalency of whole trees.
  6. LW should be distributed throughout the structure (not just concentrated at the toe) to engage flows up to the bankfull flow. LW placed above the toe may be in the form of rootwad or non-rootwad, trimmed or untrimmed, whole trees, logs, snags, slash, *etc.* Maximize the exposure of wood to water by placing and orienting wood to project into the water column up to the bankfull elevation.
  7. Develop an irregular toe and bank line to increase roughness and habitat value.
  8. Use LW and irregular rock to create large interstitial spaces and small alcoves to create planting spaces and habitat to mitigate for flood-refuge impacts – do not use geotextile fabrics as filter behind the riprap whenever possible, if a filter is necessary to prevent sapping, use a graduated gravel filter.
  9. Structure toe will incorporate LW with intact rootwads. Minimum spacing between rootwads placed at the toe will be no greater than an average rootwad diameter.
  10. Minimum rootwad diameter for LW placed at the toe of the structure shall be 1.0 times the bankfull depth, unless LW availability constrains the project to a smaller rootwad size. Where rootwad size is constrained due to availability, the largest diameter rootwads available should be used.
  11. LW placed at the toe will be sturdy material, intact, hard, and undecayed and should be sized or embedded sufficiently to withstand the design flood.
  12. Space between root wads may be filled with large boulders, trimmed or untrimmed, whole trees, logs, snags, slash, *etc.*

When used, diameter of boulders placed between toe logs with rootwads should be 1.5 to 2.0 times log diameter at breast height (dbh) of adjacent toe logs. A reasonable maximum rock size is 5-6 feet in diameter.

13. Plant woody vegetation in the joints between the rocks to enhance streambank vegetation.

14. Where possible, use terracing, or other bank shaping, to increase habitat diversity.

15. When possible, create or enhance a vegetated riparian buffer.

viii. Monitor vegetated riprap each year following installation by visual inspection during low flows to examine transitions between undisturbed and treated banks to ensure that native soils above and behind the riprap are not collapsing, sinking, or showing other evidence of piping loss or movement of rock materials; and the overall integrity of the riprap treatment, including:

1. Loss of rock materials
2. Survival rate of vegetation
3. Anchoring success of LW placed in the treatment.
4. Any channel changes since construction.

g. Roughened toe

i. Where designs use any of the approved streambank stabilization methods outlined in this section, in lieu of lining the bank with riprap above the toe, the design of any rock-filled toe will adhere to project criteria outlined in (f) Vegetated riprap with large wood (7-15, from above).

ii. Minimum amount of wood incorporated into the treated area, for mitigation of riprap, is equal to the number of whole trees whose cumulative summation of rootwad diameters is equal to 80% of linear-feet of treated streambank.

h. **Engineered log jams (ELJ).** ELJs are structures composed of LW with at least three key members and incorporating the use of any mechanical anchoring system (*i.e.*, rebar, rope, angular or large rock, *etc.*). Native soil, simulated streambed and bank materials, wood, or buttressing with adjacent trees, are not mechanical anchoring systems. ELJs are designed to redirect flow, provide roughness, and provide stability to adjacent streambed and banks or downstream reaches, while providing valuable fish and wildlife habitat.

i. **NMFS fish passage review and approval.** NMFS will review proposed ELJ projects.

ii. ELJs will be patterned, to the greatest degree possible, after stable natural log jams.

iii. Stabilizing or key pieces of LW will be intact and solid (little decay). If possible, acquire LW with untrimmed rootwads to provide functional refugia habitat for fish.

i. If LW mechanical anchoring is required, a variety of methods may be used. These include large angular rock, buttressing the wood between adjacent trees, the use of manila, sisal or other biodegradable ropes for lashing connections. If hydraulic conditions warrant use of structural connections, rebar pinning or bolted connections, may be used. Use of cable is not covered by this opinion.

j. When a hole in the channel bed caused by local scour will be filled with rock to prevent damage to a culvert, road, or bridge foundation, the amount of rock will be limited to the minimum necessary to protect the integrity of the structure.

k. When a footing, facing, head wall, or other protection will be constructed with rock to prevent scouring or down-cutting of, or fill slope erosion or failure at, an existing culvert or bridge, the amount of rock used will be limited to the minimum necessary to protect the integrity of the structure. Whenever feasible, include soil and woody vegetation as a covering and throughout the structure.

## 42. Road Maintenance, Rehabilitation and Replacement

a. All maintenance and rehabilitation actions shall observe applicable criteria detailed in the most recent version of NMFS fish passage criteria

i. Projects affecting fish passage shall adhere to industry design standards found in the most recent version of any of the following:

1. *Water Crossings Design Guidelines* (Barnard *et al.* 2013)<sup>25</sup>
2. *Part XII, Fish Passage Design and Implementation, Salmonid Stream Habitat Restoration Manual* (California Department of Fish and Game 2009)<sup>26</sup>
3. *Stream Simulation: An Ecological Approach to Providing Passage for Aquatic Organisms at Road-Stream* (USDA-Forest Service 2008)<sup>27</sup>
4. Or other design references approved by NMFS.

ii. Routine road surface, culvert and bridge maintenance activity will be completed in accordance with the *ODOT Routine Road Maintenance: Water Quality and Habitat Guide Best Management Practices* (ODOT 2009) or the most recent version approved by NMFS, unless maintenance activities and practices in that manual conflict with PDC in this opinion.

1. Any conflict between ODOT (2009) and this opinion (e.g., stormwater management for maintenance yards, erosion repair related to use of riprap, dust abatement, and use of pesticides) will be resolved in favor of PDC in this opinion.

b. Grade stabilization

i. Grade control materials may include both rock and LW. Material shall not in any part consist of gabion baskets, sheet piles, concrete, articulated concrete blocks, or cable anchors.

ii. Grade control shall be provided using morphologically-appropriate constructed riffles for riffle-pool morphologies, rough constructed riffles/ramps for plane bed morphologies, wood/debris jams, rock bands, and boulder weirs for step-pool morphologies, and roughened channels for cascade morphologies.

iii. LW placements and ELJs may be used to control grade individually or together with other grade control methods by simulating natural log jams and debris accumulation that traps sediment and creates forced, riffle-pool, step-pool, or cascade-pool morphologies.

<sup>25</sup> <http://wdfw.wa.gov/publications/01501/>

<sup>26</sup> <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=12512>

<sup>27</sup> [http://stream.fs.fed.us/fishxing/aop\\_pdfs.html](http://stream.fs.fed.us/fishxing/aop_pdfs.html)

- iv. Stream banks and bed shall be designed to be immobile at the design event to reduce undermining and flanking.
  - v. The crest of channel spanning structures will be slightly sloped on either side, with the low point in the center, to direct flows to the middle of channel and away from streambanks. Install these structures low in relation to channel dimensions so that they are completely overtopped during channel-forming flow events (approximately a 1.0- to 1.5-year flow event).
  - vi. Construct boulder weir structures in a 'V' or 'U' shape, oriented with the apex upstream.
  - vii. Key all structures into the streambed at a depth which minimizes structure undermining due to scour, at least 2.5 times their exposure height, or the Lower Vertical Adjustment Potential (LVAP) line with an offset of 2 times  $D_{90}$ , whichever is deeper.
    - 1. LVAP, and 2 times  $D_{90}$  offset, as calculated in *Stream Simulation: An ecological approach to providing passage for aquatic organisms at road crossings* (USDA-Forest Service 2008).
  - viii. Structures should be keyed into both banks—if feasible greater than 8 feet.
  - ix. If several drop structures will be used in series, space them at the appropriate distances to promote fish passage of target species and life histories. Incorporate NMFS (2011a) fish passage criteria (jump height, pool depth, etc.) in the design of drop structures.
  - x. Recommended spacing for boulder weirs should be no closer than the net drop divided by the channel slope (for example, a one-foot high step structure designed with a project slope of two-percent gradient will have a minimum spacing of 50-feet [1/0.02]). Maximum project slope for boulder weir designs is 5%.
  - xi. A series of short steep rough ramps/chutes, cascades, or roughened channel type structures, broken up by energy dissipating pools, are required where project slope is greater than 5%.
- c. Rock Structures
- i. Rock structures will be constructed out of a mix of well-graded boulder, cobble, and gravel, including the appropriate level of fines, to allow for compaction and sealing to ensure minimal loss of surface flow through the newly placed material.
  - ii. Rock sizing depends on the size of the stream, maximum depth of flow, plan form, entrenchment, and ice and debris loading.
  - iii. The project designer or an inspector experienced in these structures should be present during installation.
  - iv. To ensure that the structure is adequately sealed, no sub-surface flow will be present before equipment leaves the site.
  - v. Rock shall be durable and of suitable quality to assure long-term stability in the climate in which it is to be used.
    - i. Where feasible, channel spanning structures should be coupled with LW to improve habitat complexity of riparian areas.
- d. Structure Stabilization

- i. When a footing, facing, head wall, or other protection will be constructed with rock to prevent scouring or down-cutting of, or fill slope erosion or failure at, an existing culvert or bridge, the amount of rock used is limited to the minimum necessary to protect the integrity of the structure. Include soil, vegetation, and wood throughout the structure to the level possible.
- e. Road-stream crossing replacement or retrofit
  - i. Projects shall adhere to industry design standards found in the most recent version any of the following:
    1. *Water Crossings Design Guidelines* (Barnard *et al.* 2013)<sup>28</sup>
    2. *Part XII, Fish Passage Design and Implementation, Salmonid Stream Habitat Restoration Manual* (California Department of Fish and Game 2009)<sup>29</sup>
    3. *Stream Simulation: An Ecological Approach to Providing Passage for Aquatic Organisms at Road-Stream* (USDA-Forest Service 2008)<sup>30</sup>
    4. Or other design references approved by NMFS.
  - i. General road-stream crossing criteria
    1. Span
      - a. Span is determined by the crossing width at the proposed streambed grade.
      - b. Single span structures will maintain a clear, unobstructed opening above the general scour elevation that is at least as wide as 1.5 times the active channel width.<sup>31</sup>
      - c. Multi-span structures will maintain clear, unobstructed openings above the general scour elevation (except for piers or interior bents) that are at least as wide as 2.2 times the active channel width.
      - d. Entrenched streams: If a stream is entrenched (entrenchment ratio of less than 1.4), the crossing width will accommodate the flood prone width. Flood prone width is the channel width measured at twice the maximum bankfull depth (Rosgen 1996).
      - e. Minimum structure span is 6 feet.
    2. Bed Material
      - a. Install clean alluvium with similar angularity as the natural bed material, no crushed rock.
      - b. Bed material shall be designed based on the native particle size distribution of the adjacent channel or reference reach, as quantified by a pebble count.
      - c. Rock band designs as detailed in *Water Crossings Design Guidelines* (Barnard *et al.* 2013) are authorized.
      - d. Bed material in systems where stream gradient exceeds 3% may be conservatively sized to resist movement.

<sup>28</sup> <http://wdfw.wa.gov/publications/01501/>

<sup>29</sup> <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=12512>

<sup>30</sup> [http://stream.fs.fed.us/fishxing/aop\\_pdfs.html](http://stream.fs.fed.us/fishxing/aop_pdfs.html)

<sup>31</sup> Active channel width means the stream width measured perpendicular to stream flow between the OHW lines, or at the channel bankfull elevation if the OHW lines are indeterminate. This width includes the cumulative active channel width of all individual side- and off-channel components of channels with braided and meandering forms, and measure outside the area influence of any existing stream crossing, e.g., five to seven channel widths upstream and downstream.

### 3. Scour Prism

a. Designs shall maintain the general scour prism, as a clear, unobstructed opening (*i.e.*, free of any fill, embankment, scour countermeasure, or structural material to include abutments, footings, and culvert inverts). No scour or stream stability countermeasure may be applied above the general scour elevation.<sup>32</sup>

a. The lateral delineation of the scour prism is defined by the criteria span.

b. The vertical delineation of the scour prism is defined by the Lower Vertical Adjustment Potential (LVAP) with an additional offset of 2 times  $D_{90}$ , as calculated in *Stream Simulation: An ecological approach to providing passage for aquatic organisms at road crossings* (USDA-Forest Service 2008).

b. When bridge abutments or culvert footings are set back beyond the applicable criteria span they are outside the scour prism.

### 4. Embedment

a. All abutments, footings, and inverts shall be placed below the thalweg a depth of 3 feet, or the LVAP line with an offset of 2 times  $D_{90}$ , whichever is deeper.

i. AP, and 2 times  $D_{90}$  offset, as calculated in *Stream Simulation: An ecological approach to providing passage for aquatic organisms at road crossings* (USDA-Forest Service 2008).

b. In addition to embedment depth, embedment of closed bottom culverts shall be between 30% and 50% of the culvert rise.

### 5. Bridges

a. Primary bridge structural elements will be concrete, metal, fiberglass, or untreated timber. The use of treated wood for bridge construction or replacement is not part of this proposed action. The use of treated wood for maintenance and repair of existing wooden bridges is part of the proposed action if in conformance with project design criterion 29.

b. All concrete will be poured in the dry, or within confined waters not connected to surface waters, and will be allowed to cure a minimum of 7 days before contact with surface water as recommended by Washington State Department of Transportation (2010).

c. Riprap may only be placed below bankfull height of the stream when necessary for protection of abutments and pilings. The amount and placement of riprap will not constrict the bankfull flow.

d. Temporary work bridges will also meet the latest version of NMFS (2011a) criteria.

<sup>32</sup> For guidance on how to complete bridge scour and stream stability analysis, see Lagasse *et al.* (2012) (HEC-20), Lagasse *et al.* (2001) (HEC-23), Richardson and Davis (2001) (HEC-18), ODOT (2011), and AASHTO (2013).

- iii. The electronic notification for each permanent stream crossing replacement will contain the following:
  1. Site sketches, drawings, aerial photographs, or other supporting specifications, calculations, or information that is commensurate with the scope of the action, that show the active channel, the 100-year floodplain, the functional floodplain, any artificial fill within the project area, the existing crossing to be replaced, and the proposed crossing.
  2. A completed scour and stream stability analysis for any crossing that includes scour or stream stability countermeasures within the crossing opening that shows the general scour elevation and the local scour elevation for any pier or interior bent.
  3. The name, address, and telephone number of a person responsible for designing this part of the action that NMFS may contact if additional information is necessary to complete the effects analysis.
- f. **NMFS fish passage review and approval.** The Corps will not issue a permit to install, replace, or improve a road-stream crossing, step structure, fish ladder, or projects containing grade control, stream stability, or headcut countermeasures, until the action has been reviewed and approved by NMFS for consistency with NMFS's fish passage criteria (NMFS 2011a).

#### 43. Utility Line Stream Crossings

- a. Design utility line stream crossings in the following priority:
  - i. Aerial lines, including lines hung from existing bridges.
  - ii. Directional drilling, boring and jacking that spans the channel migration zone and any associated wetland.
  - iii. Trenching – this method is restricted to intermittent streams and may only be used when the stream is naturally dry, all trenches will be backfilled below the OHW line with native material and capped with clean gravel suitable for fish use in the project area.
- b. Align each crossing as perpendicular to the watercourse as possible. Ensure that the drilled, bored or jacked crossings are below the total scour prism.
- c. Any large wood displaced by trenching or plowing will be returned as nearly as possible to its original position, or otherwise arranged to restore habitat functions.
- d. Any action involving a stormwater outfall will meet the stormwater management criteria.<sup>33</sup>
- e. NMFS will review new or upgraded stormwater outfalls.

<sup>33</sup> The most efficient way for an applicant or the Corps to prepare and submit a stormwater management plan for NMFS' review is to attach a completed *Checklist for Submission of a Stormwater Management Plan* (the *Checklist*, ODEQ updated 2012, or the most recent version) with the electronic notification when it is sent to the SLOPES mailbox. However, stormwater conveyance to a DEQ permitted Municipal Separate Storm Sewer System (MS4) or consistency with any other program acknowledged by DEQ as adequate for stormwater management will not meet the requirements of this opinion unless NMFS determines that the facility accepting the stormwater will provide a level of treatment that is equivalent to that called for in this opinion. The *Checklist* and guidelines for its use are available from NMFS or the ODEQ in Portland Oregon. The latest version of the *Checklist* is also available online in a portable document format (pdf) through the ODEQ Water Quality Section 401 certification webpage (ODEQ 2014) at <http://www.deq.state.or.us/wq/sec401/cert/process.htm#add> (see "Post Construction Stormwater Management Plan").

**Action Completion Reporting.** It is the applicant's responsibility to submit this form to the Corps within 60 days of completing all work below ordinary high water (OHW). Upon receipt, the Corps will resubmit this form with the Action Completion Report portion completed to NMFS at [slopes.nwr@noaa.gov](mailto:slopes.nwr@noaa.gov). If it is a Corps project, the Corps shall complete and submit this form within 60 days of completing the project.

**Major hazard response reporting.** It is the applicant's responsibility to submit this form to the Corps within 30 days of completing all work below OHW. Upon receipt, the Corps will resubmit this form with the Action Completion Report portion completed to NMFS at [slopes.nwr@noaa.gov](mailto:slopes.nwr@noaa.gov). If it is a Corps project, the Corps shall complete and submit this form within 30 days of completing the project.

**Fish Salvage Reporting.** It is the applicant's responsibility to submit this form to the Corps within 60 days of completing a capture and release as part of an action completed under SLOPES V Transportation. Upon receipt, the Corps will resubmit this form with the Fish Salvage Report portion completed with the following information to NMFS at [slopes.nwr@noaa.gov](mailto:slopes.nwr@noaa.gov). If it is a Corps project, the Corps shall complete and submit this form within 60 days of completing fish salvage operations.



# 1. ACTION COMPLETION REPORT

The applicant shall submit this form to the Corps within 60 days of completing all work below ordinary high water (OHW). The Corps shall submit this form to NMFS at [slopes.nwr@noaa.gov](mailto:slopes.nwr@noaa.gov) upon receipt from the applicant. If it is a Corps project, the Corps shall submit this form within 60 days of completing all work below OHW.

<b>Actual Start and End Dates for the Completion of In-water Work:</b>	<i>Start:</i>	<i>End:</i>
<b>Actual Linear-feet of Riparian and/or Channel Modification within 150 feet of OHW</b>		
<b>Actual Acreage of Herbicide Treatment</b>		
<b>Turbidity Monitoring/Sampling Completed</b>	<input type="checkbox"/> Yes (include details below)	<input type="checkbox"/> No

**Please include the following:**

1. Attach as-built drawings for any action involving a riprap revetment, stormwater management facility, or a bridge rehabilitation or replacement.
2. Attach photos of habitat conditions before, during, and after action completion.
3. Describe compliance with fish screen criteria, as defined below, for any pump used.
4. Summarize results of pollution and erosion control inspections, including any erosion control failure, contaminant release, and correction effort.
5. Describe number, type and diameter of any pilings removed or broken during removal.
6. Describe any riparian area cleared within 150 feet of OHW.
7. Describe turbidity monitoring (visual or by turbidimeter) including dates, times and location of monitoring and any exceedances and steps taken to reduce turbidity observed.
8. Describe site restoration.

**If the project was a Major Hazard Response, ALSO include the following:**

1. Name of the major hazard event.
2. Type of major hazard.
3. Name of the public transportation district manager that declared the response necessary.
4. NMFS staff contacted, with date and time of contact.
5. Description of the amount and type of riprap or other material used to repair a culvert, road, or bridge.
6. Assess the effects of the initial response to listed species and critical habitats.
7. Summary of the design criteria followed and not followed.
8. Remedial actions necessary to bring the initial response into compliance with design criteria in this opinion.

## 2. FISH SALVAGE REPORT

**If applicable:** The applicant shall submit a completed Fish Salvage Report and Fish Salvage Data Table (see below) to the Corps within 60 days of completing a capture and release as part of an action completed under SLOPES V Transportation. The Corps will submit the report to NMFS at [slopes.nwr@noaa.gov](mailto:slopes.nwr@noaa.gov) upon receipt from the applicant. If it is a Corps project, the Corps shall submit this form to NMFS within 60 days of completing a capture and release event.

**Date(s) of Fish Salvage**

**Operation(s):**

**Supervisory Fish Biologist:**

**Address**

**Telephone Number**

---

---

---

---

---

---

Describe methods that were used to isolate the work area and remove fish

**Fish Salvage Data**

Water Temperature:

Air Temperature:

Time of Day:

ESA-Listed Species	Number Handled		Number Injured		Number Killed	
	Juvenile	Adult	Juvenile	Adult	Juvenile	Adult
Lower Columbia River Chinook						
Upper Willamette River Chinook						
Upper Columbia River spring-run Chinook						
Snake River spring/summer run Chinook						
Snake River fall-run Chinook						
Chinook, unspecified						
Columbia River chum						
Lower Columbia River Coho						
Oregon Coast Coho						
Southern Oregon/Northern California Coasts Coho						
Snake River sockeye						
Lower Columbia River steelhead						
Upper Willamette River steelhead						
Middle Columbia River steelhead						
Upper Columbia River steelhead						
Snake River Basin steelhead						
Steelhead, unspecified						
Southern green sturgeon						
Eulachon						

### **3. SITE RESTORATION/ COMPENSATORY MITIGATION**

By December 31 of any year in which the Corps approves that the site restoration or compensatory mitigation is complete, the Corps, will submit a complete a Site Restoration/Compensatory Mitigation Reporting Form, or its equivalent, with the following information to NMFS at [slopes.nwr@noaa.gov](mailto:slopes.nwr@noaa.gov).

Describe location of mitigation or restoration work.

Summarize the results of mitigation or restoration work completed.



# Compliance Certification

1. **Permit Number:** NWP-
2. **Permittee Name:**
3. **County Location:**

Upon completing the activity authorized by the permit, please complete the sections below, sign and date this certification, and return it to the U.S. Army Corps of Engineers, Portland District, Regulatory Branch. The certification can be submitted by email at [cenwp.notify@usace.army.mil](mailto:cenwp.notify@usace.army.mil) or by regular mail at the following address:

U.S. Army Corps of Engineers  
CENWP-OD-GL  
P.O. Box 2946  
Portland, OR 97208-2946

4. **Corps-required Compensatory Mitigation (see permit special conditions):**

- a. Mitigation Bank / In-lieu Fee Credit Transaction Documents:  
 Not Applicable       Submitted       Enclosed
- b. Permittee-responsible mitigation (e.g., construction and plantings) has been constructed (not including future monitoring). As-built report:  
 Not Applicable       Submitted       Enclosed

5. **Endangered Species Act – Standard Local Operating Procedures (SLOPES)**

(see permit special conditions):

- a. SLOPES Action Completion Report:  
 Not Applicable       Submitted       Enclosed
- b. SLOPES Fish Salvage Report:  
 Not Applicable       Submitted       Enclosed
- c. SLOPES Site Restoration / Compensatory Mitigation Report:  
 Not Applicable       Submitted       Enclosed

I hereby certify the work authorized by the above-referenced permit has been completed in accordance with all of the permit terms and conditions.

---

**Signature of Permittee**

**Date**

NWP-

Enclosure

Department of State Lands  
775 Summer Street, Suite 100  
Salem, OR 97301-1279  
☎ 503-986-5200

Permit No.:	<u>62459-RF</u>
Permit Type:	<u>Removal/Fill</u>
Waters:	<u>Wetland/Rock Creek</u>
County:	<u>Washington</u>
Expiration Date:	<u>July 21, 2021</u>

**CITY OF SHERWOOD**

**IS AUTHORIZED IN ACCORDANCE WITH ORS 196.800 TO 196.990 TO PERFORM THE OPERATIONS DESCRIBED IN THE REFERENCED APPLICATION, SUBJECT TO THE SPECIAL CONDITIONS LISTED ON ATTACHMENT A AND TO THE FOLLOWING GENERAL CONDITIONS:**

1. This permit does not authorize trespass on the lands of others. The permit holder must obtain all necessary access permits or rights-of-way before entering lands owned by another.
2. This permit does not authorize any work that is not in compliance with local zoning or other local, state, or federal regulation pertaining to the operations authorized by this permit. The permit holder is responsible for obtaining the necessary approvals and permits before proceeding under this permit.
3. All work done under this permit must comply with Oregon Administrative Rules, Chapter 340; Standards of Quality for Public Waters of Oregon. Specific water quality provisions for this project are set forth on Attachment A.
4. Violations of the terms and conditions of this permit are subject to administrative and/or legal action, which may result in revocation of the permit or damages. The permit holder is responsible for the activities of all contractors or other operators involved in work done at the site or under this permit.
5. Employees of the Department of State Lands (DSL) and all duly authorized representatives of the Director must be permitted access to the project area at all reasonable times for the purpose of inspecting work performed under this permit.
6. Any permit holder who objects to the conditions of this permit may request a hearing from the Director, in writing, within twenty-one (21) calendar days of the date this permit was issued.
7. In issuing this permit, DSL makes no representation regarding the quality or adequacy of the permitted project design, materials, construction, or maintenance, except to approve the project's design and materials, as set forth in the permit application, as satisfying the resource protection, scenic, safety, recreation, and public access requirements of ORS Chapters 196, 390, and related administrative rules.
8. Permittee must defend and hold harmless the State of Oregon, and its officers, agents and employees from any claim, suit, or action for property damage or personal injury or death arising out of the design, material, construction, or maintenance of the permitted improvements.
9. Authorization from the U.S. Army Corps of Engineers may also be required.

**NOTICE:** If removal is from state-owned submerged and submersible land, the permittee must comply with leasing and royalty provisions of ORS 274.530. If the project involves creation of new lands by filling on state-owned submerged or submersible lands, you must comply with ORS 274.905 to 274.940 if you want a transfer of title; public rights to such filled lands are not extinguished by issuance of this permit. This permit does not relieve the permittee of an obligation to secure appropriate leases from DSL, to conduct activities on state-owned submerged or submersible lands. Failure to comply with these requirements may result in civil or criminal liability. For more information about these requirements, please contact Department of State Lands, 503-986-5200.

Christopher Castelli, Northern Operations Manager  
Aquatic Resource Management  
Oregon Department of State Lands

\_\_\_\_\_  
**Authorized Signature**

## ATTACHMENT A

Permit Holder: City of Sherwood

Project Name: Rock Creek Sanitary Trunk Line Upsizing

Special Conditions for Removal/Fill Permit No. 62459-RF

### **READ AND BECOME FAMILIAR WITH CONDITIONS OF YOUR PERMIT.**

The project site may be inspected by the Department of State Lands (DSL) as part of our monitoring program. A copy of this permit must be available at the work site whenever authorized operations are being conducted.

1. **Responsible Party:** By signature on the application, Bob Galati is acting as the representative of City of Sherwood. By proceeding under this permit, City of Sherwood agrees to comply with and fulfill all terms and conditions of this permit, unless the permit is officially transferred to another party as approved by DSL. In the event information in the application conflicts with these permit conditions, the permit conditions prevail.
2. **Authorization to Conduct Removal and/or Fill:** This permit authorizes 0.74 acres of wetland and 570 linear feet of waterway impacts with associated removal and fill of material in T02S R01W Section 29BD, Multiple Tax Lots, in Washington County, as referenced in the application, map and drawings (See Attachment B for project location), dated January 28, 2020.
3. **Work Period in Jurisdictional Areas:** Fill or removal activities below the ordinary high water elevation of Rock Creek must be conducted between July 15 and September 30, unless otherwise coordinated with Oregon Department of Fish and Wildlife and approved in writing by DSL. If fish eggs are observed within the project area, work must cease, and DSL contacted immediately.
4. **Changes to the Project or Inconsistent Requirements from Other Permits:** It is the permittee's responsibility to ensure that all state, federal and local permits are consistent and compatible with the final approved project plans and the project as executed. Any changes made in project design, implementation or operating conditions to comply with conditions imposed by other permits resulting in removal-fill activity must be approved by DSL prior to implementation.
5. **DSL May Halt or Modify:** DSL retains the authority to temporarily halt or modify the project or require rectification in case of unforeseen adverse effects to aquatic resources or permit non-compliance.
6. **DSL May Modify Conditions Upon Permit Renewal:** DSL retains the authority to modify conditions upon renewal, as appropriate, pursuant to the applicable rules in effect at the time of the request for renewal or to protect waters of this state.

### **Pre-Construction**

7. **Stormwater Management Approval Required Before Beginning Work:** Prior to the start of construction, the permittee must obtain a National Pollution Discharge Elimination System (NPDES) permit from the Oregon Department of Environmental Quality (DEQ), if one is required by DEQ.

8. **Authorization to Use Property for Linear Projects:** For linear facility projects, the removal-fill activity cannot occur until the person obtains:
- The landowner's consent;
  - A right, title or interest with respect to the property, that is sufficient to undertake the removal or fill activity; or
  - A court order or judgment authorizing the use of the property
9. **Pre-construction Resource Area Fencing or Flagging:** Prior to any site grading, the boundaries of the avoided wetlands, waterways, and riparian areas adjacent to the project site must be surrounded by noticeable construction fencing or flagging. The marked areas must be maintained during construction of the project and be removed immediately upon project completion.

### General Construction Conditions

10. **Water Quality Certification:** The Department of Environmental Quality (DEQ) may evaluate this project for a Clean Water Act Section 401 Water Quality Certification (WQC). If the evaluation results in issuance of a Section 401 WQC, that turbidity condition will govern any allowable turbidity exceedance and monitoring requirements.
11. **Erosion Control Methods:** The following erosion control measures (and others as appropriate) must be installed prior to construction and maintained during and after construction as appropriate, to prevent erosion and minimize movement of soil into waters of this state.
- All exposed soils must be stabilized during and after construction to prevent erosion and sedimentation.
  - Filter bags, sediment fences, sediment traps or catch basins, leave strips or berms, or other measures must be used to prevent movement of soil into waterways and wetlands.
  - To prevent erosion, use of compost berms, impervious materials or other equally effective methods, must be used to protect soil stockpiled during rain events or when the stockpile site is not moved or reshaped for more than 48 hours.
  - Unless part of the authorized permanent fill, all construction access points through, and staging areas in, riparian and wetland areas must use removable pads or mats to prevent soil compaction. However, in some wetland areas under dry summer conditions, this requirement may be waived upon approval by DSL. At project completion, disturbed areas with soil exposed by construction activities must be stabilized by mulching and native vegetative plantings/seeding. Sterile grass may be used instead of native vegetation for temporary sediment control. If soils are to remain exposed more than seven days after completion of the work, they must be covered with erosion control pads, mats or similar erosion control devices until vegetative stabilization is installed.
  - Where vegetation is used for erosion control on slopes steeper than 2:1, a tackified seed mulch must be used so the seed does not wash away before germination and rooting.
  - Dredged or other excavated material must be placed on upland areas having stable slopes and must be prevented from eroding back into waterways and wetlands.
  - Erosion control measures must be inspected and maintained as necessary to ensure their continued effectiveness until soils become stabilized.
  - All erosion control structures must be removed when the project is complete, and soils are stabilized and vegetated.



12. **Fuels, Hazardous, Toxic, and Waste Material Handling:** Petroleum products, chemicals, fresh cement, sandblasted material and chipped paint, wood treated with leachable preservatives or other deleterious waste materials must not be allowed to enter waters of this state. Machinery and equipment staging, cleaning, maintenance, refueling, and fuel storage must be at least 150 feet from OHW or HMT and wetlands to prevent contaminants from entering waters of the state. Refueling is to be confined to a designated area to prevent spillage into waters of this state. Barges must have containment system to effectively prevent petroleum products or other deleterious material from entering waters of this state. Project-related spills into waters of this state or onto land with a potential to enter waters of this state must be reported to the Oregon Emergency Response System (OERS) at 1-800-452-0311.
13. **Archaeological Resources:** If any archaeological resources, artifacts or human remains are encountered during construction, all construction activity must immediately cease. The State Historic Preservation Office must be contacted at 503-986-0674. You may be contacted by a Tribal representative if it is determined by an affected Tribe that the project could affect Tribal cultural or archeological resources.
14. **Construction Corridor:** There must be no removal of vegetation or heavy equipment operating or traversing outside the designated construction corridor or footprint (Figure(s) C-4 to C-6).
15. **Hazards to Recreation, Navigation or Fishing:** The activity must be timed so as not to unreasonably interfere with or create a hazard to recreational or commercial navigation or fishing.
16. **Operation of Equipment in the Water:** Heavy equipment may be positioned on or traverse the area below ordinary high water or highest measured tide only when the area is free of flowing or standing water. All machinery operated below ordinary high water (OHW) or highest measured tide (HMT) elevation must use vegetable-based hydraulic fluids, be steam cleaned and inspected for leaks prior to each use, and be diapered to prevent leakage of fuels, oils, or other fluids below OHW or HMT elevation. Any equipment found to be leaking fluids must be immediately removed from and kept out of OHW or HMT until repaired.
17. **Work Area Isolation:** The work area must be isolated from the water during construction by using a coffer dam or similar structure. All structures and materials used to isolate the work area must be removed immediately following construction and water flow returned to pre-construction conditions.
18. **Fish Salvage Required:** Fish must be salvaged from the isolation area. Permits from NOAA Fisheries and Oregon Department of Fish and Wildlife, Fish Research are required to salvage fish. Fish salvage permit information may be obtained by contacting ODFW Fish Research at 503-947-6254 or [Fish.Research@state.or.us](mailto:Fish.Research@state.or.us).
19. **Fish Passage Required:** The project must meet Oregon Department of Fish and Wildlife requirements for fish passage, as required in ORS 509.585. Contact the local ODFW District Fish Biologist (Monica Blanchard 971-673-2040) to ensure your project meets the state's fish passage requirements.
20. **Raising or Redirecting Water:** The project must not cause water to rise or be redirected and result in damage to structures or property on the project site as well as adjacent, nearby, upstream, and downstream of the project site.

- 21. Trenching in Wetlands:** During trenching or excavation, the top layer of soil must be separated from the rest of the excavated material and put back on top when the trench or pit is back-filled. If the native underlying soils are not used as bedding material and a coarser, non-native soil or other material is used, preventative measures such as clay or concrete plugs must be used so that underground hydraulic piping does not dewater the site and adjacent wetlands.
- 22. Temporary Ground Disturbances:** All temporarily disturbed areas must be returned to original ground contours at project completion.
- 23. Site Rectification Required for Temporary Wetland Impacts:** Site rectification for temporary impacts to 0.74 acres of wetland must be conducted according to the rehabilitation plan in the application, Page 18 and figures L1 and L2. Failure to rectify the site may result in additional compensatory mitigation.
- 24. Pre-construction Elevations Must Be Restored Within the Same Construction Season:** Construction activities within areas identified as temporary impact must not exceed two construction seasons and rectification of temporary impacts must be completed within 24 months of the initiation of impacts. However, if the temporary impact only requires one construction season, re-establishment of pre-construction contours must be completed within that same construction season, before the onset of fall rains.
- 25. Woody Vegetation Planting Required:** Planting of native woody vegetation must be completed before the next growing season after re-establishment of the pre-construction contours.
- 26. Post-Construction Report Required:** A post-construction report demonstrating as-built conditions and discussing any variation from the approved plan must be provided to DSL within 90 days of revegetation. The post-construction report must include:
- a. A scaled drawing, accurate to 1-foot elevation, clearly showing the following:
    - i. Finished contours of the site.
    - ii. Current tax lot and right-of-way boundaries.
    - iii. Photo point locations.
    - iv. Permanently and temporarily impacted wetland and waterway boundaries identified separately, with square foot listed.
  - b. Photos from fixed photo points. This should clearly show the site conditions, and any signage, and fencing required.
  - c. A narrative that describes any deviation from the approved plan.
- 27. Annual Monitoring Reports Required:** Monitoring is required until DSL has officially released the site from further monitoring. The permittee must monitor the site to determine whether the site is meeting performance standards for a minimum period of 3 growing seasons after completion of all the initial plantings. Annual monitoring reports are required and are due by November 1. Failure to submit the required monitoring report by the due date may result in an extension of the monitoring period, forfeiture of the financial security and/or enforcement action.
- 28. Extension of the Monitoring Period:** The monitoring period may be extended, at the discretion of DSL, for failure of the site to meet performance standards for the final two consecutive years without corrective or remedial actions (such as irrigation, significant weed/invasive plants treatment or replanting) or when needed to evaluate corrective or remedial actions.

**29. Contents of the Annual Monitoring Report:** The annual monitoring report must include the following information:

- a. Completed Monitoring Report Cover Sheet, which includes permit number, permit holder name, monitoring date, report year, performance standards, and a determination of whether the site is meeting performance standards.
- b. Site location map(s) that clearly shows the impact site and mitigation site boundaries.
- c. Site Plan that clearly shows at least the following:
  - i. The area seeded, with the square foot area listed.
  - ii. The area planted with trees and shrubs, with the square foot area listed.
  - iii. Current tax lot and right-of-way boundaries.
  - iv. Permanent monitoring plot locations that correspond to the data collected and fixed photo-points. These points should be overlaid on the as-built map.
  - v. PEM, PSS, PFO, waterways, riparian areas, and buffer clearly identified separately and the area (square foot or acreage) of each noted.
  - vi. Creation, restoration, enhancement, and preservations areas identified separately, with the square foot area of each listed.
- d. A brief narrative that describes maintenance activities and recommendations to meet success criteria. This includes when irrigation occurred and when the above ground portion of the irrigation system was or will be removed from the site.
- e. Data collected to support the conclusions related to the status of the site relative to the performance standards listed in this permit (include summary/analysis in the report and raw data in the appendix). Data should be submitted using the DSL Mitigation Monitoring Vegetation Spreadsheet or presented in a similar format as described in DSL's Routine Monitoring Guidance for Vegetation.
- f. Photos from fixed photo points (include in the appendix).
- g. Other information necessary or required to document compliance with the performance standards listed in this permit.
- h. A post-construction functional assessment by the end of the monitoring period.

**30. Corrective Action May Be Required:** DSL retains the authority require corrective action in the event the performance standards are not accomplished at any time within the monitoring period.

### **Performance Standards**

**To be deemed successful, the rehabilitation of temporary impacts areas must meet the following performance standards, as determined by DSL:**

**31. Establishment of Permanent Monitoring Locations Required:** Permanent plot locations must be established during the first annual monitoring in sufficient number and locations to be representative of the site. The permanent plot locations must be clearly marked on the ground.

**32. Wetland Acreage Required:** The site will have a minimum acreage as shown in the Acreage and Type table above, as determined by a Wetland Delineation Light with data collected during spring of a year when precipitation has been near normal, vegetation has been established, and irrigation has been removed for at least two years. Acreage must be documented on a printed map and in a GIS shapefile (.shp) including attribute information for each unique wetland polygon identifying the size as well as HGM and Cowardin classes.

### ***Shrub-dominated and Forested Wetlands***

33. **Native Species Cover:** The cover of native species, as defined in the USDA Plants Database, in the herbaceous stratum is at least 60%.
34. **Invasive Species Cover:** The cover of invasive species is no more than 10%. A plant species should automatically be labeled as invasive if it appears on the current Oregon Department of Agriculture noxious weed list, plus known problem species including *Phalaris arundinacea*, *Mentha pulegium*, *Holcus lanatus*, *Anthoxanthum odoratum*, and the last crop plant if it is non-native. Non-native plants should be labeled as such if they are listed as non-native on the USDA Plants Database. Beginning in Year 2 of monitoring, DSL will consider a non-native plant species invasive if it comprises more than 15% cover in 10% or more of the sample plots in any habitat class and increases in cover or frequency from the previous monitoring period. Plants that meet this definition will be considered invasive for all successive years of monitoring. After the site has matured to the stage when desirable canopy species reach 50% cover, the cover of invasive understory species may increase but may not exceed 30%.
35. **Bare Substrate Cover:** Bare substrate represents no more than 20% cover.
36. **Woody Vegetation:** The density of woody vegetation is at least 1,600 live native plants (shrubs) and/or stems (trees) per acre OR the cover of native woody vegetation on the site is at least 50%. Native species volunteering on the site may be included, dead plants do not count, and the standard must be achieved for 2 years without irrigation.
37. **Species Diversity:** By Year 3 and thereafter, there are at least 6 different native species. To qualify, a species must have at least 5% average cover in the habitat class and occur in at least 10% of the plots sampled.
38. **Moisture Prevalence Index:** Prevalence Index total for all strata is <3.0.
39. **Mitigation Bank Credit Purchase:** Mitigation for the unavoidable loss of 0.00029 acres of slope, Palustrine Forested (PFO) wetland has been accomplished via purchase of 0.00062 credits from the WM Butler Wetland Mitigation Bank, per the proof of purchase.

### Monitoring and Reporting Schedule

Report	Requirements	Schedule
Post-Construction	Post-construction report	90 days after completion of revegetation
First Annual Report	Establishment of permanent monitoring locations  Vegetation performance standards  Demonstration that wetland hydrology has been accomplished  Evidence that water rights are secured, or are not required	After one growing season of all proposed plantings
Second Annual Report	Vegetation performance standards	After two growing seasons
Third (or final report if the monitoring period has been extended)	Vegetation performance standards  Actual acreage achieved by HGM and Cowardin class <sup>1</sup> .  Functional assessment <sup>1,2</sup>	After three growing seasons, one "light delineation" should be completed during spring of a year when precipitation has been near normal and no irrigation has been in use during the previous two years

<sup>1</sup>These requirements may be fulfilled any time during the monitoring period but must be received by DSL no later than the fifth annual monitoring.

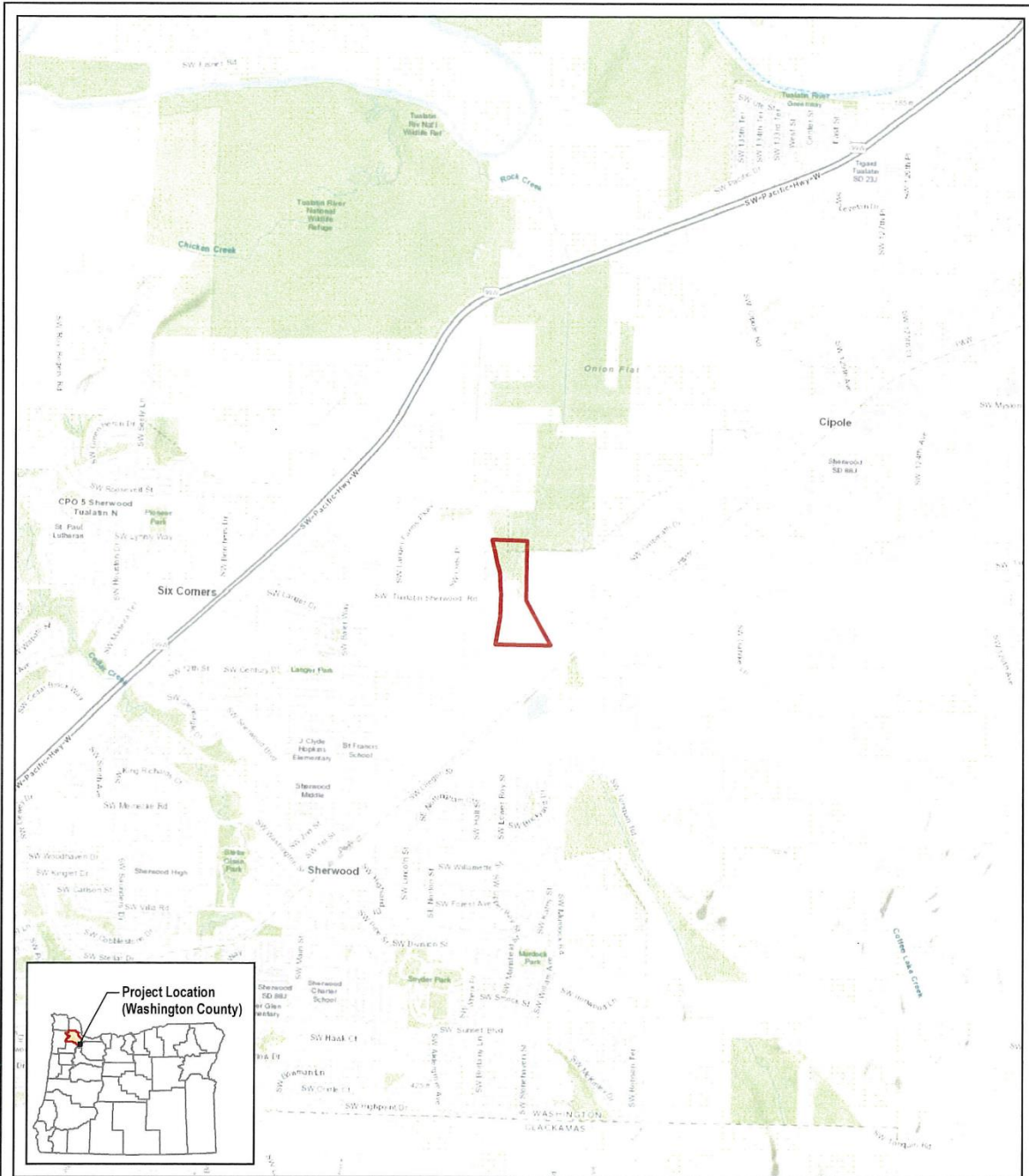
<sup>2</sup>Functional assessments must meet the standards and requirements in OAR 141-085-0685. The same assessment method used for the pre-mitigation site functional assessment should be used for monitoring purposes, unless otherwise approved by DSL.

# ATTACHMENT B


Permit Holder: City of Sherwood

Project Name: Rock Creek Sanitary Trunk Line Upsizing

Maps and Drawings for Removal/Fill Permit No. 62459-RF



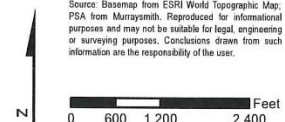
**Figure 1.**  
**Vicinity Map**

 Project Study Area (PSA)

Rock Creek Sanitary Trunk Upsizing Project  
City of Sherwood  
Washington County, Oregon

**MB&G**

Source: Basemap from ESRI World Topographic Map; PSA from MurraySmith. Reproduced for informational purposes and may not be suitable for legal, engineering or surveying purposes. Conclusions drawn from such information are the responsibility of the user.



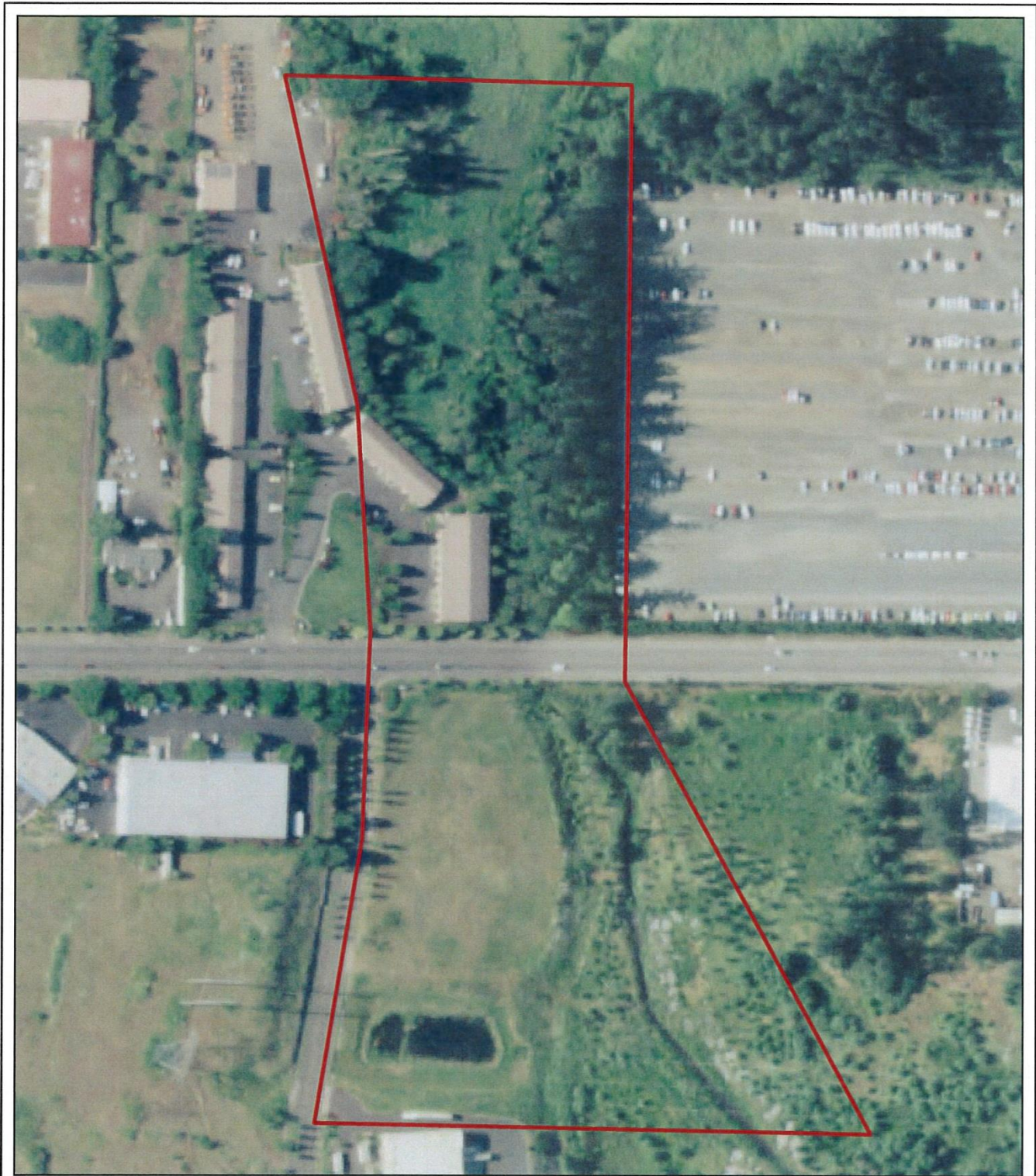



Figure 4.  
Aerial Imagery (NAIP)

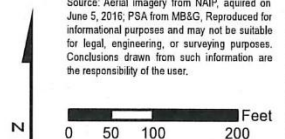
Imagery acquisition date: June 5, 2016

 Project Study Area (PSA)

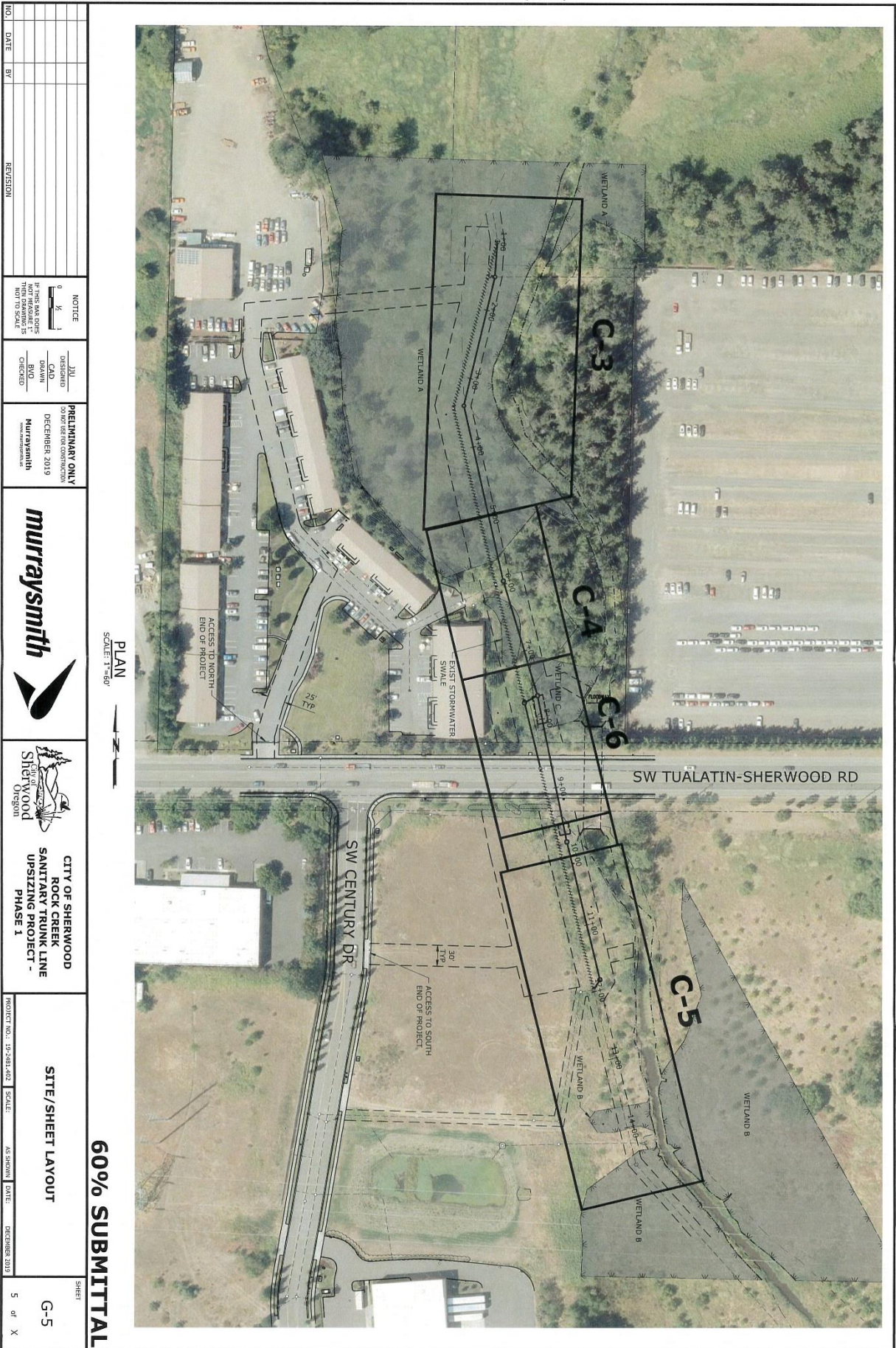
Rock Creek Sanitary Trunk Upsizing Project  
City of Sherwood  
Washington County, Oregon

**MB&G**

Source: Aerial imagery from NAIP, acquired on June 5, 2016, PSA from MB&G. Reproduced for informational purposes and may not be suitable for legal, engineering, or surveying purposes. Conclusions drawn from such information are the responsibility of the user.



G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-G.dwg G-5 12/9/2019 6:07 PM MATT.ESTEP 23.0s (LMS Tech)



NO.	DATE	BY	REVISION

**NOTICE**  
 0 1/2  
 1  
 THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION WITHOUT THE SIGNATURE OF THE DESIGNER.

JUL  
 DESIGNER  
 CAD  
 DRAWN  
 BVD  
 CHECKED

**PRELIMINARY ONLY**  
 50% FOR PERMITS  
 DECEMBER 2019  
 Murraysmith



**CITY OF SHERWOOD**  
 ROCK CREEK  
 SANITARY TRUNK LINE  
 UPSIZING PROJECT -  
 PHASE 1

**SITE/SHEET LAYOUT**

**60% SUBMITTAL**

PROJECT NO.: 19-2481-002 SCALE: AS SHOWN DATE: DECEMBER 2019

SHEET  
 G-5  
 5 of X



CITY OF SHERWOOD ROCK CREEK SANITARY TRUNK UPSIZING PROJECT  
**Wetland and Waters of the State/U.S. Delineation Report**  
Washington County, Oregon

Prepared for:



MurraySmith  
888 SW 5<sup>th</sup> Ave.  
Suite 1170  
Portland, OR 97204



Community Development Division  
Engineering Department  
22560 SW Pine St.  
Sherwood, OR 97140

Prepared by:



Mason, Bruce & Girard, Inc.  
707 SW Washington, Suite 1300  
Portland, OR 97205  
503-224-3445  
[www.masonbruce.com](http://www.masonbruce.com)

September 26, 2019  
(Revised December 12, 2019)

MB&G Project # 0102374

## TABLE OF CONTENTS

<b>A. LANDSCAPE SETTING AND LAND USE .....</b>	<b>1</b>
A.1 SOILS .....	1
A.1.1 Aloha Silt Loam (Map Unit 1) .....	2
A.1.2 Briedwell stony silt loam, 0 to 7 percent slopes (Map Unit 5B).....	2
A.1.3 Cove clay (Map Unit 14) .....	2
A.1.4 Labish mucky clay (Map Unit 27).....	2
A.1.5 Quatama loam, 0 to 3 percent slopes (Map Unit 37A).....	2
A.1.6 Quatama loam, 3 to 7 percent slopes (Map Unit 37B).....	2
A.1.7 Quatama loam, 7 to 12 percent slopes (Map Unit 37C).....	3
A.1.8 Wapato silty clay loam (Map Unit 43).....	3
A.2 VEGETATION.....	3
A.2.1 Disturbed/Maintained Upland Community.....	3
A.2.2 Palustrine Emergent (PEM) Wetland Community .....	3
A.2.3 Palustrine Scrub-Shrub (PSS) Wetland Community .....	4
A.2.4 Palustrine Forested (PFO) Wetland Community.....	4
A.2.5 Upland Riparian Forest Community.....	4
<b>B. SITE ALTERATIONS.....</b>	<b>4</b>
<b>C. PRECIPITATION DATA AND ANALYSIS .....</b>	<b>5</b>
<b>D. METHODS .....</b>	<b>5</b>
<b>E. DESCRIPTION OF WETLANDS AND WATERWAYS.....</b>	<b>7</b>
E.1 WETLAND A.....	7
E.2 WETLAND B.....	7
E.3 WETLAND C.....	8
E.4 SMALL POND.....	8
E.5 STORMWATER POND.....	8
E.6 STORMWATER SWALE .....	9
E.7 ROCK CREEK.....	9
<b>F. DEVIATION FROM LOCAL OR NATIONAL WETLAND INVENTORY.....</b>	<b>10</b>
<b>G. MAPPING METHOD.....</b>	<b>10</b>
<b>H. ADDITIONAL INFORMATION.....</b>	<b>10</b>
<b>I. RESULTS AND CONCLUSIONS.....</b>	<b>10</b>
<b>J. DISCLAIMER.....</b>	<b>11</b>

## FIGURES

<b>Figure 1.</b>	Vicinity Map .....	Appendix A
<b>Figure 2.</b>	Tax Lot Map .....	Appendix A
<b>Figure 3.</b>	National and Local Wetland Inventories (NWI and LWI) Map .....	Appendix A
<b>Figure 4.</b>	Soils Map .....	Appendix A
<b>Figure 5.</b>	Aerial Imagery (NAIP) .....	Appendix A
<b>Figure 6.</b>	Wetland and Waters Map .....	Appendix A

## TABLES

<b>Table 1.</b>	Soil Map Units and Hydric Ratings within the PSA .....	1
<b>Table 2.</b>	Summary of Precipitation from October 1, 2018, to May 22, 2019, at Sherwood, OR. ....	5

## APPENDICES

<b>Appendix A</b>	Figures
<b>Appendix B</b>	Wetland Determination Data Forms
<b>Appendix C</b>	Ground Level Color Photographs
<b>Appendix D</b>	Additional Tables and Information: Concurrence Letter WD2013-0108 Concurrence Letter WD2012-0041 Stormwater Pond Timeline Stormwater Swale Timeline Precipitation Data
<b>Appendix E</b>	Literature Citations

## A. LANDSCAPE SETTING AND LAND USE

The 18.72-acre Project Study Area (PSA) for the Rock Creek Sanitary Trunk Upsizing Project is located within the City of Sherwood in Washington County, Oregon, on both the north and south sides of SW Tualatin-Sherwood Road, east of SW Century Drive, and west of SW Gerda Lane (Figure 1, Appendix A). The PSA is mostly comprised of floodplain and old terraces associated with Rock Creek in the Rock Creek Watershed (6<sup>th</sup> Field Hydrologic Unit Code [HUC 6] 170900100501). There is an existing trunk sewer line that generally runs north-south along the west side of the existing ditched channel for Rock Creek.

Existing land use within the 18.72-acre PSA primarily consists of private, undeveloped/unmanaged land and SW Tualatin-Sherwood Road right-of-way (ROW). The Rock Creek floodplain likely has been used for farming in the past. The PSA also contains patches of what appear to be old mitigation plantings on both sides of Rock Creek south of SW Tualatin-Sherwood Road and near the northwest corner of the PSA. The floodplain and lower terrace areas contain wetlands, and the riparian area of Rock Creek near SW Tualatin-Sherwood Road and north of the road contain upland forest communities dominated by Douglas-fir (*Pseudotsuga menziesii*). Additionally, there is a large stormwater pond at the southwest corner of the PSA which discharges to Rock Creek, a stormwater swale north of SW Tualatin-Sherwood Road that drains into Rock Creek, and overhead power lines that cross the creek perpendicularly (east-west) at the south end of the PSA. Mason, Bruce & Girard, Inc. (MB&G) observed some pruning of willows and vegetation maintenance within the powerline ROW.

Elevations within the PSA range between 120 and 165 feet above mean sea level (AMSL). The topography is generally flat, gently sloping down from the south-to-north and toward Rock Creek, with a terrace of higher elevation land along the west side of the PSA that moderately slopes east down to the Rock Creek floodplain.

### A.1 Soils

The National Resource Conservation Service’s (NRCS) Soil Survey of Washington County indicates eight soil map units within the PSA (Green 1982, USDA 2019) (Figure 4, Appendix A). These soils map units are listed in Table 1 with their corresponding hydric ratings and drainage classes.

**Table 1. Soil Map Units and Hydric Ratings within the PSA.**

Map Unit Number	Map Unit Name	Hydric Rating*	Drainage Class
1	Aloha silt loam	Non-hydric	Somewhat poorly drained
5B	Briedwell stony silt loam, 0 to 7 percent slopes	Non-hydric	Well drained
14	Cove clay	Hydric	Poorly drained
27	Labish mucky clay	Hydric	Poorly drained
37A	Quatama loam, 0 to 3 percent slopes	Non-hydric	Moderately well drained
37B	Quatama loam, 3 to 7 percent slopes	Non-hydric	Moderately well drained
37C	Quatama loam, 7 to 12 percent slopes	Non-hydric	Moderately well drained
43	Wapato silty clay loam	Hydric	Poorly drained

\* A soil map unit is considered non-hydric if <66 percent of its composite soils are non-hydric; a map unit is considered hydric if ≥66 percent of its composite soils are hydric.

#### ***A.1.1 Aloha Silt Loam (Map Unit 1)***

Map Unit (MU) 1 is a non-hydric, somewhat poorly drained soil that formed from alluvium or lacustrine silt on broad valley terraces. MU 1 usually occurs between 150 to 200 feet AMSL where slopes are 0 to 3 percent. A typical soil profile has an 8-inch thick surface layer of dark-brown silt loam, underlain by 38 inches of dark to yellowish-brown, mottled silt loam, and a 19-inch thick substratum of dark yellowish-brown mottled silt loam and very sandy loam. Runoff is slow for MU 1 soils, and the erosion hazard is slight.

#### ***A.1.2 Briedwell stony silt loam, 0 to 7 percent slopes (Map Unit 5B)***

MU 5B is a non-hydric, well-drained soil that formed where silt deposits occurred over gravelly alluvium on old valley terraces. MU 5B usually occurs between 200 and 320 feet AMSL where slopes are 0 to 7 percent. A typical soil profile has a 12-inch thick surface layer comprised of dark-brown silt loam, with about 14 inches of dark-brown clay loam below that, and a 34-inch thick substratum of dark brown, very gravelly clay loam. Runoff is slow for MU 5B soils, and the erosion hazard is slight.

#### ***A.1.3 Cove clay (Map Unit 14)***

MU 14 is a hydric, poorly drained soil that formed on floodplains in recent alluvium with high clay content. MU 14 usually occurs between 150 and 300 feet AMSL in flat areas (0-2 percent slopes). A typical soil profile has an 8-inch thick surface layer of very dark grey mottled silty clay loam, with 32 inches of very dark grey mottled and gleyed clay below that, and a 20 (or more)-inch thick substratum of very dark grey clay. Runoff is slow for MU 14 soils, and the erosion hazard is slight.

#### ***A.1.4 Labish mucky clay (Map Unit 27)***

MU 27 is a hydric, poorly drained soil that formed in mixed alluvial and lacustrine materials with high amounts of organic content and, as a result, may contain stratified lenses of peat or muck. MU 27 usually occurs between 100 to 200 feet AMSL in flat areas (0-1 percent slopes). A typical soil profile has a 13-inch thick surface layer of black mucky clay, with about 23 inches of black clay below that, and a 24-inch substratum of buried organic material. Runoff is slow, and there is a potential for ponding. Erosion hazard is slight.

#### ***A.1.5 Quatama loam, 0 to 3 percent slopes (Map Unit 37A)***

MU 37A is a moderately well drained, non-hydric soil that developed on old terraces in mixed loamy alluvium. MU 37 is usually found between 140 and 200 feet AMSL in flat areas (0-3 percent slopes). A typical soil profile consists of a 9-inch thick surface layer of dark brown loam, with 34 inches of yellowish-brown loam and clay loam below that, and a 19-inch thick substratum of dark yellowish-brown loam. Runoff is slow, and the erosion hazard is slight.

#### ***A.1.6 Quatama loam, 3 to 7 percent slopes (Map Unit 37B)***

MU 37B soils exhibit the same components as MU 37A soils, except that they occur on 3-7 percent slopes and the erosion hazard is moderate.

### **A.1.7 Quatama loam, 7 to 12 percent slopes (Map Unit 37C)**

MU 37C soils exhibit the same components as MU 37A soils, except that they occur on 7-12 percent slopes, runoff is medium, and the erosion hazard is severe.

### **A.1.8 Wapato silty clay loam (Map Unit 43)**

MU 43 is a hydric, poorly drained soil that formed in recent alluvium on floodplains. MU 43 is usually found between 100 and 300 feet AMSL in flat areas (0-3 percent slopes). A typical soil profile consists of a 14-inch thick surface layer of very dark greyish-brown silty clay loam, with dark greyish-brown silty clay loam below that in both the mid- and substratum to a depth of about 42 inches. Runoff is slow, it may pond for short periods in the winter, and the hazard for erosion is slight.

## **A.2 Vegetation**

The PSA contains five vegetation communities: disturbed/maintained upland, palustrine emergent (PEM) wetland, palustrine scrub-shrub (PSS), palustrine forested (PFO), and upland riparian forest. Dominant plant species within each community are listed below. These lists do not constitute a complete inventory of plant species within each community but are presented to convey the differences in vegetation between the communities identified during the field investigation. Wetland indicator statuses assigned by the US Army Corps of Engineers (USACE) have been included with all plant species listed within this report (Lichvar 2016). Assuming natural conditions: obligate wetland (OBL) species almost exclusively occur in wetlands; facultative wetland (FACW) species primarily occur in wetlands but are occasionally found in uplands; facultative (FAC) species have an equal estimated probability of occurring in wetlands or uplands; facultative upland (FACU) species primarily occur in uplands but are occasionally found in wetlands; and upland (UPL) species almost exclusively occur in uplands.

### **A.2.1 Disturbed/Maintained Upland Community**

This community occurs primarily in the following areas: 1) the terrace in the southwest portion of the PSA (south of SW Tualatin-Sherwood Road, west of Rock Creek, and north of a stormwater treatment pond), 2) the slopes along the western edge of the Rock Creek floodplain, and 3) within the SW Tualatin-Sherwood Road ROW. Dominant vegetation in this community includes colonial bentgrass (*Agrostis capillaris*, FAC), brome species (*Bromus* spp., FACU, estimated), field meadow-foxtail (*Alopecurus pratensis*, FAC), vetch species (*Vicia* sp., FACU, estimated), and Himalayan blackberry (*Rubus Armeniacus*, FAC). Field investigators also observed some areas with Oregon ash trees (*Fraxinus latifolia*, FACW) that appeared to be enhancement/mitigation plantings. Lastly, the terrace in the southwest portion of the PSA contained traces of rush species, reed canarygrass (*Phalaris arundinacea*, FACW), and other FAC and FACW species. As discussed later, this terrace is drained by the constructed stormwater pond in the southwest corner of the PSA that is deeply incised into the terrace formation.

### **A.2.2 Palustrine Emergent (PEM) Wetland Community**

The PEM wetland community occurs throughout most of the Rock Creek floodplain within the PSA, north and south of SW Tualatin-Sherwood Road. This community is dominated primarily by reed canarygrass with lesser amounts of field meadow-foxtail, fowl blue grass (*Poa palustris*, FAC), garden bird's-foot-trefoil (*Lotus corniculatus*, FAC), common velvetgrass (*Holcus lanatus*, FAC), lamp rush (*Juncus effusus*, FACW), white clover (*Trifolium repens*, FAC), and piggyback plant (*Tolmiea menziesii*, FAC). This

community also has occasional occurrences of black hawthorn (*Crataegus douglasii*, FAC) and English hawthorn (*C. monogyna*, FAC).

### **A.2.3 Palustrine Scrub-Shrub (PSS) Wetland Community**

The PSS wetland community occurs along the outer fringe of PEM on the north side of SW Tualatin-Sherwood Road, and within the southeast portion of the PSA. Dominant midstory vegetation includes Oregon ash, Pacific ninebark (*Physocarpus capitatus*, FACW), Himalayan blackberry, oso-berry (*Oemleria cerasiformis*, FACU), Pacific willow (*Salix lucida*, FACW), and Sitka willow (*S. sitchensis*, FACW). Dominant understory vegetation includes stinging nettle (*Urtica dioica*, FAC), three-petal bedstraw (*Galium trifidum*, FACW), and pacific waterleaf (*Hydrophyllum tenuipes*, FAC).

### **A.2.4 Palustrine Forested (PFO) Wetland Community**

The PFO wetland community occurs primarily along the west side of Rock Creek in the riparian fringe, north of SW Tualatin-Sherwood Road. The dominant species in the overstory was Oregon ash, with big-leaf maple (*Acer macrophyllum*, FACU), Oregon white oak (*Quercus garryana*, FACU), Douglas-fir (FACU), and Pacific willow present to a lesser degree. Dominant species in the midstory include vine maple (*A. circinatum*, FAC), Himalayan blackberry, and Pacific ninebark.

### **A.2.5 Upland Riparian Forest Community**

This community occurs primarily north of SW Tualatin-Sherwood Road and east of Rock Creek. Dominant overstory species include Douglas-fir and Oregon white oak, with a midstory of snowberry (*Symphoricarpos albus*, FACU), colt's foot (*Tussilago farfara*, FACU), and English ivy (*Hedera helix*, FACU).

## **B. SITE ALTERATIONS**

Much of the soils in the PSA have been historically disturbed. Disturbances may include plowing, tree clearing, construction of commercial buildings and SW Tualatin-Sherwood Road, and construction of the existing sewer line. Rock Creek appears to have been straightened and channelized throughout most, if not all of the PSA. The PSA south of SW Tualatin-Sherwood Road and adjacent lands have had much development and associated disturbances to vegetation, soils, and hydrology. Vegetation within the SW Tualatin-Sherwood Road ROW is actively mowed and maintained, and aerial photography from July 2004 shows most of the PSA south of SW Tualatin-Sherwood Road as being mowed; also, much of the southern portion of the PSA appeared to have been enhanced with plantings (per July 2008 imagery) (Google Earth 2019). SW Century Drive was constructed along the west side of the PSA, south of SW Tualatin-Sherwood Road, followed by a stormwater detention pond in the southwest corner of the PSA that discharges into Rock Creek and commercial development south of that. The stormwater detention pond was under construction in July 2007 (Google Earth 2019). The PSA north of SW Tualatin-Sherwood Road appears to have been left unmanaged by its private owner and is now occupied by nonnative plant communities, primarily reed canarygrass and Himalayan blackberry.

## C. PRECIPITATION DATA AND ANALYSIS

In Washington County, most of the annual precipitation falls between November and April. The spring, fall, and winter months are cool and wet, and the summer months are typically warm and dry. The climate for the region is influenced by the Pacific Ocean and the Coast Range to the west and the Cascade Mountains to the east (Green 1982). The Forest Grove Weather Station, located approximately 20 miles northwest of the PSA, is the closest National Weather Service cooperative station with enough historical climate data (from 1989 to 2019) to produce Climate Analysis for Wetlands Tables (also known as WETS Tables). According to the WETS Table for the Forest Grove Weather Station, annual precipitation totals in the area average approximately 45 inches (Appendix D) (NOAA 2019).

The field investigation was conducted during the growing season as documented by the WETS table for Forest Grove, Oregon (NOAA 2019), and as evidenced by the observation of above-ground growth and development of herbaceous and woody plants. MB&G scientists compared the daily precipitation records at the Sherwood 2.0 NW weather station (Appendix D) (NOAA 2019) to the Forest Grove WETS data using the NRCS' Rainfall Documentation Worksheet from Hydrology Tools for Wetland Identification and Analysis (NRCS 2015) to determine if precipitation prior to the field investigation on May 23-24, 2019, was within the normal range. Precipitation amounts for the three months preceding the field investigation (March, April, and May 1-22) were below, above, and within the normal precipitation range, respectively (Table 2), and were within the normal range collectively, scoring a 13 on a scale of 1-18 used by the NRCS' Hydrology Tool (Appendix D). During the 7-day and 14-day periods prior to the field investigation, precipitation was above the normal range, whereas precipitation levels for the 2019 Water Year were within the normal range (Table 2). Additionally, 0.12 inch of precipitation was recorded during the two-day (May 23-24) field investigation (Appendix D) (Menne et al. 2012).

**Table 2. Summary of Precipitation from October 1, 2018, to May 22, 2019, at Sherwood, OR.**

Category	February	March	April	May 1-22	7 Days Prior	14 days Prior	Water Year Totals <sup>1</sup>
Recorded Precipitation (inches) <sup>2</sup>	4.31	2.28	5.07	1.53	1.37	1.53	34.86
30-70% Normal Range (inches) <sup>3</sup>	2.98-6.54	3.48-5.94	2.26-3.86	0.76-1.86	0.24-0.59	0.48-1.18	26.40-49.32
Comparison to Normal Range	Within	Below	Above	Within	Above	Above	Within

<sup>1</sup> Water Year from October 1, 2018, to May 22, 2019.

<sup>2</sup> Daily precipitation totals from Sherwood 2.0 NW weather station (Menne et al. 2012).

<sup>3</sup> From Forest Grove, Oregon, WETS Table 1989-2018 (NOAA 2019).

## D. METHODS

The methodology used for determining the presence of wetlands and delineating wetland boundaries followed the U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region Version 2.0* (Regional Supplement) (USACE 2010). Hydric



soil indicators were defined in the field using *Field Indicators of Hydric Soils in the United States, Version 8.2* (NRCS 2018).

Potential wetlands were identified prior to the field investigations using the U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle map for Sherwood, OR (USGS 2017); the Local Wetland Inventory (LWI) for the City of Sherwood (DEA 1992) (Figure 3, Appendix A); US Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) data (USFWS 2019) (Figure 3, Appendix A); Soil Survey of Washington County, Oregon (Green 1982, USDA 2019) (Figure 4, Appendix A); aerial photographs from the National Agricultural Imagery Program aerial photography (NAIP 2016); and previous wetland delineations (Pacific Habitat Services 2013 and SWCA 2012) (Appendix D).

Sample plots (SPs) were analyzed in the field to determine the location of wetland boundaries. Vegetation species within each SP were identified, and their wetland indicator statuses recorded in order to determine if hydrophytic vegetation species were present. The most current common and scientific nomenclature for plant species and their associated wetland indicator statuses were identified using the 2016 USACE National Wetland Plant List for the Western Mountains, Valleys, and Coasts Region (Lichvar 2016). If a plant species could not be fully identified to species level (e.g., *Poa* sp.), its indicator status was estimated based on either the status of other species in the same genus or the status of other identifiable species growing in its vicinity.

Wetland delineation data forms from the USACE were used to record soils, vegetation, and hydrology data at 19 SPs located within the PSA (Appendix B). In SPs located along slopes (often near the wetland/upland boundary), the plot area for vegetation analysis was extended along elevation contours (instead of within a typical circular plot) to better reflect the vegetation community associated with the landscape position. Wetland determination data forms are provided in Appendix B; ground level photographs of representative site conditions are provided in Appendix C; and the locations of SPs and delineated wetlands and waters are presented in Figure 6, Appendix A.

MB&G biologists attempted to examine soils at each representative plot to a minimum depth of 16 inches or immediately below observations of positive hydric soil indicators. Soil colors were determined using the Munsell Color Charts (Munsell 2000).

Sample plots and wetland boundaries were flagged in the field and surveyed by professional surveyors with submeter accuracy. All wetlands were classified according to the USFWS's *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979) and the Hydrogeomorphic (HGM) Classification system (Adamus 2001). The anticipated jurisdictional status for delineated wetlands was determined using the Oregon Department of State Lands' (DSL's) Oregon Administrative Rule (OAR) 141-085 Sections 0510 & 0515 (DSL 2019), USACE's Rapanos Guidance (USACE 2008), and the 2015 Definition of Waters of the U.S. (40 CFR 230.3, Guidelines for Specification of Disposal Sites for Dredged or Fill Material 2015).

The ordinary high water mark (OHWM) of Rock Creek was identified in the field according to 33 CFR Sections 328.3(e) and 329.11(a), and OAR 141-085 Section 0515(3). Field indicators included an abrupt change in topography and a sudden transition to stunted or missing vegetation immediately before the observed water surface (Rock Creek flows within a low-gradient, straightened channel through the PSA). Therefore, due to the nearly vertical banks of its excavated channel, the OHWM of Rock Creek was

delineated using the top of bank as determined by a full topographic survey of the PSA conducted by professional land surveyors with submeter accuracy.

## **E. DESCRIPTION OF WETLANDS AND WATERWAYS**

Five wetlands (Wetland A, Wetland B, Wetland C, Small Pond, Stormwater Pond, and Stormwater Swale) and one perennial stream (Rock Creek) were documented within the PSA during the site investigation on May 23<sup>rd</sup> and May 24<sup>th</sup>, 2019. The location, extent, characteristics, and wetland indicators are described for each feature below. Additionally, Figure 6 (Appendix A) shows the locations of these features and the locations of photo points (PPs) and SPs within the PSA. Wetland data forms are available in Appendix B, and photos are included in Appendix C.

### **E.1 Wetland A**

Wetland A is a Riverine-Impounding feature located north of SW Tualatin-Sherwood Road and is largely comprised of PEM wetland, with areas of PSS and PFO wetland on its outer fringes (Figure 6, Appendix A). Wetland A extends beyond the PSA to the north. See sections A.2.2, A.2.3, and A.2.4 above for respective lists of vegetation within the PEM, PSS, and PFO portions of Wetland A. Hydrology within this wetland is primarily supplied by lateral flows from Rock Creek during the wet season, and an elevated water table associated with Wetland A's location within the Rock Creek floodplain. Stream hydrology is also backed-up and spread over the floodplain during high flows due to several small beaver dams. Secondary sources of hydrology include direct precipitation and stormwater runoff from surrounding upland-area point sources.

The boundaries of Wetland A are based on data collected at multiple paired wetland and upland SPs: wetland SP-11 and upland SP-10 (photos 12 and 13, Appendix C); wetland SP-12 and upland SP-13 (photos 14 and 15, Appendix C); and wetland SP-15 and upland SP-14 (photos 16 and 17, Appendix C). Wetland A is likely jurisdictional to the DSL pursuant to OAR 141-085-0515(4) (DSL 2019) and is likely jurisdictional to the USACE due to its adjacency to Rock Creek, a perennial tributary to a traditional navigable water (USACE 2008).

### **E.2 Wetland B**

Wetland B is a Riverine Impounding feature located south of SW Tualatin-Sherwood Road that is mostly comprised of PEM wetland with areas of PSS wetland on its southern and eastern edges (Figure 6, Appendix A). Wetland B extends beyond the PSA to the south. See sections A.2.2 and A.2.3 above for respective lists of vegetation within the PEM and PSS portions of Wetland B. Hydrology within Wetland B primarily comes from a seasonally elevated water table associated with Wetland B's location within the Rock Creek floodplain, and from direct precipitation. Also, several small beaver dams and debris jams back up hydrology and spread flow across the floodplain during high flow events. Secondary inputs of hydrology for Wetland B include stormwater runoff from upslope areas

The boundary of Wetland B is based on data collected at two paired wetland and upland SPs: wetland SP-5 and upland SP-6 (photo 7, Appendix C) and wetland SP-7 and upland SP-8 (photos 8 and 9, Appendix C). Wetland B is likely jurisdictional to the DSL pursuant to OAR 141-085-0515(4) (DSL 2019), and it is

likely jurisdictional to the USACE due to its adjacency to Rock Creek, a perennial tributary to a traditional navigable water (USACE 2008).

### E.3 Wetland C

Wetland C is a Slope-Class, PFO wetland located north of SW Tualatin Sherwood Road and south of Wetland A, between the upland terrace to the west and Rock Creek to the east (Figure 6, Appendix A). See section A.2.3 and A.2.4 for respective lists of midstory and upperstory vegetation within Wetland C. Hydrology within Wetland C is primarily supplied by upgradient sources and from a seasonally elevated water table associated with Rock Creek. Secondary sources of hydrology include direct precipitation.

The boundary of Wetland C is based on data collected at one set of paired plots: wetland SP-16 and upland SP-17 (photos 18 and 19, Appendix C). Wetland C is likely jurisdictional to the DSL pursuant to OAR 141-085-0515(4) (DSL 2019), and it is likely jurisdictional to the USACE due to adjacency to Rock Creek, a perennial tributary to a traditional navigable water (USACE 2008).

### E.4 Small Pond

Small Pond is a Depressional-Class, lacustrine, limnetic, unconsolidated mud-bottom, permanently flooded (L1UB3H) wetland feature located in the southwest portion of Wetland A (Figure 6, Appendix A). Small Pond is a depression within the Rock Creek floodplain that accumulates groundwater; it was likely excavated at some point in the past and has since been abandoned (photo 23, Appendix C). The primary source of hydrology for Small Pond is groundwater from the surrounding Rock Creek floodplain, and seasonal lateral flow from Rock Creek during high-flow events in the wet season. Secondary sources of hydrology include precipitation and stormwater drainage from development on the upland terrace to the west.

The boundary of Small Pond was delineated using the break in slope as determined by a full topographic survey of the PSA conducted by professional land surveyors with submeter accuracy, and was corroborated using a light detection and ranging (LiDAR)-derived Digital Elevation Model (DEM) of the PSA and surrounding area. Small Pond is likely jurisdictional to the DSL, pursuant to OAR 141-085-0515(4) (DSL 2019), and it is likely jurisdictional to the USACE due to its adjacency to Rock Creek, a perennial tributary to a traditional navigable water (USACE 2008).

### E.5 Stormwater Pond

Stormwater Pond is a Depressional-Class, excavated, artificially flooded, palustrine, aquatic bed with rooted vascular plants (PAB3Kx) wetland feature that was constructed in the southwest corner of the PSA to detain stormwater piped in under SW Century Drive from the west as well as impervious surface associated with a commercial development immediately south of the PSA (Figure 6, Appendix A). The vegetation community surrounding Stormwater Pond is comprised of species listed in section A.2.2, but with only trace amounts of reed canarygrass, and a prevalence of *Rorippa* sp. (OBL) aquatic vegetation; the perimeter is planted with shrubs including Pacific willow, rose species (*Rosa*, sp., FAC, estimated), and spiraea (*Spiraea douglasii*, FACW) (photo 5, Appendix C). Stormwater Pond appears to have been constructed in 2007 on the terrace west of the Rock Creek floodplain (Google Earth 2019) (Stormwater Pond Timeline, Appendix D). Hydrology for Stormwater Pond primarily comes from the connected stormwater drainage system and groundwater from surrounding upland; MB&G observed water seeping in from the uphill side of both the wetland SP and the upland SP. The only secondary hydrology source

is precipitation. This feature is constructed on a terrace such that groundwater likely drains to the Rock Creek floodplain below and to the east of it. Stormwater Pond has a point source discharge to Rock Creek (photo 6, Appendix C). This pond is deeply excavated into the general terrace formation and likely has a draining effect on the entire terrace.

The boundary of Stormwater Pond is based on data collected at one set of paired plots: wetland SP-3 and upland SP-4 (photo 4, Appendix C). Stormwater Pond is likely jurisdictional to the DSL as it was likely created from wetland (per the 1992 LWI by DEA), pursuant to OAR 141-085-0515(6)(b) (DSL 2019). It is also likely that Stormwater Pond would be jurisdictional to the USACE pursuant to 33 CFR 328.3(5) as it has a significant nexus with Rock Creek, which is a tributary of Tualatin River, a traditional navigable water (USACE 2008).

## E.6 Stormwater Swale

Stormwater Swale is a stormwater biofiltration feature (artificially created wetland) that was constructed as part of the business park on the terrace along the west side of the Rock Creek floodplain, about 125 feet north of SW Tualatin-Sherwood Road (Figure 6, Appendix A). It is a Depressional-Class, artificially flooded, excavated, artificial PSS wetland (PSSKrx) feature. Stormwater Swale is surrounded by a chain-link fence. Based on observations from outside of the fence, the vegetation community includes Oregon ash, Himalayan blackberry, red osier dogwood (*Cornus alba*, FACW), vetch species (*Vicia* sp., FAC, estimated), red alder (*Alnus rubra*, FAC), and some broad-leaf cattail (*Typha latifolia*, OBL) (photos 21 and 21, Appendix C). The primary source of hydrology for Stormwater Swale is the stormwater drainage system of the business park that it is a part of. The only secondary source of hydrology for Stormwater Swale is precipitation. Stormwater Swale appears to have been constructed in 2002 on the upland terrace west of the Rock Creek floodplain (Google Earth 2019) (Stormwater Swale Timeline, Appendix D).

Stormwater Swale is likely not within the jurisdiction of the DSL as it was artificially created entirely from upland for the purpose of stormwater detention, pursuant to OAR 141-085-0515(7)(c) (DSL 2019). Stormwater Swale is also not likely to be jurisdictional to the USACE as it is a swale with no clear nexus to Rock Creek (USACE 2008).

## E.7 Rock Creek

Rock Creek is a perennial tributary to the Tualatin River that flows north through the PSA (Figure 6, Appendix A). MB&G's field observations indicate that Rock Creek is a riverine, lower perennial, unconsolidated bottom (R2UB) waters feature that shares a boundary with Wetlands A and B in some reaches and extends outside of the PSA to the north and south (Figure 6, Appendix A). The OHWM of Rock Creek was delineated using the top of bank as determined by a full topographic survey of the PSA conducted by professional land surveyors with submeter accuracy. During the field investigation (May 23-24, 2019), the average width of the channel was 21 feet and 23 feet north and south of SW Tualatin-Sherwood Road, respectively.

The riparian area of Rock Creek north of SW Tualatin-Sherwood Road is predominantly forested with species listed in sections A.2.4 and A.2.5 above. The riparian area of Rock Creek south of SW Tualatin-Sherwood Road is generally dominated by reed canarygrass, becoming more forested and shrub-

dominated as it approaches the road. MB&G Biologists observed active beaver dams in the channel both north and south of SW Tualatin-Sherwood Road (photo 26, Appendix C).

Hydrology for Rock Creek within the PSA is primarily provided by upgradient in-stream flow and seasonal hyporheic flow from surrounding upslope areas. Secondary sources of hydrology for Rock Creek include precipitation and stormwater point sources such as the one shown in Photo 6 (Attachment C). Rock Creek is a perennial tributary of the Tualatin River, a traditional navigable water. Therefore, Rock Creek is likely jurisdictional to the DSL pursuant to OAR 141-085-0515(3) (DSL 2019), and it is likely jurisdictional to the USACE pursuant to 33 CFR 328.3(a)(5).

## **F. DEVIATION FROM LOCAL OR NATIONAL WETLAND INVENTORY**

The Sherwood LWI (DEA 1992) documents two wetlands within the PSA north of SW Tualatin-Sherwood Road and two wetlands within the PSA south of the road; and the NWI (USFWS 2019) only shows two linear wetland features (Figure 3, Appendix A). A linear portion of Wetland A that is coincident with Rock Creek is identified in the NWI as a seasonally flooded, broadleaved deciduous PFO (PFO1C) wetland in the north, and as a seasonally flooded, persistent, excavated PEM (PEM1Cx) wetland in the south (Figure 3, Appendix A). Additionally, parts of Wetland A are identified in the LWI as seasonally flooded PEM (PEMC) wetland, and as seasonally flooded PFO (PFOC) wetland (Figure 3, Appendix A). A linear portion of Wetland B that is coincident with Rock Creek is identified in the NWI as a PEM1Cx wetland, and the LWI identifies most of Wetland B as an excavated PFOC (PFOCx) wetland and a PEMC wetland. The LWI identifies most of Wetland C as a PFOC wetland. The NWI identifies Rock Creek as both a PEM1Cx wetland and a PFO1C wetland within the PSA.

## **G. MAPPING METHOD**

Wetland boundaries and SPs were flagged in the field by MB&G Biologists. Professional land surveyors then surveyed each flag with an estimated accuracy of  $\pm 0.2$  feet. MB&G used the top of bank from the full topographic survey of the PSA to delineate and map the OHWM of Rock Creek.

## **H. ADDITIONAL INFORMATION**

Two previous wetland delineations have been recorded within the PSA (Christine Stevenson, pers. comm., Jurisdictional Coordinator, DSL; May 7, 2019). Both previous delineations (WD2013-0108 and WD2012-0041) are included in Attachment D. Also included in Attachment D are aerial photography timelines from Google Earth showing Stormwater Pond and Stormwater Swale before, during, and after construction.

## **I. RESULTS AND CONCLUSIONS**

Based upon the results of the site investigation conducted on May 23<sup>rd</sup> and 24<sup>th</sup>, 2019, MB&G delineated the OHWM for one perennial stream (Rock Creek) and five wetlands: Wetland A (3.53 acres); Wetland

B (2.99 acres); Wetland C (0.16 acre); Small Pond (0.10 acre); Stormwater Pond (0.35 acre); and Stormwater Swale (0.07 acre) within the 18.72-acre PSA. All wetlands and waters delineated and described in this report except for Stormwater Swale will likely be jurisdictional to both the DSL and the USACE. Stormwater Swale will likely not be regulated by the DSL or the USACE.

## **J. DISCLAIMER**

This report documents the investigation, best professional judgment and conclusions of the investigator. It is correct and complete to the best of my knowledge. It should be considered a Preliminary Jurisdictional Determination of wetlands and other waters and used at your own risk unless it has been reviewed and approved in writing by the Oregon Department of State Lands in accordance with OAR 141-090-0005 through 141-090-0055.

## APPENDIX A

---

### Figures

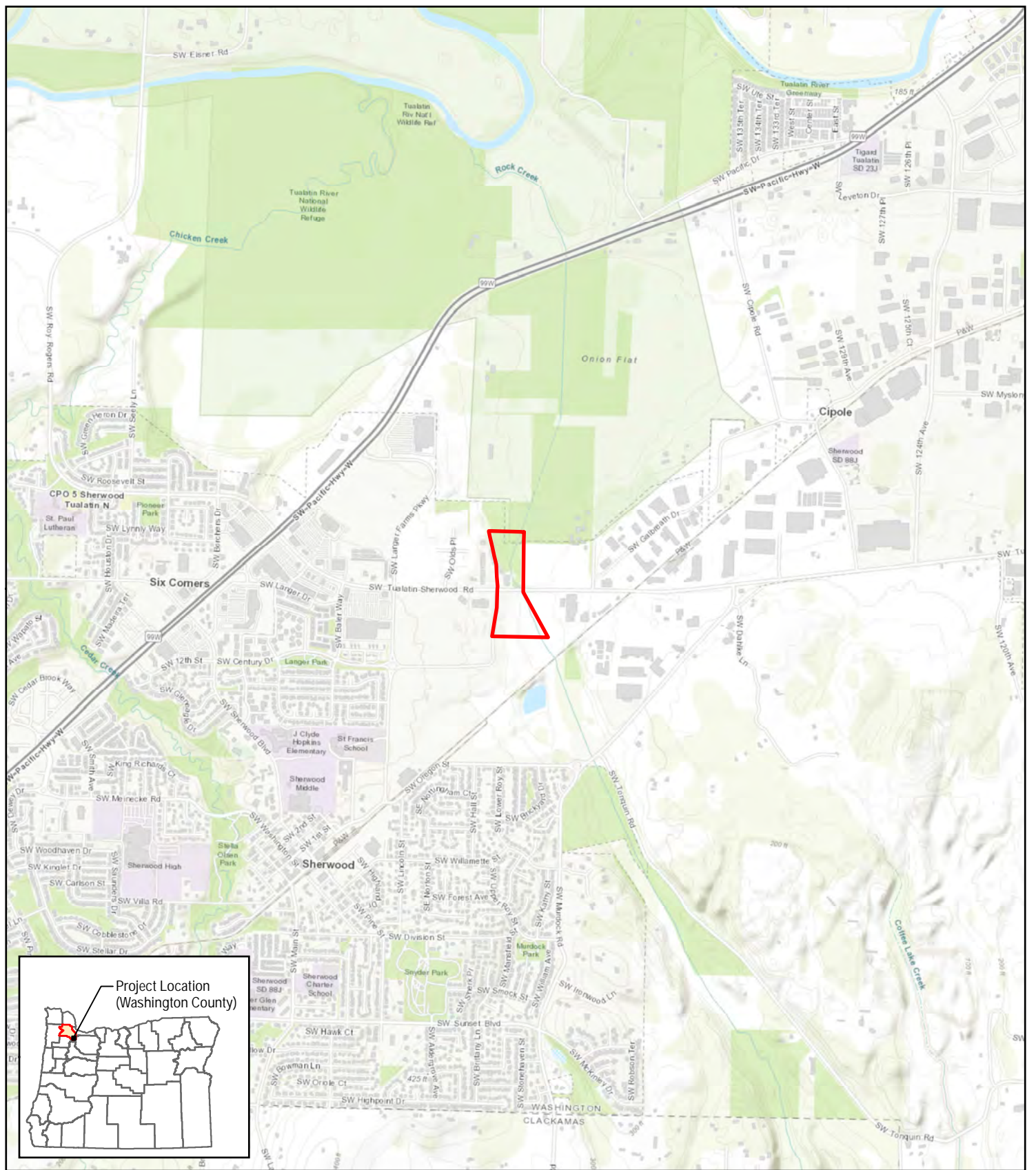



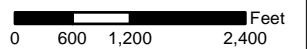
Figure 1.  
Vicinity Map

 Project Study Area (PSA)

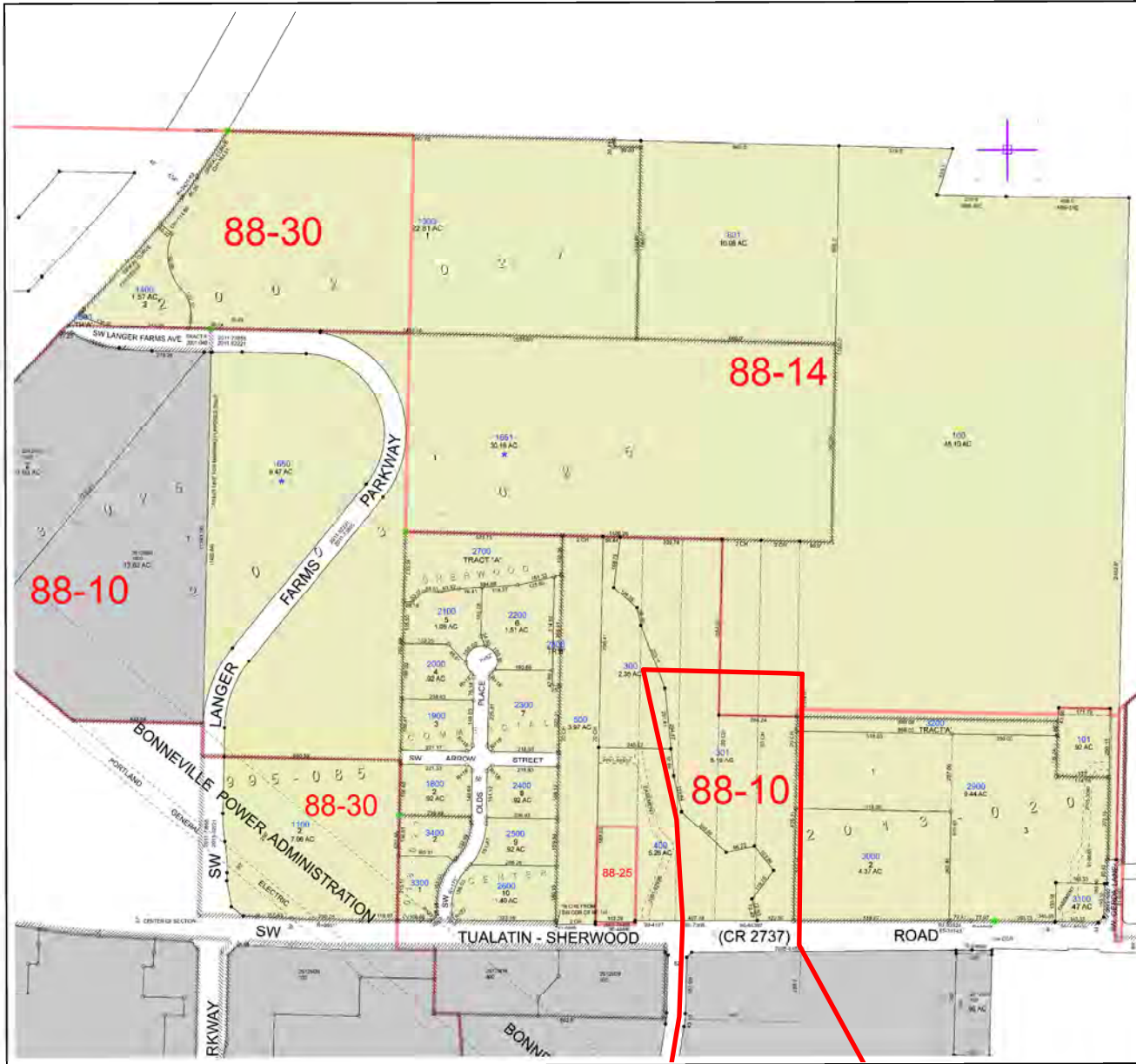
Rock Creek Sanitary Trunk Upsizing Project  
City of Sherwood  
Washington County, Oregon



Source: Basemap from ESRI World Topographic Map; PSA from Murraysmith. Reproduced for informational purposes and may not be suitable for legal, engineering or surveying purposes. Conclusions drawn from such information are the responsibility of the user.







2S129A

WASHINGTON COUNTY OREGON  
NE 1/4 SECTION 29 T2S R1W W.M.  
SCALE 1" = 200'

35	34	33	32	31
36	35	34	33	32
37	36	35	34	33
38	37	36	35	34
39	38	37	36	35
40	39	38	37	36
41	40	39	38	37
42	41	40	39	38
43	42	41	40	39
44	43	42	41	40
45	44	43	42	41

FOR ADDITIONAL MAPS VISIT OUR WEBSITE AT  
[www.co.washington.or.us](http://www.co.washington.or.us)

ES	EA	AS	AA
ES	EA	AS	AA
ES	EA	AS	AA
ES	EA	AS	AA

SECTION 29

Cancelled Taxlots For: 2S129A  
401, 103, 200, 900, 1000, 800, 1200, 600, 700, 102, 800, 1700.

Feet  
0 100 200 400 600

PLUT DATE: 6/4/2018  
Revised  
FOR ASSESSMENT PURPOSES  
ONLY - DO NOT RELY ON  
FOR OTHER USE

May be used for other purposes only if you obtain a license from the Oregon Department of Transportation. All other uses are prohibited. Please contact the appropriate map for the most current information.

SHERWOOD  
2S129A

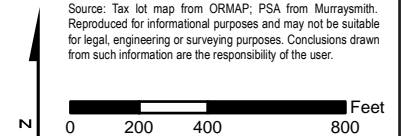
Figure 2a.  
Tax Lot Map

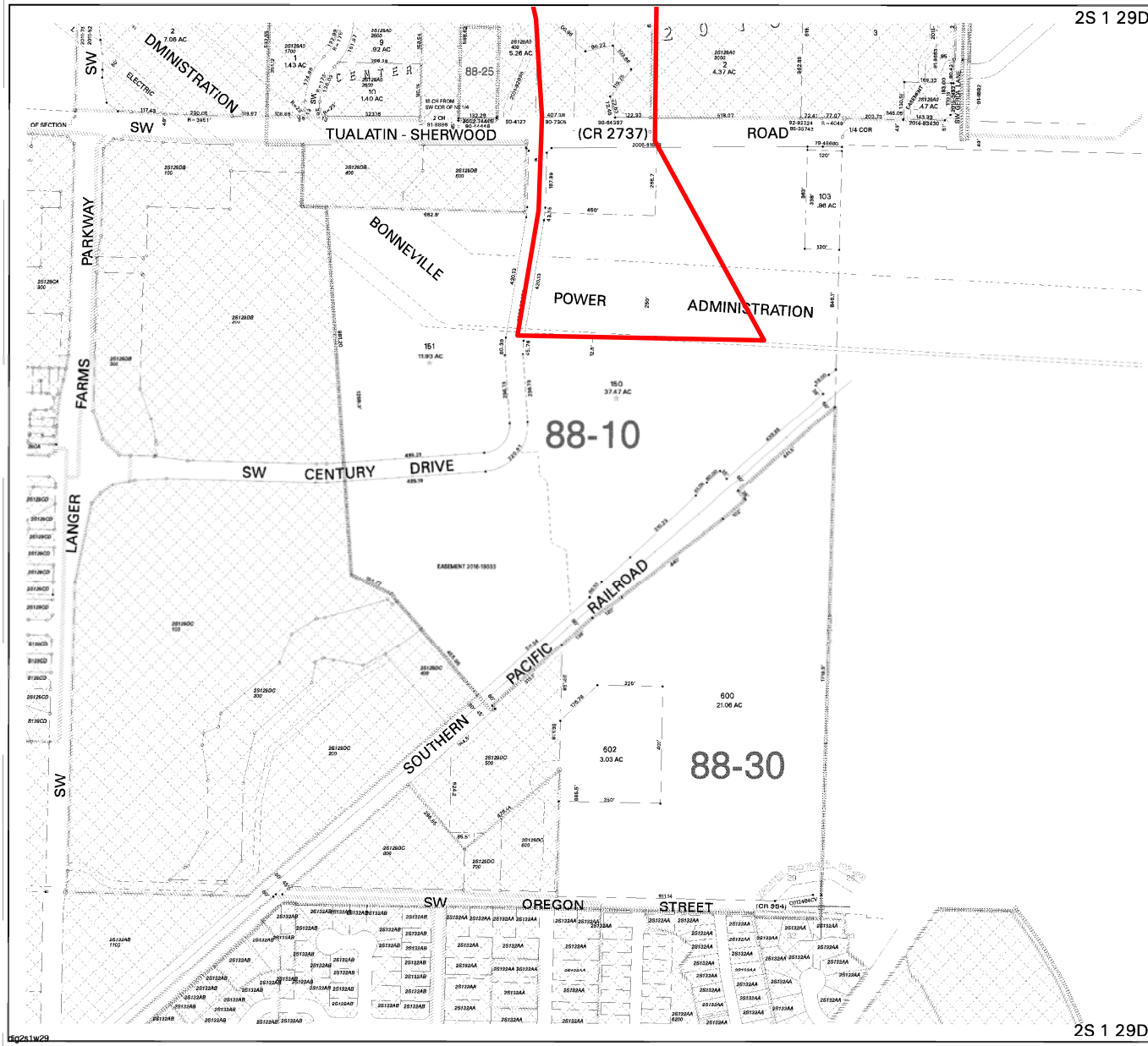
Rock Creek Sanitary Trunk Upsizing Project  
City of Sherwood  
Washington County, Oregon

Project Study Area (PSA)



Source: Tax lot map from ORMAP; PSA from Murraysmith. Reproduced for informational purposes and may not be suitable for legal, engineering or surveying purposes. Conclusions drawn from such information are the responsibility of the user.

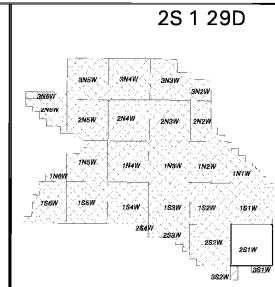




2S 1 29D

2S 1 29D

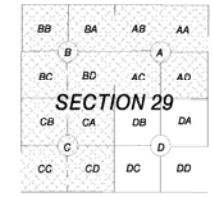
2S 1 29D



WASHINGTON COUNTY OREGON  
SE 1/4 SECTION 29 T2S R1W W.M.  
SCALE 1" = 200'

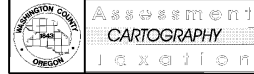
36	31	32	33	34	35	36	37
1	6	5	4	3	2	1	6
12	7	8	9	10	11	12	7
13	18	17	16	15	14	13	18
24	19	20	21	22	23	24	19
25	30	29	28	27	26	25	30
36	31	32	33	34	35	36	37
1	6	5	4	3	2	1	6

FOR ADDITIONAL MAPS VISIT OUR WEBSITE AT  
[www.co.washington.or.us](http://www.co.washington.or.us)



Cancelled Taxlots For: 2S129D  
401,000,000-411,000,000; 403,000,000-403,999,999; 405,000,000-405,999,999; 407,000,000-407,999,999; 409,000,000-409,999,999; 411,000,000-411,999,999; 413,000,000-413,999,999; 415,000,000-415,999,999; 417,000,000-417,999,999; 419,000,000-419,999,999; 421,000,000-421,999,999; 423,000,000-423,999,999; 425,000,000-425,999,999; 427,000,000-427,999,999; 429,000,000-429,999,999; 431,000,000-431,999,999; 433,000,000-433,999,999; 435,000,000-435,999,999; 437,000,000-437,999,999; 439,000,000-439,999,999; 441,000,000-441,999,999; 443,000,000-443,999,999; 445,000,000-445,999,999; 447,000,000-447,999,999; 449,000,000-449,999,999; 451,000,000-451,999,999; 453,000,000-453,999,999; 455,000,000-455,999,999; 457,000,000-457,999,999; 459,000,000-459,999,999; 461,000,000-461,999,999; 463,000,000-463,999,999; 465,000,000-465,999,999; 467,000,000-467,999,999; 469,000,000-469,999,999; 471,000,000-471,999,999; 473,000,000-473,999,999; 475,000,000-475,999,999; 477,000,000-477,999,999; 479,000,000-479,999,999; 481,000,000-481,999,999; 483,000,000-483,999,999; 485,000,000-485,999,999; 487,000,000-487,999,999; 489,000,000-489,999,999; 491,000,000-491,999,999; 493,000,000-493,999,999; 495,000,000-495,999,999; 497,000,000-497,999,999; 499,000,000-499,999,999; 501,000,000-501,999,999; 503,000,000-503,999,999; 505,000,000-505,999,999; 507,000,000-507,999,999; 509,000,000-509,999,999; 511,000,000-511,999,999; 513,000,000-513,999,999; 515,000,000-515,999,999; 517,000,000-517,999,999; 519,000,000-519,999,999; 521,000,000-521,999,999; 523,000,000-523,999,999; 525,000,000-525,999,999; 527,000,000-527,999,999; 529,000,000-529,999,999; 531,000,000-531,999,999; 533,000,000-533,999,999; 535,000,000-535,999,999; 537,000,000-537,999,999; 539,000,000-539,999,999; 541,000,000-541,999,999; 543,000,000-543,999,999; 545,000,000-545,999,999; 547,000,000-547,999,999; 549,000,000-549,999,999; 551,000,000-551,999,999; 553,000,000-553,999,999; 555,000,000-555,999,999; 557,000,000-557,999,999; 559,000,000-559,999,999; 561,000,000-561,999,999; 563,000,000-563,999,999; 565,000,000-565,999,999; 567,000,000-567,999,999; 569,000,000-569,999,999; 571,000,000-571,999,999; 573,000,000-573,999,999; 575,000,000-575,999,999; 577,000,000-577,999,999; 579,000,000-579,999,999; 581,000,000-581,999,999; 583,000,000-583,999,999; 585,000,000-585,999,999; 587,000,000-587,999,999; 589,000,000-589,999,999; 591,000,000-591,999,999; 593,000,000-593,999,999; 595,000,000-595,999,999; 597,000,000-597,999,999; 599,000,000-599,999,999; 601,000,000-601,999,999; 603,000,000-603,999,999; 605,000,000-605,999,999; 607,000,000-607,999,999; 609,000,000-609,999,999; 611,000,000-611,999,999; 613,000,000-613,999,999; 615,000,000-615,999,999; 617,000,000-617,999,999; 619,000,000-619,999,999; 621,000,000-621,999,999; 623,000,000-623,999,999; 625,000,000-625,999,999; 627,000,000-627,999,999; 629,000,000-629,999,999; 631,000,000-631,999,999; 633,000,000-633,999,999; 635,000,000-635,999,999; 637,000,000-637,999,999; 639,000,000-639,999,999; 641,000,000-641,999,999; 643,000,000-643,999,999; 645,000,000-645,999,999; 647,000,000-647,999,999; 649,000,000-649,999,999; 651,000,000-651,999,999; 653,000,000-653,999,999; 655,000,000-655,999,999; 657,000,000-657,999,999; 659,000,000-659,999,999; 661,000,000-661,999,999; 663,000,000-663,999,999; 665,000,000-665,999,999; 667,000,000-667,999,999; 669,000,000-669,999,999; 671,000,000-671,999,999; 673,000,000-673,999,999; 675,000,000-675,999,999; 677,000,000-677,999,999; 679,000,000-679,999,999; 681,000,000-681,999,999; 683,000,000-683,999,999; 685,000,000-685,999,999; 687,000,000-687,999,999; 689,000,000-689,999,999; 691,000,000-691,999,999; 693,000,000-693,999,999; 695,000,000-695,999,999; 697,000,000-697,999,999; 699,000,000-699,999,999; 701,000,000-701,999,999; 703,000,000-703,999,999; 705,000,000-705,999,999; 707,000,000-707,999,999; 709,000,000-709,999,999; 711,000,000-711,999,999; 713,000,000-713,999,999; 715,000,000-715,999,999; 717,000,000-717,999,999; 719,000,000-719,999,999; 721,000,000-721,999,999; 723,000,000-723,999,999; 725,000,000-725,999,999; 727,000,000-727,999,999; 729,000,000-729,999,999; 731,000,000-731,999,999; 733,000,000-733,999,999; 735,000,000-735,999,999; 737,000,000-737,999,999; 739,000,000-739,999,999; 741,000,000-741,999,999; 743,000,000-743,999,999; 745,000,000-745,999,999; 747,000,000-747,999,999; 749,000,000-749,999,999; 751,000,000-751,999,999; 753,000,000-753,999,999; 755,000,000-755,999,999; 757,000,000-757,999,999; 759,000,000-759,999,999; 761,000,000-761,999,999; 763,000,000-763,999,999; 765,000,000-765,999,999; 767,000,000-767,999,999; 769,000,000-769,999,999; 771,000,000-771,999,999; 773,000,000-773,999,999; 775,000,000-775,999,999; 777,000,000-777,999,999; 779,000,000-779,999,999; 781,000,000-781,999,999; 783,000,000-783,999,999; 785,000,000-785,999,999; 787,000,000-787,999,999; 789,000,000-789,999,999; 791,000,000-791,999,999; 793,000,000-793,999,999; 795,000,000-795,999,999; 797,000,000-797,999,999; 799,000,000-799,999,999; 801,000,000-801,999,999; 803,000,000-803,999,999; 805,000,000-805,999,999; 807,000,000-807,999,999; 809,000,000-809,999,999; 811,000,000-811,999,999; 813,000,000-813,999,999; 815,000,000-815,999,999; 817,000,000-817,999,999; 819,000,000-819,999,999; 821,000,000-821,999,999; 823,000,000-823,999,999; 825,000,000-825,999,999; 827,000,000-827,999,999; 829,000,000-829,999,999; 831,000,000-831,999,999; 833,000,000-833,999,999; 835,000,000-835,999,999; 837,000,000-837,999,999; 839,000,000-839,999,999; 841,000,000-841,999,999; 843,000,000-843,999,999; 845,000,000-845,999,999; 847,000,000-847,999,999; 849,000,000-849,999,999; 851,000,000-851,999,999; 853,000,000-853,999,999; 855,000,000-855,999,999; 857,000,000-857,999,999; 859,000,000-859,999,999; 861,000,000-861,999,999; 863,000,000-863,999,999; 865,000,000-865,999,999; 867,000,000-867,999,999; 869,000,000-869,999,999; 871,000,000-871,999,999; 873,000,000-873,999,999; 875,000,000-875,999,999; 877,000,000-877,999,999; 879,000,000-879,999,999; 881,000,000-881,999,999; 883,000,000-883,999,999; 885,000,000-885,999,999; 887,000,000-887,999,999; 889,000,000-889,999,999; 891,000,000-891,999,999; 893,000,000-893,999,999; 895,000,000-895,999,999; 897,000,000-897,999,999; 899,000,000-899,999,999; 901,000,000-901,999,999; 903,000,000-903,999,999; 905,000,000-905,999,999; 907,000,000-907,999,999; 909,000,000-909,999,999; 911,000,000-911,999,999; 913,000,000-913,999,999; 915,000,000-915,999,999; 917,000,000-917,999,999; 919,000,000-919,999,999; 921,000,000-921,999,999; 923,000,000-923,999,999; 925,000,000-925,999,999; 927,000,000-927,999,999; 929,000,000-929,999,999; 931,000,000-931,999,999; 933,000,000-933,999,999; 935,000,000-935,999,999; 937,000,000-937,999,999; 939,000,000-939,999,999; 941,000,000-941,999,999; 943,000,000-943,999,999; 945,000,000-945,999,999; 947,000,000-947,999,999; 949,000,000-949,999,999; 951,000,000-951,999,999; 953,000,000-953,999,999; 955,000,000-955,999,999; 957,000,000-957,999,999; 959,000,000-959,999,999; 961,000,000-961,999,999; 963,000,000-963,999,999; 965,000,000-965,999,999; 967,000,000-967,999,999; 969,000,000-969,999,999; 971,000,000-971,999,999; 973,000,000-973,999,999; 975,000,000-975,999,999; 977,000,000-977,999,999; 979,000,000-979,999,999; 981,000,000-981,999,999; 983,000,000-983,999,999; 985,000,000-985,999,999; 987,000,000-987,999,999; 989,000,000-989,999,999; 991,000,000-991,999,999; 993,000,000-993,999,999; 995,000,000-995,999,999; 997,000,000-997,999,999; 999,000,000-999,999,999; 1,000,000,000-1,000,000,000.

SCALE 1" = 200'



PLOT DATE: August 02, 2016  
FOR ASSESSMENT PURPOSES  
ONLY - DO NOT RELY ON  
FOR OTHER USE

Map areas delineated by either grey shading or a cross-hatched pattern are for reference only and may not indicate the most current property boundaries. Please consult the appropriate map for the most current information.

SHERWOOD  
2S 1 29D

Figure 2b.  
Tax Lot Map

Rock Creek Sanitary Trunk Upsizing Project  
City of Sherwood  
Washington County, Oregon

Project Study Area (PSA)

Source: Tax lot map from ORMAP; PSA from Murraysmith. Reproduced for informational purposes and may not be suitable for legal, engineering or surveying purposes. Conclusions drawn from such information are the responsibility of the user.



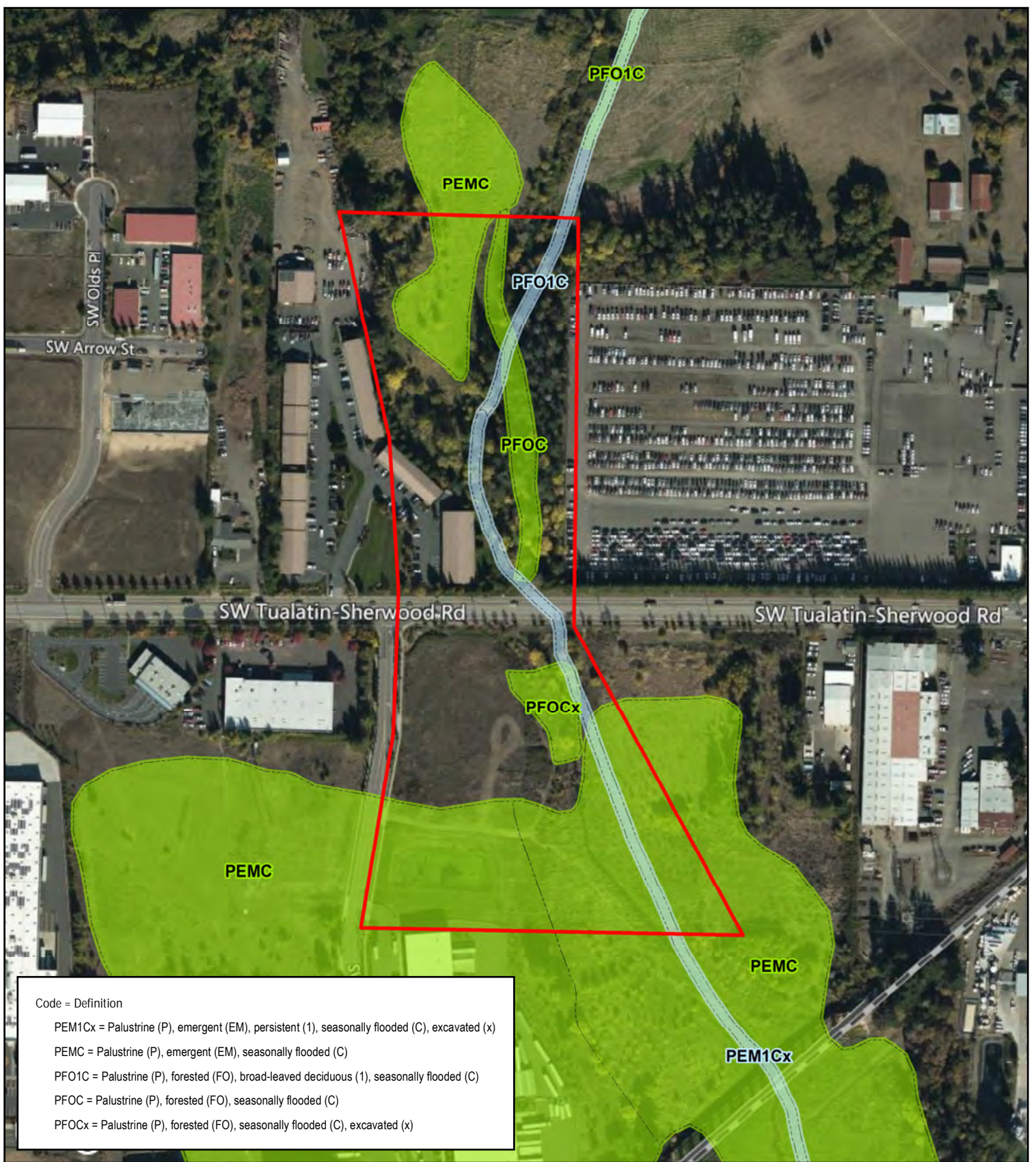


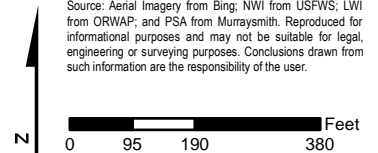
Figure 3.  
National and Local Wetland  
Inventories (NWI and LWI) Map

Rock Creek Sanitary Trunk Upsizing Project  
City of Sherwood  
Washington County, Oregon

- Project Study Area (PSA)
- NWI
- LWI

**MB&G**

Source: Aerial Imagery from Bing; NWI from USFWS; LWI from ORWAP; and PSA from Murraysmith. Reproduced for informational purposes and may not be suitable for legal, engineering or surveying purposes. Conclusions drawn from such information are the responsibility of the user.



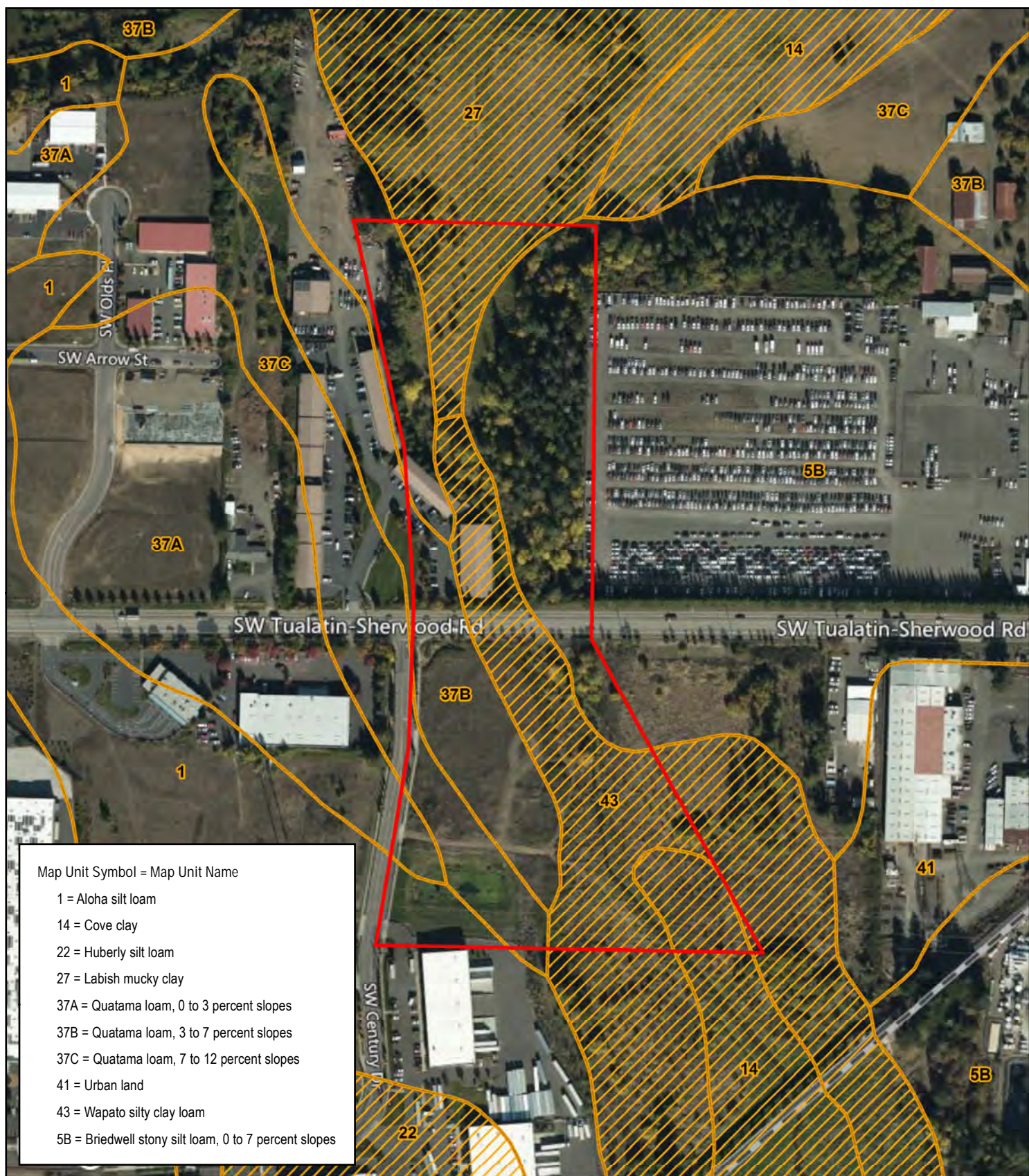





Figure 4.  
Soils Map

Rock Creek Sanitary Trunk Upsizing Project  
City of Sherwood  
Washington County, Oregon

-  Project Study Area (PSA)
-  Non-Hydric Soils (<66 percent hydric)
-  Hydric Soils (≥66 percent hydric)

**MB&G**

Source: Aerial imagery from Microsoft Bing; soils from NRCS; and PSA from Murraysmith. Reproduced for informational purposes and may not be suitable for legal, engineering, or surveying purposes. Conclusions drawn from such information are the responsibility of the user.



0 100 200 400 Feet

City of Sherwood Sewer Upgrade, Figure 4 - 7/11/2019

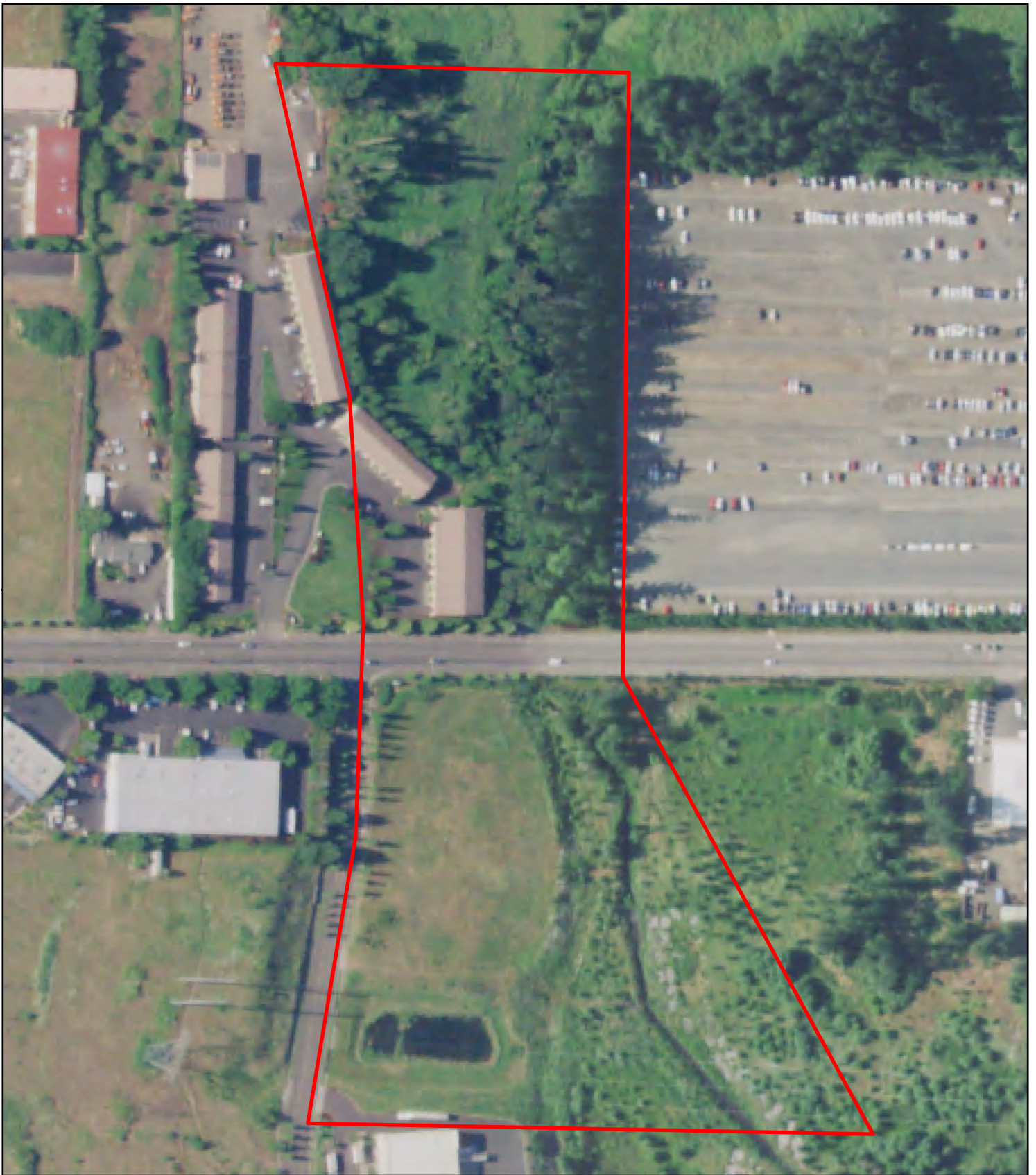


Figure 5.  
Aerial Imagery (NAIP)

Imagery acquisition date: June 5, 2016

 Project Study Area (PSA)

Rock Creek Sanitary Trunk Upsizing Project  
City of Sherwood  
Washington County, Oregon

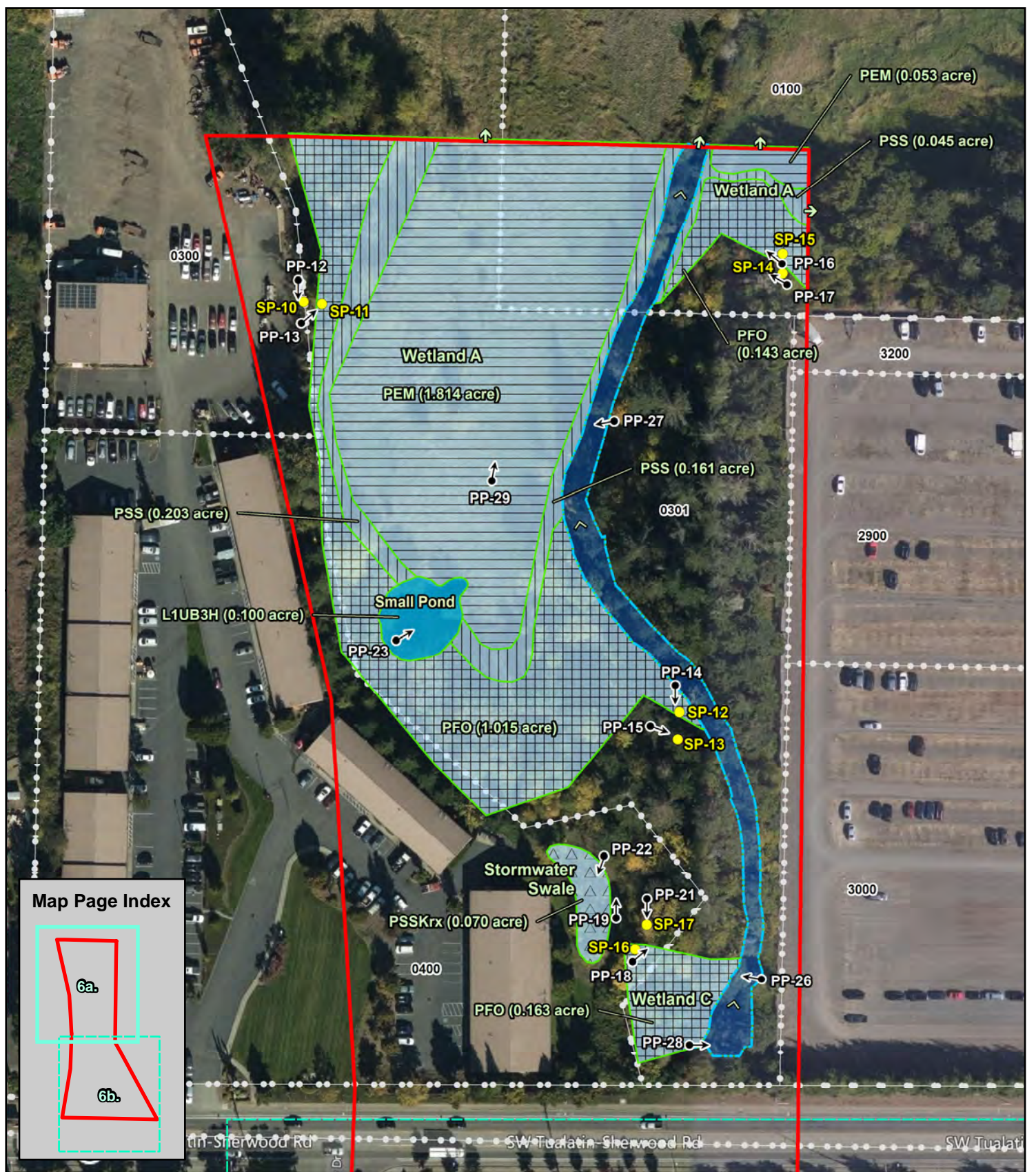
**MB&G**

Source: Aerial imagery from NAIP, acquired on June 5, 2016; PSA from MB&G. Reproduced for informational purposes and may not be suitable for legal, engineering, or surveying purposes. Conclusions drawn from such information are the responsibility of the user.



0 50 100 200 Feet

City of Sherwood Sewer upgrade Figure 5-7/11/2019



All wetland and waters boundary locations were recorded by professional land surveyors to an accuracy of  $\pm 2$  feet.

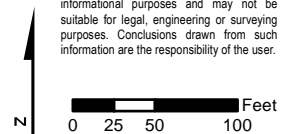
Figure 6a.  
Wetland/Waters Map

Rock Creek Sanitary Trunk Upsizing Project  
City of Sherwood  
Washington County, Oregon

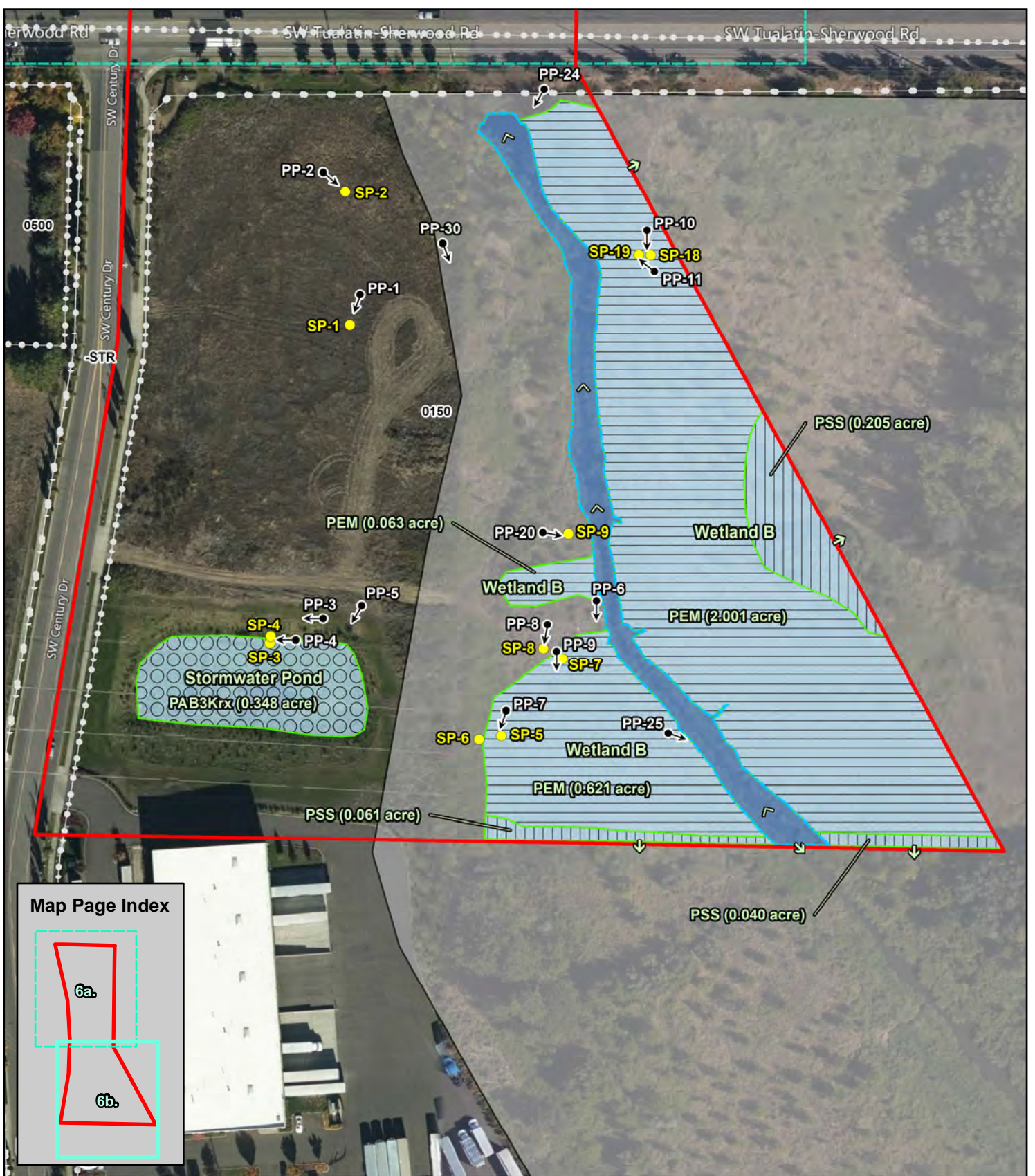
- |                          |                |                        |
|--------------------------|----------------|------------------------|
| Project Study Area (PSA) | L1UB3H Wetland | Flow Direction         |
| Tax Lots                 | PEM Wetland    | Extends Outside of PSA |
| Match Lines              | PFO Wetland    | Sample Plots           |
| Rock Creek OHWM          | PSS Wetland    | PhotoPoint             |
|                          | PSSKrx Wetland |                        |

**MB&G**

Source: Aerial imagery from Microsoft Bing; All other data from MB&G. Reproduced for informational purposes and may not be suitable for legal, engineering or surveying purposes. Conclusions drawn from such information are the responsibility of the user.



City of Sherwood Sewer Upgrade Figure 6 - 12/13/2019



All wetland and waters boundary locations were recorded by professional land surveyors to an accuracy of ± 2 feet.

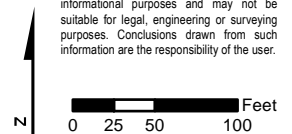
Figure 6b.  
Wetland/Waters Map

Rock Creek Sanitary Trunk Upsizing Project  
City of Sherwood  
Washington County, Oregon

- |                          |                      |                        |
|--------------------------|----------------------|------------------------|
| Project Study Area (PSA) | PAB3Krx Wetland      | Flow Direction         |
| Tax Lots                 | PEM Wetland          | Extends Outside of PSA |
| Match Lines              | PSS Wetland          | Sample Plots           |
| Rock Creek OHWM          | Past Mitigation Area | PhotoPoint             |

**MB&G**

Source: Aerial imagery from Microsoft Bing; All other data from MB&G. Reproduced for informational purposes and may not be suitable for legal, engineering or surveying purposes. Conclusions drawn from such information are the responsibility of the user.



City of Sherwood Sewer Upgrade Figure 6 - 12/13/2019

## APPENDIX B

---

### Wetland Determination Data Forms



# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Rock Creek Trunk Line Project City/County: Sherwood/Washington Sampling Date: 5/23/19  
 Applicant/Owner: City of Sherwood State: OR Sampling Point: SP-1  
 Investigator(s): D. Covington and J. Roper Section, Township, Range: T2S, R1W, Section 28 or (29)  
 Landform (hillslope, terrace, etc.): \_\_\_\_\_ Local relief (concave, convex, none): \_\_\_\_\_ Slope (%): 0  
 Subregion (LRR): A Lat: 45.367134 Long: -122.829341 Datum: WGS 1984  
 Soil Map Unit Name: 37B - Quatama Loam, 3 to 7 percent slopes NWI classification: None  
 Are climatic / hydrology conditions on the site typical for this time of year? Yes  No  (If no, explain in Remarks.)  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes  No   
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	<b>Is the Sampled Area within a Wetland?</b>	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>			
Wetland Hydrology Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>			

This elevated terrace may have experienced some drainage in the past due to a large stormwater pond excavated at the south end of the property.

## VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____ )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC:	<u>1</u> (A)
2. _____				Total Number of Dominant Species Across All Strata:	<u>2</u> (B)
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC:	<u>50</u> (A/B)
4. _____				= Total Cover	
Sapling/Shrub Stratum (Plot size: _____ )				<b>Prevalence Index worksheet:</b>	
1. _____				Total % Cover of:	Multiply by:
2. _____				OBL species <u>0</u>	x 1 = <u>0</u>
3. _____				FACW species <u>20</u>	x 2 = <u>40</u>
4. _____				FAC species <u>40</u>	x 3 = <u>120</u>
5. _____				FACU species <u>65</u>	x 4 = <u>260</u>
				UPL species _____	x 5 = _____
				Column Totals: <u>125</u> (A)	<u>420</u> (B)
				Prevalence Index = B/A = <u>3.36</u>	
Herb Stratum (Plot size: <u>10ft meter diameter</u> )				<b>Hydrophytic Vegetation Indicators:</b>	
1. <u>Bromus hordeaceus?</u>	<u>50</u>	<u>Y</u>	<u>FACU</u>	1 - Rapid Test for Hydrophytic Vegetation	
2. <u>Juncus balticus</u>	<u>15</u>	<u>N</u>	<u>FACW</u>	2 - Dominance Test is >50%	
3. <u>Juncus pumilus</u>	<u>5</u>	<u>N</u>	<u>FACW</u>	3 - Prevalence Index is ≤3.0 <sup>1</sup>	
4. <u>Alopecurus pratensis</u>	<u>5</u>	<u>N</u>	<u>FAC</u>	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)	
5. <u>Vicia villosa</u>	<u>15</u>	<u>N</u>	<u>FACU (est)</u>	5 - Wetland Non-Vascular Plants <sup>1</sup>	
6. <u>Agrostis capillaris</u>	<u>35</u>	<u>Y</u>	<u>FAC</u>	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
7. _____				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
8. _____					
9. _____					
10. _____					
11. _____					
	<u>125</u> <u>130</u>	= Total Cover		<b>Hydrophytic Vegetation Present?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Woody Vine Stratum (Plot size: _____ )					
1. _____					
2. _____					
= Total Cover					
% Bare Ground in Herb Stratum <u>0</u>					

Remarks:

**SOIL**

Sampling Point: SP- /

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-4	10YR 3/2	100	-	-	-	-	Silt loam	
4-16	10YR 4/2	20	-	-	-	-	Silt loam	
4-16	10YR 5/1	30	-	-	-	-	Silt loam	
4-16	10YR 5/2	30	-	-	-	-	Silt loam	
4-16	-	-	10YR 3/6	20	C	M	Silt loam	prominent, common, medium

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input checked="" type="checkbox"/> Depleted Dark Surface (F7)
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

**Restrictive Layer (if present):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes  No

Remarks: Hydric indicators appear to be relict based on sharp boundaries between redox features and matrix. Depleted pockets indicate relict or infrequent saturated conditions. *are isolated and discontinuous and*

**HYDROLOGY**

**Wetland Hydrology Indicators:**

<b>Primary Indicators (minimum of one required; check all that apply)</b>	<b>Secondary Indicators (2 or more required)</b>
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Shallow Aquitard (D3)
	<input type="checkbox"/> FAC-Neutral Test (D5)
	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
	<input type="checkbox"/> Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____
Water Table Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____

Wetland Hydrology Present? Yes  No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Aerial imagery, LiDAR-derived hillshade, NWI, and LWI

Remarks: Does not pass FAC Neutral test

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Rock Creek Trunk Line Project City/County: Sherwood/Washington Sampling Date: 5/23/19  
 Applicant/Owner: City of Sherwood State: OR Sampling Point: SP- 2  
 Investigator(s): D. Covington and J. Roper Section, Township, Range: T2S, R1W, Section 28 or 29  
 Landform (hillslope, terrace, etc.): \_\_\_\_\_ Local relief (concave, convex, none): \_\_\_\_\_ Slope (%): 2  
 Subregion (LRR): A Lat: 45.367454 Long: -122.829369 Datum: WGS 1984  
 Soil Map Unit Name: 43-Wapato silty clay loam NWI classification: None  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes  No  (If no, explain in Remarks.)  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes  No   
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Is the Sampled Area within a Wetland?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>			
Wetland Hydrology Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>			

## VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____ )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC:	<u>2</u> (A)
2. _____				Total Number of Dominant Species Across All Strata:	<u>3</u> (B)
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC:	<u>66</u> (A/B)
4. _____					
= Total Cover					
Sapling/Shrub Stratum (Plot size: <u>10' dia.</u> )	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:	
1. <u>Fraxinus latifolia</u>	<u>5</u>	<u>Y</u>	<u>FACW</u>	Total % Cover of:	Multiply by:
2. _____				OBL species	x 1 = _____
3. _____				FACW species	x 2 = _____
4. _____				FAC species	x 3 = _____
5. _____				FACU species	x 4 = _____
<u>5</u> = Total Cover				UPL species	x 5 = _____
				Column Totals:	(A) _____ (B) _____
				Prevalence Index = B/A = _____	
Herb Stratum (Plot size: _____ ) <u>10' dia.</u>	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:	
1. <u>Dipsacus fullanum</u>	<u>5</u>	<u>N</u>	<u>FAC</u>	1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 <sup>1</sup> <input type="checkbox"/> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> 5 - Wetland Non-Vascular Plants <sup>1</sup> <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
2. <u>Alysicurus pratensis</u>	<u>55</u>	<u>Y</u>	<u>FAC</u>		
3. <u>Phalaris arundinacea</u>	<u>15</u>	<u>N</u>	<u>FACW</u>		
4. <u>Vicia villosa</u>	<u>25</u>	<u>Y</u>	<u>FACU (est)</u>		
5. <u>Bromus hordeaceus</u>	<u>15</u>	<u>N</u>	<u>FACU (est)</u>		
6. <u>Rumex crispus</u>	<u>5</u>	<u>N</u>	<u>FAC</u>		
7. <u>Holcus lanatus</u>	<u>5</u>	<u>N</u>	<u>FAC</u>		
<u>125</u> = Total Cover					
Woody Vine Stratum (Plot size: <u>Ø</u> )	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Present?	
1. _____				Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
2. _____					
= Total Cover					
% Bare Ground in Herb Stratum <u>0</u>					

Remarks: marginal wetland veg community. Small smattering of FACW Scouler's popcorn flower to south outside of plot. Failed the FAC neutral test when considering all species (b/c of FACW/FACU tiebreak based on cover)

**SOIL**

Sampling Point: SP- **2**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-6	10YR 3/1	80	—	—	—	—	silt loam	—
0-6	—	—	10YR 3/4	20	C	M	silt loam	Distinct, common, med.
6-16	10YR 4/1	75	—	—	—	—	silt loam	—
6-16	—	—	10YR 3/4	25	C	M	silt loam	Prominent, many, med.

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- |  |   |   |
|--|---|---|
| <input type="checkbox"/> Histosol (A1)                     | <input type="checkbox"/> Sandy Redox (S5)                         | <input type="checkbox"/> 2 cm Muck (A10)                  |
| <input type="checkbox"/> Histic Epipedon (A2)              | <input type="checkbox"/> Stripped Matrix (S6)                     | <input type="checkbox"/> Red Parent Material (TF2)        |
| <input type="checkbox"/> Black Histic (A3)                 | <input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1) | <input type="checkbox"/> Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> Hydrogen Sulfide (A4)             | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                 | <input type="checkbox"/> Other (Explain in Remarks)       |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input checked="" type="checkbox"/> Depleted Matrix (F3)          |   |
| <input type="checkbox"/> Thick Dark Surface (A12)          | <input type="checkbox"/> Redox Dark Surface (F6)                  |   |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)          | <input type="checkbox"/> Depleted Dark Surface (F7)               |   |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)          | <input type="checkbox"/> Redox Depressions (F8)                   |   |

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

**Restrictive Layer (if present):**

Type: \_\_\_\_\_  
Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes  No

Remarks: many prominent coarse redox features appear to be relict due to sharp boundaries. There are both contemporary and relict redox features.

**HYDROLOGY**

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

Secondary Indicators (2 or more required)

- |  |   |  |
|--|---|--|
| <input type="checkbox"/> Surface Water (A1)                        | <input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) | <input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) |
| <input type="checkbox"/> High Water Table (A2)                     | <input type="checkbox"/> Salt Crust (B11)   | <input type="checkbox"/> Drainage Patterns (B10)                           |
| <input type="checkbox"/> Saturation (A3)                           | <input type="checkbox"/> Aquatic Invertebrates (B13)                              | <input type="checkbox"/> Dry-Season Water Table (C2)                       |
| <input type="checkbox"/> Water Marks (B1)                          | <input type="checkbox"/> Hydrogen Sulfide Odor (C1)                               | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)         |
| <input type="checkbox"/> Sediment Deposits (B2)                    | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)            | <input checked="" type="checkbox"/> Geomorphic Position (D2)               |
| <input type="checkbox"/> Drift Deposits (B3)                       | <input type="checkbox"/> Presence of Reduced Iron (C4)                            | <input type="checkbox"/> Shallow Aquitard (D3)                             |
| <input type="checkbox"/> Algal Mat or Crust (B4)                   | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)               | <input type="checkbox"/> FAC-Neutral Test (D5)                             |
| <input type="checkbox"/> Iron Deposits (B5)                        | <input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)                  | <input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)                    |
| <input type="checkbox"/> Surface Soil Cracks (B6)                  | <input type="checkbox"/> Other (Explain in Remarks)                               | <input type="checkbox"/> Frost-Heave Hummocks (D7)                         |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) |   |  |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)   |   |  |

**Field Observations:**

Surface Water Present? Yes  No  Depth (inches): \_\_\_\_\_  
 Water Table Present? Yes  No  Depth (inches): \_\_\_\_\_  
 Saturation Present? (includes capillary fringe) Yes  No  Depth (inches): \_\_\_\_\_

Wetland Hydrology Present? Yes  No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Aerial imagery, LiDAR-derived hillshade, NWI, and LWI

Remarks:

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Rock Creek Trunk Line Project City/County: Sherwood/Washington Sampling Date: 5/23/19  
 Applicant/Owner: City of Sherwood State: OR Sampling Point: SP-3  
 Investigator(s): D. Covington and J. Roper Section, Township, Range: T2S, R1W, Section 28 or 29  
 Landform (hillslope, terrace, etc.): bank of pond Local relief (concave, convex, none): none Slope (%): 4  
 Subregion (LRR): A Lat: 45.366362 Long: -122.829583 Datum: WGS 1984  
 Soil Map Unit Name: 37C-Quatama Loam, 7 to 12 percent slopes NWI classification: None  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes  No  (If no, explain in Remarks.)  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes  No   
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> <u>Wetland (constructed pond)</u> <u>stormwater</u>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	

## VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>    </u> )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. <u>    </u>				Number of Dominant Species That Are OBL, FACW, or FAC:	<u>3</u> (A)
2. <u>    </u>				Total Number of Dominant Species Across All Strata:	<u>3</u> (B)
3. <u>    </u>				Percent of Dominant Species That Are OBL, FACW, or FAC:	<u>100</u> (A/B)
4. <u>    </u>				= Total Cover	
<b>Sapling/Shrub Stratum</b> (Plot size: <u>10' dia</u> )				<b>Prevalence Index worksheet:</b>	
1. <u>Salix lasiandra</u>	<u>15</u>	<u>Y</u>	<u>FACW</u>	Total % Cover of:	Multiply by:
2. <u>    </u>				OBL species	x 1 = <u>    </u>
3. <u>    </u>				FACW species	x 2 = <u>    </u>
4. <u>    </u>				FAC species	x 3 = <u>    </u>
5. <u>    </u>				FACU species	x 4 = <u>    </u>
<u>15</u> = Total Cover				UPL species	x 5 = <u>    </u>
<b>Herb Stratum</b> (Plot size: <u>10' dia</u> )				Column Totals:	<u>    </u> (A) <u>    </u> (B)
1. <u>Poa palustris</u>	<u>60</u>	<u>Y</u>	<u>FAC</u>	Prevalence Index = B/A = <u>    </u>	
2. <u>Lotus corniculatus</u>	<u>15</u>	<u>N</u>	<u>FAC</u>	<b>Hydrophytic Vegetation Indicators:</b> <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 <sup>1</sup> <input type="checkbox"/> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> 5 - Wetland Non-Vascular Plants <sup>1</sup> <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
3. <u>Holcus lanatus</u>	<u>30</u>	<u>Y</u>	<u>FAC</u>		
4. <u>Alopecurus pratensis</u>	<u>15</u>	<u>N</u>	<u>FAC</u>		
5. <u>Phalaris arundinacea</u>	<u>5</u>	<u>N</u>	<u>FACW</u>		
6. <u>Trifolium repens</u>	<u>5</u>	<u>N</u>	<u>FAC</u>		
7. <u>Juncus effusus</u>	<u>5</u>	<u>N</u>	<u>FACW</u>		
8. <u>    </u>					
9. <u>    </u>					
10. <u>    </u>					
11. <u>    </u>					
<u>135</u> = Total Cover					
<b>Woody Vine Stratum</b> (Plot size: <u>    </u> )				<b>Hydrophytic Vegetation Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
1. <u>    </u>					
2. <u>    </u>					
% Bare Ground in Herb Stratum <u>0</u>					

Remarks: plot along shore/banks of constructed wetland/stormwater pond

**SOIL**

Sampling Point: SP- 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-3	10YR 3/3	100					SL	
3-6	10YR 4/2	80	10YR 4/6	20	C	M	SL	Comm, med, prom
6-16	6.2Y 4/10.6	75	10YR 4/6	25	C	M	SCL	lot of angular rock fill many, med, prom

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1) (except MLRA 1)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

- 2 cm Muck (A10)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

**Restrictive Layer (if present):**

Type: \_\_\_\_\_  
Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes  No

Remarks:

**HYDROLOGY**

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

Secondary Indicators (2 or more required)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Surface Soil Cracks (B6)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres along Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Stunted or Stressed Plants (D1) (LRR A)
- Other (Explain in Remarks)

- Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Saturation Visible on Aerial Imagery (C9)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- FAC-Neutral Test (D5)
- Raised Ant Mounds (D6) (LRR A)
- Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes  No  Depth (inches): NA  
 Water Table Present? Yes  No  Depth (inches): 7"  
 Saturation Present? (includes capillary fringe) Yes  No  Depth (inches): 6"

Wetland Hydrology Present? Yes  No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Aerial imagery, LiDAR-derived hillshade, NWI, and LWI

Remarks:

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Rock Creek Trunk Line Project City/County: Sherwood/Washington Sampling Date: 5/23/19  
 Applicant/Owner: City of Sherwood State: OR Sampling Point: SP-4  
 Investigator(s): D. Covington and J. Roper Section, Township, Range: T2S, R1W, Section 28 or 29  
 Landform (hillslope, terrace, etc.): slope adjacent to pond Local relief (concave, convex, none): none Slope (%): 15  
 Subregion (LRR): A Lat: 45.366378 Long: -122.829581 Datum: WGS 1984  
 Soil Map Unit Name: 37C-Quintana Loam, 7 to 12 percent slopes NWI classification: None  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes  No  (If no, explain in Remarks.)  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes  No   
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	

## VEGETATION – Use scientific names of plants.

Stratum	Plot size	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
<b>Tree Stratum</b>	(Plot size: <u>        </u> )				Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A)
1. <u>        </u>					Total Number of Dominant Species Across All Strata: <u>4</u> (B)
2. <u>        </u>					Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)
3. <u>        </u>					
4. <u>        </u>					
<u>∅</u> = Total Cover					<b>Prevalence Index worksheet:</b>
<b>Sapling/Shrub Stratum</b>	(Plot size: <u>30' dia</u> )				Total % Cover of: <u>        </u> Multiply by:
1. <u>Salix lasandra</u>		<u>5</u>	<u>Y</u>	<u>FACW</u>	OBL species <u>        </u> x 1 = <u>        </u>
2. <u>Spirea douglasii</u>		<u>5</u>	<u>Y</u>	<u>FACW</u>	FACW species <u>        </u> x 2 = <u>        </u>
3. <u>        </u>					FAC species <u>        </u> x 3 = <u>        </u>
4. <u>        </u>					FACU species <u>        </u> x 4 = <u>        </u>
5. <u>        </u>					UPL species <u>        </u> x 5 = <u>        </u>
<u>10</u> = Total Cover					Column Totals: <u>        </u> (A) <u>        </u> (B)
<b>Herb Stratum</b>	(Plot size: <u>5' rad</u> )				Prevalence Index = B/A = <u>        </u>
1. <u>Helios helianthus</u>		<u>60</u>	<u>Y</u>	<u>FAC</u>	
2. <u>Poa palustris</u>		<u>10</u>	<u>N</u>	<u>FAC</u>	
3. <u>Lotus corniculatus</u>		<u>40</u>	<u>Y</u>	<u>FAC</u>	
4. <u>Trifolium repens</u>		<u>5</u>	<u>N</u>	<u>FAC</u>	
5. <u>Alopecurus pratensis</u>		<u>5</u>	<u>N</u>	<u>FAC</u>	
6. <u>        </u>					
7. <u>        </u>					
8. <u>        </u>					
9. <u>        </u>					
10. <u>        </u>					
11. <u>        </u>					
<u>120</u> = Total Cover					<b>Hydrophytic Vegetation Indicators:</b>
<b>Woody Vine Stratum</b>	(Plot size: <u>        </u> )				<input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation
1. <u>        </u>					<input checked="" type="checkbox"/> 2 - Dominance Test is >50%
2. <u>        </u>					<input type="checkbox"/> 3 - Prevalence Index is ≤3.0 <sup>1</sup>
<u>∅</u> = Total Cover					<input type="checkbox"/> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
% Bare Ground in Herb Stratum <u>∅</u>					<input type="checkbox"/> 5 - Wetland Non-Vascular Plants <sup>1</sup>
					<input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
					<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
					<b>Hydrophytic Vegetation Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

Remarks: plot located 5 vertical feet above SP-3 on upper banks of constructed wetland / stormwater pond.

**SOIL**

Sampling Point: SP- 4

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-16	10YR 3/3	100	—	—	—	—	silt loam	—

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

<p><b>Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)</b></p> <p><input type="checkbox"/> Histosol (A1)</p> <p><input type="checkbox"/> Histic Epipedon (A2)</p> <p><input type="checkbox"/> Black Histic (A3)</p> <p><input type="checkbox"/> Hydrogen Sulfide (A4)</p> <p><input type="checkbox"/> Depleted Below Dark Surface (A11)</p> <p><input type="checkbox"/> Thick Dark Surface (A12)</p> <p><input type="checkbox"/> Sandy Mucky Mineral (S1)</p> <p><input type="checkbox"/> Sandy Gleyed Matrix (S4)</p> <p><input type="checkbox"/> Sandy Redox (S5)</p> <p><input type="checkbox"/> Stripped Matrix (S6)</p> <p><input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)</p> <p><input type="checkbox"/> Loamy Gleyed Matrix (F2)</p> <p><input type="checkbox"/> Depleted Matrix (F3)</p> <p><input type="checkbox"/> Redox Dark Surface (F6)</p> <p><input type="checkbox"/> Depleted Dark Surface (F7)</p> <p><input type="checkbox"/> Redox Depressions (F8)</p>	<p><b>Indicators for Problematic Hydric Soils<sup>3</sup>:</b></p> <p><input type="checkbox"/> 2 cm Muck (A10)</p> <p><input type="checkbox"/> Red Parent Material (TF2)</p> <p><input type="checkbox"/> Very Shallow Dark Surface (TF12)</p> <p><input type="checkbox"/> Other (Explain in Remarks)</p> <p><sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic</p>
--	---

**Restrictive Layer (if present):**  
 Type: \_\_\_\_\_  
 Depth (inches): \_\_\_\_\_

**Hydric Soil Present?** Yes  No

Remarks: There is a lot of non-native, angular fill.

**HYDROLOGY**

<p><b>Wetland Hydrology Indicators:</b></p> <p><u>Primary Indicators (minimum of one required; check all that apply)</u></p> <p><input type="checkbox"/> Surface Water (A1)</p> <p><input type="checkbox"/> High Water Table (A2)</p> <p><input checked="" type="checkbox"/> Saturation (A3)</p> <p><input type="checkbox"/> Water Marks (B1)</p> <p><input type="checkbox"/> Sediment Deposits (B2)</p> <p><input type="checkbox"/> Drift Deposits (B3)</p> <p><input type="checkbox"/> Algal Mat or Crust (B4)</p> <p><input type="checkbox"/> Iron Deposits (B5)</p> <p><input type="checkbox"/> Surface Soil Cracks (B6)</p> <p><input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)</p> <p><input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)</p> <p><input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)</p> <p><input type="checkbox"/> Salt Crust (B11)</p> <p><input type="checkbox"/> Aquatic Invertebrates (B13)</p> <p><input type="checkbox"/> Hydrogen Sulfide Odor (C1)</p> <p><input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)</p> <p><input type="checkbox"/> Presence of Reduced Iron (C4)</p> <p><input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)</p> <p><input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)</p> <p><input type="checkbox"/> Other (Explain in Remarks)</p>			<p><u>Secondary Indicators (2 or more required)</u></p> <p><input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)</p> <p><input type="checkbox"/> Drainage Patterns (B10)</p> <p><input type="checkbox"/> Dry-Season Water Table (C2)</p> <p><input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)</p> <p><input type="checkbox"/> Geomorphic Position (D2)</p> <p><input type="checkbox"/> Shallow Aquitard (D3)</p> <p><input type="checkbox"/> FAC-Neutral Test (D5)</p> <p><input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)</p> <p><input type="checkbox"/> Frost-Heave Hummocks (D7)</p>		
---	--	--	---	--	--

**Field Observations:**

Surface Water Present? Yes  No  Depth (inches): \_\_\_\_\_

Water Table Present? Yes  No  Depth (inches): \_\_\_\_\_

Saturation Present? (includes capillary fringe) Yes  No  Depth (inches): 8

**Wetland Hydrology Present?** Yes  No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Aerial imagery, LiDAR-derived hillshade, NWI, and LWI

Remarks: (seeping in from hillside)  
 Water visible at depth of 14 inches; however, this hydrology appears to be coming from upslope drainage. Constructed depression appears to be draining hydrology from uplands to the north.



# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Rock Creek Trunk Line Project City/County: Sherwood/Washington Sampling Date: 5/23/19  
 Applicant/Owner: City of Sherwood State: OR Sampling Point: SP- 5  
 Investigator(s): D. Covington and J. Roper Section, Township, Range: T2S, R1W, Section 28 or 29  
 Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Slight Concave Slope (%): 0  
 Subregion (LRR): A Lat: 45.366154 Long: -122.828784 Datum: WGS 1984  
 Soil Map Unit Name: 43 - Wapato silty clay loam NWI classification: \_\_\_\_\_  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes  No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes \_\_\_\_\_ No \_\_\_\_\_  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____ <i>Wetland B next to Rock Creek</i>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No _____	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No _____	

*large wetland area in floodplain of Rock Creek.*

## VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____ )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC:	<u>4</u> (A)
2. _____				Total Number of Dominant Species Across All Strata:	<u>4</u> (B)
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC:	<u>100</u> (A/B)
4. _____				= Total Cover	
Sapling/Shrub Stratum (Plot size: <u>30' dia</u> )				Prevalence Index worksheet:	
1. <u>Salix sitkensis</u>	<u>5</u>	<u>Y</u>	<u>FACW</u>	Total % Cover of:	Multiply by:
2. <u>Rubus armeniacus</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>	OBL species _____ x 1 = _____	
3. _____				FACW species _____ x 2 = _____	
4. _____				FAC species _____ x 3 = _____	
5. _____				FACU species _____ x 4 = _____	
<u>15</u> = Total Cover				UPL species _____ x 5 = _____	
Herb Stratum (Plot size: <u>10' dia</u> )				Column Totals: _____ (A)	_____ (B)
1. <u>Juncus effusus</u>	<u>40</u>	<u>Y</u>	<u>FACW</u>	Prevalence Index = B/A = _____	
2. <u>Monarda pratensis</u>	<u>65</u>	<u>Y</u>	<u>FAC</u>		
3. <u>Phalaris arundinacea</u>	<u>20</u>	<u>N</u>	<u>FACW</u>		
4. <u>Vicia villosa</u>	<u>10</u>	<u>N</u>	<u>FACW</u>		
5. _____					
6. _____					
7. _____					
8. _____					
9. _____					
10. _____					
11. _____					
<u>135</u> = Total Cover					
Woody Vine Stratum (Plot size: _____ )				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	
1. _____					
2. _____					
= Total Cover					
% Bare Ground in Herb Stratum <u>0</u>					

Remarks:

**SOIL**

Sampling Point: SP- 5

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-5	10YR 3/3	100	/	/	/	/	SCL	many fine roots
5-16	10YR 3/1	80	10YR 3/3	20	C	M	SCL	many fine, distinct

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils <sup>3</sup> :	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input checked="" type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)		

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

**Restrictive Layer (if present):**  
 Type: \_\_\_\_\_  
 Depth (inches): \_\_\_\_\_

**Hydric Soil Present?** Yes  No

Remarks:

**HYDROLOGY**

Wetland Hydrology Indicators:		Secondary Indicators (2 or more required)	
Primary Indicators (minimum of one required; check all that apply)			
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)	
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)	
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)	
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> FAC-Neutral Test (D5)	
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)	
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)	
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)			
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)			

**Field Observations:**

Surface Water Present? Yes  No  Depth (inches): NA

Water Table Present? Yes  No  Depth (inches): 76

Saturation Present? (includes capillary fringe) Yes  No  Depth (inches): 8

**Wetland Hydrology Present?** Yes  No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Aerial imagery, LiDAR-derived hillshade, NWI, and LWI

Remarks:

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Rock Creek Trunk Line Project City/County: Sherwood/Washington Sampling Date: 5/23/19  
 Applicant/Owner: City of Sherwood State: OR Sampling Point: SP-6  
 Investigator(s): D. Covington and J. Roper Section, Township, Range: T2S, R1W, Section 28 or 29  
 Landform (hillslope, terrace, etc.): \_\_\_\_\_ Local relief (concave, convex, none): none Slope (%): 8  
 Subregion (LRR): A Lat: 45.366144 Long: -122.828859 Datum: WGS 1984  
 Soil Map Unit Name: 43-Wapato silty clay loam NWI classification: None  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes  No  (If no, explain in Remarks.)  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes  No   
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Wetland Hydrology Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	

plot located upslope of wetland plot SP-5 (on transition slope of old terrace to Rock Creek)

## VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____ )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC:	<u>7</u> (A)
2. _____				Total Number of Dominant Species Across All Strata:	<u>2</u> (B)
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC:	<u>100</u> (A/B)
4. _____					
_____ = Total Cover					
Sapling/Shrub Stratum (Plot size: <u>10' dia</u> )	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:	
1. <u>Rubus armeniacus</u>	<u>90</u>	<u>Y</u>	<u>FAC</u>		
2. <u>Polystichum monitum</u>	<u>7</u>	<u>N</u>	<u>FA</u>	OBL species _____ x 1 = _____	
3. _____				FACW species _____ x 2 = _____	
4. _____				FAC species _____ x 3 = _____	
5. _____				FACU species _____ x 4 = _____	
<u>90</u> = Total Cover				UPL species _____ x 5 = _____	
Herb Stratum (Plot size: <u>10' dia</u> )	Absolute % Cover	Dominant Species?	Indicator Status	Column Totals: _____ (A)	_____ (B)
1. <u>Phalaris arundinacea</u>	<u>15</u>	<u>Y</u>	<u>FACW</u>	Prevalence Index = B/A = _____	
2. <u>Polystichum monitum</u>	<u>7</u>	<u>N</u>	<u>FACU</u>		
3. _____				<b>Hydrophytic Vegetation Indicators:</b> <input checked="" type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 <sup>1</sup> <input type="checkbox"/> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> 5 - Wetland Non-Vascular Plants <sup>1</sup> <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
4. _____					
5. _____					
6. _____					
7. _____					
8. _____					
9. _____					
10. _____					
11. _____					
<u>15</u> = Total Cover					
Woody Vine Stratum (Plot size: _____ )	Absolute % Cover	Dominant Species?	Indicator Status		
1. _____					
2. _____					
_____ = Total Cover					
% Bare Ground in Herb Stratum <u>0</u>					

Remarks:

**SOIL**

Sampling Point: SP- 6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-6	10YR 3/2	100					SL	
6-16	10YR 3/1	60	5YR 3/4	20	C	M	many coarse, prom.	SL
	10YR 4/1	20						

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1) (except MLRA 1)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- 2 cm Muck (A10)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

**Restrictive Layer (if present):**

Type: \_\_\_\_\_  
Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes  No

Remarks: redox concentrations and depletions appear to be relict and ~~are~~ not formed/maintained by frequent inundation or saturation

**HYDROLOGY**

**Wetland Hydrology Indicators:**

**Primary Indicators (minimum of one required; check all that apply)**

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Surface Soil Cracks (B6)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)

- Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres along Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Stunted or Stressed Plants (D1) (LRR A)
- Other (Explain in Remarks)

**Secondary Indicators (2 or more required)**

- Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Saturation Visible on Aerial Imagery (C9)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- FAC-Neutral Test (D5)
- Raised Ant Mounds (D6) (LRR A)
- Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes  No  Depth (inches): \_\_\_\_\_  
 Water Table Present? Yes  No  Depth (inches): \_\_\_\_\_  
 Saturation Present? (includes capillary fringe) Yes  No  Depth (inches): \_\_\_\_\_

Wetland Hydrology Present? Yes  No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Aerial imagery, LiDAR-derived hillshade, NWI, and LWI

Remarks:

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Rock Creek Trunk Line Project City/County: Sherwood/Washington Sampling Date: 5/23/19  
 Applicant/Owner: City of Sherwood State: OR Sampling Point: SP-7  
 Investigator(s): D. Covington and J. Roper Section, Township, Range: T2S, R1W, Section 28 or 29  
 Landform (hillslope, terrace, etc.): flat plain Local relief (concave, convex, none) Slope (%): 1  
 Subregion (LRR): A Lat: 45.366344 Long: -122.828582 Datum: WGS 1984  
 Soil Map Unit Name: 43-Wapato silty clay loam NWI classification: None  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes  No  (If no, explain in Remarks.)  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes  No   
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> <u>Wetland B on Rock Creek FP</u>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	

## VEGETATION – Use scientific names of plants.

Stratum	Plot size	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
<b>Tree Stratum</b>	(Plot size: <u>    </u> )				Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A)
1. <u>    </u>					Total Number of Dominant Species Across All Strata: <u>3</u> (B)
2. <u>    </u>					Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
3. <u>    </u>					
4. <u>    </u>					
= Total Cover					
<b>Sapling/Shrub Stratum</b>	(Plot size: <u>10' dia</u> )				<b>Prevalence Index worksheet:</b>
1. <u>Salix lasiandra (sprout)</u>		<u>5</u>	<u>Y</u>	<u>FACW</u>	Total % Cover of: <u>    </u> Multiply by: <u>    </u>
2. <u>    </u>					OBL species <u>    </u> x 1 = <u>    </u>
3. <u>    </u>					FACW species <u>    </u> x 2 = <u>    </u>
4. <u>    </u>					FAC species <u>    </u> x 3 = <u>    </u>
5. <u>    </u>					FACU species <u>    </u> x 4 = <u>    </u>
<u>5</u> = Total Cover					UPL species <u>    </u> x 5 = <u>    </u>
					Column Totals: <u>    </u> (A) <u>    </u> (B)
					Prevalence Index = B/A = <u>    </u>
<b>Herb Stratum</b>	(Plot size: <u>10' dia</u> )				<b>Hydrophytic Vegetation Indicators:</b>
1. <u>Phalaris arundinacea</u>		<u>60</u>	<u>Y</u>	<u>FACW</u>	<input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation
2. <u>Cirsium arvense</u>		<u>5</u>	<u>N</u>	<u>FAC</u>	<input checked="" type="checkbox"/> 2 - Dominance Test is >50%
3. <u>Alopecurus pratensis</u>		<u>40</u>	<u>Y</u>	<u>FAC</u>	<input type="checkbox"/> 3 - Prevalence Index is ≤3.0 <sup>1</sup>
4. <u>Galium trifidum</u>		<u>10</u>	<u>N</u>	<u>FACW</u>	<input type="checkbox"/> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
5. <u>Salix lasiandra (sprout)</u>		<u>5</u>	<u>N</u>	<u>FACW</u>	<input type="checkbox"/> 5 - Wetland Non-Vascular Plants <sup>1</sup>
6. <u>Vicia americana</u>		<u>5</u>	<u>N</u>	<u>FACU</u>	<input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
7. <u>    </u>					
8. <u>    </u>					
9. <u>    </u>					
10. <u>    </u>					
11. <u>    </u>					
<u>120</u> = Total Cover					<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
<b>Woody Vine Stratum</b>	(Plot size: <u>    </u> )				<b>Hydrophytic Vegetation Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
1. <u>    </u>					
2. <u>    </u>					
= Total Cover					
% Bare Ground in Herb Stratum <u>0</u>					

Remarks:

**SOIL**

Sampling Point: SP-7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-6	10YR 3/1	100					SL	
6-16	10YR 3/1	80	10YR 3/4	10	C	M	SCL	many, med, dist.
	10YR 4/1	10					SCL	

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1) (except MLRA 1)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

- 2 cm Muck (A10)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

**Restrictive Layer (if present):**

Type: \_\_\_\_\_  
Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes  No

Remarks:

**HYDROLOGY**

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

Secondary Indicators (2 or more required)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Surface Soil Cracks (B6)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres along Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Stunted or Stressed Plants (D1) (LRR A)
- Other (Explain in Remarks)

- Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Saturation Visible on Aerial Imagery (C9)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- FAC-Neutral Test (D5)
- Raised Ant Mounds (D6) (LRR A)
- Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes  No  Depth (inches): NA  
 Water Table Present? Yes  No  Depth (inches): >16  
 Saturation Present? (includes capillary fringe) Yes  No  Depth (inches): 10

Wetland Hydrology Present? Yes  No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Aerial imagery, LiDAR-derived hillshade, NWI, and LWI

Remarks:

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Rock Creek Trunk Line Project City/County: Sherwood/Washington Sampling Date: 5/23/19  
 Applicant/Owner: City of Sherwood State: OR Sampling Point: SP-8  
 Investigator(s): D. Covington and J. Roper Section, Township, Range: T2S, R1W, Section 28 or 29  
 Landform (hillslope, terrace, etc.): \_\_\_\_\_ Local relief (concave, convex, none): \_\_\_\_\_ Slope (%): 2  
 Subregion (LRR): A Lat: 45.366368 Long: -122.828648 Datum: WGS 1984  
 Soil Map Unit Name: 43-Wapato silty clay loam NWI classification: None  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes  No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes  No \_\_\_\_\_  
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No _____	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No _____	
Wetland Hydrology Present?	Yes _____	No <input checked="" type="checkbox"/>	

## VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____ )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC:	<u>1</u> (A)
2. _____				Total Number of Dominant Species Across All Strata:	<u>1</u> (B)
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC:	<u>100</u> (A/B)
4. _____					
_____ = Total Cover					
Sapling/Shrub Stratum (Plot size: _____ )	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:	
1. _____				Total % Cover of:	Multiply by:
2. _____				OBL species _____	x 1 = _____
3. _____				FACW species _____	x 2 = _____
4. _____				FAC species _____	x 3 = _____
5. _____				FACU species _____	x 4 = _____
				UPL species _____	x 5 = _____
_____ = Total Cover				Column Totals:	(A) _____ (B) _____
				Prevalence Index = B/A = _____	
Herb Stratum (Plot size: <u>10' dia</u> )	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:	
1. <u>Cirsium arvense</u>	<u>5</u>	<u>N</u>	<u>5 N FAC</u>	<input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation	
2. <u>Vicia americana</u>	<u>75</u>	<u>Y</u>	<u>75 Y FACU</u>	<input checked="" type="checkbox"/> 2 - Dominance Test is >50%	
3. <u>Holcus lanatus</u>	<u>5</u>	<u>N</u>	<u>5 N FAC</u>	<input type="checkbox"/> 3 - Prevalence Index is ≤3.0 <sup>1</sup>	
4. <u>Phalaris arundinacea</u>	<u>10</u>	<u>N</u>	<u>10 N FACW</u>	<input type="checkbox"/> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)	
5. <u>Alopecurus pratensis</u>	<u>20</u>	<u>N</u>	<u>20 N FAC</u>	<input type="checkbox"/> 5 - Wetland Non-Vascular Plants <sup>1</sup>	
6. <u>Rumex crispus</u>	<u>5</u>	<u>N</u>	<u>5 N FAC</u>	<input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
7. _____				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
8. _____					
9. _____					
10. _____					
11. _____					
<u>120</u> = Total Cover					
Woody Vine Stratum (Plot size: _____ )	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Present?	
1. _____				Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
2. _____					
_____ = Total Cover					
% Bare Ground in Herb Stratum <u>0</u>					

Remarks:

**SOIL**

Sampling Point: SP- 8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-6	10YR 3/2	100					SL	
6-16	10YR 3/1	30					SL	
	10YR 5/1	55	7.5YR 4/6	15	C	M	JL	many medics, prominent

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils <sup>3</sup> :	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input checked="" type="checkbox"/> Depleted Matrix (F3)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input checked="" type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)		

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

**Restrictive Layer (if present):**  
 Type: \_\_\_\_\_  
 Depth (inches): \_\_\_\_\_

**Hydric Soil Present?** Yes  No

Remarks:

**HYDROLOGY**

Wetland Hydrology Indicators:		Secondary Indicators (2 or more required)	
Primary Indicators (minimum of one required; check all that apply)			
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)	
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)	
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> FAC-Neutral Test (D5)	
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)	
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)	
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)			
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)			

**Field Observations:**

Surface Water Present? Yes  No  Depth (inches): \_\_\_\_\_

Water Table Present? Yes  No  Depth (inches): \_\_\_\_\_

Saturation Present? (includes capillary fringe) Yes  No  Depth (inches): \_\_\_\_\_

**Wetland Hydrology Present?** Yes  No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Aerial imagery, LiDAR-derived hillshade, NWI, and LWI

Remarks:





**SOIL**

Sampling Point: SP- 9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-6	10YR 3/2	100	✓	✓	✓	✓	SL	
6-16	10YR 3/2	80	10YR 3/4	20	C	M	SL	many, med, distinct

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1) (except MLRA 1)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- 2 cm Muck (A10)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

**Restrictive Layer (if present):**

Type: \_\_\_\_\_  
Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes  No

Remarks: Some redox appears to be relict.

**HYDROLOGY**

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Surface Soil Cracks (B6)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres along Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Stunted or Stressed Plants (D1) (LRR A)
- Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Saturation Visible on Aerial Imagery (C9)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- FAC-Neutral Test (D5)
- Raised Ant Mounds (D6) (LRR A)
- Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes  No  Depth (inches): \_\_\_\_\_  
 Water Table Present? Yes  No  Depth (inches): \_\_\_\_\_  
 Saturation Present? (includes capillary fringe) Yes  No  Depth (inches): \_\_\_\_\_

Wetland Hydrology Present? Yes  No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Aerial imagery, LiDAR-derived hillshade, NWI, and LWI

Remarks:

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Rock Creek Trunk Line Project City/County: Sherwood/Washington Sampling Date: 5/24/19  
 Applicant/Owner: City of Sherwood State: OR Sampling Point: SP- 10  
 Investigator(s): D. Covington and J. Roper Section, Township, Range: T2S, R1W, Section 28 or 29  
 Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, ~~none~~): \_\_\_\_\_ Slope (%): 6  
 Subregion (LRR): A Lat: 45.369849 Long: -122.830373 Datum: WGS 1984  
 Soil Map Unit Name: 37C-Quaternary Loam, 7 to 12 percent slopes NWI classification: None  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes  No  (If no, explain in Remarks.)  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes  No   
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Wetland Hydrology Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	

## VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30' dia</u> )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. <u>Crataegus monogyna</u>	50	Y	FAC	Number of Dominant Species That Are OBL, FACW, or FAC:	<u>3</u> (A)
2. <u>Fraxinus latifolia</u>	10	N	FACW	Total Number of Dominant Species Across All Strata:	<u>5</u> (B)
3. <u>Amelanchier alnifolia</u>	25	Y	FACU	Percent of Dominant Species That Are OBL, FACW, or FAC:	<u>60%</u> (A/B)
4. _____					
<u>85</u> = Total Cover					
Sapling/Shrub Stratum (Plot size: <u>10' dia</u> )	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:	
1. <u>Rubus armeniacus</u>	30	Y	FAC		
2. <u>Corylus cornuta</u>	15	Y	UPL	OBL species	x 1 = _____
3. _____				FACW species	x 2 = _____
4. _____				FAC species	x 3 = _____
5. _____				FACU species	x 4 = _____
<u>45</u> = Total Cover				UPL species	x 5 = _____
				Column Totals:	(A) _____ (B) _____
				Prevalence Index = B/A = _____	
Herb Stratum (Plot size: <u>5' rad</u> )	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:	
1. <u>Equisetum arvense</u>	10	Y	FAC		
2. _____				<input checked="" type="checkbox"/> 2 - Dominance Test is >50%	
3. _____				<input type="checkbox"/> 3 - Prevalence Index is ≤3.0 <sup>1</sup>	
4. _____				<input type="checkbox"/> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)	
5. _____				<input type="checkbox"/> 5 - Wetland Non-Vascular Plants <sup>1</sup>	
6. _____				<input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
7. _____				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
8. _____					
9. _____					
10. _____					
11. _____					
<u>10</u> = Total Cover					
Woody Vine Stratum (Plot size: <u>30' rad</u> )	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Present?	
1. <u>Solanum dulcamara</u>	2	N	FAC		
2. <u>Hebea helix</u>	2	N	UPL		
<u>4</u> = Total Cover					
% Bare Ground in Herb Stratum <u>85 (w/ leaf litter)</u>					

Remarks:



# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Rock Creek Trunk Line Project City/County: Sherwood/Washington Sampling Date: 5/24/19  
 Applicant/Owner: City of Sherwood State: OR Sampling Point: SP- 11  
 Investigator(s): D. Covington and J. Roper Section, Township, Range: T2S, R1W, Section 28 or 29  
 Landform (hillslope, terrace, etc.): flood plain Local relief (concave, convex, none): \_\_\_\_\_ Slope (%): 4  
 Subregion (LRR): A Lat: 45.369846 Long: -122.830310 Datum: WGS 1984  
 Soil Map Unit Name: 37C-Quaternary Loam, 7 to 12 percent slopes NWI classification: None  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes  No  (If no, explain in Remarks.)  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes  No   
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland <u>A</u> ( <u>floodplain wetland of Rock Creek</u> )
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	

## VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30' rad</u> )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. <u>Populus trichocarpa</u>	15	Y	FAC	Number of Dominant Species That Are OBL, FACW, or FAC: <u>8</u> (A) Total Number of Dominant Species Across All Strata: <u>8</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)
2. <u>Betula (European birch)</u>	15	Y	FAC (est)	
3. <u>Fraxinus latifolia</u>	30	Y	FACW	
<u>60</u> = Total Cover				<b>Prevalence Index worksheet:</b> Total % Cover of: Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
<b>Sapling/Shrub Stratum (Plot size: <u>5' rad</u>)</b>				
1. <u>Rubus armeniacus</u>	35	Y	FAC	
2. <u>Crataegus douglasii</u>	20	Y	FAC	
3. <u>Crataegus monogyna</u>	20	Y	FAC	
<u>65</u> = Total Cover				
<b>Herb Stratum (Plot size: <u>5' rad</u>)</b>				
1. <u>Idemna menziesii</u>	15	Y	FAC	<b>Hydrophytic Vegetation Indicators:</b> <input checked="" type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 <sup>1</sup> <input type="checkbox"/> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> 5 - Wetland Non-Vascular Plants <sup>1</sup> <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain) <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. <u>Phalaris arundinacea</u>	20	Y	FACW	
3. <u>Polytrichum minutum</u>	5	N	FACU	
4. <u>Juncus effusus</u>	10	N X	FACW	
5. <u>Ranunculus repens</u>	5	N X	FAC FACW	
6. <u>Equisetum arvense</u>	10	N X	FAC	
<u>65</u> = Total Cover				
<b>Woody Vine Stratum (Plot size: _____)</b>				
1. _____				<b>Hydrophytic Vegetation Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
2. _____				
_____ = Total Cover				
% Bare Ground in Herb Stratum <u>35</u> (plus leaf litter)				
Remarks:				

**SOIL**

Sampling Point: SP-11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-6	10YR 3/1	95	10YR 3/4	5	C	M	SCL	few, fine dist.
6-16	10YR 3/1	85	5YR 3/3	15	C	M, PL	SCL	many, med, prom

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils <sup>3</sup> :	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input checked="" type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)		

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

**Restrictive Layer (if present):**  
 Type: \_\_\_\_\_  
 Depth (inches): \_\_\_\_\_

**Hydric Soil Present?** Yes  No

Remarks: some redox in lower horizon appeared relict

**HYDROLOGY**

Wetland Hydrology Indicators:		Secondary Indicators (2 or more required)	
Primary Indicators (minimum of one required; check all that apply)			
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)	
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input checked="" type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)	
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input checked="" type="checkbox"/> FAC-Neutral Test (D5)	
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)	
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)	
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)			
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)			

**Field Observations:**

Surface Water Present? Yes  No  Depth (inches): \_\_\_\_\_

Water Table Present? Yes  No  Depth (inches): \_\_\_\_\_

Saturation Present? (includes capillary fringe) Yes  No  Depth (inches): \_\_\_\_\_

**Wetland Hydrology Present?** Yes  No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Aerial imagery, LiDAR-derived hillshade, NWI, and LWI

Remarks:

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Rock Creek Trunk Line Project City/County: Sherwood/Washington Sampling Date: 5/24/19  
 Applicant/Owner: City of Sherwood State: OR Sampling Point: SP- 12  
 Investigator(s): D. Covington and J. Roper Section, Township, Range: T2S, R1W, Section 28 or 29  
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): \_\_\_\_\_ Slope (%): 0  
 Subregion (LRR): A Lat: 45.368884 Long: -122.829046 Datum: WGS 1984  
 Soil Map Unit Name: S8-Briedwell stony silt loam, 0 to 7 percent slopes NWI classification: None  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes  No  (If no, explain in Remarks.)  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes  No   
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland <u>A</u> <u>PFO</u>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	

## VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30' rad.</u> )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:		
1. <u>Fraxinus latifolia</u>	<u>30</u>	<u>Y</u>	<u>FACW</u>	Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A)		
2. _____				Total Number of Dominant Species Across All Strata: <u>4</u> (B)		
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>75%</u> (A/B)		
4. _____						
<u>30</u> = Total Cover				<b>Prevalence Index worksheet:</b> Total % Cover of: Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____		
Sapling/Shrub Stratum (Plot size: <u>10' dia</u> )	Absolute % Cover	Dominant Species?	Indicator Status			
1. <u>Physocarpus capitatus</u>	<u>60</u>	<u>Y</u>	<u>FACW</u>			
2. <u>Oenothera biennis</u>	<u>10</u>	<u>N</u>	<u>FACU</u>			
3. <u>Rubus ursinus</u>	<u>10</u>	<u>N</u>	<u>FACU</u>			
4. _____						
5. _____						
<u>80</u> = Total Cover						
Herb Stratum (Plot size: <u>10' dia</u> )	Absolute % Cover	Dominant Species?	Indicator Status			
1. <u>Ulmus menziesii</u>	<u>10</u>	<u>N</u>	<u>FAC</u>			
2. <u>Galium triflorum</u>	<u>5</u>	<u>N</u>	<u>FACW</u>			
3. <u>Petasites frigidus</u>	<u>35</u>	<u>Y</u>	<u>FACW</u>			
4. <u>Urtica dioica</u>	<u>10</u>	<u>N</u>	<u>FAC</u>			
5. _____						
6. _____						
7. _____						
8. _____						
9. _____						
10. _____						
11. _____						
<u>60</u> = Total Cover						
Woody Vine Stratum (Plot size: <u>30' rad.</u> )	Absolute % Cover	Dominant Species?	Indicator Status			
1. <u>Aedon helix</u>	<u>15</u>	<u>Y</u>	<u>UPL</u>			
2. _____						
<u>15</u> = Total Cover						
% Bare Ground in Herb Stratum <u>40</u>				<b>Hydrophytic Vegetation Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		

Remarks:

**SOIL**

Sampling Point: SP- 12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
<del>10-17R</del>								
0-7	10 <sup>+</sup> YR 3/1	100					SL w/ rocks	
7-16	10 <sup>+</sup> YR 5/1	80	10 <sup>+</sup> YR 3/4	20	C	M	SL w/ rocks	many, fine, prom.

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils <sup>3</sup> :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	<sup>3</sup> Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

**Restrictive Layer (if present):**  
 Type: \_\_\_\_\_  
 Depth (inches): \_\_\_\_\_

**Hydric Soil Present?** Yes  No

Remarks:

**HYDROLOGY**

Wetland Hydrology Indicators:		
Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)
<input checked="" type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
<input checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

**Field Observations:**

Surface Water Present? Yes  No  Depth (inches): \_\_\_\_\_

Water Table Present? Yes  No  Depth (inches): 10

Saturation Present? (includes capillary fringe) Yes  No  Depth (inches): 7

**Wetland Hydrology Present?** Yes  No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Aerial imagery, LiDAR-derived hillshade, NWI, and LWI

Remarks:



# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Rock Creek Trunk Line Project City/County: Sherwood/Washington Sampling Date: 5/24/19  
 Applicant/Owner: City of Sherwood State: OR Sampling Point: SP-13  
 Investigator(s): D. Covington and J. Roper Section, Township, Range: T2S, R1W, Section 28 or 29  
 Landform (hillslope, terrace etc.): \_\_\_\_\_ Local relief (concave, convex, none): \_\_\_\_\_ Slope (%): 3  
 Subregion (LRR): A Lat: 45.368818 Long: -122.829049 Datum: WGS 1984  
 Soil Map Unit Name: SB-Briedwell stony silt loam, 0 to 7 percent slopes NWI classification: None  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes  No  (If no, explain in Remarks.)  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes  No   
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Wetland Hydrology Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	

### VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30' rad</u> )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. <u>Psuedotsuga menziesii</u>	40	Y	FACU	Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>25</u> (A/B)
2. <u>Acer macrophyllum</u>	30	Y	FACU	
3. _____				
4. _____				
<u>70</u> = Total Cover				<b>Prevalence Index worksheet:</b> Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
<b>Sapling/Shrub Stratum (Plot size: <u>10' dia</u>)</b>				
1. <u>Symphoricarpos albus</u>	15	N	FACU	
2. <u>Oemleria canaliculata</u>	35	Y	FACU	
3. <u>Toxicodendron diversilobum</u>	40	Y	FACU	
4. <u>Rubus ursinus</u>	20	N	FACU	
5. <u>Mahonia repens</u>	10	N	FACU	
<u>120</u> = Total Cover				
<b>Herb Stratum (Plot size: _____)</b>				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
_____ = Total Cover				
<b>Woody Vine Stratum (Plot size: _____)</b>				
1. _____				
2. _____				
_____ = Total Cover				
% Bare Ground in Herb Stratum <u>40</u>				
<b>Hydrophytic Vegetation Indicators:</b> <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 <sup>1</sup> <input type="checkbox"/> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> 5 - Wetland Non-Vascular Plants <sup>1</sup> <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)				
<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.				
<b>Hydrophytic Vegetation Present?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>				

Remarks: \_\_\_\_\_

**SOIL**

Sampling Point: SP- 13

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
10 YR 3/2	10 YR 3/2	1W					rocky loam	
0-16								

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

<b>Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)</b>		<b>Indicators for Problematic Hydric Soils<sup>3</sup>:</b>	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)		

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

**Restrictive Layer (if present):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes  No

Remarks:

**HYDROLOGY**

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)	
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)	
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)	
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> FAC-Neutral Test (D5)	
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)	
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)	
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)			
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)			

**Field Observations:**

Surface Water Present? Yes  No  Depth (inches): \_\_\_\_\_

Water Table Present? Yes  No  Depth (inches): \_\_\_\_\_

Saturation Present? (includes capillary fringe) Yes  No  Depth (inches): \_\_\_\_\_

Wetland Hydrology Present? Yes  No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Aerial imagery, LiDAR-derived hillshade, NWI, and LWI

Remarks:

**WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region**

Project/Site: Rock Creek Trunk Line Project City/County: Sherwood/Washington Sampling Date: 5/24/19  
 Applicant/Owner: City of Sherwood State: OR Sampling Point: SP-14  
 Investigator(s): D. Covington and J. Roper Section, Township, Range: T2S, R1W, Section 28 or 29  
 Landform (hillslope, terrace) etc.): \_\_\_\_\_ Local relief (concave, convex, none): \_\_\_\_\_ Slope (%): 1  
 Subregion (LRR): A Lat: 45.369952 Long: -122.828735 Datum: WGS 1984  
 Soil Map Unit Name: SB-Briedwell stony silt loam, 0 to 7 percent slopes NWI classification: None  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes  No  (If no, explain in Remarks.)  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes  No   
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	<b>Is the Sampled Area within a Wetland?</b>	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>			
Wetland Hydrology Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>			

**VEGETATION – Use scientific names of plants.**

Tree Stratum (Plot size: <u>30' rad.</u> )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>5</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>60%</u> (A/B)
1. <u>Amelanchier alnifolia</u>	<u>25</u>	<u>Y</u>	<u>FACU</u>	
2. <u>Fraxinus latifolia</u>	<u>65</u>	<u>Y</u>	<u>FACW</u>	
3. <u>Cotoneaster integerrimus</u>	<u>25</u>	<u>Y</u>	<u>FAC</u>	
4. _____				
	<u>115</u>	= Total Cover		
Sapling/Shrub Stratum (Plot size: <u>10' dia</u> )	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
1. <u>Ostrya cerasiformis</u>	<u>15</u>	<u>N</u>	<u>FACU</u>	
2. <u>Symphoricarpos albus</u>	<u>40</u>	<u>Y</u>	<u>FACU</u>	
3. <u>Rubus armeniacus</u>	<u>25</u>	<u>Y</u>	<u>FAC</u>	
4. <u>Sambucus racemosa nigra</u>	<u>5</u>	<u>N</u>	<u>FAC</u>	
5. _____				
	<u>85</u>	= Total Cover		
Herb Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 <sup>1</sup> <input type="checkbox"/> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> 5 - Wetland Non-Vascular Plants <sup>1</sup> <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
		= Total Cover		
Woody Vine Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
1. _____				
2. _____				
		= Total Cover		
% Bare Ground in Herb Stratum	<u>80</u>			

Remarks: \_\_\_\_\_



# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Rock Creek Trunk Line Project City/County: Sherwood/Washington Sampling Date: 5/29/19  
 Applicant/Owner: City of Sherwood State: OR Sampling Point: SP- 15  
 Investigator(s): D. Covington and J. Roper Section, Township, Range: T2S, R1W, Section 28 or 29  
 Landform (hillslope, terrace, etc.): \_\_\_\_\_ Local relief (concave, convex, none): \_\_\_\_\_ Slope (%): 1  
 Subregion (LRR): A Lat: 45.369999 Long: -122.828738 Datum: WGS 1984  
 Soil Map Unit Name: SB-Briedwell stony silt loam, 0 to 7 percent slopes NWI classification: PFO1C  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes  No  (If no, explain in Remarks.)  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes  No   
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland A (PFO)
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	

## VEGETATION – Use scientific names of plants.

Stratum	Plot size	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
<b>Tree Stratum</b>	<u>30' rad</u>				Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A)
1. <u>Fraxinus latifolia</u>		<u>75</u>	<u>Y</u>	<u>FACW</u>	Total Number of Dominant Species Across All Strata: <u>4</u> (B)
2. <u>Crataegus monogyna</u>		<u>40</u>	<u>Y</u>	<u>FAC</u>	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>75</u> (A/B)
3. _____					
4. _____					
<u>115</u> = Total Cover					<b>Prevalence Index worksheet:</b> Total % Cover of: Multiply by: OBL species <input type="checkbox"/> x 1 = _____ FACW species <input type="checkbox"/> x 2 = _____ FAC species <input type="checkbox"/> x 3 = _____ FACU species <input type="checkbox"/> x 4 = _____ UPL species <input type="checkbox"/> x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
<b>Sapling/Shrub Stratum</b>	<u>5' rad</u>				
1. <u>Symphoricarpos albus</u>		<u>10</u>	<u>Y</u>	<u>FACU</u>	
2. <u>Rubus armeniacus</u>		<u>20</u>	<u>Y</u>	<u>FAC</u>	
3. _____					
<u>30</u> = Total Cover					
<b>Herb Stratum</b>	_____				<b>Hydrophytic Vegetation Indicators:</b> <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 <sup>1</sup> <input type="checkbox"/> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> 5 - Wetland Non-Vascular Plants <sup>1</sup> <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain) <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. _____					
2. _____					
3. _____					
4. _____					
5. _____					
6. _____					
7. _____					
8. _____					
9. _____					
10. _____					
11. _____					
_____ = Total Cover					
<b>Woody Vine Stratum</b>	_____				<b>Hydrophytic Vegetation Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
1. _____					
2. _____					
_____ = Total Cover					
% Bare Ground in Herb Stratum <u>65</u>					

Remarks: \_\_\_\_\_

**SOIL**

Sampling Point: SP- 15

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-7	10YR 2/2	100	/	/	/	/	SL	
7-16	10YR 3/1	95	10YR 3/4	5	C	M	SL	few fine distinct

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

<b>Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)</b>		<b>Indicators for Problematic Hydric Soils<sup>3</sup>:</b>
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input checked="" type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	<sup>3</sup> Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

**Restrictive Layer (if present):**  
 Type: \_\_\_\_\_  
 Depth (inches): \_\_\_\_\_

**Hydric Soil Present?** Yes  No

Remarks:

**HYDROLOGY**

<b>Wetland Hydrology Indicators:</b>		
<b>Primary Indicators (minimum of one required; check all that apply)</b>		<b>Secondary Indicators (2 or more required)</b>
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input checked="" type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

**Field Observations:**

Surface Water Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____
Water Table Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____

**Wetland Hydrology Present?** Yes  No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Aerial imagery, LiDAR-derived hillshade, NWI, and LWI

Remarks: bare ground, leaf litter build up due to seasonal ponding.

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Rock Creek Trunk Line Project City/County: Sherwood/Washington Sampling Date: 5/29/19  
 Applicant/Owner: City of Sherwood State: OR Sampling Point: SP-16  
 Investigator(s): D. Covington and J. Roper Section, Township, Range: T2S, R1W, Section 28 or 29  
 Landform (hillslope, terrace etc.): \_\_\_\_\_ Local relief (concave, convex, none): \_\_\_\_\_ Slope (%): 0  
 Subregion (LRR): A Lat: 45.368308 Long: -122.829174 Datum: WGS 1984  
 Soil Map Unit Name: S8-Briedwell stony silt loam, 0 to 7 percent slopes NWI classification: None  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes  No  (If no, explain in Remarks.)  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes  No   
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> <i>Wetland</i>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	

## VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30' rad</u> )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. <u>Fraxinus latifolia</u>	<u>55</u>	<u>Y</u>	<u>FACW</u>	Number of Dominant Species That Are OBL, FACW, or FAC:	<u>4</u> (A)
2. _____				Total Number of Dominant Species Across All Strata:	<u>4</u> (B)
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC:	<u>X 100</u> (A/B)
4. _____					
<u>55</u> = Total Cover				<b>Prevalence Index worksheet:</b>	
Sapling/Shrub Stratum (Plot size: <u>10' dia</u> )				Total % Cover of:	Multiply by:
1. <u>Rosa nutkana</u>	<u>10</u>	<u>N</u>	<u>FAC</u>	OBL species	x 1 = _____
2. <u>Rubus armeniacus</u>	<u>50</u>	<u>Y</u>	<u>FAC</u>	FACW species	x 2 = _____
3. <u>Physocarpus capitatus</u>	<u>25</u>	<u>Y</u>	<u>FAC</u>	FAC species	x 3 = _____
4. _____				FACU species	x 4 = _____
5. _____				UPL species	x 5 = _____
<u>85</u> = Total Cover				Column Totals:	(A) _____ (B) _____
Herb Stratum (Plot size: <u>10' dia</u> )				Prevalence Index = B/A = _____	
1. <u>Urtica dioica</u>	<del>70</del> <u>80</u>	<del>X</del> <u>Y</u>	<u>FAC</u>	<b>Hydrophytic Vegetation Indicators:</b>	
2. _____				<input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 <sup>1</sup> <input type="checkbox"/> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> 5 - Wetland Non-Vascular Plants <sup>1</sup> <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
3. _____				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
4. _____					
5. _____					
6. _____					
7. _____					
8. _____					
9. _____					
10. _____					
11. _____					
_____ = Total Cover				<b>Hydrophytic Vegetation Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Woody Vine Stratum (Plot size: _____)					
1. _____					
2. _____					
_____ = Total Cover					
% Bare Ground in Herb Stratum		<u>15</u>			

Remarks:

**SOIL**

Sampling Point: SP- 16

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-6	10YR 2/1	100	1	1	1	1	SL	
6-16	10YR 3/1	85	2.5YR 3/6	15	C	M	SL	many med p rom

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils <sup>3</sup> :	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input checked="" type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)		

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

<b>Restrictive Layer (if present):</b> Type: _____ Depth (inches): _____	Hydric Soil Present?    Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
--	---

Remarks:

**HYDROLOGY**

Wetland Hydrology Indicators:	
Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
<input checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Drift Deposits (B3)	<input checked="" type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)
<input type="checkbox"/> Iron Deposits (B5)	<input checked="" type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Drainage Patterns (B10)
	<input type="checkbox"/> Dry-Season Water Table (C2)
	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
	<input checked="" type="checkbox"/> Geomorphic Position (D2)
	<input type="checkbox"/> Shallow Aquitard (D3)
	<input checked="" type="checkbox"/> FAC-Neutral Test (D5)
	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
	<input type="checkbox"/> Frost-Heave Hummocks (D7)

<b>Field Observations:</b> Surface Water Present?    Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present?    Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>716</u> Saturation Present? (includes capillary fringe)    Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>10</u>	Wetland Hydrology Present?    Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
---	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Aerial imagery, LiDAR-derived hillshade, NWI, and LWI

Remarks:



# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Rock Creek Trunk Line Project City/County: Sherwood/Washington Sampling Date: 5/24/19  
 Applicant/Owner: City of Sherwood State: OR Sampling Point: SP-17  
 Investigator(s): D. Covington and J. Roper Section, Township, Range: T2S, R1W, Section 28 or 29  
 Landform (hillslope, terrace, etc.): \_\_\_\_\_ Local relief (concave, convex, none): \_\_\_\_\_ Slope (%): 2  
 Subregion (LRR): A Lat: 45.368368 Long: -122.829136 Datum: WGS 1984  
 Soil Map Unit Name: S5-Briedwell stony silt loam, 0 to 7 percent slopes NWI classification: None  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes  No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes  No \_\_\_\_\_  
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes _____	No <input checked="" type="checkbox"/>	
Wetland Hydrology Present?	Yes _____	No <input checked="" type="checkbox"/>	

## VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30' rad</u> )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. <u>Fraxinus latifolia</u>	<u>70</u>	<u>Y</u>	<u>FACW</u>	Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)
2. _____				Total Number of Dominant Species Across All Strata: <u>4</u> (B)
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50%</u> (A/B)
4. _____				
<u>70</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>10' dia</u> )	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:
1. <u>Quercus coccifera</u>	<u>25</u>	<u>Y</u>	<u>FACU</u>	Total % Cover of: Multiply by:
2. <u>Rubus armeniacus</u>	<u>10</u>	<u>N</u>	<u>FAC</u>	OBL species <u>0</u> x 1 = <u>0</u>
3. <u>Rosa sp.</u>	<u>5</u>	<u>N</u>	<u>FAC (os)</u>	FACW species <u>70</u> x 2 = <u>140</u>
4. <u>Physocarpus capitatus</u>	<u>25</u>	<u>Y</u>	<u>FAC</u>	FAC species <u>55</u> x 3 = <u>165</u>
5. <u>Toxicodendron diversilobum</u>	<u>15</u>	<u>N</u>	<u>FAC</u>	FACU species <u>35</u> x 4 = <u>140</u>
6. <u>Corylus cornuta</u>	<u>10</u>	<u>N</u>	<u>FACU</u>	UPL species <u>80</u> x 5 = <u>400</u>
<u>90</u> = Total Cover				Column Totals: <u>240</u> (A) <u>845</u> (B)
<u>90</u> = Total Cover				Prevalence Index = B/A = <u>3.52</u>
Herb Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:
1. _____				<input checked="" type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation
2. _____				<input checked="" type="checkbox"/> 2 - Dominance Test is >50%
3. _____				<input type="checkbox"/> 3 - Prevalence Index is ≤3.0 <sup>1</sup>
4. _____				<input type="checkbox"/> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
5. _____				<input type="checkbox"/> 5 - Wetland Non-Vascular Plants <sup>1</sup>
6. _____				<input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
7. _____				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
8. _____				
9. _____				
10. _____				
11. _____				
<u>80</u> = Total Cover				
<u>80</u> = Total Cover				
% Bare Ground in Herb Stratum <u>5</u>				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input checked="" type="checkbox"/>

Remarks:



# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Rock Creek Trunk Line Project City/County: Sherwood/Washington Sampling Date: 5/24/19  
 Applicant/Owner: City of Sherwood State: OR Sampling Point: SP- 18  
 Investigator(s): D. Covington and J. Roper Section, Township, Range: T2S, R1W, Section 28 or 29  
 Landform (hillslope, terrace, etc.): \_\_\_\_\_ Local relief (concave, convex, none): \_\_\_\_\_ Slope (%): 0  
 Subregion (LRR): A Lat: 45.367322 Long: -122.828321 Datum: WGS 1984  
 Soil Map Unit Name: S8-Briedwell stony silt loam, 0 to 7 percent slopes NWI classification: None  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes  No  (If no, explain in Remarks.)  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes  No   
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> <span style="font-size: 1.2em; margin-left: 100px;">Wetland B</span>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	

## VEGETATION – Use scientific names of plants.

Stratum	Plot size	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
<u>Tree Stratum</u>	(Plot size: _____ )				Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A)
1. _____					Total Number of Dominant Species Across All Strata: <u>3</u> (B)
2. _____					Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
3. _____					
4. _____					
= Total Cover					
<u>Sapling/Shrub Stratum</u>	(Plot size: <u>5' rad</u> )				<b>Prevalence Index worksheet:</b>
1. <u>Fraxinus latifolia</u>		<u>15</u>	<u>X Y FACW</u>		Total % Cover of: _____ Multiply by:
2. _____					OBL species _____ x 1 = _____
3. _____					FACW species _____ x 2 = _____
4. _____					FAC species _____ x 3 = _____
5. _____					FACU species _____ x 4 = _____
= Total Cover					UPL species _____ x 5 = _____
= Total Cover					Column Totals: _____ (A) _____ (B)
= Total Cover					Prevalence Index = B/A = _____
<u>Herb Stratum</u>	(Plot size: <u>5' rad</u> )				<b>Hydrophytic Vegetation Indicators:</b>
1. <u>Alopecurus pratensis</u>			<u>80 Y FAC</u>		<input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation
2. <u>Phalaris arundinacea</u>			<u>35 Y FACW</u>		<input checked="" type="checkbox"/> 2 - Dominance Test is >50%
3. <u>Agrostis capillaris</u>			<u>5 N FAC</u>		<input type="checkbox"/> 3 - Prevalence Index is ≤3.0 <sup>1</sup>
4. <u>Vicia villosa</u>			<u>10 N FACU</u>		<input type="checkbox"/> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
5. _____					<input type="checkbox"/> 5 - Wetland Non-Vascular Plants <sup>1</sup>
6. _____					<input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
7. _____					
8. _____					
9. _____					
10. _____					
11. _____					
= Total Cover					<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
= Total Cover					
<u>Woody Vine Stratum</u>	(Plot size: _____ )				<b>Hydrophytic Vegetation Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
1. _____					
2. _____					
= Total Cover					
% Bare Ground in Herb Stratum <u>0</u>					

Remarks:



# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Rock Creek Trunk Line Project City/County: Sherwood/Washington Sampling Date: 5/24/19  
 Applicant/Owner: City of Sherwood State: OR Sampling Point: SP-19  
 Investigator(s): D. Covington and J. Roper Section, Township, Range: T2S, R1W, Section 28 or 29  
 Landform (hillslope, terrace, etc.): \_\_\_\_\_ Local relief (concave, convex, none): None Slope (%): 0  
 Subregion (LRR): A Lat: 45.367322 Long: -122.828361 Datum: WGS 1984  
 Soil Map Unit Name: SB-Briedwell stony silt loam, 0 to 7 percent slopes NWI classification: None  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes  No  (If no, explain in Remarks.)  
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes  No   
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Is the Sampled Area within a Wetland?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>			
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>			

## VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50%</u> (A/B)
2. _____				
3. _____				
4. _____				
_____ = Total Cover				<b>Prevalence Index worksheet:</b> Total % Cover of:      Multiply by: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>55</u> x 3 = <u>165</u> FACU species <u>85</u> x 4 = <u>340</u> UPL species <u>0</u> x 5 = <u>0</u> Column Totals: <u>140</u> (A) <u>505</u> (B) Prevalence Index = B/A = <u>3.6</u>
Sapling/Shrub Stratum (Plot size: <u>10' dia</u> )	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Crataegus douglasii</u>	<u>15</u>	<u>Y Y</u>	<u>FAC</u>	
2. _____				
3. _____				
4. _____				
5. _____				
_____ = Total Cover				
Herb Stratum (Plot size: <u>10' dia</u> )	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Holcus lanatus</u>	<u>10</u>	<u>N</u>	<u>FAC</u>	
2. <u>Bromus hordeaceus</u>	<u>30</u>	<u>Y</u>	<u>FACU</u>	
3. <u>Vicia villosa</u>	<u>55</u>	<u>Y</u>	<u>FACU (e+)</u>	
4. <u>Moexcurus pratensis</u>	<u>30</u>	<u>Y</u>	<u>FAC</u>	
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
_____ = Total Cover				
Woody Vine Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____				
2. _____				
_____ = Total Cover				
% Bare Ground in Herb Stratum <u>0</u>				

Remarks: Sample plot is located within a wetland mitigation area. BPT hydrophytic dominance.

**SOIL**

Sampling Point: SP- 19

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-7	10YR 3/2	10	/	/	/	/	Sandy loam	w/ rocks
7-16	10YR 3/2	30	/	/	/	/	Sandy loam	w/ rocks
	10YR 5/1	45	10YR	25	C	M	SL	w/ rocks/fill
			2.5YR 3/6					
						med, many, prom.		

*mixed matrix*

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- |  |   |  |
|--|---|--|
| <input type="checkbox"/> Histosol (A1)                     | <input type="checkbox"/> Sandy Redox (S5)                         | <input type="checkbox"/> 2 cm Muck (A10)   |
| <input type="checkbox"/> Histic Epipedon (A2)              | <input type="checkbox"/> Stripped Matrix (S6)                     | <input type="checkbox"/> Red Parent Material (TF2)   |
| <input type="checkbox"/> Black Histic (A3)                 | <input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1) | <input type="checkbox"/> Very Shallow Dark Surface (TF12)  |
| <input type="checkbox"/> Hydrogen Sulfide (A4)             | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                 | <input checked="" type="checkbox"/> Other (Explain in Remarks)   |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input checked="" type="checkbox"/> Depleted Matrix (F3)          |  |
| <input type="checkbox"/> Thick Dark Surface (A12)          | <input type="checkbox"/> Redox Dark Surface (F6)                  | <sup>3</sup> Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)          | <input type="checkbox"/> Depleted Dark Surface (F7)               |  |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)          | <input type="checkbox"/> Redox Depressions (F8)                   |  |

**Restrictive Layer (if present):**

Type: \_\_\_\_\_  
Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes  No

Remarks: *mix matrix of old depletions and upper horizon colors. Most of the redox concentrations appear relict. BPT hydric.*

**HYDROLOGY**

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

Secondary Indicators (2 or more required)

- |  |   |  |
|--|---|--|
| <input type="checkbox"/> Surface Water (A1)                        | <input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) | <input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) |
| <input type="checkbox"/> High Water Table (A2)                     | <input type="checkbox"/> Salt Crust (B11)   | <input type="checkbox"/> Drainage Patterns (B10)                           |
| <input type="checkbox"/> Saturation (A3)                           | <input type="checkbox"/> Aquatic Invertebrates (B13)                              | <input type="checkbox"/> Dry-Season Water Table (C2)                       |
| <input type="checkbox"/> Water Marks (B1)                          | <input type="checkbox"/> Hydrogen Sulfide Odor (C1)                               | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)         |
| <input type="checkbox"/> Sediment Deposits (B2)                    | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)            | <input checked="" type="checkbox"/> Geomorphic Position (D2)               |
| <input type="checkbox"/> Drift Deposits (B3)                       | <input type="checkbox"/> Presence of Reduced Iron (C4)                            | <input type="checkbox"/> Shallow Aquitard (D3)                             |
| <input type="checkbox"/> Algal Mat or Crust (B4)                   | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)               | <input type="checkbox"/> FAC-Neutral Test (D5)                             |
| <input type="checkbox"/> Iron Deposits (B5)                        | <input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)                  | <input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)                    |
| <input type="checkbox"/> Surface Soil Cracks (B6)                  | <input checked="" type="checkbox"/> Other (Explain in Remarks)                    | <input type="checkbox"/> Frost-Heave Hummocks (D7)                         |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) |   |  |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)   |   |  |

**Field Observations:**

Surface Water Present? Yes  No  Depth (inches): \_\_\_\_\_  
 Water Table Present? Yes  No  Depth (inches): \_\_\_\_\_  
 Saturation Present? (includes capillary fringe) Yes  No  Depth (inches): 14

Wetland Hydrology Present? Yes  No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Aerial imagery, LIDAR-derived hillshade, NWI, and LWI

Remarks: *BPT. hydro - saturation relatively high @ 14 inches. sample plot located within a wetland mitigation area.*

## APPENDIX C

---

### Ground Level Color Photographs



**PHOTO 1**  
**May 23, 2019**

Investigating upland Sample Plot 1 (SP-1). Looking southwest at terrace above Rock creek floodplain on the west side of the PSA, south of SW Tualatin-Sherwood Road.

p



**PHOTO 2**  
**May 23, 2019**

Investigating upland SP-2. Looking southeast on terrace above Rock Creek floodplain on the west side of the PSA, south of SW Tualatin-Sherwood Road. Observers recorded what appeared to be small, planted Oregon ash trees (*Fraxinus latifolia*).





**PHOTO 3**  
**May 23, 2019**

Looking west at Stormwater Pond, located in southwest corner of PSA. Approximate feature boundary shown as red line.



**PHOTO 4**  
**May 23, 2019**

Documenting wetland SP-3 and upland SP-4 near boundary of Stormwater Pond (red line).



**PHOTO 5**  
**May 23, 2019**

Looking southwest at planted shrubs surrounding Stormwater Pond at the southwest corner of the PSA.



**PHOTO 6**  
**May 23, 2019**

Looking south at point source discharge from Stormwater Pond to Rock Creek.



**PHOTO 7**  
**May 23, 2019**  
Wetland SP-5 and upland SP-6 near west boundary of Wetland B (red line).



**PHOTO 8**  
**May 23, 2019**  
Wetland SP-7 near west boundary of Wetland B.



**PHOTO 9**  
**May 23, 2019**  
Upland SP-8 near west boundary of Wetland B.



**PHOTO 10**  
**May 24, 2019**  
Wetland SP-18 within Wetland B.



**PHOTO 11**  
**May 24, 2019**  
Wetland SP-19 within  
Wetland B.



**PHOTO 12**  
**May 24, 2019**  
Upland SP-10 near  
west boundary of  
Wetland A.



**PHOTO 13**  
**May 24, 2019**  
Wetland SP-11 near west boundary of Wetland A (red line).



**PHOTO 14**  
**May 24, 2019**  
Wetland SP-12 near south boundary of Wetland A (red line).



**PHOTO 15**  
**May 24, 2019**

Upland SP-13 near south boundary of Wetland A.



**PHOTO 16**  
**May 24, 2019**

Wetland SP-15 near boundary of Wetland A in northeast corner of PSA. This area had water-stained leaves, a sign of seasonal ponding at some point in the recent past.



**PHOTO 17**  
**May 24, 2019**

Upland SP-14 near boundary of Wetland A in northeast corner of PSA.



**PHOTO 18**  
**May 24, 2019**

Wetland SP-16 near the north border of Wetland C.





**PHOTO 19**  
**May 24, 2019**  
Upland SP-17 near the north border of Wetland C (red line).



**PHOTO 20**  
**May 23, 2019**  
Investigating upland at SP-9 north of Wetland B, on west side of Rock creek.



**PHOTO 21**  
**May 24, 2019**

Standing near east boundary (chain-link fence) of Stormwater Swale looking north.



**PHOTO 22**  
**May 24, 2019**

Standing on east boundary (chain-link fence) of Stormwater Swale looking southwest.



**PHOTO 23**  
**May 24, 2019**

Looking northeast at Small Pond in Wetland A. This is a depression within the Rock Creek floodplain that collects groundwater. It was likely excavated and has since been abandoned.



**PHOTO 24**  
**May 24, 2019**

Looking southwest at Rock Creek from shoulder of SW Tualatin-Sherwood Road. Rock Creek flows from upper left to lower right of photo through double box culvert under road.



**PHOTO 25**  
**May 24, 2019**

Looking southeast at Rock Creek and its floodplain (Wetland B).



**PHOTO 26**  
**May 24, 2019**

Looking west at beaver dam in Rock Creek on north side of SW Tualatin-Sherwood Road.



**PHOTO 27**  
**May 24, 2019**

Looking west across  
Rock Creek and  
Wetland A.



**PHOTO 28**  
**May 24, 2019**

Looking east where  
Rock Creek flows out  
of double box culvert  
on north side of SW  
Tualatin-Sherwood  
Road.



**PHOTO 29**  
**May 24, 2019**  
Looking north at Rock  
Creek floodplain and  
Wetland A.



**PHOTO 30**  
**May 24, 2019**  
Looking southeast at  
Rock Creek floodplain  
and Wetland B.

## APPENDIX D

---

Additional Tables and Information:

Concurrence Letter WD2013-0108

Concurrence Letter WD2012-0041

Stormwater Pond Timeline

Stormwater Swale Timeline

Precipitation Data



# Oregon

John A. Kitzhaber, MD, Governor

## Department of State Lands

775 Summer Street NE, Suite 100

Salem, OR 97301-1279

(503) 986-5200

FAX (503) 378-4844

[www.oregonstatelands.us](http://www.oregonstatelands.us)

June 24, 2013

City of Sherwood  
Attn: Craig Christensen, P.E.  
22560 SW Pine Street  
Sherwood, OR 97140

### State Land Board

John A. Kitzhaber, MD  
Governor

Re: Wetland Delineation Report for the Proposed Tonquin  
Employment Area Sanitary Sewer Upgrades, Washington County;  
T 2S R 1W S 28C Portion of TL 200 and 204; S 29D Portion of  
TL 600; WD #2013-0108; APP #53441; City of Sherwood Local  
Wetlands Inventory, Wetland R-5

Kate Brown  
Secretary of State

Ted Wheeler  
State Treasurer

Dear Mr. Christensen:

The Department of State Lands has reviewed the wetland delineation report prepared by Pacific Habitat Services for the site referenced above. [Please note that the study area includes only a portion of the tax lots described above (see the attached map)]. Based upon our review, we concur with their delineation and conclusions. Within the study area, one wetland (totaling approximately 0.93 acres) and a portion of Rock Creek were identified. The wetland and creek are subject to the permit requirements of the state Removal-Fill Law. Under current regulations, a state permit is required for cumulative fill or annual excavation of 50 cubic yards or more in a wetland, or below the ordinary high water line (OHWL) of a waterway (or the 2 year recurrence interval flood elevation if OHWL cannot be determined). However, Rock Creek is an essential salmonid stream; therefore, fill or removal of any amount of material below its OHWL, or within hydrologically-connected wetlands, may require a state permit.

This concurrence is for purposes of the state Removal-Fill Law only. Federal or local permit requirements may apply as well. This concurrence is based on information provided to the agency. The jurisdictional determination is valid for five years from the date of this letter, unless new information necessitates a revision. Circumstances under which the Department may change a determination are found in OAR 141-090-0045 (available on our web site or upon request). In addition, laws enacted by the legislature and/or rules adopted by the Department may result in a change in jurisdiction; individuals and applicants are subject to the regulations that are in effect at the time of the removal-fill activity, or complete permit application. The applicant, landowner, or agent may submit a request for reconsideration of this determination in writing within six months of the date of this letter.



Thank you for having the site evaluated. Please phone me at 503-986-5232 if you have any questions.

Sincerely,

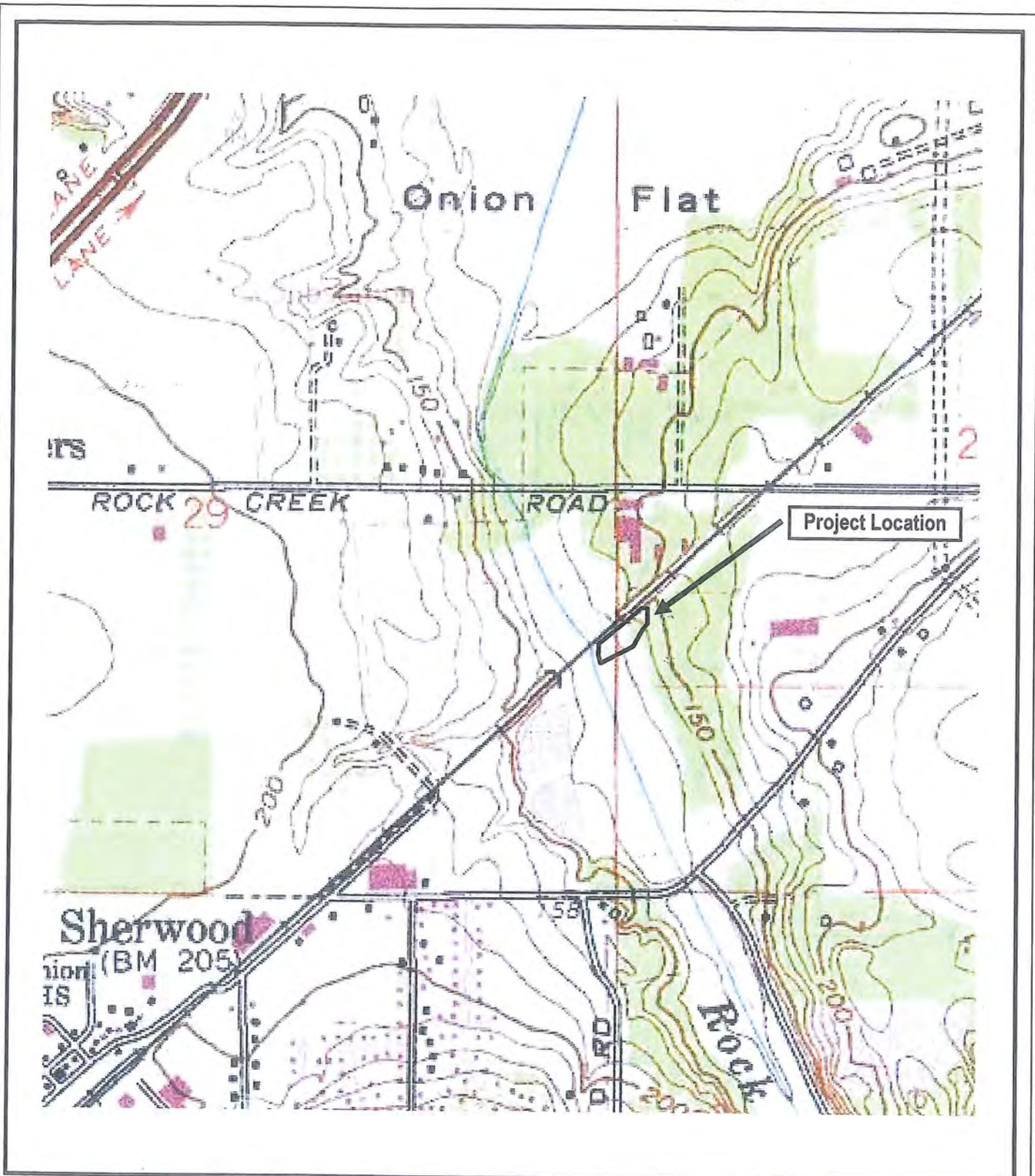
  
Peter Ryan, PWS  
Wetland Specialist

Approved by

  
Kathy Verble, CPSS  
Acting Wetlands Program Manager

Enclosures

ec: Caroline Rim, Pacific Habitat Services  
City of Sherwood Planning Department (Map enclosed for updating LWI)  
Mike Turaski, Corps of Engineers  
Charles Redon, DSL  
Amber Wierck, Clean Water Services



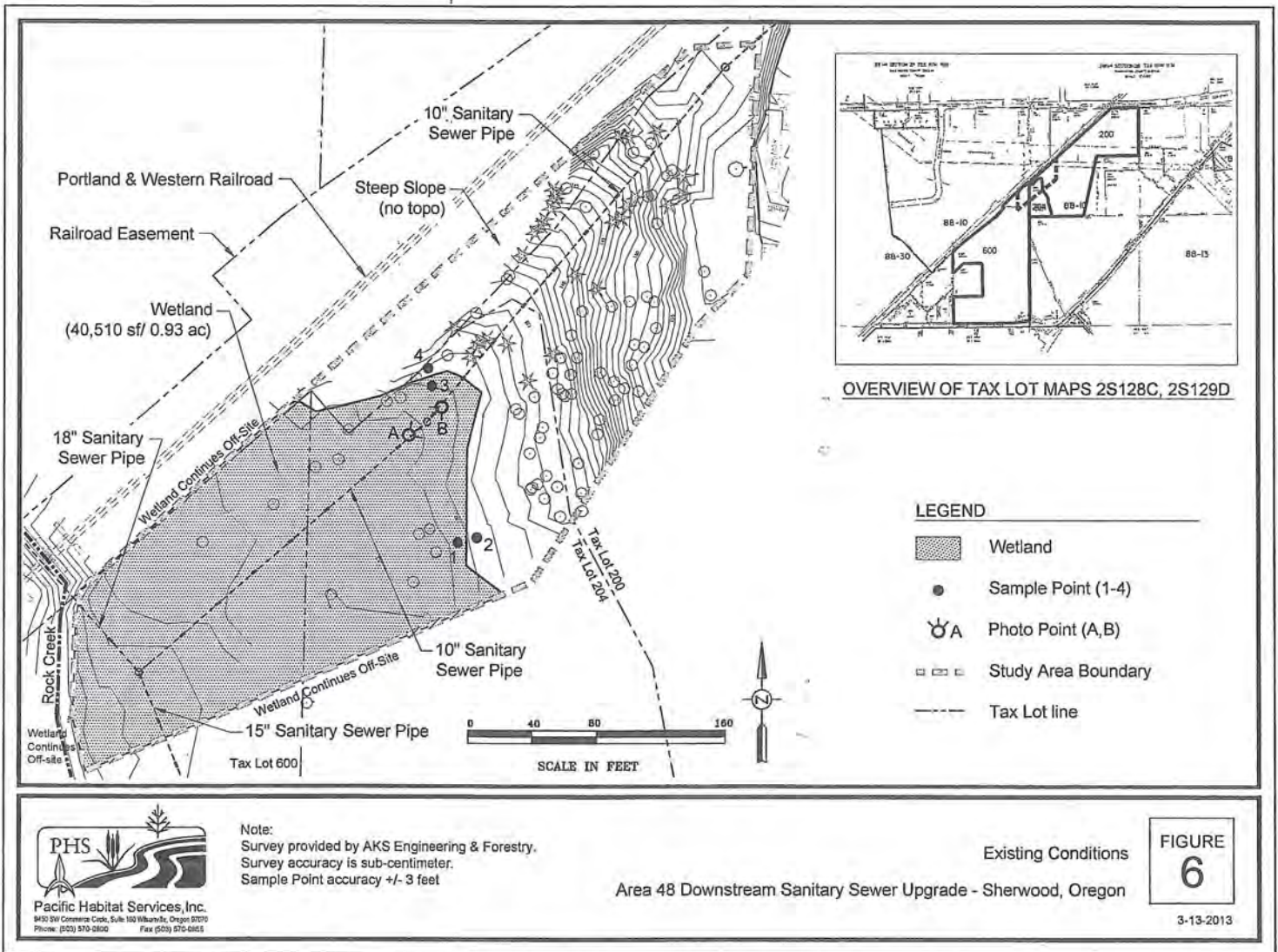
4984  
1/14/13



Pacific Habitat Services, Inc.  
9450 SW Commerce Circle, Suite 180  
Wilsonville, OR 97070

General location and topography  
Area 48 Downstream Sanitary Sewer Upgrade - Sherwood, OR  
(USGS Sherwood, OR Quadrangle, 1961 photorevised 1985)

FIGURE  
1



Note:  
 Survey provided by AKS Engineering & Forestry.  
 Survey accuracy is sub-centimeter.  
 Sample Point accuracy +/- 3 feet

Area 48 Downstream Sanitary Sewer Upgrade - Sherwood, Oregon

Existing Conditions

FIGURE  
**6**

3-13-2013

DSL WD # 13-0108

Approval Issued 6/24/2013

Approval Expires 6/24/2018

**WETLAND DELINEATION / DETERMINATION REPORT COVER FORM**

This form must be included with any wetland delineation report submitted to the Department of State Lands for review and approval. A wetland delineation report submittal is not "complete" unless the fully completed and signed report cover form and the required fee are submitted. Attach the form to the front of an unbound report and submit to: Oregon Department of State Lands, 775 Summer Street NE, Suite 100, Salem, OR 97301-1279

Mail a copy of the completed form with payment of the required report review fee to: Oregon Department of State Lands, P.O. Box 4395, Unit 18, Portland, OR 97208-4395.

For new credit card payment option, see DSL web site.

<input checked="" type="checkbox"/> Applicant <input type="checkbox"/> Owner Name, Firm and Address: <b>City of Sherwood</b> Attn: <b>Craig Christensen, P.E.</b> 22560 SW Pine Street Sherwood, OR 97140	Business phone # <b>503-925-2301</b> Mobile phone # (optional) FAX # E-mail: <b>ChristensenC@SherwoodOregon.gov</b>
RECEIVED	
APR 01 2013	
<input checked="" type="checkbox"/> Authorized Legal Agent, Name and Address: City of Sherwood Attn: <b>Joseph Gall</b> 22560 SW Pine Street Sherwood, OR 97140	Business phone # <b>503-625-4200</b> FAX # Mobile phone # E-mail: <b>gallj@sherwoodoregon.gov</b>
I either own the property described below or I have legal authority to allow access to the property. I authorize the Department to access the property for the purpose of confirming the information in the report, after prior notification to the primary contact.	
Typed/Printed Name: <b>Joseph Gall</b>	Signature:
Date: _____	Special instructions regarding site access: <b>Please contact applicant concerning access to site.</b>

**Project and Site Information** (for latitude & longitude, use centroid of site or start & end points of linear project)

Project Name: <b>Tonquin Employment Area Sanitary Upgrade</b>	Latitude: <b>45.36526</b> <i>3</i>	Longitude: <b>122.82475</b> <i>38</i>
Proposed Use: <b>Replacement of an existing sanitary sewer line</b>	Tax Map # <b>2S128C; 2S129D</b> ✓	
Project Street Address (or other descriptive location):  <b>South of SW Tualatin-Sherwood Road, south side of the railroad tressel, east of Rock Creek, west of SW Oregon Street</b>	Township <b>2S</b> Range <b>1W</b> Section: <b>QQ</b> Tax lot <b>200 &amp; 204; 600</b> <i>28C 29D</i>	
City: <b>Sherwood</b> County: <b>Washington</b>	Waterway: <b>Wetland</b> River Mile: <b>N/A</b> <i>Rock Creek</i>	
NWI Quad(s): <b>Sherwood, OR</b>		

**Wetland Delineation Information**

Wetland Consultant Name, Firm and Address: <b>Pacific Habitat Services</b> Attn: <b>Caroline Rim</b> 9450 SW Commerce Circle, Suite 180 Wilsonville, OR 97070	Phone # <b>503-570-0800</b> Mobile phone # FAX # <b>503-570-0855</b> E-mail: <b>cr@pacifichabitat.com</b>
The information and conclusions on this form and in the attached report are true and correct to the best of my knowledge.	
Consultant Signature:	Date: <b>3/21/2013</b>
Primary Contact for report review and site access is <input checked="" type="checkbox"/> Consultant <input type="checkbox"/> Applicant/Owner <input type="checkbox"/> Authorized Agent	
Wetland/Waters Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Study Area size: <b>1.95 Acres</b> Total Wetland Acreage: <b>0.93</b>	

**Check Box Below if Applicable:**

**Fees:**

<input checked="" type="checkbox"/> R-F permit application submitted <input type="checkbox"/> Mitigation bank site <input type="checkbox"/> Wetland restoration/enhancement project (not mitigation) <input type="checkbox"/> Industrial Land Certification Program Site	<input checked="" type="checkbox"/> Fee payment submitted <b>\$ 388.00</b> <input type="checkbox"/> Fee (\$100) for resubmittal of rejected report Name of Payor: <b>City of Sherwood</b>
<b>Other Information:</b>	
Has previous delineation/application been made on parcel?	Y <input type="checkbox"/> N <input checked="" type="checkbox"/> If known, previous DSL #
Does LWI, if any, show wetland or waters on parcel?	<input checked="" type="checkbox"/> <input type="checkbox"/>

**For Office Use Only**

DSL Reviewer: <u>PR</u> Fee Paid Date: <u>4 / 5 / 13</u>	DSL WD # <u>2013-0108</u>
Date Delineation Received: <u>4 / 1 / 13</u>	DSL Project # <u>54101</u>
Scanned: <input type="checkbox"/> Final Scan: <input type="checkbox"/>	DSL App. # <u>53441</u>



# Oregon

John A. Kitzhaber, MD, Governor

## Department of State Lands

775 Summer Street NE, Suite 100

Salem, OR 97301-1279

(503) 986-5200

FAX (503) 378-4844

[www.oregonstatelands.us](http://www.oregonstatelands.us)

May 3, 2012

City of Sherwood

Attn: Tom Pessemier, PE, City Manager Pro-Tem

22560 SW Pine Street

Sherwood, Oregon 97140

State Land Board

John A. Kitzhaber, MD

Governor

Misty Mountain Enterprises

Attn: Jim Dougherty

P.O. Box 623

Manzanita, Oregon 97130

Kate Brown

Secretary of State

Ted Wheeler

State Treasurer

Re: Wetland Delineation Report for Sherwood, Washington  
County; T2S R1W Sec. 29A, Tax Lot 301 – portion only;  
WD #2012-0041; App. #49706; Sherwood Local Wetlands  
Inventory wetlands R-1 & R-2

Dear Mr. Pessemier:

The Department of State Lands has reviewed the wetland delineation report prepared by SWCA Environmental Consultants for the site referenced above. Please note that the study area includes only a portion of the tax lots described above (please see the attached map). Based upon the information presented in the report and additional information submitted upon request, we concur with the wetland and waterway boundaries as mapped in revised Figure 6 of the report. Please replace all copies of the preliminary wetland map with this final Department-approved map. Within the study area, one wetland (totaling approximately 0.18 acres) and one waterway, Rock Creek, was identified. The wetland and waterway are subject to the permit requirements of the state Removal-Fill Law. Under current regulations, a state permit is required for cumulative fill or annual excavation of 50 cubic yards or more in the wetland or below the ordinary high water line (OHWL) of a waterway (or the 2 year recurrence interval flood elevation if OHWL cannot be determined). However, Rock Creek is designated essential salmonid habitat; therefore, fill or removal of any amount of material within the OHWL and hydrologically-connected wetlands (the mapped wetlands) may require a state permit.

This concurrence is for purposes of the state Removal-Fill Law only. Federal or local permit requirements may apply as well. The Army Corps of Engineers will review the report and make a determination of jurisdiction for purposes of the Clean Water Act.

This concurrence is based on information provided to the agency. The jurisdictional determination is valid for five years from the date of this letter, unless new information necessitates a revision. Circumstances under which the Department may change a

determination are found in OAR 141-090-0045 (available on our web site or upon request). In addition, laws enacted by the legislature and/or rules adopted by the Department may result in a change in jurisdiction; individuals and applicants are subject to the regulations that are in effect at the time of the removal-fill activity, or complete permit application. The applicant, landowner, or agent may submit a request for reconsideration of this determination in writing within six months of the date of this letter.

Thank you for having the site evaluated. Please phone me at 503-986-5297 if you have any questions.

Sincerely,



Jevra Brown  
Wetland Specialist

Approved by Anna Buckley  
Anna Buckley  
Acting Wetlands Program Manager

Enclosures

ec: Stacey Reed, SWCA Environmental Consultants  
City of Sherwood Planning Department (Maps enclosed for updating LWI)  
Brian Villalon, Corps of Engineers, Portland office  
Amber Wierck, Clean Water Services  
Mike McCabe, DSL

**WETLAND DELINEATION / DETERMINATION REPORT COVER FORM**

This form must be included with any wetland delineation report submitted to the Department of State Lands for review and approval. A wetland delineation report submittal is not "complete" unless the fully completed and signed report cover form and the required fee are submitted. Attach the form to the front of an unbound report and submit to: Oregon Department of State Lands, 775 Summer Street NE, Suite 100, Salem, OR 97301-1279

Mail a copy of the completed form with payment of the required report review fee to: Oregon Department of State Lands, P.O. Box 4395, Unit 18, Portland, OR 97208-4395. For new credit card payment option, see DSL web site.

RECEIVED

<input checked="" type="checkbox"/> Applicant <input checked="" type="checkbox"/> Owner Name, Firm and Address: <b>Misty Mountain Enterprises</b> <i>owner TL 102</i> <b>Attn: Jim Dougherty</b> <b>P.O. Box 623</b> <b>Manzanita, OR 97130</b>	Business phone # <i>503 368-</i> Mobile phone # (optional) <i>4567</i> FAX # E-mail: <i>patnjim@nehalembl.net</i>	FEB 02 2012 DEPARTMENT OF STATE LANDS
<input checked="" type="checkbox"/> Authorized Legal Agent, Name and Address: <b>City of Sherwood</b> <i>owner TL 301</i> <b>Attn: Tom Pessemier, PE, City Manager Pro-Tem</b> <b>22560 SW Pine Street</b> <b>Sherwood Oregon, 97140</b>	Business phone # <b>503-625-5522</b> FAX # Mobile phone # E-mail: <i>pessemiert@ci.sherwood.or.us</i>	
I either own the property described below or I have legal authority to allow access to the property. I authorize the Department to access the property for the purpose of confirming the information in the report, after prior notification.		
Typed/Printed Name: <u>Tom Pessemier</u>		Signature:
Date: <b>01/26/12</b> Special Instructions regarding site access:		

*owner of SA*

**Project and Site Information** (for latitude & longitude, use centroid of site or start & end points of linear project)

Project Name: <b>20765 SW Gerda Lane Sanitary Sewer Line Connection</b>	Latitude: <b>45.3693</b>	Longitude: <b>-122.827122</b>
Proposed Use: <b>New sanitary sewer line connection</b>	Tax Map # <b>2S 1 29A</b>	
Project Street Address (or other descriptive location): <b>West of 20765 SW Gerda Lane</b>	Township <b>2S</b> Range <b>1W</b> Section <b>29</b> QQ <b>A</b>	Tax Lot (s) <b>301</b> ( <i>portion only</i> )
City: <b>Sherwood</b> County: <b>Washington</b>	Waterway: <b>Rock Creek</b> River Mile:	NWI Quad(s): <b>Sherwood</b>

**Wetland Delineation Information**

Wetland Consultant Name, Firm and Address: <b>SWCA Environmental Consultants</b> <b>Attn: Stacey Reed</b> <b>1220 SW Morrison, Ste 700</b> <b>Portland, OR 97205</b>	Phone # <b>503-224-0333 ext 6316</b> Mobile phone # FAX # <b>503-224-1851</b> E-mail: <i>sreed@swca.com</i>
The information and conclusions reached report are true and correct to the best of my knowledge.	
Consultant Signature:	Date: <b>January 18, 2012</b>
<b>Primary Contact</b> for report review and site access is <input checked="" type="checkbox"/> Consultant <input type="checkbox"/> Applicant/Owner <input type="checkbox"/> Authorized Agent	
Wetland/Waters Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Study Area size: <b>0.56 AC</b> Total Wetland Acreage: <b>0.18 AC</b>

**Check Box Below if Applicable:**

**Fees:**

<input checked="" type="checkbox"/> R-F permit application submitted <i>-will be submitted</i>	<input checked="" type="checkbox"/> Fee payment submitted \$ <b>378</b>
<input type="checkbox"/> Mitigation bank site	<input type="checkbox"/> Fee (\$100) for resubmittal of rejected report
<input type="checkbox"/> Wetland restoration/enhancement project (not mitigation)	Name of Payor:
<input type="checkbox"/> Industrial Land Certification Program Site	
<b>Other Information:</b>	Y N
Has previous delineation/application been made on parcel?	<input checked="" type="checkbox"/> <input type="checkbox"/> If known, previous DSL # <b>2010-0094</b> ( <i>PORTION SAME TL</i> ) <i>2008-0589 ADJ</i> <i>2000-0276 ADJ</i>
Does LWI, if any, show wetland or waters on parcel?	<input checked="" type="checkbox"/> <input type="checkbox"/>

**For Office Use Only**

DSL Reviewer: <u>JB</u>	Fee Paid Date: <u>02 / 06 / 2012</u>	DSL WD # <u>2012-0041</u>
Date Delineation Received: <u>2 / 2 / 12</u>	DSL Project # _____	DSL Site # _____
Scanned: <input type="checkbox"/> Final Scan: <input type="checkbox"/>	DSL WN # _____	DSL App. # <u>49706</u>

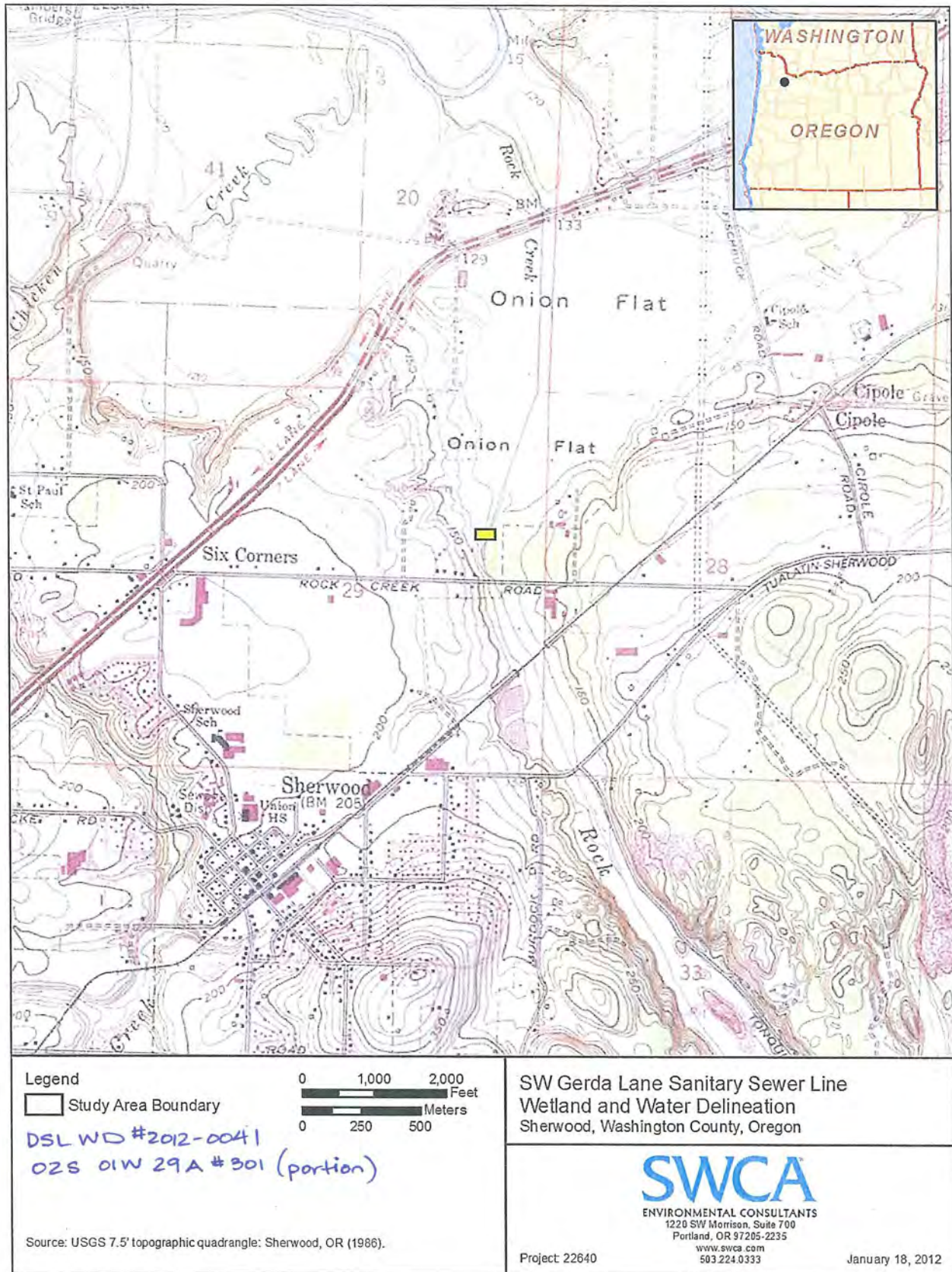
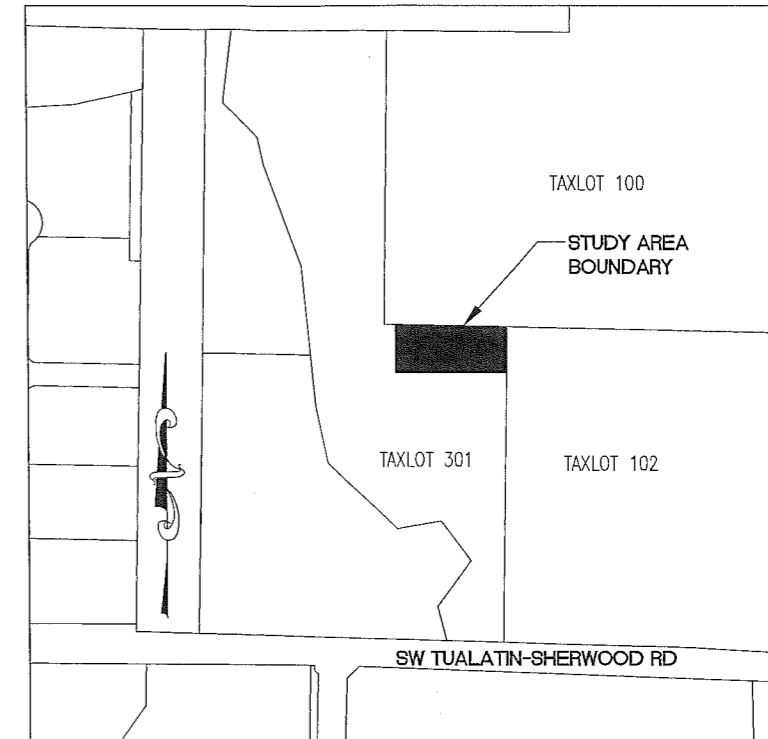
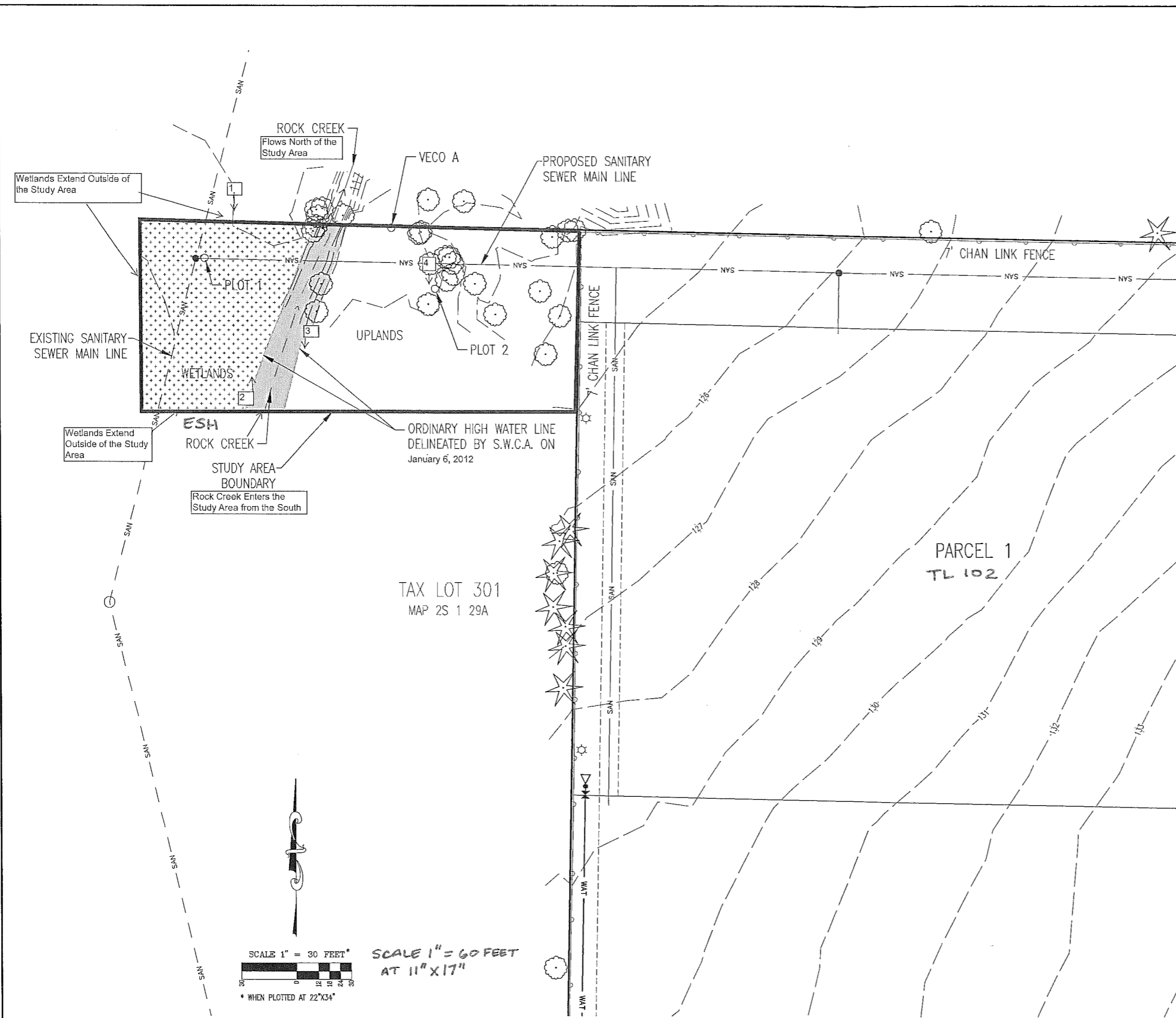


Figure 1. Site location map.





**STUDY AREA BOUNDARY** NTS

Approximately 0.56 acre within the eastern portion of tax lot 301

- WETLAND IN STUDY AREA (7,813± SF) = 0.18 ac
- WATERS IN STUDY AREA (1,972± SF)
- Photos 1-4 and direction of view

DSL WD # 2012-0041

Approval Issued 05/03/2012

Approval Expires 05/03/2017

Figure 5 Wetland and Water Delineation Map  
20765 SW Gerda Lane Sanitary Sewer Line Connection  
Sherwood, Washington County, OR

SCALE 1" = 30 FEET\*  
SCALE 1" = 60 FEET  
AT 11" X 17"  
\* WHEN PLOTTED AT 22" X 34"

The partial OHWM for Rock Creek within the Study Area and Plots 1 and 2 were flagged in the field by SWCA on 1/06/2012 and professionally land surveyed by AKS Engineering and Forestry, LLC.

**TOPOGRAPHIC SURVEY  
MAP**

**20765 SW GERDA LANE**

**SHERWOOD**  
WASHINGTON COUNTY, TAN. MAP 25 1 29A  
TAX LOT 102

**AKS**  
ENGINEERING & FORESTRY

ENGINEERING • PLANNING  
SURVEYING • FORESTRY

13910 SW GALBREATH DR.,  
SHERWOOD, OR 97140  
PHONE: (503) 925-0799  
FAX: (503) 925-8869

DESIGNED BY:	JMM
DRAWN BY:	JMM
CHECKED BY:	MBH
DRAWING NO.:	
SCALE:	AS NOTED
PREPARED FOR:	MISTY MOUNTAIN ENTERPRISES PO BOX 623 MANZANITA, OR 97130
DATE:	1-9-12
<b>PRELIMINARY NOT FOR CONSTRUCTION</b>	
JOB NUMBER	2977
SHEET	E1

# Stormwater Pond

Before Construction (July 2003)



Google Earth

Image © 2019 Metro, Portland Oregon



200 ft

# Stormwater Pond

During Construction (July 2007)



Google Earth

Image © 2019 Metro, Portland Oregon

200 ft



# Stormwater Pond

After Construction (July 2008)



Google Earth

Image © 2019 Metro, Portland Oregon



# Stormwater Pond

Most Recent (July 2018)



# Stormwater Swale

Before Construction (July 2001)



# Stormwater Swale

During Construction (May 2002)



# Stormwater Swale

After Construction (July 2003)



Google Earth

Image © 2019 Metro, Portland Oregon



100 ft



# Stormwater Swale

Most Recent (July 2018)



Google Earth

100 ft



**NRCS method - Rainfall Documentation Worksheet Hydrology Tools for Wetland Determination  
NRCS Engineering Field Handbook Chapter 19**

<b>Date</b>	5/22/2019	<b>Landowner/Project</b>	Sherwood Rock Creek Trunk Line
<b>Weather Station</b>	SHERWOOD-US1ORWS0096	<b>State</b>	OR
<b>County</b>	Washington	<b>Growing Season</b>	
<b>Photo/obs Date</b>		<b>Soil Name</b>	

shaded cells are  
locked or calculated

**Long-term rainfall statistics**  
(from WETS table or State  
Climatology Office)

	<b>Month</b>	<b>30% chance &lt;</b>	<b>30% chance &gt;</b>	<b>Precip</b>	<b>Condition Dry, Wet, Normal</b>	<b>Condition Value</b>	<b>Month Weight Value</b>	<b>Product of Previous 2 Columns</b>
<b>1st Prior Month*</b>	May	1.07	2.62	1.97	N	2	3	6
<b>2nd Prior Month*</b>	April	2.26	3.86	5.07	W	3	2	6
<b>3rd Prior Month*</b>	March	3.48	5.94	2.28	D	1	1	1
<b>Sum</b>								<b>13</b>

\*compared to photo/observation date

<b>Note: If sum is</b>	
<b>6 - 9</b>	prior period has been drier than normal
<b>10 - 14</b>	prior period has been normal
<b>15 - 18</b>	prior period has been wetter than normal

<b>Condition value:</b>
Dry =1
Normal =2
Wet =3

**Conclusions:** prior period has been normal

14 Days prior to site visit			Observed			WETS	
Days Prior to Investigation	Date	Precip (in.)	Period	Days / month	Observed Total	Range (1989 - 2018)	
1	5/22/2019	0.02	October 2018	31	3.49	2.24	4.46
2	5/21/2019	0.17	November 2018	30	4.21	4.45	8.43
3	5/20/2019	0.02	December 2018	31	9.23	5.44	9.63
4	5/19/2019	0.86	January 2019	31	4.74	4.79	8.60
5	5/18/2019	0.04	February 2019	28	4.31	2.98	6.54
6	5/17/2019	0.09	March 2019	31	2.28	3.48	5.94
7	5/16/2019	0.17	April 2019	30	5.07	2.26	3.86
8	5/15/2019	0.15	May 1-22, 2018	22	1.53	0.76	1.86
9	5/14/2019	0.01	7 Days Prior	-	1.37	0.24	0.59
10	5/13/2019	0.00	14 Days prior	-	1.53	0.48	1.18
11	5/12/2019	0.00	2018 Water Year Total	-	34.86	26.40	49.32
12	5/11/2019	0.00	<b>Key:</b> Above Within Below				
13	5/10/2019	0.00					
14	5/9/2019	0.00					
	SUM	1.53					
<b>Field Investigation</b>	5/23/2019	0.10					
<b>Field Investigation</b>	5/24/2019	0.02					

Table 1. Summary of Precipitation from October 1, 2018, to May 22, 2019, at Sherwood, Oregon.

Category	February	March	April	May 1-22	7 Days Prior	14 days Prior	2019 Water Year Totals*
Recorded Precipitation (inches)	4.31	2.28	5.07	1.53	1.37	1.53	34.86
30-70% Normal Range (inches)	2.98-6.54	3.48-5.94	2.26-3.86	0.76-1.86	0.24-0.59	0.48-1.18	26.40-49.32
Comparison to Normal Range	Within	Below	Above	Within	Above	Above	Within

WETS Table

WETS Station: FOREST GROVE, OR								
Requested years: 1989 - 2018								
Month	Avg Max Temp	Avg Min Temp	Avg Mean Temp	Avg Precip	30% chance precip less than	30% chance precip more than	Avg number days precip 0.10 or more	Avg Snowfall
Jan	46.5	33.5	40.0	7.18	4.79	8.60	13	0.5
Feb	50.8	33.8	42.3	5.36	2.98	6.54	10	1.1
Mar	56.0	36.9	46.5	5.00	3.48	5.94	11	0.0
Apr	61.7	40.0	50.8	3.25	2.26	3.86	9	0.0
May	69.2	45.8	57.5	2.15	1.07	2.62	7	0.0
Jun	74.5	50.5	62.5	1.36	0.87	1.64	4	0.0
Jul	82.8	54.3	68.6	0.31	0.11	0.34	1	0.0
Aug	83.2	54.1	68.6	0.54	0.22	0.61	2	0.0
Sep	77.7	49.1	63.4	1.20	0.47	1.42	3	0.0
Oct	64.5	42.2	53.4	3.68	2.24	4.46	8	0.1
Nov	52.4	37.3	44.8	6.99	4.45	8.43	13	0.0
Dec	45.1	33.1	39.1	8.06	5.44	9.63	13	1.2
Annual:					38.76	51.07		
Average	63.7	42.5	53.1	-	-	-	-	-
Total	-	-	-	45.07			94	3.0

GROWING SEASON DATES

Years with missing data:	24 deg = 8	28 deg = 3	32 deg = 1
Years with no occurrence:	24 deg = 2	28 deg = 0	32 deg = 0
Data years used:	24 deg = 22	28 deg = 27	32 deg = 29
Probability	24 F or higher	28 F or higher	32 F or higher
50 percent *	2/6 to 12/7: 304 days	3/7 to 11/16: 254 days	4/13 to 10/26: 196 days
70 percent *	1/26 to 12/18: 326 days	2/27 to 11/24: 270 days	4/5 to 11/3: 212 days

\* Percent chance of the growing season occurring between the Beginning and Ending dates.

STATS TABLE - total precipitation (inches)													
Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annl
1893	2.42	M5.17	M4.53	M4.19	1.35	1.58	0.02		0.45	7.24	12.17	5.77	44.89
1894	11.69	M7.73	9.72	2.61	1.53	1.97				5.19	4.74	M6.10	51.28
1895	11.93	1.36	M2.99	3.33	6.26					0.12	5.01	14.76	45.76
1896	10.84	4.14	2.46	5.21	5.35	0.60			0.62	2.78	18.37	10.45	60.82
1897	4.10	7.98	8.45	2.04	0.52	1.79			3.50	2.69	13.74	14.63	59.44
1898	3.85	7.87	2.03	M2.97	2.48					1.59	6.85	5.81	33.45
1899	8.58	7.08	3.58	4.47	2.79					5.53	14.22	5.73	51.98
1900	5.74	4.33	5.40	2.10	3.74	0.20				6.01	6.81	9.40	43.73

1901	9.81	7.99	5.17	5.08	3.49						1.35	8.78	4.82	46.49
1902	M5.19	14.29	6.76	3.24	2.73						2.15	13.59	11.92	59.87
1903	9.59	2.37	5.69	2.70	1.57	1.24	0.22	0.99	0.34	2.95	11.75	3.72	43.13	
1904	7.89	M14.96	11.62	2.78	0.20	0.02	0.53	T	0.50	2.61	M11.13	M13.49	65.73	
1905	3.57	3.20	6.74	1.49	1.54	1.98	0.00	0.06	2.98	4.61	3.44	7.08	36.69	
1906	7.80	7.45	4.03	2.21	2.43	2.90	T	0.00	1.81	3.95	9.86	M9.19	51.63	
1907	8.11	4.52	2.52	3.20	1.00								19.35	
1908	5.89	4.85	3.89	0.95	2.89			1.00	0.19	5.05	5.64	5.37	35.72	
1909	M10.36	M11.94	3.17	0.85	1.28	0.54	1.95		0.91	3.68	14.53	5.08	54.29	
1910	M12.45	7.13	1.09	3.19	1.89					3.96	13.76	5.39	48.86	
1911	M8.26	3.73	0.70	2.59	4.42		0.00	0.60	4.56	1.68	3.80	5.36	35.70	
1912	M11.97	6.62	2.92	3.24									24.75	
1913	7.61	0.24	5.35	2.42	1.62	4.54	0.38						22.16	
1914			3.32										3.32	
1915														
1916						2.02	M2.07	M0.37	M0.83	M1.48	5.40	M6.10	18.27	
1917	M2.35	M2.99	7.91	M5.33	2.28	0.92	0.00	0.00	1.62	T	M3.76	15.49	42.65	
1918	5.31	7.85	4.14	1.40	1.32	0.07	0.95	0.71	0.50	3.87	5.97	5.51	37.60	
1919	11.10	10.25	5.60	M4.25	M1.93	0.89	0.06	0.12	3.22	1.09	M5.39	M6.65	50.55	
1920	3.39	M0.19	4.73	M4.17	M0.49	M1.83	1.21	1.29	4.40	M5.36	M7.72	10.47	45.25	
1921	M9.50	M6.92	M6.81	M1.73	1.59	1.21	0.02	0.12	2.10	4.80	10.79	3.88	49.47	
1922	3.04	M4.98	7.90	2.48	1.27	0.17	0.00	2.09	1.92	4.17	2.55	13.52	44.09	
1923	12.31	3.25	2.07	1.94	1.14	1.72	1.30	0.03	0.76	1.77	3.43	7.26	36.98	
1924	4.67	M5.19	1.42	0.76	0.66	0.22	0.02	0.69	1.99	M7.46	8.37	5.44	36.89	
1925	7.96	9.68	1.34	1.81	1.18	0.78	T	0.58	1.88	T	6.28	5.08	36.57	
1926	4.01	8.54	0.75	0.25	3.21	0.75	T	1.96	1.58	5.98	11.38	M6.65	45.06	
1927	11.19	10.00	2.50	1.51	3.00	1.90	0.49	0.22	3.92	3.09	9.66	3.71	51.19	
1928	7.51	1.88	10.04	6.04	0.47	0.78	0.22	T	0.99	2.18	6.17	8.64	44.92	
1929	3.51	0.80	2.40	4.02	0.87	2.05	0.09	0.24	0.19	0.86	0.53	10.55	26.11	
1930	4.23	6.93	1.65	2.93	2.77	0.84	0.02	0.03	2.02	1.28	3.46	3.07	29.23	
1931	7.43	3.79	M8.00	2.04	0.67	3.98	T	T	2.63	5.71	7.60	11.86	53.71	
1932	7.22	3.47	6.86	3.41	1.40	0.25	0.48	0.21	0.10	2.68	10.46	8.92	45.46	
1933	8.94	3.99	6.42	0.44	3.55	1.97	0.02	0.63	2.55	3.10	1.69	18.73	52.03	
1934	7.00	1.85	3.40	2.25	1.41	0.39	0.02	0.24	1.41	7.38	14.44	10.64	50.43	
1935	6.36	3.84	7.09	2.04	0.23	0.22	0.71	0.14	1.65	2.76	2.88	6.82	34.74	

1936	12.02	7.80	3.62	1.24	3.80	2.58	0.57	0.15	0.75	M0.33	0.40	9.46	42.72
1937	5.27	8.18	4.48	6.99	1.63	3.41	0.08	0.89	1.68	1.62	12.00	15.26	61.49
1938	5.96	8.20	10.49	1.78	0.50	0.06	0.29	0.28	1.42	4.08	4.91	M5.20	43.17
1939	6.15	6.52	2.64	0.38	0.89	0.99	0.27	0.98	M0.06	2.26	1.99	M12.31	35.44
1940	4.72	13.45	5.37	M2.74	2.28	0.05	1.05	0.08	3.36	4.79	4.98	6.59	49.46
1941	8.21	2.08	2.17	2.27	3.82	1.19	0.05	1.79	2.63	2.42	5.75	11.82	44.20
1942	5.08	4.81	2.26	1.97	2.59	1.51	0.97	0.33	0.01	2.68	14.18	11.17	47.56
1943	5.90	4.82	7.28	2.85	1.43	2.19	0.32	1.36	0.06	M6.25	3.10	4.37	39.93
1944	4.30	3.68	3.21	3.74	0.85	0.67	1.54	0.18	2.56	1.50	M5.30	2.60	30.13
1945	4.68	M7.11	7.50	2.48	3.69	0.15	0.17	0.14	3.41	1.69	13.27	8.27	52.56
1946	M7.86	7.35	5.68	1.41	1.55	M1.77	0.95	0.11	0.96	4.60	9.48	M7.24	48.96
1947	5.55	M3.79	5.31	1.59	0.11	2.77	M0.62	0.95	0.98	M10.90	4.09	4.36	41.02
1948	7.54	7.48	M4.28	M4.26	4.86	0.80	0.41	0.78	2.61	2.30	8.39	10.38	54.09
1949	1.54	10.78	3.34	0.40	3.17	0.25	0.64	0.07	0.63	2.22	M6.56	6.44	36.04
1950	10.19	6.83	6.28	1.81	0.42	1.52	0.49	0.83	1.01	9.37	9.48	8.46	56.69
1951	10.83	5.29	4.58	0.96	1.58	0.04	M0.09	0.43	2.47	5.50	8.50	8.37	48.64
1952	6.64	5.53	4.62	1.39	0.57	2.26	0.00	0.18	0.36	0.70	2.09	10.08	34.42
1953	15.68	4.63	M5.00	2.48	2.90	1.23	0.06	1.43	M0.92	3.58	6.33	7.15	51.39
1954	14.78	7.65	2.83	3.28	1.02	2.00	0.26	0.94	1.69	3.36	6.62	M6.23	50.66
1955	4.10	4.00	4.67	4.07	M0.63	1.09	1.11	0.00	2.50	6.95	10.38	12.34	51.84
1956	13.20	4.17	7.29	0.63	0.96	1.70	0.03	1.29	1.63	5.10	1.90	4.81	42.71
1957	2.97	6.14	6.97	1.93	2.24	M1.25	0.08	0.42	0.65	M3.17	3.19	10.51	39.52
1958	9.04	8.13	2.49	3.82	1.20	2.48	0.00	0.00	0.84	2.47	7.72	6.34	44.53
1959	11.51	4.41	3.94	1.06	2.57	2.18	1.01	0.04	2.48	2.37	3.96	4.59	40.12
1960	5.47	6.26	5.96	4.00	3.80	0.40	0.00	0.91	0.38	3.88	10.63	3.45	45.14
1961	6.57	11.16	8.61	2.96	2.00	0.16	0.40	0.41	0.61	5.38	5.21	7.34	50.81
1962	1.38	4.14	5.31	4.20	2.27	0.46	0.04	1.75	1.91	6.00	11.28	3.08	41.82
1963	2.07	4.33	6.50	3.62	2.37	1.73	0.96	1.99	1.12	3.34	6.54	4.95	39.52
1964	14.75	0.77	4.32	1.07	0.89	1.34	0.55	0.36	1.33	1.29	9.44	13.01	49.12
1965	7.89	2.01	0.58	1.99	1.20	0.69	0.32	0.89	T	1.88	7.84	9.19	34.48
1966	8.32	2.47	7.93	0.45	1.19	1.32	0.97	0.54	1.69	3.85	6.99	11.21	46.93
1967	10.02	1.93	5.66	2.83	0.79	0.91	0.00	0.02	0.88	5.67	3.16	6.78	38.65
1968	8.31	8.57	5.07	1.26	3.17	1.92	0.19	4.02	2.94	5.63	7.29	12.69	61.06
1969	8.93	3.92	1.01	2.07	1.58	1.59	0.01	T	2.22	5.25	3.37	10.63	40.58

1970	14.04	5.12	2.83	2.70	1.02	0.36	0.05	0.04	1.12	3.80	6.37	13.59	51.04
1971	8.72	4.72	8.21	3.71	1.01	1.58	0.23	0.64	2.80	3.04	7.92	10.88	53.46
1972	8.90	5.09	7.18	4.22	1.05	0.67	0.26	0.26	3.04	0.62	4.78	10.93	47.00
1973	5.41	2.36	3.29	1.37	1.49	1.28	0.06	0.86	2.72	3.50	15.97	12.35	50.66
1974	10.19	6.68	7.85	2.92	1.40	0.76	1.18	0.10	0.05	1.56	7.50	8.12	48.31
1975	9.85	6.79	4.79	1.53	1.80	0.44	0.42	1.63	0.00	7.23	6.30	7.23	48.01
1976	6.86	7.31	5.37	2.27	1.29	0.75	0.60	2.27	0.76	0.99	2.14	1.57	32.18
1977	1.44	3.08	4.74	0.39	2.99	0.98	0.59	2.93	3.37	2.73	6.94	10.94	41.12
1978	7.16	5.80	2.31	4.49	2.55	M0.63	0.99	1.73	3.29	0.53	4.10	2.57	36.15
1979	3.19	7.74	2.62	2.56	1.88	0.47	0.17	1.01	2.53	5.23	3.99	7.63	39.02
1980	7.91	6.11	3.57	3.70	1.38	1.56	0.28	T	1.14	1.46	7.77	11.10	45.98
1981	2.45	5.48	2.79	2.53	2.10	2.95	0.11	0.25	3.31	5.46	5.88	12.20	45.51
1982	6.66	7.74	3.81	5.30	0.55	1.42	0.44	1.66	2.53	5.06	6.03	12.08	53.28
1983	7.61	11.77	8.19	2.68	1.34	2.96	2.32	1.33	0.77	1.23	13.35	6.38	59.93
1984	2.71	5.70	4.19	3.66	3.17	3.33	0.00	0.00	0.92	4.37	12.88	3.84	44.77
1985	0.44	3.46	4.58	1.06	0.48	2.82	0.38	0.96	1.54	3.87	3.54	2.30	25.43
1986	7.97	6.77	3.71	1.51	1.84	0.49	0.75	0.00	3.40	3.26	7.64	5.78	43.12
1987	8.36		8.05	1.73			1.14	0.36	0.26		4.50	10.86	35.26
1988	8.21	1.46	3.67	2.06	2.46	2.18	0.07	0.01	0.81	0.14	10.80	3.94	35.81
1989	4.29	3.98	6.80	1.09	1.43	0.78	0.42	0.77	0.44	2.39	3.59	3.48	29.46
1990	12.25	5.96	2.20	1.85	2.66	1.63	0.34	0.91	0.45	4.19	4.22	M2.74	39.40
1991	3.35	4.26	4.73	6.67	2.36	1.41	0.27	0.38	0.27	1.50	5.10	4.19	34.49
1992	6.39	3.73	1.18	4.73	0.04	0.80	0.45	0.41	1.49	2.55	5.17	7.98	34.92
1993	5.46	0.80	5.50	6.26	3.83	1.63	1.43	0.17	T	1.12	1.30	9.03	36.53
1994	4.39	6.03	2.53	1.76	2.26	0.81	0.01	0.30	0.64	5.02	8.42	9.87	42.04
1995	9.99	4.10	6.42	3.63	1.34	1.47	0.56	0.45	1.40	3.59	12.14	10.24	55.33
1996	9.89	12.91	2.11	7.96	4.77	0.81	0.57	0.38	2.33	4.84	7.34	17.01	70.92
1997	8.62	2.34	9.34	2.54	1.56	3.64	0.51	1.57	3.70	7.76	9.24	3.73	54.55
1998	12.04	8.23	5.13	1.55	4.72	1.05	0.10	0.00	0.58	3.34	14.62	11.95	63.31
1999	11.09	20.83	7.19	3.91	3.56	1.35	1.15	1.11	0.07	2.99	18.12	9.08	80.45
2000	10.77	8.08	5.12	1.69	2.21	2.44	0.04	0.20	1.93	2.86	2.74	4.75	42.83
2001	M2.53	2.22	3.85	2.52	1.61	2.25	0.48	1.24	0.61	3.04	11.46	M10.90	42.71
2002	10.04	3.82	4.83	2.03	1.49	1.17	0.20	0.13	0.81	0.41	3.64	M13.40	41.97
2003	M9.53	3.05	7.67	5.20	0.89	0.26	0.00	0.58	0.90	3.34	4.72	7.73	43.87

2004	7.62	5.20	1.56	3.07	1.80	0.38	0.11	2.06	1.92	4.19	2.84	4.93	35.68
2005	3.15	0.47	6.35	2.79	4.36	2.28	0.21	0.16	0.16	6.28	7.37	11.52	45.10
2006	15.42	3.42	5.10	2.57	2.43	0.78	0.20	0.02	0.52	0.91	M15.59	8.85	55.81
2007	4.01	5.20	2.39	2.41	0.92	1.41	0.67	0.60	1.41	3.48	4.52	M12.12	39.14
2008	7.98	3.34	4.48	2.42	0.89		0.02	1.07	0.25	2.38	6.14	6.19	35.16
2009	5.69	2.12	3.96	1.89	3.62	0.63	0.18	0.97	1.66	3.78	8.89	5.49	38.88
2010	8.55	4.48	5.28	4.51	3.19	3.37	0.15	0.08	1.27	3.79	6.55	12.30	53.52
2011	M3.15	M2.02	M5.54	M3.05	M1.20	M0.89	M0.18	0.00	M0.12	M1.54	M5.61	M3.47	26.77
2012	M2.77	M1.85	M8.29	M1.40	M2.40	M1.53	0.02	0.03	0.02	M1.26	M3.00	M0.95	23.52
2013	M1.02	2.48	2.28	1.76	3.40	1.97	0.00	0.89	6.63	0.83	2.92	1.88	26.06
2014	2.91	7.53	8.73	4.37	1.72	1.66	0.38	0.15	1.13	6.57	M3.24	M7.67	46.06
2015	M4.00	M3.52	M4.47	1.88	0.74	0.57	0.37	M0.81	1.02	M2.59	M5.36	M17.51	42.84
2016	M8.83	M4.59	8.46	M2.17	M0.54	0.84	0.26	0.52	0.78	11.45	8.82	M6.44	53.70
2017	M6.18	12.16	M8.60	M4.84	M1.64	0.93	0.00	0.11	M1.64	M4.80	8.82	M3.34	53.06
2018	M6.73	M1.86	M3.74	M4.45	0.10	0.85	0.01	0.00	M0.79	M3.05	2.90	M5.88	30.36
2019	M3.88	7.46	1.30	M0.94	M0.00								13.58

Notes: Data missing in any month have an "M" flag. A "T" indicates a trace of precipitation.

Data missing for all days in a month or year is blank.

Creation date: 2016-07-22



## Record of Climatological Observations

**These data are quality controlled and may not be identical to the original observations.**

Generated on 07/01/2019

Observation Time Temperature: Unknown Observation Time Precipitation: Unknown

Year	Month	Day	Temperature (F)		At Observation	Precipitation				Evaporation		Soil Temperature (F)						
			24 Hrs. Ending at Observation Time			24 Hour Amounts Ending at Observation Time				At Obs. Time	24 Hour Wind Movement (mi)	Amount of Evap. (in)	4 in. Depth			8 in. Depth		
			Max.	Min.		Rain, Melted Snow, Etc. (in)	Flag	Snow, Ice Pellets, Hail (in)	Flag				Snow, Ice Pellets, Hail, Ice on Ground (in)	Ground Cover (see *)	Max.	Min.	Ground Cover (see *)	Max.
2018	10	01				0.01												
2018	10	02				0.00		0.0										
2018	10	03				0.00		0.0										
2018	10	04				0.00		0.0										
2018	10	05				0.00		0.0										
2018	10	06				0.38												
2018	10	07				0.02												
2018	10	08				0.18												
2018	10	09				0.04												
2018	10	10				0.01												
2018	10	11				0.00		0.0										
2018	10	12				0.00		0.0										
2018	10	13				0.00		0.0										
2018	10	14				0.00		0.0										
2018	10	15				0.00		0.0										
2018	10	16				0.00		0.0										
2018	10	17				0.00		0.0										
2018	10	18				0.00		0.0										
2018	10	19				0.00		0.0										
2018	10	20				0.00		0.0										
2018	10	21				0.00		0.0										
2018	10	22				0.00		0.0										
2018	10	23				0.00		0.0										
2018	10	24				0.03												
2018	10	25				0.03												
2018	10	26				0.45												
2018	10	27				0.28												
2018	10	28				1.22												
2018	10	29				0.63												
2018	10	30				0.09												
2018	10	31				0.12												
Summary						3.49		0.0										

Empty, or blank, cells indicate that a data observation was not reported.

\*Ground Cover: 1=Grass; 2=Fallow; 3=Bare Ground; 4=Brome grass; 5=Sod; 6=Straw mulch; 7=Grass muck; 8=Bare muck; 0=Unknown

"s" This data value failed one of NCDC's quality control tests.

"T" values in the Precipitation or Snow category above indicate a "trace" value was recorded.

"A" values in the Precipitation Flag or the Snow Flag column indicate a multiday total, accumulated since last measurement, is being used.

Data value inconsistency may be present due to rounding calculations during the conversion process from SI metric units to standard imperial units.

## Record of Climatological Observations

**These data are quality controlled and may not be identical to the original observations.**

Generated on 07/01/2019

Observation Time Temperature: Unknown Observation Time Precipitation: Unknown

Year	Month	Day	Temperature (F)		At Observation	Precipitation					Evaporation		Soil Temperature (F)						
			24 Hrs. Ending at Observation Time			24 Hour Amounts Ending at Observation Time				At Obs. Time	24 Hour Wind Movement (mi)	Amount of Evap. (in)	4 in. Depth			8 in. Depth			
			Max.	Min.		Rain, Melted Snow, Etc. (in)	Flag	Snow, Ice Pellets, Hail (in)	Flag	Snow, Ice Pellets, Hail, Ice on Ground (in)			Ground Cover (see *)	Max.	Min.	Ground Cover (see *)	Max.	Min.	
2018	11	01				0.03													
2018	11	02				0.18													
2018	11	03				0.02													
2018	11	04				0.18													
2018	11	05				0.02													
2018	11	06				0.07													
2018	11	07				0.05													
2018	11	08				0.02													
2018	11	09				0.01													
2018	11	10				T													
2018	11	11				0.00		0.0											
2018	11	12				0.00		0.0											
2018	11	13				0.00		0.0											
2018	11	14				0.03													
2018	11	15				0.01													
2018	11	16				0.01													
2018	11	17				T													
2018	11	18				0.00		0.0											
2018	11	19				0.00		0.0											
2018	11	20				0.00		0.0											
2018	11	21				0.00		0.0											
2018	11	22				0.28													
2018	11	23				1.11													
2018	11	24				0.47													
2018	11	25				0.02													
2018	11	26				0.02													
2018	11	27				1.15													
2018	11	28				0.02													
2018	11	29				0.43													
2018	11	30				0.08													
Summary						4.21		0.0											

Empty, or blank, cells indicate that a data observation was not reported.

\*Ground Cover: 1=Grass; 2=Fallow; 3=Bare Ground; 4=Brome grass; 5=Sod; 6=Straw mulch; 7=Grass muck; 8=Bare muck; 0=Unknown

"s" This data value failed one of NCDC's quality control tests.

"T" values in the Precipitation or Snow category above indicate a "trace" value was recorded.

"A" values in the Precipitation Flag or the Snow Flag column indicate a multiday total, accumulated since last measurement, is being used.

Data value inconsistency may be present due to rounding calculations during the conversion process from SI metric units to standard imperial units.

## Record of Climatological Observations

**These data are quality controlled and may not be identical to the original observations.**

Generated on 07/01/2019

Observation Time Temperature: Unknown Observation Time Precipitation: Unknown

Year	Month	Day	Temperature (F)		At Observation	Precipitation				Evaporation		Soil Temperature (F)							
			24 Hrs. Ending at Observation Time			24 Hour Amounts Ending at Observation Time				At Obs. Time	24 Hour Wind Movement (mi)	Amount of Evap. (in)	4 in. Depth			8 in. Depth			
			Max.	Min.		Rain, Melted Snow, Etc. (in)	Flag	Snow, Ice Pellets, Hail (in)	Flag				Snow, Ice Pellets, Hail, Ice on Ground (in)	Ground Cover (see *)	Max.	Min.	Ground Cover (see *)	Max.	Min.
2018	12	01				0.92													
2018	12	02				0.03													
2018	12	03				0.02													
2018	12	04				0.02													
2018	12	05				0.00		0.0											
2018	12	06				0.00		0.0											
2018	12	07				0.00		0.0											
2018	12	08				0.08													
2018	12	09				0.02													
2018	12	10				0.64													
2018	12	11				0.17													
2018	12	12				1.20													
2018	12	13				0.02													
2018	12	14				T													
2018	12	15				0.14													
2018	12	16				0.23													
2018	12	17				0.34													
2018	12	18				2.21													
2018	12	19				0.46													
2018	12	20				0.02													
2018	12	21				0.20													
2018	12	22				0.03													
2018	12	23				0.51													
2018	12	24				0.45													
2018	12	25				0.00		0.0											
2018	12	26				0.06													
2018	12	27				0.15													
2018	12	28				0.08													
2018	12	29				0.24													
2018	12	30				0.95													
2018	12	31				0.04													
Summary						9.23		0.0											

Empty, or blank, cells indicate that a data observation was not reported.

\*Ground Cover: 1=Grass; 2=Fallow; 3=Bare Ground; 4=Brome grass; 5=Sod; 6=Straw mulch; 7=Grass muck; 8=Bare muck; 0=Unknown

"s" This data value failed one of NCDC's quality control tests.

"T" values in the Precipitation or Snow category above indicate a "trace" value was recorded.

"A" values in the Precipitation Flag or the Snow Flag column indicate a multiday total, accumulated since last measurement, is being used.

Data value inconsistency may be present due to rounding calculations during the conversion process from SI metric units to standard imperial units.

## Record of Climatological Observations

**These data are quality controlled and may not be identical to the original observations.**

Generated on 07/01/2019

Observation Time Temperature: Unknown Observation Time Precipitation: Unknown

Year	Month	Day	Temperature (F)		At Observation	Precipitation				Evaporation		Soil Temperature (F)						
			24 Hrs. Ending at Observation Time			24 Hour Amounts Ending at Observation Time				At Obs. Time	24 Hour Wind Movement (mi)	Amount of Evap. (in)	4 in. Depth			8 in. Depth		
			Max.	Min.		Rain, Melted Snow, Etc. (in)	Flag	Snow, Ice Pellets, Hail (in)	Flag				Snow, Ice Pellets, Hail, Ice on Ground (in)	Ground Cover (see *)	Max.	Min.	Ground Cover (see *)	Max.
2019	01	01				0.00		0.0										
2019	01	02				0.01												
2019	01	03				0.04												
2019	01	04				0.25												
2019	01	05				0.02												
2019	01	06				0.16												
2019	01	07				0.46												
2019	01	08				0.30												
2019	01	09				0.08												
2019	01	10				0.26												
2019	01	11				0.05												
2019	01	12				0.02												
2019	01	13				0.00		0.0										
2019	01	14				0.00		0.0										
2019	01	15				0.00		0.0										
2019	01	16				0.00		0.0										
2019	01	17				0.20												
2019	01	18				0.43												
2019	01	19				1.09												
2019	01	20				0.17												
2019	01	21				0.46												
2019	01	22				0.03												
2019	01	23				0.64												
2019	01	24				0.02												
2019	01	25				0.01												
2019	01	26				T												
2019	01	27				0.02												
2019	01	28				0.02												
2019	01	29				0.00		0.0										
2019	01	30				0.00		0.0										
2019	01	31				0.00		0.0										
Summary						4.74		0.0										

Empty, or blank, cells indicate that a data observation was not reported.

\*Ground Cover: 1=Grass; 2=Fallow; 3=Bare Ground; 4=Brome grass; 5=Sod; 6=Straw mulch; 7=Grass muck; 8=Bare muck; 0=Unknown

"s" This data value failed one of NCDC's quality control tests.

"T" values in the Precipitation or Snow category above indicate a "trace" value was recorded.

"A" values in the Precipitation Flag or the Snow Flag column indicate a multiday total, accumulated since last measurement, is being used.

Data value inconsistency may be present due to rounding calculations during the conversion process from SI metric units to standard imperial units.

## Record of Climatological Observations

Current Location: Elev: 285 ft. Lat: 45.3800° N Lon: -122.8716° W  
 Station: **SHERWOOD 2.0 NW, OR US US1ORWS0096**

**These data are quality controlled and may not be identical to the original observations.**

Generated on 07/01/2019

Observation Time Temperature: Unknown Observation Time Precipitation: Unknown

Year	Month	Day	Temperature (F)		At Observation	Precipitation				Evaporation		Soil Temperature (F)							
			24 Hrs. Ending at Observation Time			24 Hour Amounts Ending at Observation Time				At Obs. Time	24 Hour Wind Movement (mi)	Amount of Evap. (in)	4 in. Depth			8 in. Depth			
			Max.	Min.		Rain, Melted Snow, Etc. (in)	Flag	Snow, Ice Pellets, Hail (in)	Flag				Snow, Ice Pellets, Hail, Ice on Ground (in)	Ground Cover (see *)	Max.	Min.	Ground Cover (see *)	Max.	Min.
2019	02	01				0.04													
2019	02	02				0.20													
2019	02	03				0.03													
2019	02	04				0.15													
2019	02	05				0.12		1.1		1.1									
2019	02	06				0.03													
2019	02	07				0.00		0.0											
2019	02	08																	
2019	02	09				0.55		0.3		0.3									
2019	02	10				0.00		0.0											
2019	02	11				0.58													
2019	02	12																	
2019	02	13				0.61													
2019	02	14				0.13													
2019	02	15				0.31													
2019	02	16				0.21													
2019	02	17				0.12													
2019	02	18				0.00		0.0											
2019	02	19				0.02													
2019	02	20				0.21													
2019	02	21				0.03													
2019	02	22				0.00		0.0											
2019	02	23				0.25													
2019	02	24				0.47		0.5		0.5									
2019	02	25				0.12		1.0		1.0									
2019	02	26				0.03													
2019	02	27				0.06		0.6		0.6									
2019	02	28				0.04													
Summary						4.31		3.5											

Empty, or blank, cells indicate that a data observation was not reported.

\*Ground Cover: 1=Grass; 2=Fallow; 3=Bare Ground; 4=Brome grass; 5=Sod; 6=Straw mulch; 7=Grass muck; 8=Bare muck; 0=Unknown

"s" This data value failed one of NCDC's quality control tests.

"T" values in the Precipitation or Snow category above indicate a "trace" value was recorded.

"A" values in the Precipitation Flag or the Snow Flag column indicate a multiday total, accumulated since last measurement, is being used.

Data value inconsistency may be present due to rounding calculations during the conversion process from SI metric units to standard imperial units.

## Record of Climatological Observations

**These data are quality controlled and may not be identical to the original observations.**

Generated on 07/01/2019

Observation Time Temperature: Unknown Observation Time Precipitation: Unknown

Year	Month	Day	Temperature (F)		At Observation	Precipitation				Evaporation		Soil Temperature (F)						
			24 Hrs. Ending at Observation Time			24 Hour Amounts Ending at Observation Time				At Obs. Time	24 Hour Wind Movement (mi)	Amount of Evap. (in)	4 in. Depth			8 in. Depth		
			Max.	Min.		Rain, Melted Snow, Etc. (in)	Flag	Snow, Ice Pellets, Hail (in)	Flag				Snow, Ice Pellets, Hail, Ice on Ground (in)	Ground Cover (see *)	Max.	Min.	Ground Cover (see *)	Max.
2019	03	01				0.06												
2019	03	02				0.02												
2019	03	03				0.00		0.0										
2019	03	04				0.00		0.0										
2019	03	05				0.00		0.0										
2019	03	06				0.00		0.0										
2019	03	07				0.19												
2019	03	08				0.05												
2019	03	09				0.15												
2019	03	10				0.00		0.0										
2019	03	11				0.00		0.0										
2019	03	12				0.74												
2019	03	13				0.05												
2019	03	14				0.02												
2019	03	15				0.02												
2019	03	16				0.00		0.0										
2019	03	17				0.00		0.0										
2019	03	18				0.00		0.0										
2019	03	19				0.00		0.0										
2019	03	20				0.00		0.0										
2019	03	21				0.00		0.0										
2019	03	22				0.04												
2019	03	23				0.15												
2019	03	24				0.02												
2019	03	25				T												
2019	03	26				0.23												
2019	03	27				0.02												
2019	03	28				0.32												
2019	03	29				0.18												
2019	03	30				0.02												
2019	03	31				0.00		0.0										
Summary						2.28		0.0										

Empty, or blank, cells indicate that a data observation was not reported.

\*Ground Cover: 1=Grass; 2=Fallow; 3=Bare Ground; 4=Brome grass; 5=Sod; 6=Straw mulch; 7=Grass muck; 8=Bare muck; 0=Unknown

"s" This data value failed one of NCDC's quality control tests.

"T" values in the Precipitation or Snow category above indicate a "trace" value was recorded.

"A" values in the Precipitation Flag or the Snow Flag column indicate a multiday total, accumulated since last measurement, is being used.

Data value inconsistency may be present due to rounding calculations during the conversion process from SI metric units to standard imperial units.

## Record of Climatological Observations

**These data are quality controlled and may not be identical to the original observations.**

Generated on 07/01/2019

Observation Time Temperature: Unknown Observation Time Precipitation: Unknown

Year	Month	Day	Temperature (F)		At Observation	Precipitation				Evaporation		Soil Temperature (F)						
			24 Hrs. Ending at Observation Time			24 Hour Amounts Ending at Observation Time				At Obs. Time	24 Hour Wind Movement (mi)	Amount of Evap. (in)	4 in. Depth			8 in. Depth		
			Max.	Min.		Rain, Melted Snow, Etc. (in)	Flag	Snow, Ice Pellets, Hail (in)	Flag				Snow, Ice Pellets, Hail, Ice on Ground (in)	Ground Cover (see *)	Max.	Min.	Ground Cover (see *)	Max.
2019	04	01				0.00		0.0										
2019	04	02				0.13												
2019	04	03				0.35												
2019	04	04				0.05												
2019	04	05				0.22												
2019	04	06				0.81												
2019	04	07				1.47												
2019	04	08				0.49												
2019	04	09				0.24												
2019	04	10				0.10												
2019	04	11				0.11												
2019	04	12				0.13												
2019	04	13				0.02												
2019	04	14				0.33												
2019	04	15				0.04												
2019	04	16				0.20												
2019	04	17				0.04												
2019	04	18				0.02												
2019	04	19				0.01												
2019	04	20				0.26												
2019	04	21				0.02												
2019	04	22				0.00		0.0										
2019	04	23				0.02												
2019	04	24				0.00		0.0										
2019	04	25				0.00		0.0										
2019	04	26				0.00		0.0										
2019	04	27				0.01												
2019	04	28				0.00		0.0										
2019	04	29				0.00		0.0										
2019	04	30				0.00		0.0										
Summary						5.07		0.0										

Empty, or blank, cells indicate that a data observation was not reported.

\*Ground Cover: 1=Grass; 2=Fallow; 3=Bare Ground; 4=Brome grass; 5=Sod; 6=Straw mulch; 7=Grass muck; 8=Bare muck; 0=Unknown

"s" This data value failed one of NCDC's quality control tests.

"T" values in the Precipitation or Snow category above indicate a "trace" value was recorded.

"A" values in the Precipitation Flag or the Snow Flag column indicate a multiday total, accumulated since last measurement, is being used.

Data value inconsistency may be present due to rounding calculations during the conversion process from SI metric units to standard imperial units.

## Record of Climatological Observations

**These data are quality controlled and may not be identical to the original observations.**

Generated on 07/01/2019

Observation Time Temperature: Unknown Observation Time Precipitation: Unknown

Year	Month	Day	Temperature (F)		At Observation	Precipitation				Evaporation		Soil Temperature (F)						
			24 Hrs. Ending at Observation Time			24 Hour Amounts Ending at Observation Time				At Obs. Time	24 Hour Wind Movement (mi)	Amount of Evap. (in)	4 in. Depth			8 in. Depth		
			Max.	Min.		Rain, Melted Snow, Etc. (in)	Flag	Snow, Ice Pellets, Hail (in)	Flag				Snow, Ice Pellets, Hail, Ice on Ground (in)	Ground Cover (see *)	Max.	Min.	Ground Cover (see *)	Max.
2019	05	01				0.00		0.0										
2019	05	02				0.00		0.0										
2019	05	03				0.00		0.0										
2019	05	04				0.00		0.0										
2019	05	05				0.00		0.0										
2019	05	06				0.00		0.0										
2019	05	07				0.00		0.0										
2019	05	08				0.00		0.0										
2019	05	09				0.00		0.0										
2019	05	10				0.00		0.0										
2019	05	11				0.00		0.0										
2019	05	12				0.00		0.0										
2019	05	13				0.00		0.0										
2019	05	14				0.01												
2019	05	15				0.15												
2019	05	16				0.17												
2019	05	17				0.09												
2019	05	18				0.04												
2019	05	19				0.86												
2019	05	20				0.02												
2019	05	21				0.17												
2019	05	22				0.02												
2019	05	23																
2019	05	24																
2019	05	25																
2019	05	26																
2019	05	27																
2019	05	28																
2019	05	29																
2019	05	30																
2019	05	31																
Summary						1.53		0.0										

Empty, or blank, cells indicate that a data observation was not reported.

\*Ground Cover: 1=Grass; 2=Fallow; 3=Bare Ground; 4=Brome grass; 5=Sod; 6=Straw mulch; 7=Grass muck; 8=Bare muck; 0=Unknown

"s" This data value failed one of NCDC's quality control tests.

"T" values in the Precipitation or Snow category above indicate a "trace" value was recorded.

"A" values in the Precipitation Flag or the Snow Flag column indicate a multiday total, accumulated since last measurement, is being used.

Data value inconsistency may be present due to rounding calculations during the conversion process from SI metric units to standard imperial units.



## APPENDIX E

---

### Literature Citations

- Adamus, P.R. 2001. Guidebook for Hydrogeomorphic (HGM)–Based Assessment of Oregon Wetlands and Riparian Sites. Statewide Classification and Profiles. Oregon State Division of State Lands, Salem, Oregon.
- Cowardin, L. M., V. Carter, F. C. Golet, E. T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. 131pp.
- DEA (David Evans and Associates). 1992. City of Sherwood, Oregon, Local Wetlands Inventory. May 22, 2019. URL: <https://docs.dsl.state.or.us/PublicReview/0/doc/863324/Electronic.aspx>
- Environmental Laboratory. 1987. Corps of Engineers Wetland Delineation Manual. Technical Report Y-87-1, U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi.
- Green, G. L. 1982. Soil Survey of Washington County Area, Oregon. Soil Conservation Service, U.S. Department of Agriculture and Oregon Agricultural Experiment Station. 90 pp.
- Google Earth. 2019. Historical aerial imagery of the Project Study Area and surrounding land from July 2001 to July 2018. Assessed June 26,2019.
- Guidelines for Specification of Disposal Sites for Dredged or Fill Material, 40 CFR § 230.3 (2015).
- Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. The National Wetland Plant List: 2016 wetland ratings. *Phytoneuron* 2016-30: 1-17. Published 28 April 2016. ISSN 2153 733X.
- Menne, M.J., Durre, I., Korzeniewski, B., McNeal, S., Thomas, K., Yin, X., Anthony, S., Ray, R., Vose, R.S., Gleason, B.E., and Houston, T.G. 2012. Global Historical Climatology Network - Daily (GHCN-Daily), Version 3. Station: Sherwood 2.0 NW, OR US US1ORWS0096. Period: October 1, 2018, to May 22, 2019. NOAA National Climatic Data Center. doi:10.7289/V5D21VHZ. Accessed May 2019. URL: <https://www.ncdc.noaa.gov/cdo-web/search>
- Munsell. 2012. Munsell Soil Color Charts. Revised Washable Edition. Division of Gretag Macbeth LLC, New Windsor, NY.
- NAIP (National Agriculture Imagery Program). 2016. MrSID Raster Dataset. Oregon 1-meter resolution. Washington County Mosaic. U.S. Department of Agriculture, Farm Service Agency, Washington, D.C.
- NRCS (National Resources Conservation Service). 2015. Engineering Field Handbook, Part 650, Chapter 19: Hydrology Tools for Wetland Identification and Analysis. Issued September 2015. USDA, NRCS, Technical Publications, National Geospatial Center of Excellence, Fort Worth, TX. URL: <https://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=37808.wba>
- NRCS (Natural Resources Conservation Service). 2018. Field Indicators of Hydric Soils in the United States: A Guide for Identifying and Delineating Hydric Soils, Version 8.2. L.M. Vasilas, G.W. Hurt, and J.F. Berkowitz (eds.). USDA, NRCS, in cooperation with the National Technical Committee for Hydric Soils. URL: [https://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs142p2\\_053171.pdf](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_053171.pdf)
- NOAA (National Oceanic and Atmospheric Administration). 2019. WETS Table for Forest Grove Weather Station, years 1989-2018. Generated by Applied Climate Information System (ACIS), a tool developed and maintained by NOAA. URL: <http://agacis.rcc-acis.org/?fips=41067>

- DSL (Oregon Department of State Lands). 2019. Oregon Administrative Rules (OARs). OAR 141 Division 85. Administrative Rules Governing the Issuance and Enforcement of Removal-Fill Authorizations within Waters of Oregon Including Wetlands. URL: [http://arcweb.sos.state.or.us/pages/rules/oars\\_100/oar\\_141/141\\_085.html](http://arcweb.sos.state.or.us/pages/rules/oars_100/oar_141/141_085.html)
- Pacific Habitat Services. 2013. WD2013-0108, Concurrence for Wetland Delineation Report for Tonquin Employment Area Sanitary Upgrade. DSL Project #: 54101. Sherwood, Oregon.
- Stevenson, Christine. 2019. Personal communication with Kate Custer (Mason Bruce & Girard) via email. May 7, 2019, Jurisdictional Coordinator, Oregon Department of State Lands.
- SWCA. 2012. WD2012-0041, Concurrence for Wetland Delineation Report for Sherwood, Washington County. DSL Application # 49706.
- USACE (U.S. Army Corps of Engineers). 2008. Memorandum: Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision on Rapanos v. United States & Carabell v. United States. U.S Army Corps of Engineers and Environmental Protection Agency. 13 pp.
- USACE (U.S. Army Corps of Engineers). 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region, ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-10-03. Vicksburg, MS: U.S. Army Engineer Research and Development Center.
- USDA (U.S. Department of Agriculture). 2019. Web Soil Survey. USDA Natural Resources Conservation Service (NRCS). URL: <http://websoilsurvey.nrcs.usda.gov>. (June 2019).
- USFWS (U.S. Fish and Wildlife Service). 2019. National Wetland Inventory Vector Data (ESRI shapefile) CONUS\_wet\_poly. U.S. Department of Interior, Washington, D.C. URL: <https://www.fws.gov/wetlands/data/State-Downloads.html>.
- USGS (U.S. Geological Survey). 2017. USGS US Topo 7.5-minute map for Sherwood, OR. Published March 28, 2017: USGS - National Geospatial Technical Operations Center (NGTOC). URL: <https://www.sciencebase.gov/catalog/item/58dc771be4b04620130b5ff3>



# Oregon

Kate Brown, Governor

## Department of State Lands

775 Summer Street NE, Suite 100

Salem, OR 97301-1279

(503) 986-5200

FAX (503) 378-4844

[www.oregon.gov/dsl](http://www.oregon.gov/dsl)

### State Land Board

Kate Brown

Governor

Bev Clarno

Secretary of State

Tobias Read

State Treasurer

December 18, 2019

City of Sherwood  
Attn: Bob Galati, PE  
22580 SW Pine St  
Sherwood, OR 97140

Re: WD # 2019-0535 Correction **Approved**  
Wetland Delineation Report for the Rock Creek Sanitary Trunk Upsizing Project;  
Washington County; T2S R1W S29A TLs 100, 300, 301, 400, 2900, 3000, and  
3200 (Portions); S29D TL150 and ROWs for SW Tualatin-Sherwood RD and SW  
Century DR. (Portions); RGL 1758; City of Sherwood Local Wetlands Inventory,  
Wetlands R-1, R-2, R-3, R-5, R-6

Dear Mr. Galati:

The original concurrence letter dated December 17, 2019 for the wetland delineation report referenced above contained an error. The letter reference two stormwater features (Stormwater Swale; Stormwater Pond) but did not correctly identify each feature's regulated status. Based on information provided by the consultant, Mason Bruce and Girard, Inc., the stormwater swale is exempt per OAR 141-085-0515(7); therefore, it is not subject to state removal-fill permit requirements. The stormwater pond on the other hand is jurisdictional because it was created at least partially from wetlands.

In addition, normally, jurisdictional wetlands are subject to the permit requirements of the state Removal-Fill Law. However, the stormwater pond location was previously mitigated for under an earlier permit application (APP #22971). Therefore, we recommend that you contact the Department's Aquatic Resource Coordinator for Washington County (Anita Huffman) before completing a new permit process. Anita may have recommendations for how you need to proceed. You can reach her at (503) 480-5985.

The Department apologizes for any confusion this mistake may have caused and we thank you again for having the site evaluated. Please contact Chris Stevenson at (503) 986-5246 if you have any additional questions.

Sincerely,

Peter Ryan, PWS  
Aquatic Resource Specialist

Enclosures

ec: Daniel Covington, Mason, Bruce & Girard, Inc.  
Stuart Myers, Mason, Bruce & Girard  
City of Sherwood Planning Department (Maps enclosed for updating LWI)  
Carrie Bond, Corps of Engineers  
Anita Huffman, DSL  
Lindsey Obermiller, Clean Water Services



# Oregon

Kate Brown, Governor

## Department of State Lands

775 Summer Street NE, Suite 100

Salem, OR 97301-1279

(503) 986-5200

FAX (503) 378-4844

[www.oregon.gov/dsl](http://www.oregon.gov/dsl)

### State Land Board

December 17, 2019

City of Sherwood  
Attn: Bob Galati, PE  
22580 SW Pine St  
Sherwood, OR 97140

Kate Brown  
Governor

Bev Clarno  
Secretary of State

Tobias Read  
State Treasurer

Re: WD # 2019-0535 **Approved** (See Corrected Letter Dated 12-18-2019)  
Wetland Delineation Report for the Rock Creek Sanitary Trunk  
Upsizing Project; Washington County; T2S R1W S29A TLs 100, 300,  
301, 400, 2900, 3000, and 3200 (Portions); S29D TL150 and ROWs  
for SW Tualatin-Sherwood RD and SW Century DR. (Portions);  
RGL 1758; City of Sherwood Local Wetlands Inventory, Wetlands R-1,  
R-2, R-3, R-5, R-6

Dear Mr. Galati:

The Department of State Lands has reviewed the wetland delineation report prepared by Mason, Bruce & Girard, Inc. for the site referenced above. Please note that the study area includes only a portion of the tax lots described above (see the attached maps). Based upon the information presented in the report, and additional information submitted upon request, we concur with the wetland and waterway boundaries as mapped in revised Figures 6a and 6b of the report. Please replace all copies of the preliminary wetland maps with these final Department-approved maps.

Within the study area, 3 wetlands (Wetland A to C, totaling approximately 6.68 acres), Rock Creek, a Small Pond, Stormwater Pond and Stormwater Swale were identified. The wetlands, Rock Creek, Small Pond and Stormwater Swale are subject to the permit requirements of the state Removal-Fill Law. Normally, a state permit is required for cumulative fill or annual excavation of 50 cubic yards or more in wetlands or below the ordinary high-water line (OHWL) of the waterway (or the 2-year recurrence interval flood elevation if OHWL cannot be determined). However, Rock Creek is an essential salmonid stream. Therefore, fill or removal of any amount of material below its OHWL or within hydrologically connected wetlands (Wetland A, B, or C) may require a state permit. In addition, Wetland B and a portion of the surrounding uplands are part of a compensatory wetland mitigation (CWM) area (RGL 1758). Any ground disturbance within a CWM area may require a permit and additional mitigation. The Stormwater Pond identified on Figure 6b is exempt per OAR 141-085-0515(7).

This concurrence is for purposes of the state Removal-Fill Law only. Federal or local permit requirements may apply as well. The U.S. Army Corps of Engineers will determine jurisdiction under the Clean Water Act, which may require submittal of a complete Wetland Delineation Report.

Please be advised that state law establishes a preference for avoidance of wetland impacts. Because measures to avoid and minimize wetland impacts may include reconfiguring parcel layout and size or development design, we recommend that you work with Department staff on appropriate site design before completing the city or county land use approval process.

This concurrence is based on information provided to the agency. The jurisdictional determination is valid for five years from the date of this letter unless new information necessitates a revision. Circumstances under which the Department may change a determination are found in OAR 141-090-0045 (available on our web site or upon request). In addition, laws enacted by the legislature and/or rules adopted by the Department may result in a change in jurisdiction; individuals and applicants are subject to the regulations that are in effect at the time of the removal-fill activity or complete permit application. The applicant, landowner, or agent may submit a request for reconsideration of this determination in writing within six months of the date of this letter.

Thank you for having the site evaluated. If you have any questions, please contact Chris Stevenson, the Jurisdictional Coordinator for Washington County at (503) 986-5246.

Sincerely,

Peter Ryan

Peter Ryan, PWS  
Aquatic Resource Specialist

Enclosures

ec: Daniel Covington, Mason, Bruce & Girard, Inc.  
Stuart Myers, Mason, Bruce & Girard  
City of Sherwood Planning Department (Maps enclosed for updating LWI)  
Carrie Bond, Corps of Engineers  
Anita Huffman, DSL  
Lindsey Obermiller, Clean Water Services

**WETLAND DELINEATION / DETERMINATION REPORT COVER FORM**

Fully completed and signed report cover forms and applicable fees are required before report review timelines are initiated by the Department of State Lands. Make checks payable to the Oregon Department of State Lands. To pay fees by credit card, go online at: <https://apps.oregon.gov/DSL/EPS/program?key=4>.

Attach this completed and signed form to the front of an unbound report or include a hard copy with a digital version (single PDF file of the report cover form and report, minimum 300 dpi resolution) and submit to: **Oregon Department of State Lands, 775 Summer Street NE, Suite 100, Salem, OR 97301-1279**. A single PDF of the completed cover form and report may be e-mailed to: **Wetland\_Delineation@dsl.state.or.us**. For submittal of PDF files larger than 10 MB, e-mail DSL instructions on how to access the file from your ftp or other file sharing website.

<b>Contact and Authorization Information</b>	
<input checked="" type="checkbox"/> Applicant <input checked="" type="checkbox"/> Owner Name, Firm and Address: City of Sherwood 22560 SW Pine St. Sherwood, OR 97140	Business phone # (503) 925-2309 Mobile phone # (optional) E-mail:
<input checked="" type="checkbox"/> Authorized Legal Agent, Name and Address (if different): Bob Galati, P.E. Community Development Division, Engineering Department 22560 SW Pine St. Sherwood, OR 97140	Business phone # (503) 925-2309 Mobile phone # (optional) E-mail: GalatiB@SherwoodOregon.gov
I either own the property described below or I have legal authority to allow access to the property. I authorize the Department to access the property for the purpose of confirming the information in the report, after prior notification to the primary contact.	
Typed/Printed Name: <u>Bob Galati</u> Signature: <u><i>Bob Galati</i></u> 9.24.19 Date: _____ Special instructions regarding site access: _____	
<b>Project and Site Information</b>	
Project Name: Rock Creek Sanitary Trunk Upsizing Project	Latitude: 45.3679      Longitude: -122.8292 <b>decimal degree</b> - centroid of site or start & end points of linear project
Proposed Use: Increasing the capacity of existing sanitary trunk line	Tax Map # 2S 1 29A Tax Lot(s) 100, 300, 301, 400, 2900, 3000, 3200, Tax Map # 2S 1 29D
Project Street Address (or other descriptive location): North and south of SW Tualatin-Sherwood Rd, East of SW Century Dr. West of SW Gerda Ln.	Tax Lot(s) 150, SW Tualatin-Sherwood Rd. ROW, SW Century Dr. ROW Township 2S      Range 1W      Section 29      QQ Use separate sheet for additional tax and location information
City: Sherwood      County: Washington	Waterway: Rock Creek      River Mile: N/A
<b>Wetland Delineation Information</b>	
Wetland Consultant Name, Firm and Address: Daniel Covington Mason, Bruce & Girard, Inc. (MB&G) 707 SW Washington St., Suite 1300 Portland, OR 97205	Phone # (503) 224-3445 Mobile phone # (if applicable) E-mail: DCovington@masonbruce.com
The information and conclusions on this form and in the attached report are true and correct to the best of my knowledge.	
Consultant Signature: <u><i>Daniel Covington</i></u>	Date: <u>09/25/2019</u> 9/25/19
Primary Contact for report review and site access is <input checked="" type="checkbox"/> Consultant <input type="checkbox"/> Applicant/Owner <input type="checkbox"/> Authorized Agent	
Wetland/Waters Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No      Study Area size: 18.72 acres      Total Wetland Acreage: 6.6270	
<b>Check Applicable Boxes Below</b>	
<input type="checkbox"/> R-F permit application submitted	<input checked="" type="checkbox"/> Fee payment submitted \$ <u>454</u>
<input type="checkbox"/> Mitigation bank site	<input type="checkbox"/> Resubmittal of rejected report (\$100)
<input type="checkbox"/> EFSC/ODOE Proj. Mgr: _____	<input type="checkbox"/> Request for Reissuance. See eligibility criteria. (no fee)
<input type="checkbox"/> Wetland restoration/enhancement project (not mitigation)	DSL # _____      Expiration date _____
<input checked="" type="checkbox"/> Previous delineation/application on parcel If known, previous DSL # <u>WD2013-0108, WD2012-0041</u>	<input checked="" type="checkbox"/> LWI shows wetlands or waters on parcel Wetland ID code <u>R-1, R-2, R-3, R-5, R-6 (DEA 1992)</u>
<b>For Office Use Only</b>	
DSL Reviewer: <u>CS</u> Fee Paid Date: ____ / ____ / ____	DSL WD # <u>2019-0535</u>
Date Delineation Received: <u>9 / 26 / 19</u> Scanned: <input type="checkbox"/> Electronic: <input checked="" type="checkbox"/>	DSL App.# _____

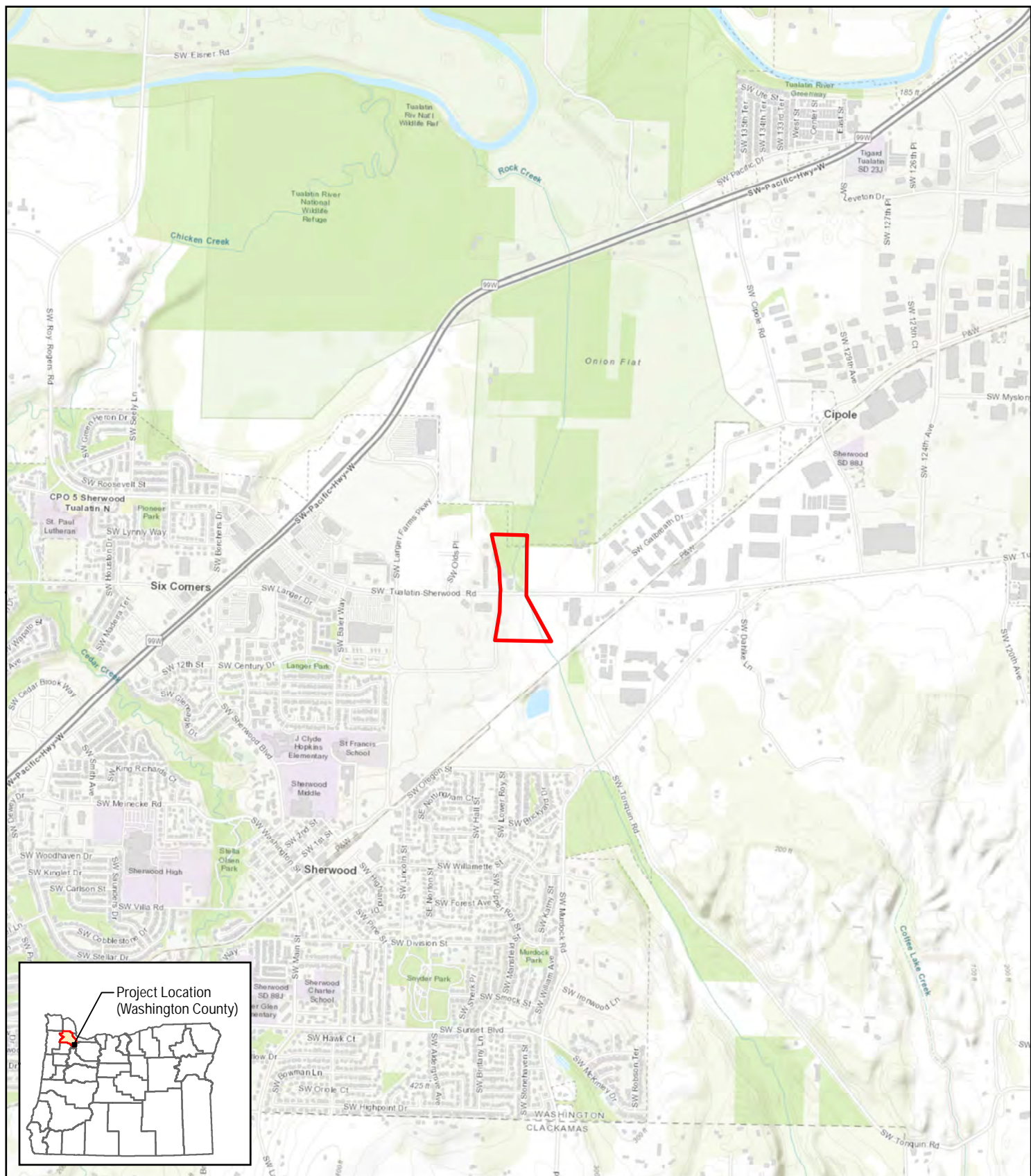


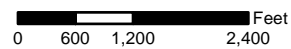
Figure 1.  
Vicinity Map

 Project Study Area (PSA)

Rock Creek Sanitary Trunk Upsizing Project  
City of Sherwood  
Washington County, Oregon

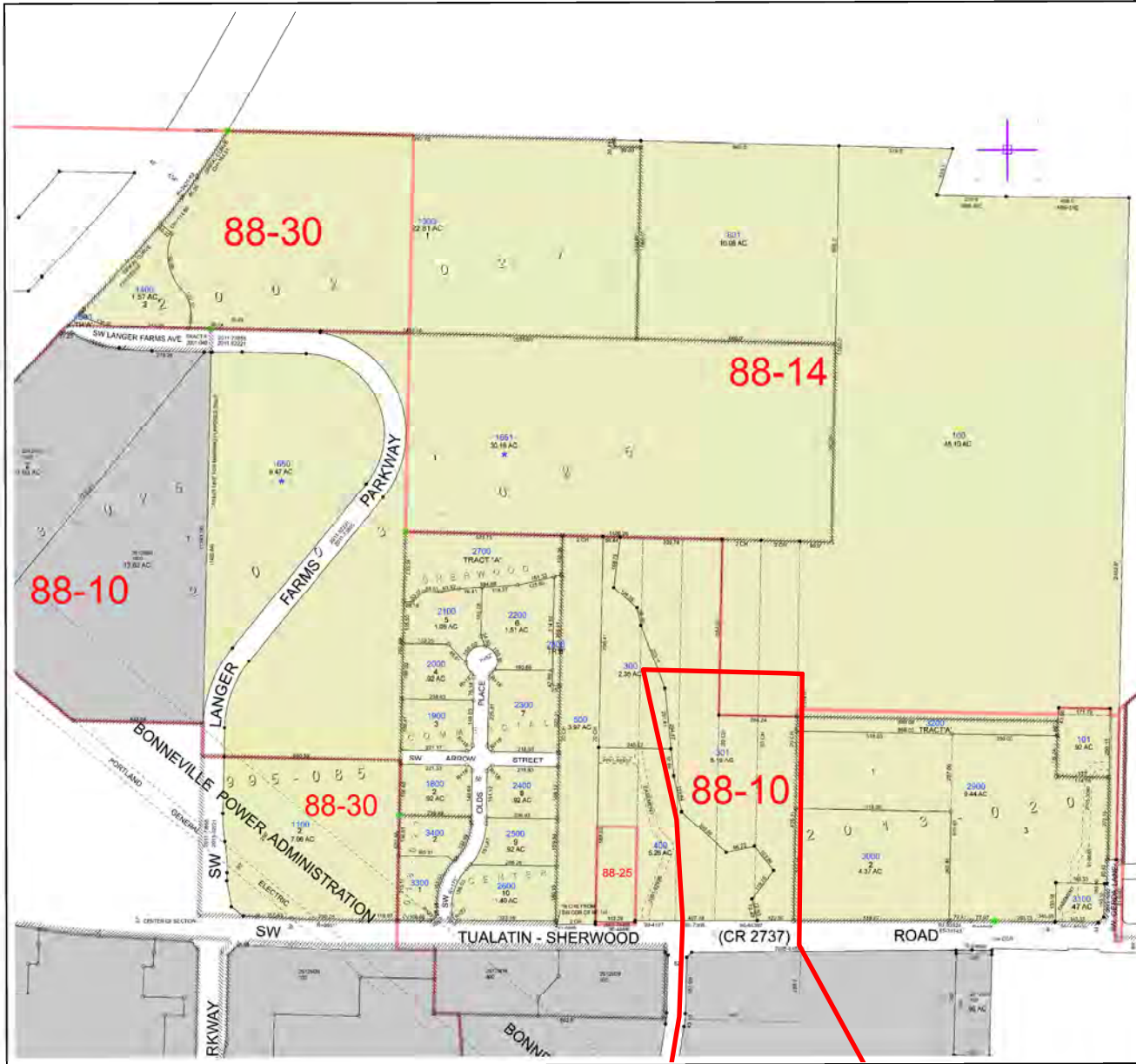


Source: Basemap from ESRI World Topographic Map; PSA from Murraysmith. Reproduced for informational purposes and may not be suitable for legal, engineering or surveying purposes. Conclusions drawn from such information are the responsibility of the user.



City of Sherwood Sewer upgrade Figure 1- 7/11/2019





2S129A

WASHINGTON COUNTY OREGON  
NE 1/4 SECTION 29 T2S R1W W.M.  
SCALE 1" = 200'

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32	33	34	35	36

FOR ADDITIONAL MAPS VISIT OUR WEBSITE AT  
[www.co.washington.or.us](http://www.co.washington.or.us)

EB	EA	EA	EA
EB	EA	EA	EA
EB	EA	EA	EA
EB	EA	EA	EA

SECTION 29

Cancelled Taxlots For: 2S129A  
401, 103, 200, 900, 1000, 800, 1200, 800, 700, 102, 800, 1700.

Feet  
0 100 200 400 600

PLUT DATE: 6/4/2018  
FOR ASSESSMENT PURPOSES ONLY - DO NOT RELY ON FOR OTHER USE

SHERWOOD  
2S129A

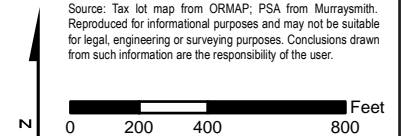
Figure 2a.  
Tax Lot Map

Rock Creek Sanitary Trunk Upsizing Project  
City of Sherwood  
Washington County, Oregon

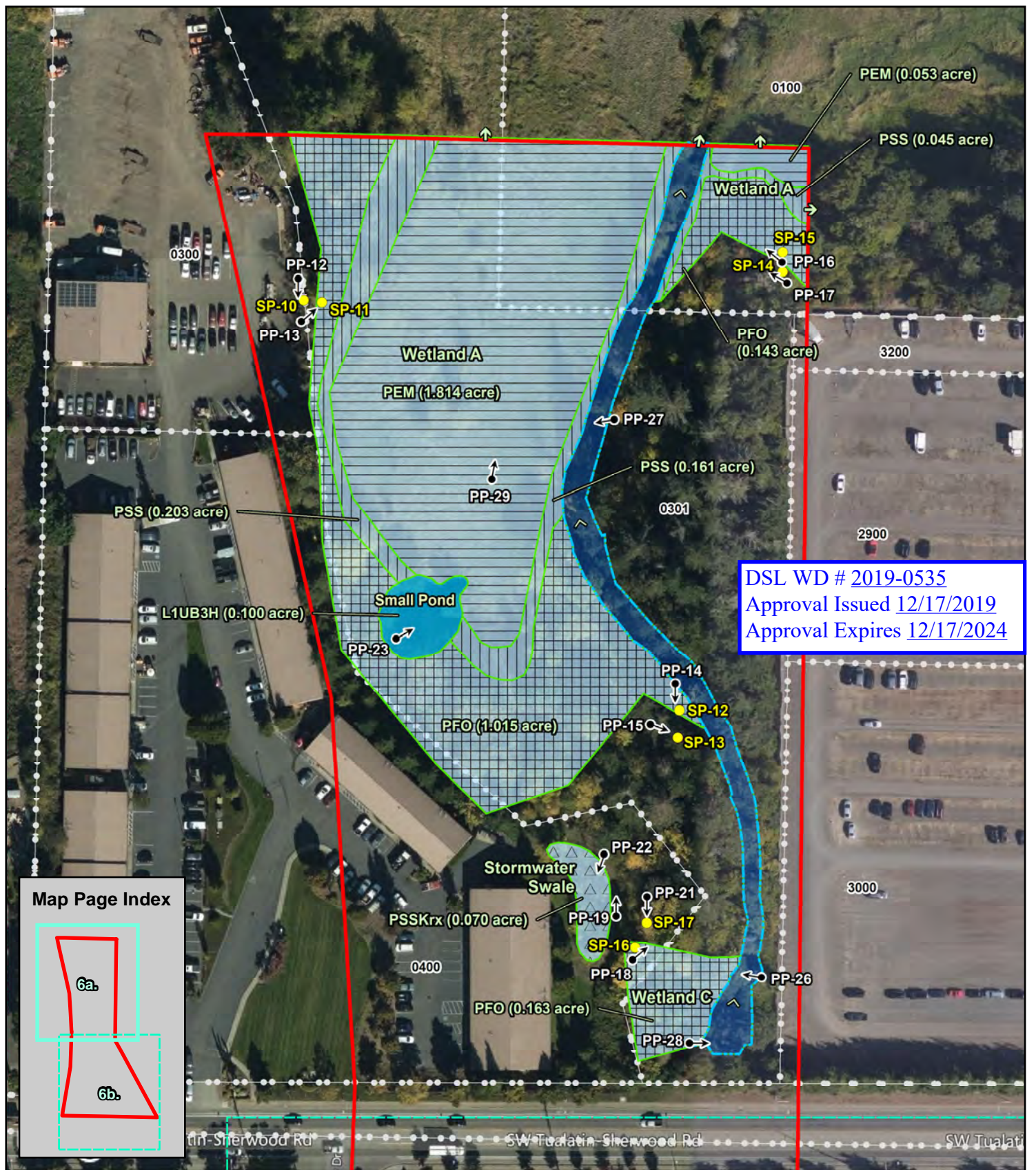
Project Study Area (PSA)



Source: Tax lot map from ORMAP; PSA from Murraysmith. Reproduced for informational purposes and may not be suitable for legal, engineering or surveying purposes. Conclusions drawn from such information are the responsibility of the user.







All wetland and waters boundary locations were recorded by professional land surveyors to an accuracy of ± 2 feet.

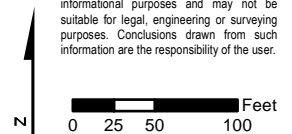
Figure 6a.  
Wetland/Waters Map

Rock Creek Sanitary Trunk Upsizing Project  
City of Sherwood  
Washington County, Oregon

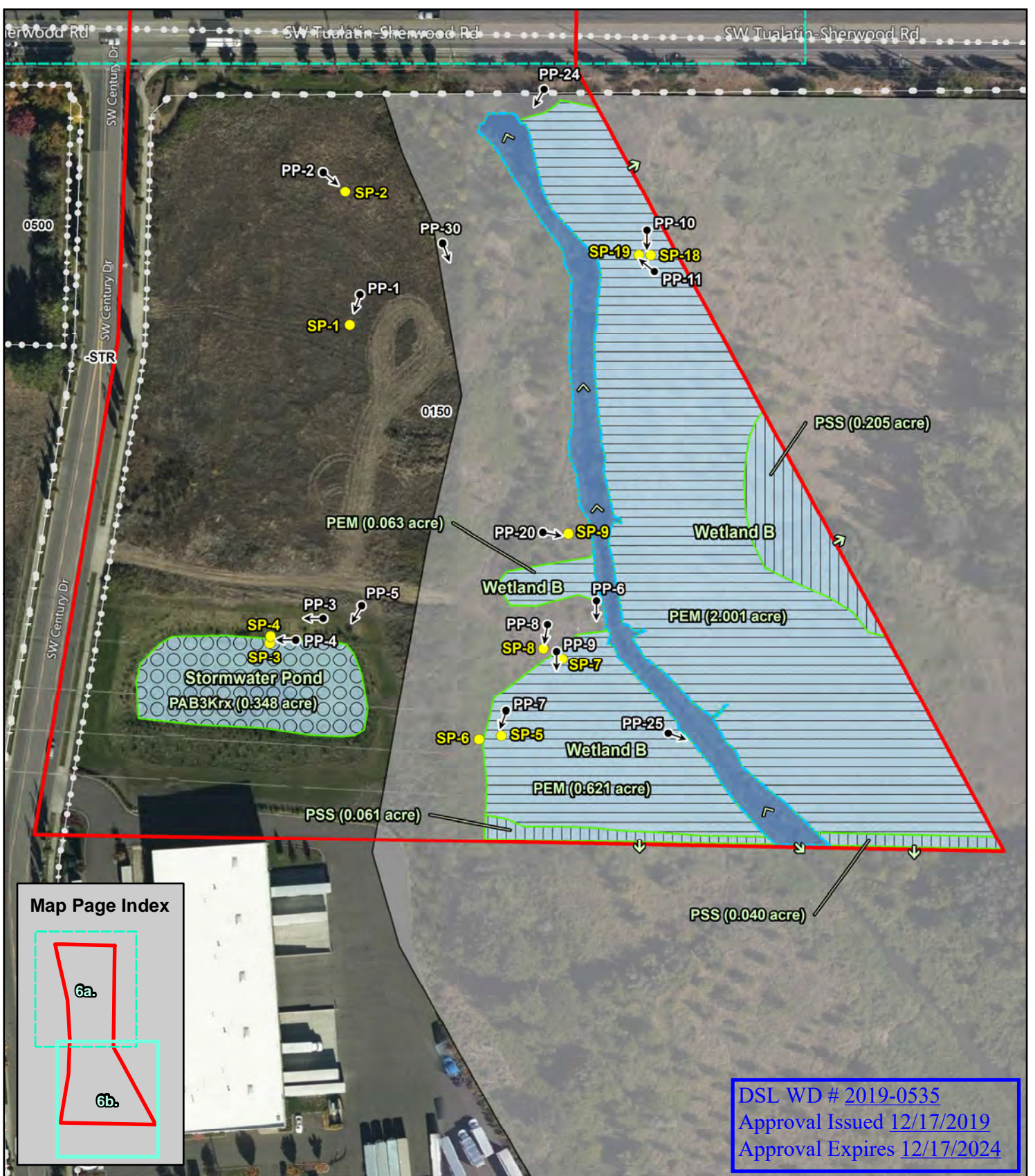
- |                          |                |                        |
|--------------------------|----------------|------------------------|
| Project Study Area (PSA) | L1UB3H Wetland | Flow Direction         |
| Tax Lots                 | PEM Wetland    | Extends Outside of PSA |
| Match Lines              | PFO Wetland    | Sample Plots           |
| Rock Creek OHWM          | PSS Wetland    | PhotoPoint             |
|                          | PSSKrx Wetland |                        |

**MB&G**

Source: Aerial Imagery from Microsoft Bing; All other data from MB&G. Reproduced for informational purposes and may not be suitable for legal, engineering or surveying purposes. Conclusions drawn from such information are the responsibility of the user.



City of Sherwood Sewer Upgrade Figure 6 - 12/13/2019



All wetland and waters boundary locations were recorded by professional land surveyors to an accuracy of ± 2 feet.

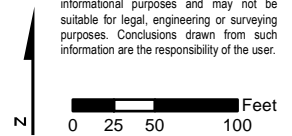
Figure 6b.  
Wetland/Waters Map

Rock Creek Sanitary Trunk Upsizing Project  
City of Sherwood  
Washington County, Oregon

- |                          |  |                        |
|--------------------------|--|------------------------|
| Project Study Area (PSA) | PAB3Krx Wetland                                | Flow Direction         |
| Tax Lots                 | PEM Wetland                                    | Extends Outside of PSA |
| Match Lines              | PSS Wetland                                    | Sample Plots           |
| Rock Creek OHWM          | Compensatory Wetland Mitigation Site (RGL1758) | PhotoPoint             |

**MB&G**

Source: Aerial imagery from Microsoft Bing; All other data from MB&G. Reproduced for informational purposes and may not be suitable for legal, engineering or surveying purposes. Conclusions drawn from such information are the responsibility of the user.



City of Sherwood Sewer Upgrade Figure 6 - 12/13/2019



# Oregon

Kate Brown, Governor

Department of Environmental Quality  
Northwest Region Portland Office/Water Quality  
700 NE Multnomah Street, Suite 600  
Portland, OR 97232-4100  
(503) 229-5263  
FAX (503) 229-6957  
TTY 711

April 14, 2020

Bob Galati  
City of Sherwood  
22560 SW Pine Street  
Sherwood, OR 97410

RE: Nationwide 401 Water Quality Certification Approval for 2013-128-1, City of Sherwood-Rock Creek Sanitary Trunk Line Upsizing

The US Army Corps of Engineers (USACE) has determined that your project will be authorized under Nationwide Permit (NWP) category #12. As described in the application package received and reviewed by the Oregon Department of Environmental Quality (DEQ), the project qualifies for the Nationwide Section 401 Water Quality Certification (WQC), subject to the conditions outlined below. If you cannot meet all conditions of this 401 WQC, you may apply for a standard individual certification. A standard individual certification will require additional information and higher fees will apply.

**Certification Decision:** Based on information provided by USACE and the Applicant, DEQ is reasonably assured that implementation-eligible activities under the proposed NWP will be consistent with applicable provisions of Sections 301, 302, 303, 306, and 307 of the federal Clean Water Act, state water-quality standards set forth in Oregon Administrative Rules Chapter 340 Division 41, and other appropriate requirements of state law, provided the following conditions are incorporated into the federal permit and strictly adhered to by the Applicant.

**In addition to all USACE national and regional permit conditions, the following 401 WQC conditions apply to all NWP categories that qualify for the Nationwide 401 WQC.**

#### 401 GENERAL CERTIFICATION CONDITIONS

- 1) **Responsible parties:** This 401 WQC applies to the Applicant. The Applicant is responsible for the work of its contractors and sub-contractors, as well as any other entity that performs work related to this WQC.
- 2) **Work Authorized:** Work authorized by this 401 WQC is limited to the work described in the Application or Pre-Construction Notification submitted to the USACE and additional application materials (hereafter "the permit application materials"), unless otherwise authorized by DEQ. If the project is operated in a manner not consistent with the project description contained in the permit application materials, the Applicant is not in compliance with this 401 WQC and may be subject to enforcement.
- 3) A copy of this 401 WQC must be kept on the job site and readily available for reference by Applicant and its contractors, as well as by DEQ, USACE, National Marine Fisheries Service

(NMFS), Oregon Department of Fish and Wildlife (ODFW), and other appropriate state and local government officials.

- 4) In accordance with OAR 340-048-0050, DEQ may modify or revoke this 401 WQC if project activities are having an adverse impact on state water quality or beneficial uses, or if the Applicant is otherwise in violation of the conditions of this certification.
- 5) The Applicant and its contractors must allow DEQ access to the project site, staging areas, and mitigation sites to monitor compliance with these 401 WQC conditions, including:
  - a. Access to any records, logs, and reports that must be kept under the conditions of this 401 WQC;
  - b. To inspect best management practices (BMPs), monitoring or operational equipment or methods; and
  - c. To collect samples or monitor any discharge of pollutants.
- 6) Failure of any person or entity to comply with this Order may result in the issuance of civil penalties or other actions, whether administrative or judicial, to enforce its terms.
- 7) **Land Use Compatibility Statement:** In accordance with OAR 340-048-0020(2) (i), each Applicant must submit findings prepared by the local land use jurisdiction that demonstrates the activity's compliance with the local comprehensive plan. Such findings can be submitted using the appropriate section of the USACE & DSL Joint Permit Application, signed by the appropriate local official and indicating:
  - a. "This project is consistent with the comprehensive plan and land use regulations;" or,
  - b. "This project will be consistent with the comprehensive plan and land use regulations when the following local approvals are obtained," accompanied by the obtained local approvals.
  - c. Rarely, such as for federal projects on federal land, "this project is not regulated by the comprehensive plan" will be acceptable.

In lieu of submitting the appropriate section of the USACE & DSL Joint Permit Application, the Applicant may use DEQ's Land Use Compatibility Statement form found at:  
<http://www.oregon.gov/deq/FilterDocs/lucs.pdf>

**FOR PROJECTS THAT PROPOSE CONSTRUCTION, THE FOLLOWING GENERAL  
CONDITIONS APPLY**

- 8) **Erosion and Sediment Control:** During construction, erosion and sediment control measures must be implemented to prevent or control movement of sediment, soil or pollutants into waters of the state. The Applicant is required to develop and implement an effective erosion and sediment control plan. **Any project that disturbs more than one acre is required to obtain an NPDES 1200-C construction stormwater permit from DEQ.** In addition, the Applicant (or responsible party) must:
  - a. Where practicable, use removable pads or mats to prevent soil compaction at all construction access points through, and staging areas in, riparian or wetland areas to prevent soil compaction.

- b. Demarcate wetlands not specifically authorized to be impacted to protect from disturbance and/or erosion.
  - c. Place dredged or other excavated material on upland areas with stable slopes to prevent materials from eroding back into waterways or wetlands. Place BMPs as necessary to stabilize and prevent erosion.
- 9) **Spill Prevention:** The Applicant must fuel, operate, maintain and store vehicles, and must store construction materials, in areas that will not impact water quality either directly or due to potential discharges.
- 10) **Spill & Incident Reporting:**
- a. In the event that petroleum products, chemicals, or any other deleterious materials are discharged into state waters, the discharge must be promptly reported to the Oregon Emergency Response Service (OERS, 1-800-452-0311). Containment and cleanup must begin immediately and be completed as soon as practicable.
  - b. If the project operations result in distressed or dying fish, the operator must immediately: cease operations; take appropriate corrective measures to prevent further environmental damage; and immediately notify DEQ and ODFW.
- 11) **Vegetation Protection and Site Restoration:**
- a. The Applicant must protect riparian, wetland, and shoreline vegetation in the authorized project area from disturbance through one or more of the following:
    - i. Minimization of project and impact footprint;
    - ii. Designation of staging areas and access points in open, upland areas;
    - iii. Fencing and other barriers demarking construction areas; and
    - iv. Use of alternative equipment (e.g., spider hoe or crane).
  - b. If authorized work results in any vegetative disturbance and the disturbance has not been accounted for in planned mitigation actions, the Applicant must successfully reestablish vegetation to a degree of function equivalent or better than before the disturbance.
- 12) The Applicant shall avoid and protect from harm, **all wetlands and riparian areas located within 50 feet of USACE jurisdictional waters**, unless proposed, necessary, and approved as part of the project. If a local jurisdiction has a more stringent buffer requirement, that requirement will override this certification requirement.

#### **FOR PROJECTS THAT PROPOSE IN-STREAM WORK IN JURISDICTIONAL WATERS**

- 13) **Fish protection/Oregon Department of Fish and Wildlife timing:** The Applicant must perform in-water work only within the Oregon Department of Fish and Wildlife preferred time window as specified in the *Oregon Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources*, or as authorized otherwise under a USACE permit and/or Department of State Lands removal/fill permit. Exceptions to the timing window must be recommended by Oregon Department of Fish and Wildlife, the National Marine Fisheries Services and/or the US Fish and Wildlife as appropriate.
- 14) **Aquatic life movements:** Any activity that may disrupt the movement of aquatic life living in the water body, including those species that normally migrate through the area, is prohibited.

The Applicant must provide unobstructed fish passage at all times during any authorized activity, unless otherwise approved in the approved application.

- 15) **Turbidity:** The Applicant must implement appropriate Best Management Practices (BMPs) to minimize turbidity during in-water work. Any activity that causes turbidity to exceed 10% above natural stream turbidity is prohibited except as specifically provided below:
- a. **Monitoring:** Turbidity monitoring must be conducted and recorded as described below. Monitoring must occur at two hour intervals each day during daylight hours when in-water work is being conducted. A properly calibrated turbidimeter is required **unless another monitoring method is proposed and authorized by DEQ.**
    - i. Representative Background Point: The Applicant must take and record a turbidity measurement every two hours during in-water work at an undisturbed area. A background location shall be established at a representative location approximately 100 feet upcurrent of the in water activity unless otherwise authorized by DEQ. The background turbidity, location, date, tidal stage (if applicable) and time must be recorded immediately prior to monitoring downcurrent at the compliance point described below.
    - ii. Compliance Point: The must monitor every two hours. A compliance location shall be established at a representative location approximately 100 feet downcurrent from the disturbance at approximately mid-depth of the waterbody and within any visible plume. The turbidity, location, date, tidal stage (if applicable) and time must be recorded for each measurement.
  - b. **Compliance:** The Applicant must compare turbidity monitoring results from the compliance points to the representative background levels taken during each two – hour monitoring interval. Pursuant to OAR 340-041-0036, short term exceedances of the turbidity water quality standard are allowed as follows:

<b>MONITORING WITH A TURBIDIMETER EVERY 2 HOURS</b>	
<b>TURBIDITY LEVEL</b>	<b>Restrictions to Duration of Activity</b>
0 to 4 NTU above background	No Restrictions
5 to 29 NTU above background	Work may continue maximum of 4 hours. If turbidity remains 5-29 NTU above background, stop work and modify BMPs. Work may resume when NTU is 0-5 above background.
30 to 49 NTU above background	Work may continue maximum of 2 hours. If turbidity remains 30-49 NTU above background, stop work and modify BMPs. Work may resume when NTU is 0-5 above background.
50 NTU or more above background	Stop work immediately and inform DEQ



- c. **Reporting:** The Applicant must record all turbidity monitoring required by subsections (a) and (b) above in daily logs. The daily logs must include calibration documentation; background NTUs; compliance point NTUs; comparison of the points in NTUs; location; date; time; and tidal stage (if applicable) for each reading. Additionally, a narrative must be prepared discussing all exceedances with subsequent monitoring, actions taken, and the effectiveness of the actions. Applicant must make available copies of daily logs for turbidity monitoring to DEQ, USACE, NMFS, USFWS, and ODFW upon request.
- d. **BMPs to Minimize In-stream Turbidity:** The Applicant must implement the following BMPs, unless otherwise accepted by DEQ:
  - i. Sequence/Phasing of Work – The Applicant must schedule work activities so as to minimize in-water disturbance and duration of in-water disturbances;
  - ii. Bucket control - All in-stream digging passes by excavation machinery and placement of fill in-stream using a bucket must be completed so as to minimize turbidity. All practicable techniques such as employing an experienced equipment operator, not dumping partial or full buckets of material back into the wetted stream, adjusting the volume, speed, or both of the load, or using a closed-lipped environmental bucket must be implemented;
  - iii. The Applicant must limit the number and location of stream-crossing events. Establish temporary crossing sites as necessary in the least sensitive areas and amend these crossing sites with clean gravel or other temporary methods as appropriate;
  - iv. Machinery may not be driven into the flowing channel, unless authorized by DEQ; and
  - v. Excavated material must be placed so that it is isolated from the water edge or wetlands, and not placed where it could re-enter waters of the state uncontrolled.

**FOR PROJECTS THAT INCLUDE NEW IMPERVIOUS SURFACES OR REDEVELOPMENT OF EXISTING SURFACES, THE FOLLOWING CONDITIONS APPLY**

- 16) **Post-Construction Stormwater Management:** For projects which propose new impervious surfaces or the redevelopment of existing surfaces, the Applicant must submit a post-construction stormwater management plan to DEQ for review and approval prior to construction, in order to ensure compliance with water quality standards. The Applicant must implement BMPs as proposed in the stormwater management plan, including operation and maintenance. If proposed stormwater facilities change due to site conditions, the Applicant must notify DEQ.

In lieu of a complete stormwater management plan, the Applicant may submit documentation of acceptance of the stormwater into a DEQ permitted National Pollutant Discharge Elimination System (NPDES) Phase I Municipal Separate Storm Sewer System (MS4).

- 17) **Stormwater Management & System Maintenance:** The Applicant is required to implement effective operation and maintenance practices for the lifetime of the proposed facility.

## CATEGORY-SPECIFIC CONDITIONS

In addition to all national and regional conditions of the USACE permit and the 401 Water Quality Certification general conditions above, the following conditions apply to the noted specific categories of authorized activities.

### NWP 7 – Outfall Structures and Associated Intake Structures:

- 7.1) The following actions are denied certification:
- a. Discharge outfalls that are not subject to an NPDES permit; and
  - b. Outfalls that discharge stormwater without pollutant removal demonstrated to meet water-quality standards prior to discharge to waters of the state.
- 7.2) If an Applicant cannot obtain an NPDES permit or submit an approvable stormwater management plan per DEQ's Guidelines found at: <http://www.oregon.gov/deq/FilterDocs/401wqcertPostCon.pdf> the Applicant must submit complete project information and water quality impacts analysis directly to DEQ in order to undergo individual 401 WQC evaluation and fulfill public participation requirements.

### NWP 12 – Utility Lines:

- 12.1) For proposals that include directionally-bored stream or wetland crossings:
- a. All drilling equipment, drill recovery and recycling pits, and any waste or spoil produced, must be completely isolated, recovered, then recycled or disposed of to prevent entry into waters of the state.
  - b. In the event that drilling fluids enter a water of the state, the equipment operator must stop work, immediately initiate containment measures and report the spill to the Oregon Emergency Response System (OERS) at 800-452-0311.
  - c. An adequate supply of materials needed to control erosion and to contain drilling fluids must be maintained at the project construction site and deployed as necessary.
  - d. The Applicant must have a contingency plan in place prior to construction for the inadvertent return of drilling lubricant.
- 12.2) For proposals that include utility lines through wetlands, include anti-seep collars or equivalent technology to prevent draining the wetlands.

### NWP 13 – Bank Stabilization:

- 13.1) Projects that do not include bioengineering are denied certification, unless a registered professional engineer provides a written statement that non-bioengineered solutions are the only means of protection.

- 13.2) To apply for certification for a project without bioengineering, the Applicant must submit complete project information and water quality impacts analysis directly to DEQ in order to undergo individual 401 WQC evaluation and fulfill public participation requirements.

**NWP 14 – Linear Transportation:**

- 14.1) For projects that include bank stabilization, bioengineering must be a component of the project, unless a registered professional engineer provides a written statement that non-bioengineered solutions are the only means to protect an existing structure.
- 14.2) To apply for certification for a project without bioengineering, the Applicant must submit complete project information and water quality impacts analysis directly to DEQ in order to undergo individual 401 WQC evaluation and fulfill public participation requirements.

**NWP 16 - Return Water from Contained Upland Disposal Areas:** Water-quality criteria and guidance values for toxics, per OAR 340-041-0033, are available in Tables 30, 31, and 40 at: <http://www.oregon.gov/deq/Rulemaking%20Docs/tables303140.pdf>.

- 16.1) Discharge of return water from contaminated dredged material that exceeds a chronic or acute toxicity water quality standard is prohibited.
- 16.2) Water removed with contaminated dredged material that could or does exceed chronic water-quality criteria must be contained and disposed of at an appropriately sized and sealed upland facility by evaporation or infiltration.
- 16.3) If a Modified Elutriate Test (MET) is performed for the known contaminants of concern (CoCs) and CoC concentrations are below DEQ chronic water-quality criteria, return water discharge is not limited.
- a. The MET must be performed before dredging.
  - b. DEQ must approve the list of CoCs and analytical method prior to the Applicant performing the MET.
  - c. DEQ must review the results and provide approval of discharge from return water, in writing, prior to dredging.

**NWP 20 – Response Operations for Oil and Hazardous Waste:**

- 20.1) Coordination with DEQ's Emergency Response program is required. See: <http://www.oregon.gov/deq/Hazards-and-Cleanup/env-cleanup/Pages/Emergency-Response.aspx>.

**NWP 22 – Removal of Vessels:**

- 22.1) Coordination with DEQ's Emergency Response program is required. See: <http://www.oregon.gov/deq/Hazards-and-Cleanup/env-cleanup/Pages/Emergency-Response.aspx>.

**NWP 31 – Maintenance of Existing Flood Control Facilities:**

- 31.1) Projects in streams with temperature TMDLs which result in a net reduction of riparian shade are prohibited.

**NWP 38 – Cleanup of Hazardous and Toxic Waste:**

- 38.1) For removal of contaminated material from waters, dredging method is limited to diver assisted hydraulic suction, hydraulic suction, closed-lipped environmental bucket, or excavation in the dry, unless otherwise authorized by DEQ.
- a. For in-water isolation measures, the Applicant is referred to Appendix D of DEQ's Oregon Erosion and Sediment Control Manual, April 2005 (or most current version), at: <https://www.oregon.gov/deq/FilterPermitsDocs/ErosionSedimentControl.pdf>.
- 38.2) Discharge to waters of the state resulting from dewatering during dredging or release of return water from an upland facility is prohibited except as provided below.
- a. All water removed with sediment must be contained and disposed of at an appropriately sized and sealed upland facility by evaporation or infiltration; or,
  - b. A Modified Elutriate Test (MET) may be performed for the known Contaminants of Concern (CoCs) and if CoC concentrations are below DEQ chronic water-quality criteria; return water discharge is not limited.
    - i. The MET must be performed before dredging.
    - ii. DEQ must approve the list of CoCs and analytical method prior to the Applicant performing the MET.
    - iii. DEQ must review the results and provide approval of discharge from dewatering and return water in writing prior to dredging.
- 38.3) Dredged material must be disposed of in compliance with DEQ Rules governing Hazardous Waste (see: <http://www.oregon.gov/deq/Hazards-and-Cleanup/hw/Pages/default.aspx>) or Solid Waste (see: <http://www.oregon.gov/deq/mm/swpermits/Pages/Solid-Waste-Disposal-Sites-and-Landfill.aspx>).
- 38.4) The new in-water surface must be managed to prevent exposure or mobilization of contaminants.

**NWP 41 - Reshaping Existing Drainage Ditches:**

- 41.1) To the extent practicable, the Applicant must work from only one bank in order to minimize disturbance to existing vegetation, preferably the bank with the least existing vegetation;
- 41.2) Following authorized work, the Applicant must establish in-stream and riparian vegetation on reshaped channels and side-channels using native plant species wherever practicable. Plantings must be targeted to address water-quality improvement (e.g., provide shade to water to reduce temperature or provide bank stability through root systems to limit sediment inputs). Planting options may include clustering or vegetating only one side of a channel, preferably the side which provides maximum shade.

#### **NWP 42 – Recreational Facilities:**

- 42.1) For facilities that include turf maintenance actions, the Applicant must develop and implement an Integrated Pest Management Plan (IPM) that describes pest prevention, monitoring and control techniques with a focus on prevention of chemical and nutrient inputs to waters of the state, including maintenance of adequate buffers for pesticide application near salmonid streams, or coverage under an NPDES permit, if required (information is available at: <http://www.oregon.gov/deq/wq/wqpermits/Pages/Pesticide.aspx>).

#### **NWP 43 – Stormwater Management Facilities:**

- 43.1) Projects that propose the following elements are denied certification:
- a. In-stream or wetland stormwater facilities;
  - b. Discharge outfalls not subject to an NPDES permit; and,
  - c. Proposals that do not demonstrate pollutant removal to meet water-quality standards prior to discharge to waters of the state.
- 43.2) To apply for certification for a project with in-stream stormwater facilities, without an NPDES permit, or without submittal of an approvable stormwater management plan per DEQ's Guidelines (at: <http://www.oregon.gov/deq/FilterDocs/401wqcertPostCon.pdf>), the Applicant must submit complete project information and water quality impacts analysis directly to DEQ in order to undergo individual 401 WQC evaluation and fulfill public participation requirements.

#### **NWP 44 – Mining Activities:**

- 44.1) Projects that do not obtain an NPDES 700-PM or Individual permit are denied certification.
- 44.2) To apply for certification for a project without an NPDES permit, the Applicant must submit complete project information and water quality impacts analysis directly to DEQ in order to undergo individual 401 WQC evaluation and fulfill public participation requirements.

#### **NWP 51 – Land-Based Renewable Energy Generation Facilities:**

- 51.1) For associated utility lines with directionally-bored stream or wetland crossings proposed, condition 12.1 must be applied.

#### **NWP 54 – Living Shorelines**

- 54.1) Projects that do not include bioengineering are denied certification, unless a registered professional engineer provides a written statement that non-bioengineered solutions are the only means of protection.

If the Applicant is dissatisfied with the conditions contained in this certification, a hearing may be requested. Such request must be made in writing to DEQ's Office of Compliance and Enforcement at 700 NE Multnomah St, Suite 600, Portland Oregon 97232, within 20 days of the mailing of this certification.

The DEQ hereby certifies that this project complies with the Clean Water Act and state rules, with the above conditions. If you have any questions, please contact Anne Kim at 503-229-5623, by email at [Kim.Anne@deq.state.or.us](mailto:Kim.Anne@deq.state.or.us), or at the address on this letterhead.

Sincerely,



Steve Mrazik,  
Water Quality Manager  
Northwest Region

ec: Melody White, USACE  
Anita Huffman, DSL  
Stuart Myers, Mason, Bruce, and Girard, Inc.

## 401 Water Quality Certification Turbidity Monitoring Report

Project Name:	USACE Project #	DSL Project #
---------------	-----------------	---------------

Name of Inspector(s):	Turbidimeter Model:	Calibration Standard Type (Circle One) <b>Formazin Solution or Gelex</b>	Calibration Standard Expiration Date:
-----------------------	---------------------	---	---------------------------------------

Sampling Date:	Calibration Values: _____ NTU (Standard) = _____ NTU (Reading) _____ NTU (Standard) = _____ NTU (Reading) _____ NTU (Standard) = _____ NTU (Reading)	*Upstream (Background) Point Location: Latitude:  Longitude:	*Downstream (Compliance) Point Location: Latitude:  Longitude:
----------------	---	---	---

In-Water Work Start Time:	In-Water Work End Time:	Description of In-Water Work:
---------------------------	-------------------------	-------------------------------

Upstream Sample		Downstream Sample		Change in Turbidity (NTU)	Observation of waterbody		NOTES (Describe any modifications made to BMPs)
Time	Turbidity (NTU)	Time	Turbidity (NTU)		Tidal Stage	Note any plume, sheen, floatables, color	

*\* Include a figure with the turbidity sampling forms showing the sampling locations.*

## 401 Water Quality Certification Turbidity Monitoring Report

**Turbidity:** The Applicant must implement appropriate Best Management Practices (BMPs) to minimize turbidity during in-water work. Any activity that causes turbidity to exceed 10% above natural stream turbidity is prohibited except as specifically provided below:

**Monitoring:** Turbidity monitoring must be conducted and recorded as described below. Monitoring must occur at two hour intervals each day during daylight hours when in-water work is being conducted. A properly calibrated turbidimeter is required **unless another monitoring method is proposed and authorized by DEQ.**

**Representative Background Point:** The Applicant must take and record a turbidity measurement every two hours during in-water work at an undisturbed area. A background location shall be established at a representative location approximately 100 feet upcurrent of the in water activity unless otherwise authorized by DEQ. The background turbidity, location, date, tidal stage (if applicable) and time must be recorded immediately prior to monitoring downcurrent at the compliance point described below.

**Compliance Point:** The must monitor every two hours. A compliance location shall be established at a representative location approximately 100 feet downcurrent from the disturbance at approximately mid-depth of the waterbody and within any visible plume. The turbidity, location, date, tidal stage (if applicable) and time must be recorded for each measurement.

**Compliance:** The Applicant must compare turbidity monitoring results from the compliance points to the representative background levels taken during each two – hour monitoring interval. Pursuant to OAR 340-041-0036, short term exceedances of the turbidity water quality standard are allowed as shown in the monitoring table shown here.

**Reporting:** The Applicant must record all turbidity monitoring required by subsections (a) and (b) above in daily logs. The daily logs must include calibration documentation; background NTUs; compliance point NTUs; comparison of the points in NTUs; location; date; time; and tidal stage (if applicable) for each reading. Additionally, a narrative must be prepared discussing all exceedances with subsequent monitoring, actions taken, and the effectiveness of the actions. Applicant must make available copies of daily logs for turbidity monitoring to DEQ, USACE, NMFS, USFWS, and ODFW upon request.

**BMPs to Minimize In-stream Turbidity:** The Applicant must implement the following BMPs, unless otherwise accepted by DEQ:

- i. Sequence/Phasing of Work – The Applicant must schedule work activities so as to minimize in-water disturbance and duration of in-water disturbances;
- ii. Bucket control - All in-stream digging passes by excavation machinery and placement of fill in-stream using a bucket must be completed so as to minimize turbidity. All practicable techniques such as employing an experienced equipment operator, not dumping partial or full buckets of material back into the wetted stream, adjusting the volume, speed, or both of the load, or using a closed-lipped environmental bucket must be implemented;
- iii. The Applicant must limit the number and location of stream-crossing events. Establish temporary crossing sites as necessary in the least sensitive areas and amend these crossing sites with clean gravel or other temporary methods as appropriate;
- iv. Machinery may not be driven into the flowing channel, unless authorized by DEQ; and
- v. Excavated material must be placed so that it is isolated from the water edge or wetlands, and not placed where it could re-enter waters of the state uncontrolled.

<b>MONITORING WITH A TURBIDIMETER EVERY 2 HOURS</b>	
<b>TURBIDITY LEVEL</b>	<b>Restrictions to Duration of Activity</b>
0 to 4 NTU above background	No Restrictions
5 to 29 NTU above background	Work may continue maximum of 4 hours. If turbidity remains 5-29 NTU above background, stop work and modify BMPs. Work may resume when NTU is 0-5 above background.
30 to 49 NTU above background	Work may continue maximum of 2 hours. If turbidity remains 30-49 NTU above background, stop work and modify BMPs. Work may resume when NTU is 0-5 above background.
50 NTU or more above background	Stop work immediately and inform DEQ



## Service Provider Letter

This form and the attached conditions will serve as your Service Provider Letter in accordance with Clean Water Services Design and Construction Standards (R&O 19-5, as amended by R&O 19-22).

Jurisdiction:	<u>City of Sherwood</u>	Review Type:	<u>Tier 2 Analysis</u>
Site Address / Location:	<u>20555 SW Gerda Ln</u> <u>Sherwood, OR 97140</u>	SPL Issue Date:	<u>April 14, 2020</u>
		SPL Expiration Date:	<u>April 14, 2022</u>

**Applicant Information:**

Name BOB GALATI  
 Company CITY OF SHERWOOD  
 Address 22560 SW PINE ST  
SHERWOOD OR 97140  
 Phone/Fax (503) 925-2303  
 E-mail: galatib@sherwoodoregon.gov

**Owner Information:**

Name \_\_\_\_\_  
 Company CITY OF SHERWOOD  
 Address 22560 SW PINE ST  
SHERWOOD OR 97140  
 Phone/Fax (503) 925-2303  
 E-mail: galatib@sherwoodoregon.gov

**Tax lot ID**

2S129A000100, 300, 301,  
& 400

**Development Activity**

Rock Creek Sanitary Sewer Trunk Line Upsizing

**Pre-Development Site Conditions:**

Sensitive Area Present:  On-Site  Off-Site  
 Vegetated Corridor Width: Variable  
Good/Marginal/Degraded  
 Vegetated Corridor Condition: \_\_\_\_\_

**Post Development Site Conditions:**

Sensitive Area Present:  On-Site  Off-Site  
 Vegetated Corridor Width: Variable

Enhancement of Remaining Vegetated Corridor Required:

Square Footage to be enhanced: 67,936

**Encroachments into Pre-Development Vegetated Corridor:**

Type and location of Encroachment:	Square Footage:
<u>Manholes (Permanent encroachment; No mitigation required under 100 SF)</u>	<u>76</u>
<u>Sanitary sewer line (Temporary encroachment; Restoration and planting in-place required)</u>	<u>26,277</u>

**Mitigation Requirements:**

Type/Location	Sq. Ft./Ratio/Cost
<u>Temporary encroachments mitigated in-place</u>	<u>26,277</u>

Conditions Attached  Development Figures Attached ( 7 )  Planting Plan Attached  Geotech Report Required

**This Service Provider Letter does NOT eliminate the need to evaluate and protect water quality sensitive areas if they are subsequently discovered on your property.**

**In order to comply with Clean Water Services water quality protection requirements the project must comply with the following conditions:**

1. No structures, development, construction activities, gardens, lawns, application of chemicals, uncontained areas of hazardous materials as defined by Oregon Department of Environmental Quality, pet wastes, dumping of materials of any kind, or other activities shall be permitted within the sensitive area or Vegetated Corridor which may negatively impact water quality, except those allowed in R&O 19-5, Chapter 3, as amended by R&O 19-22.
2. Prior to any site clearing, grading or construction the Vegetated Corridor and water quality sensitive areas shall be surveyed, staked, and temporarily fenced per approved plan. During construction the Vegetated Corridor shall remain fenced and undisturbed except as allowed by R&O 19-5, Section 3.06.1, as amended by R&O 19-22 and per approved plans.
3. **Prior to any activity within the sensitive area, the applicant shall gain authorization for the project from the Oregon Department of State Lands (DSL) and US Army Corps of Engineers (USACE). The applicant shall provide Clean Water Services or its designee (appropriate city) with copies of all DSL and USACE project authorization permits.**
4. An approved Oregon Department of Forestry Notification is required for one or more trees harvested for sale, trade, or barter, on any non-federal lands within the State of Oregon.
5. **Prior to ground disturbing activities, an erosion control permit is required. Appropriate Best Management Practices (BMP's) for Erosion Control, in accordance with Clean Water Services' Erosion Prevention and Sediment Control Planning and Design Manual, shall be used prior to, during, and following earth disturbing activities.**
6. Prior to construction, a Stormwater Connection Permit from Clean Water Services or its designee is required pursuant to Ordinance 27, Section 4.B.
7. Activities located within the 100-year floodplain shall comply with R&O 19-5, Section 5.10, as amended by R&O 19-22.
8. Removal of native, woody vegetation shall be limited to the greatest extent practicable.
9. **Should final development plans differ significantly from those submitted for review by Clean Water Services, the applicant shall provide updated drawings, and if necessary, obtain a revised Service Provider Letter.**
10. The Vegetated Corridor width for sensitive areas within the project site shall be a minimum of 50 feet wide, as measured horizontally from the delineated boundary of the sensitive area.
11. For Vegetated Corridors up to 50 feet wide, the applicant shall enhance the entire Vegetated Corridor to meet or exceed good corridor condition or as approved in attached figures consistent with Linear Development Projects as defined in R&O 19-5, Section 3.12 and 3.14.2, Table 3-3, as amended by R&O 19-22.
12. **Removal of invasive non-native species by hand is required in all Vegetated Corridors rated ""good."" Replanting is required in any cleared areas larger than 25 square feet using low impact methods. The applicant shall calculate all cleared areas larger than 25 square feet prior to the preparation of the required Vegetated Corridor enhancement/restoration plan.**
13. Prior to any site clearing, grading or construction, the applicant shall provide Clean Water Services with a Vegetated Corridor enhancement/restoration plan. Enhancement/restoration of the Vegetated Corridor shall be provided in accordance with R&O 19-5, Appendix A, as amended by R&O 19-22, and shall include planting specifications for all Vegetated Corridor, including any cleared areas larger than 25 square feet in Vegetated Corridor rated ""good.""
14. Prior to installation of plant materials, all invasive vegetation within the Vegetated Corridor shall be removed per methods described in Clean Water Services' Integrated Pest Management Plan, 2019. During removal of invasive vegetation care shall be taken to minimize impacts to existing native tree and shrub species.
15. Clean Water Services and/or City shall be notified 72 hours prior to the start and completion of enhancement/restoration activities. Enhancement/restoration activities shall comply with the

guidelines provided in Planting Requirements (R&O 19-5, Appendix A, as amended by R&O 19-22).

16. **Maintenance and monitoring requirements shall comply with R&O 19-5, Section 2.12.2, as amended by R&O 19-22. If at any time during the warranty period the landscaping falls below the 80% survival level, the owner shall reinstall all deficient planting at the next appropriate planting opportunity and the two year maintenance period shall begin again from the date of replanting.**
17. **Performance assurances for the Vegetated Corridor shall comply with R&O 19-5, Section 2.07.2, Table 2-1 and Section 2.11, Table 2-2, as amended by R&O 19-22.**
18. **Clean Water Services will require an easement over the Water Quality Sensitive Area and Vegetated Corridor conveying storm and surface water management to Clean Water Services or the City that would prevent the owner of the Vegetated Corridor from activities and uses inconsistent with the purpose of the corridor and any easements therein.**

#### **FINAL PLANS**

19. **Final construction plans shall include landscape plans.** In the details section of the plans, a description of the methods for removal and control of exotic species, location, distribution, condition and size of plantings, existing plants and trees to be preserved, and installation methods for plant materials is required. Plantings shall be tagged for dormant season identification and shall remain on plant material after planting for monitoring purposes.
20. **A Maintenance Plan shall be included on final plans** including methods, responsible party contact information, and dates (minimum two times per year, by June 1 and September 30).
21. **Final construction plans shall clearly depict the location and dimensions of the sensitive area and the Vegetated Corridor** (indicating good, marginal, or degraded condition). Sensitive area boundaries shall be marked in the field.
22. Protection of the Vegetated Corridors and associated sensitive areas shall be provided by the installation of permanent fencing and signage between the development and the outer limits of the Vegetated Corridors. **Fencing and signage details to be included on final construction plans.**

**This Service Provider Letter is not valid unless CWS-approved site plan is attached.**

**Please call (503) 681-3653 with any questions.**



**Lindsey Obermiller  
Environmental Plan Review**

**Attachments ( 7 )**

COLOR COPY  
 CWS FILE NO. 20-000667  
 Approved  
 Clean Water Services  
 FOR ENVIRONMENTAL REVIEW  
 By LO Date 04/14/2020  
 SPL ATTACHMENT 1 OF 7

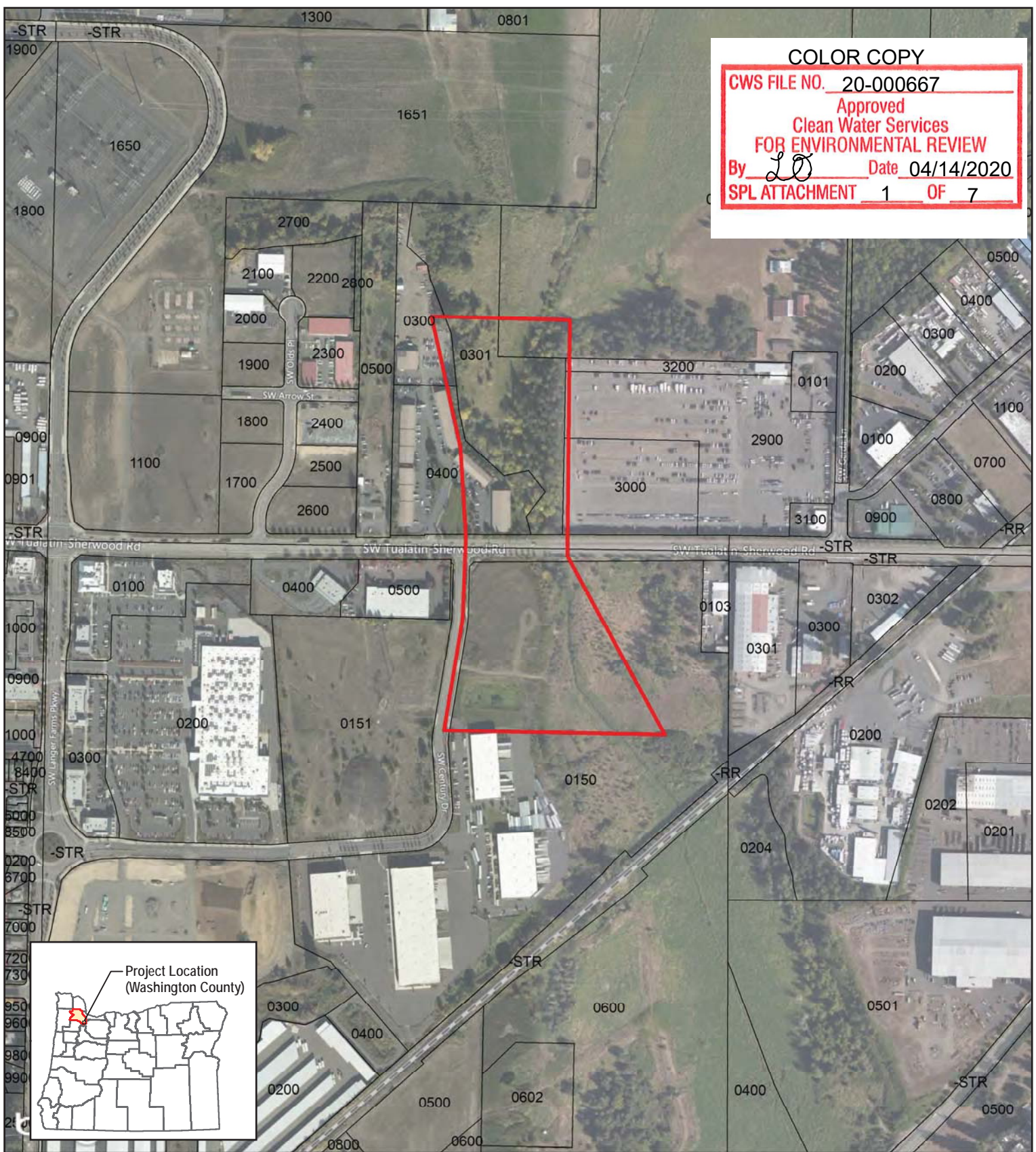


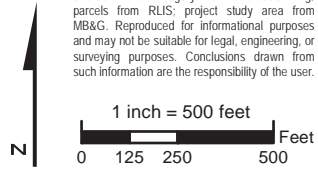
Figure 1.  
 Project Vicinity Map

Rock Creek Sanitary Trunk Upsizing Project  
 City of Sherwood  
 Washington County, Oregon

- Project Study Area (PSA)
- AreaTaxLots



Source: Aerial imagery from Microsoft Bing; parcels from RLIS; project study area from MB&G. Reproduced for informational purposes and may not be suitable for legal, engineering, or surveying purposes. Conclusions drawn from such information are the responsibility of the user.



COLOR COPY

CWS FILE NO. 20-000667

Approved  
Clean Water Services  
FOR ENVIRONMENTAL REVIEW

By LO Date 04/14/2020

SPL ATTACHMENT 2 OF 7

Summary of Permanent VC Encroachment

Non-Native Scrub-Shrub, Degraded = 13 sf  
Riparian Forested, Degraded = 35 sf  
Riparian Forested, Good = 28 sf

Summary of Temporary VC Encroachment

Herbaceous Maintained, Degraded = 1,696 sf  
Non-Native Scrub-Shrub, Degraded = 6,863 sf  
Riparian Forested, Degraded = 13,766 sf  
Riparian Forested, Good = 3,490 sf  
Riparian Forested, Marginal = 462 sf

Summary of Proposed Enhancement

Degraded Condition VC = 25,225 sf  
Good Condition VC = 44,725 sf  
Marginal Condition VC = 3,090 sf

Parcel Owned by  
City of Sherwood

Parcel Owned by  
U.S. Dept. of Interior  
(USFWS)

Parcel Owned by  
TMK Properties LLC

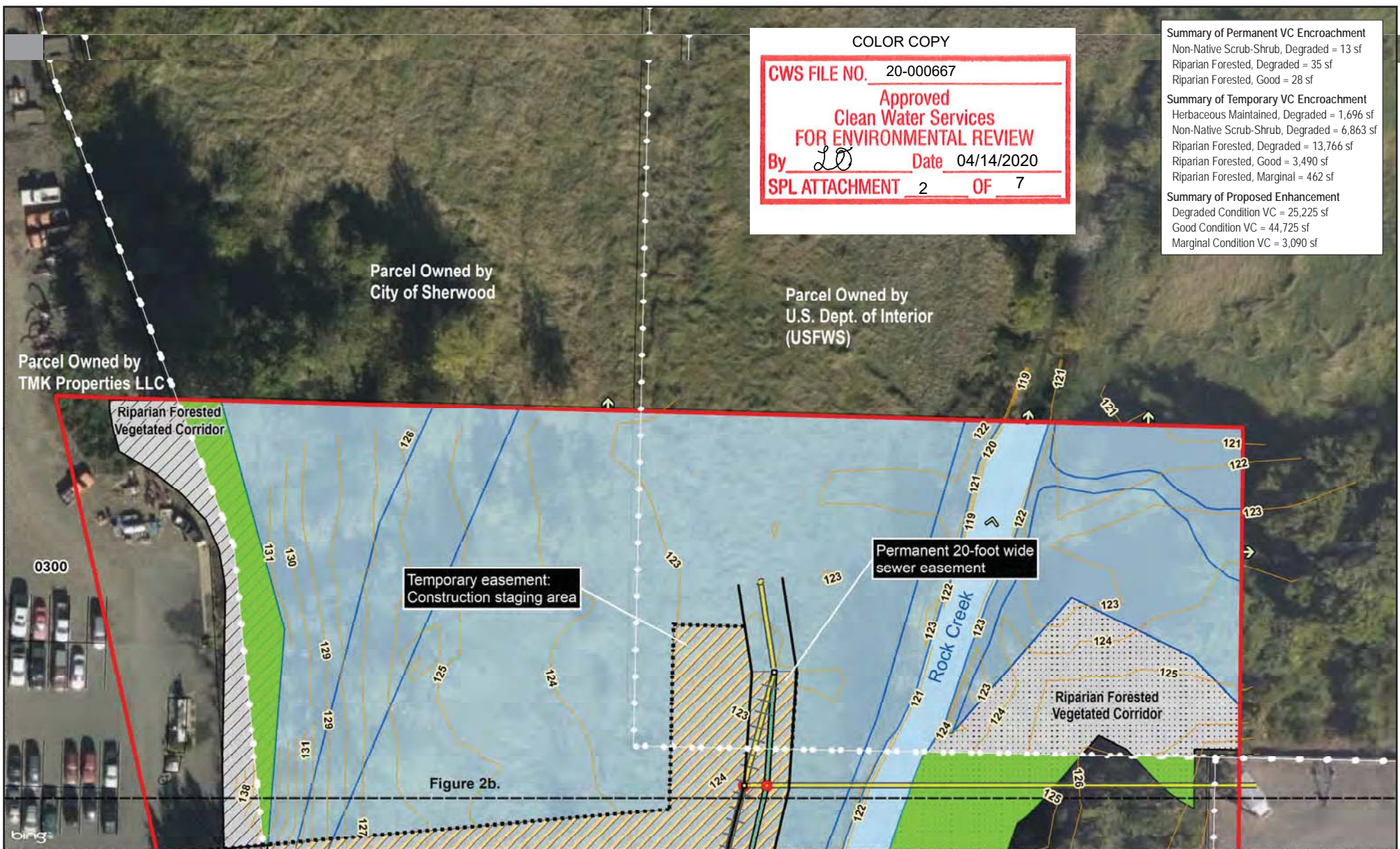
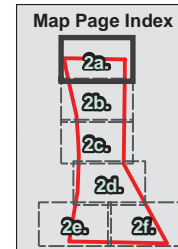
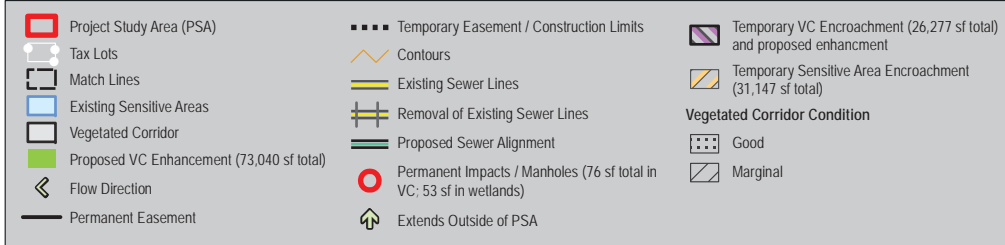


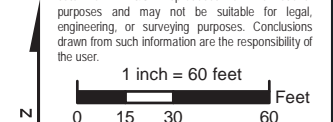
Figure 3a.  
Proposed Development and  
Final Conditions Figure

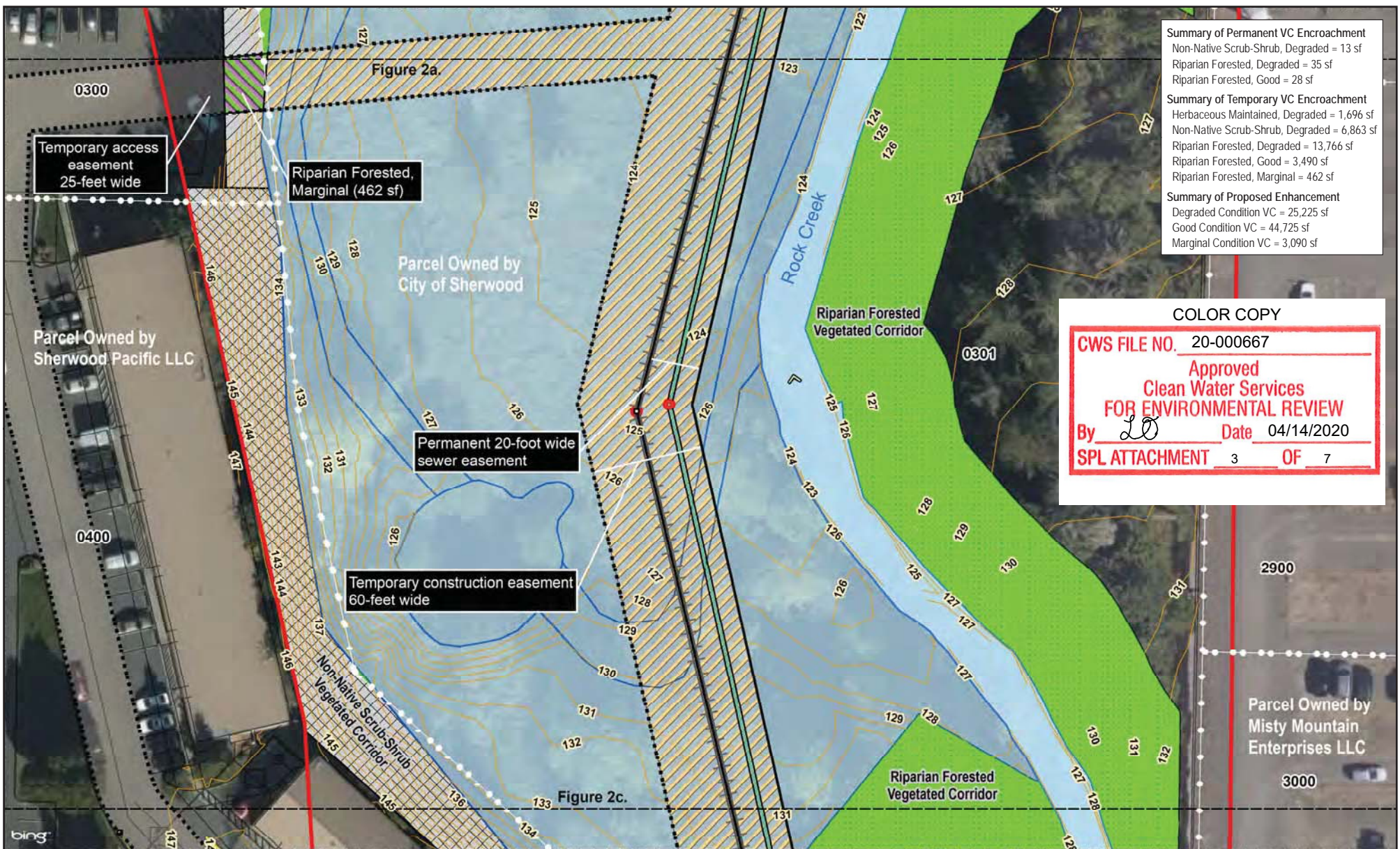
Rock Creek Sanitary Trunk Upsizing Project  
City of Sherwood  
Washington County, Oregon



MB&G

Source: Aerial imagery from Microsoft Bing; proposed design data from MurraySmith; all other data from MB&G. Reproduced for informational purposes and may not be suitable for legal, engineering, or surveying purposes. Conclusions drawn from such information are the responsibility of the user.





**Summary of Permanent VC Encroachment**  
 Non-Native Scrub-Shrub, Degraded = 13 sf  
 Riparian Forested, Degraded = 35 sf  
 Riparian Forested, Good = 28 sf

**Summary of Temporary VC Encroachment**  
 Herbaceous Maintained, Degraded = 1,696 sf  
 Non-Native Scrub-Shrub, Degraded = 6,863 sf  
 Riparian Forested, Degraded = 13,766 sf  
 Riparian Forested, Good = 3,490 sf  
 Riparian Forested, Marginal = 462 sf

**Summary of Proposed Enhancement**  
 Degraded Condition VC = 25,225 sf  
 Good Condition VC = 44,725 sf  
 Marginal Condition VC = 3,090 sf

**COLOR COPY**

**CWS FILE NO. 20-000667**

**Approved  
 Clean Water Services  
 FOR ENVIRONMENTAL REVIEW**

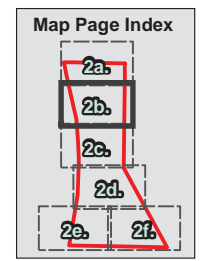
By *[Signature]* Date 04/14/2020

**SPL ATTACHMENT 3 OF 7**

**Figure 3b.**  
**Proposed Development and  
 Final Conditions Figure**

Rock Creek Sanitary Trunk Upsizing Project  
 City of Sherwood  
 Washington County, Oregon

Project Study Area (PSA)	Temporary Easement / Construction Limits	Temporary VC Encroachment (26,277 sf total) and proposed enhancement
Tax Lots	Contours	Temporary Sensitive Area Encroachment (31,147 sf total)
Match Lines	Existing Sewer Lines	<b>Vegetated Corridor Condition</b>
Existing Sensitive Areas	Removal of Existing Sewer Lines	Degraded
Vegetated Corridor	Proposed Sewer Alignment	Good
Proposed VC Enhancement (73,040 sf total)	Permanent Impacts / Manholes (76 sf total in VC; 53 sf in wetlands)	Marginal
Flow Direction		
Permanent Easement		



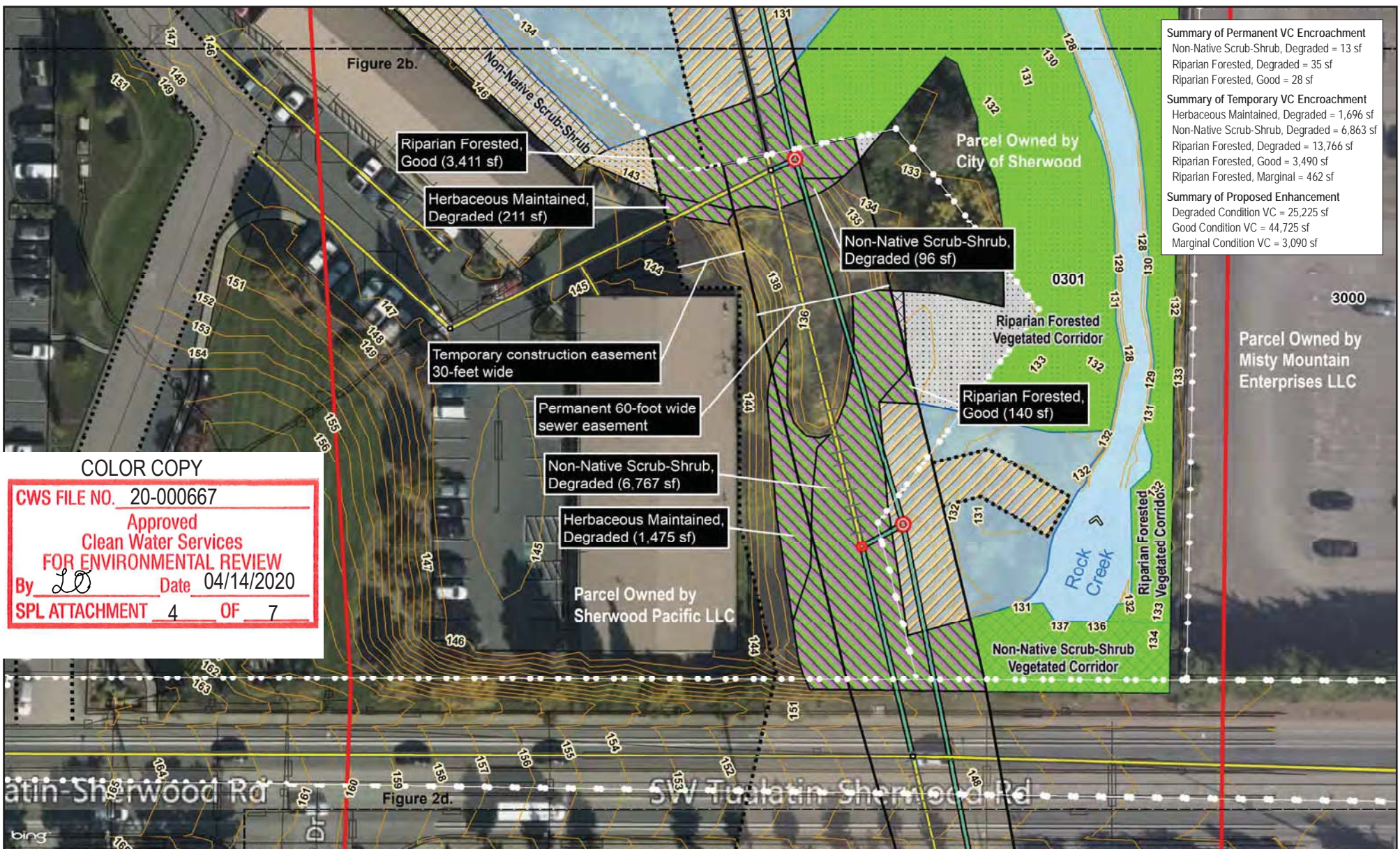
**MB&G**

Source: Aerial imagery from Microsoft Bing; proposed design data from MurraySmith; all other data from MB&G. Reproduced for informational purposes and may not be suitable for legal, engineering, or surveying purposes. Conclusions drawn from such information are the responsibility of the user.

1 inch = 60 feet

0 15 30 60 Feet

©2020 MurraySmith Environmental Services, LLC



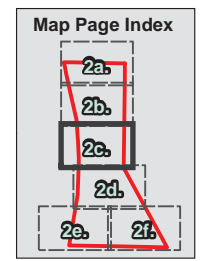
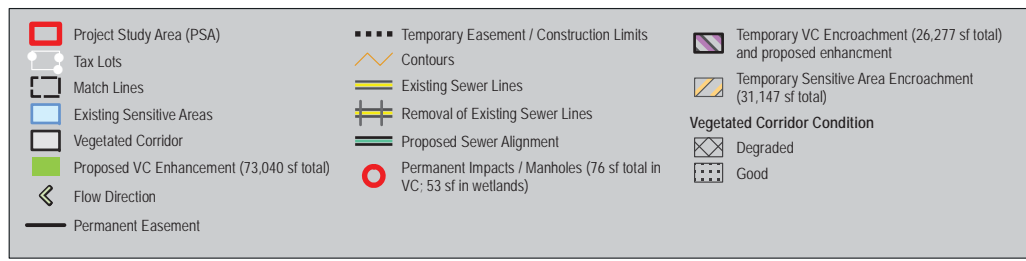
**Summary of Permanent VC Encroachment**  
 Non-Native Scrub-Shrub, Degraded = 13 sf  
 Riparian Forested, Degraded = 35 sf  
 Riparian Forested, Good = 28 sf

**Summary of Temporary VC Encroachment**  
 Herbaceous Maintained, Degraded = 1,696 sf  
 Non-Native Scrub-Shrub, Degraded = 6,863 sf  
 Riparian Forested, Degraded = 13,766 sf  
 Riparian Forested, Good = 3,490 sf  
 Riparian Forested, Marginal = 462 sf

**Summary of Proposed Enhancement**  
 Degraded Condition VC = 25,225 sf  
 Good Condition VC = 44,725 sf  
 Marginal Condition VC = 3,090 sf

COLOR COPY  
**CWS FILE NO. 20-000667**  
 Approved  
**Clean Water Services**  
**FOR ENVIRONMENTAL REVIEW**  
 By LD Date 04/14/2020  
**SPL ATTACHMENT 4 OF 7**

**Figure 3c.**  
**Proposed Development and**  
**Final Conditions Figure**

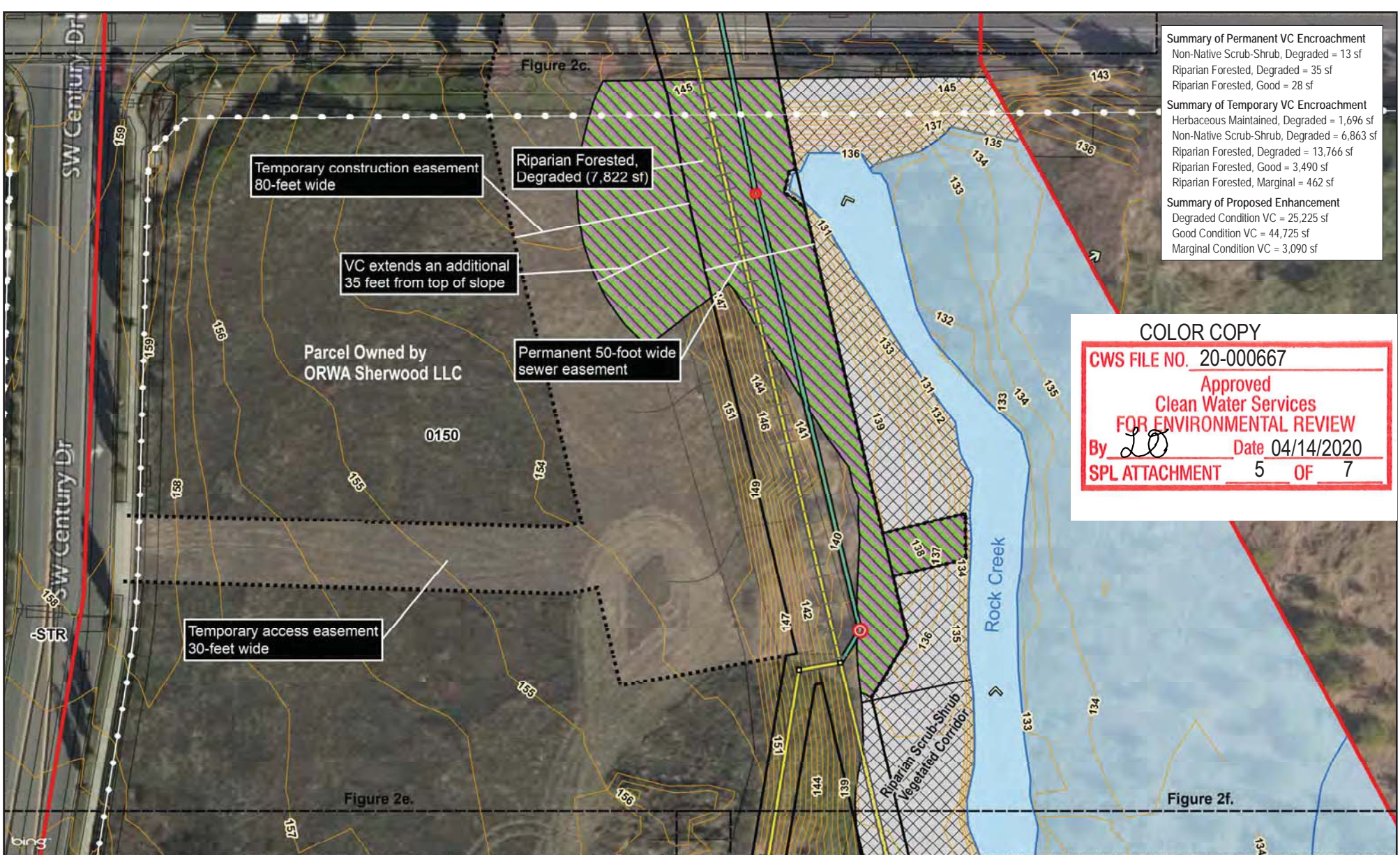


Source: Aerial imagery from Microsoft Bing; proposed design data from MurraySmith; all other data from MB&G. Reproduced for informational purposes and may not be suitable for legal, engineering, or surveying purposes. Conclusions drawn from such information are the responsibility of the user.

1 inch = 60 feet

0 15 30 60 Feet

Rock Creek Sanitary Trunk Upsizing Project  
 City of Sherwood  
 Washington County, Oregon



**Summary of Permanent VC Encroachment**  
 Non-Native Scrub-Shrub, Degraded = 13 sf  
 Riparian Forested, Degraded = 35 sf  
 Riparian Forested, Good = 28 sf

**Summary of Temporary VC Encroachment**  
 Herbaceous Maintained, Degraded = 1,696 sf  
 Non-Native Scrub-Shrub, Degraded = 6,863 sf  
 Riparian Forested, Degraded = 13,766 sf  
 Riparian Forested, Good = 3,490 sf  
 Riparian Forested, Marginal = 462 sf

**Summary of Proposed Enhancement**  
 Degraded Condition VC = 25,225 sf  
 Good Condition VC = 44,725 sf  
 Marginal Condition VC = 3,090 sf

**COLOR COPY**

**CWS FILE NO. 20-000667**

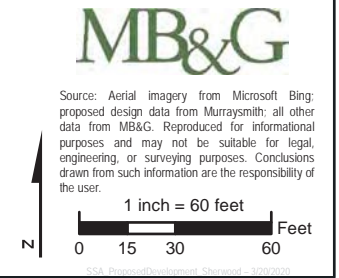
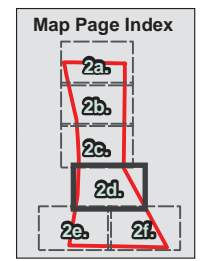
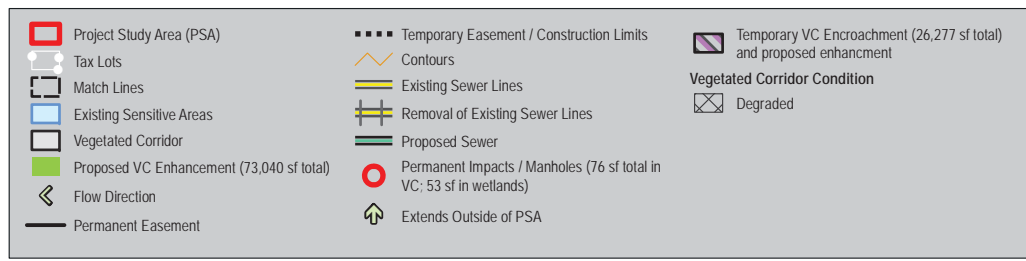
**Approved**  
**Clean Water Services**  
**FOR ENVIRONMENTAL REVIEW**

By LO Date 04/14/2020

**SPL ATTACHMENT 5 OF 7**

**Figure 3d.**  
**Proposed Development and**  
**Final Conditions Figure**

Rock Creek Sanitary Trunk Upsizing Project  
 City of Sherwood  
 Washington County, Oregon



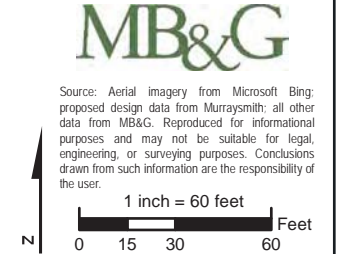
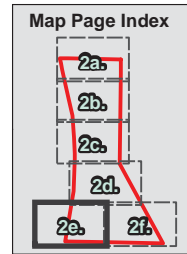
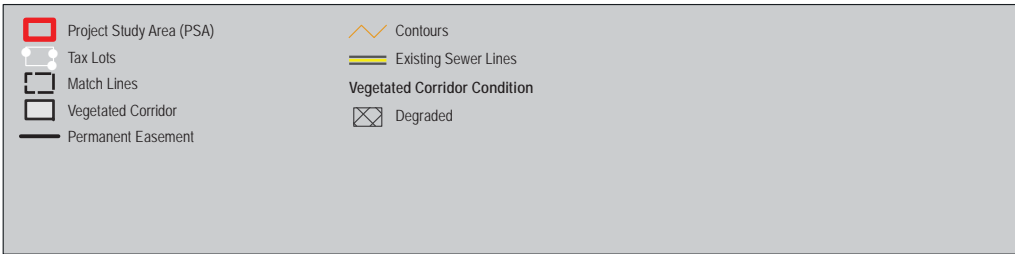


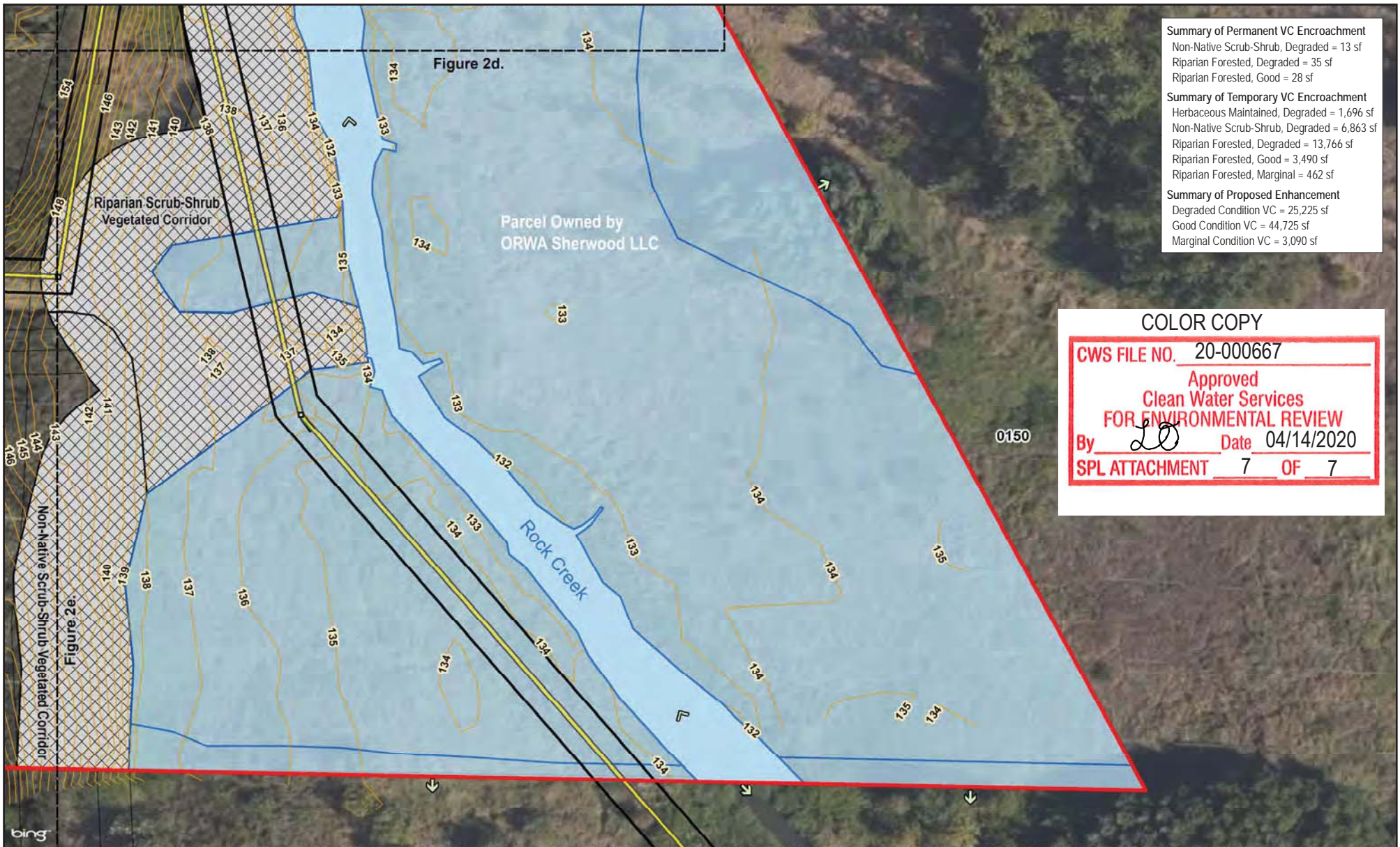


COLOR COPY  
**CWS FILE NO. 20-000667**  
 Approved  
 Clean Water Services  
**FOR ENVIRONMENTAL REVIEW**  
 By LO Date 04/14/2020  
**SPL ATTACHMENT 6 OF 7**

**Figure 3e.**  
**Proposed Development and**  
**Final Conditions Figure**

Rock Creek Sanitary Trunk Upsizing Project  
 City of Sherwood  
 Washington County, Oregon





**Summary of Permanent VC Encroachment**  
 Non-Native Scrub-Shrub, Degraded = 13 sf  
 Riparian Forested, Degraded = 35 sf  
 Riparian Forested, Good = 28 sf

**Summary of Temporary VC Encroachment**  
 Herbaceous Maintained, Degraded = 1,696 sf  
 Non-Native Scrub-Shrub, Degraded = 6,863 sf  
 Riparian Forested, Degraded = 13,766 sf  
 Riparian Forested, Good = 3,490 sf  
 Riparian Forested, Marginal = 462 sf

**Summary of Proposed Enhancement**  
 Degraded Condition VC = 25,225 sf  
 Good Condition VC = 44,725 sf  
 Marginal Condition VC = 3,090 sf

**COLOR COPY**

**CWS FILE NO. 20-000667**

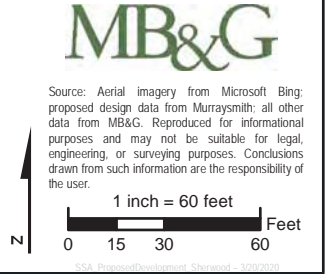
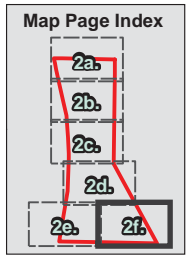
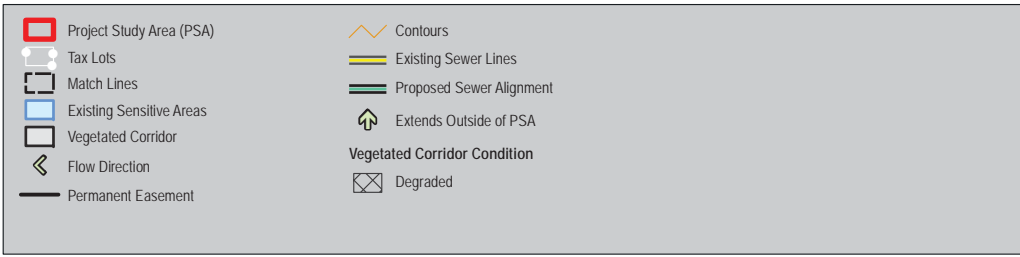
**Approved**  
**Clean Water Services**  
**FOR ENVIRONMENTAL REVIEW**

By LO Date 04/14/2020

**SPL ATTACHMENT 7 OF 7**

**Figure 3f.**  
**Proposed Development and**  
**Final Conditions Figure**

Rock Creek Sanitary Trunk Upsizing Project  
 City of Sherwood  
 Washington County, Oregon



# Storm Water Connection Permit Authorization



**Permit Number**  
**20-000667**

This Authorization to issue a Storm Water Connection Permit, in accordance with the requirements of Resolution and Order 19-22, including section 3.01.2, when signed and dated by the District, verifies that the District has reviewed the construction plans, as submitted by the City, and concurs that they are in accordance with the previously identified design standards and either, 1) the Service Provider Letter (SPL) or, 2) the Sensitive Area Pre-Screening Site Assessment acting as the SPL issued for project and is in compliance with the District's water quality protection standards. This authorizes the Jurisdictional City to issue a Stormwater Connection Permit for the project.

If modifications occur after the issuance of this letter which create a violation of the Service Provider Letter, then the Permit becomes null and void.

It is the responsibility of the Jurisdictional City to notify Clean Water Services of changes that effect the Service Provider Letter.

Service Provider Letter Number: 20-000667      Date of Service Provider Letter: April 14, 2020

Map and Tax Lot #: 2S129A000100, 300, 301, 400      Project Name: Rock Creek Sanitary Trunk Upsizing Project

Developer/Applicant: City of Sherwood      Jurisdictional City: Sherwood

**Comments:**  
\_\_\_\_\_  
\_\_\_\_\_

**CONCLUSION**  
\_\_\_\_\_  
The City, in accepting this Authorization for permit ,and authorizing construction of permitted activities, certifies that all portions of this project have been designed to CWS Design and Construction Standards, R&O 19-22, and have been reviewed and approved by the Jurisdictional City.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Storm Water Connection Permit authorized by: Steve Olson      Date: 3/9/2021  
**Steve Olson**



State of Oregon  
Department of  
Environmental  
Quality

**GENERAL PERMIT  
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM  
STORMWATER DISCHARGE PERMIT**

Oregon Department of Environmental Quality  
811 SW Sixth Avenue, Portland OR 97204  
Telephone: (503) 229-5279 or 1-800-452-4011 (toll free in Oregon)

**Issued pursuant to ORS 468B.050 and Section 402 of the Federal Clean Water Act**

**AUTOMATICALLY COVERED CONSTRUCTION ACTIVITIES**

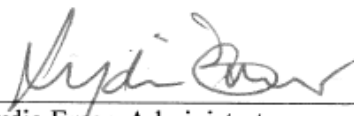
**SOURCES COVERED BY THIS PERMIT:**

- Coverage under this permit is not available in all jurisdictions. Coverage under this permit is available only in specific jurisdictions referred to as “1200-CN Jurisdictions.”
- An owner or operator that has received a local permit authorizing construction activities meeting the conditions in Schedule A, conditions 1 or 2 is not required to submit an application for permit coverage to DEQ. The owner or operator must comply with all applicable local jurisdiction permit requirements, codes, and ordinances. The construction activities are automatically covered under the State 1200-CN permit, and are authorized to discharge in accordance with Schedule A, conditions 3 through 6. Construction activities covered under this permit include:
  - Construction activities including clearing, grading, excavation, materials or equipment staging and stockpiling that will disturb one or more acres but less than 5 acres and may discharge to surface waters or conveyance systems leading to surface waters of the state; and
  - Construction activities including clearing, grading, excavation, materials or equipment staging and stockpiling that will disturb less than one acre that are part of a common plan of development or sale if the larger common plan of development or sale will ultimately disturb one acre or more and may discharge to surface waters or conveyance systems leading to surface waters of the state.

DEQ retains the right to require registration (by the owner or operator) of construction activities in these jurisdictions in accordance with the 1200-C permit, when DEQ determines that registration is necessary to ensure protection of water quality.

This permit does not authorize the following:

- In-water or riparian work, that is regulated by other programs and agencies including the Federal Clean Water Act Section 404 permit program, the Oregon Department of State Lands, the Oregon Department of Fish and Wildlife, the U.S. Fish and Wildlife Service, the U.S. Army Corp of Engineers, the National Marine Fisheries Service and the Department of Environmental Quality Section 401 certification program.
- Post-construction stormwater discharges that originate from the site after completion of construction activities and the site has undergone final stabilization.
- Discharges to underground injection control (UIC) systems.

  
Lydia Enjer, Administrator  
Operations Division

Effective: December 15, 2015  
Expiration Date: December 14, 2020

**PERMITTED ACTIVITIES**

Until this permit expires, is modified or revoked, the owner/operator of an automatically covered activity is authorized to construct, install, modify, or operate erosion and sediment control measures and stormwater treatment and control facilities, and to discharge stormwater and certain specified non-stormwater discharges to surface waters of the state or conveyance systems leading to surface waters of the state only in conformance with all the requirements, limitations, and conditions set forth in the permit including attached schedules as follows:

**CONTENTS**

SCHEDULE A CONTROLS AND LIMITATIONS .....3

- 1. Disturbance Less Than 5 Acres .....3
- 2. Disturbance Less Than 1 Acre .....4
- 3. Performance Measures .....4
- 4. Authorized Stormwater Discharges .....4
- 5. Authorized Non-Stormwater Discharges .....5
- 6. Prohibited Discharges .....5

SCHEDULE B MINIMUM MONITORING AND RECORDKEEPING REQUIREMENTS .....5

- 1. Visual Monitoring .....5
- 2. Recordkeeping .....6

SCHEDULE D SPECIAL CONDITIONS .....7

- 1. Standard Conditions .....7
- 2. Other Requirements .....7
- 3. Permit-specific Definitions .....7

## SCHEDULE A CONTROLS AND LIMITATIONS

### 1. Disturbance Less Than 5 Acres

An owner or operator of construction activities that meet the conditions listed below automatically receives coverage under this permit.

- a. The owner or operator has received a local permit authorizing the construction activities; and
- b. The construction activities are within the jurisdictions listed below; and
  - i. Albany
  - ii. Corvallis
  - iii. Eugene
  - iv. Milwaukie
  - v. Springfield
  - vi. West Linn
  - vii. Wilsonville
  - viii. Clackamas County Water Environment Services, within its two service districts: Clackamas County Service District #1 and the Surface Water Management Agency of Clackamas County.
  - ix. Clean Water Services, including:
    - (1) Banks
    - (2) Beaverton
    - (3) Cornelius
    - (4) Durham
    - (5) Forest Grove
    - (6) Hillsboro
    - (7) King City
    - (8) North Plains
    - (9) Sherwood
    - (10) Tigard
    - (11) Tualatin
    - (12) Washington County within the Urban Growth Boundary
  - x. Portions of Lane County that are in Lane County's MS4 Phase II Permit area
  - xi. Multnomah County (unincorporated portions of the county)
  - xii. Rogue Valley Sewer Services, including:
    - (1) Central Point
    - (2) Phoenix
    - (3) Talent
    - (4) Portions of Jackson County in Rogue Valley Sewer Services' MS4 Phase II Permit area
- c. The construction activity does not have the potential to discharge to a portion of a waterbody listed for turbidity or sedimentation on the most recently EPA-approved Oregon 303(d) list and is not addressed by a Total Maximum Daily Load (TMDL) (listings are available at [www.deq.state.or.us/WQ/assessment/assessment.htm](http://www.deq.state.or.us/WQ/assessment/assessment.htm)); and
- d. Either,
  - i. The construction activities will disturb one or more acres but less than 5 acres over the life of the project; or
  - ii. The construction activities will disturb less than 1 acre and are part of a common plan of development or sale that will ultimately disturb one acre or more.

## 2. Disturbance Less Than 1 Acre

An owner or operator of construction activities that meet the conditions listed below automatically receives coverage under this permit.

- a. The owner or operator has received a local permit authorizing the construction activities; and
- b. The construction activities are within the jurisdictions listed below; and
  - i. Gresham
  - ii. Troutdale
  - iii. Wood Village
- c. The construction activity does not have the potential to discharge to a portion of a waterbody listed for turbidity or sedimentation on the most recently EPA-approved Oregon 303(d) list and is not addressed by a Total Maximum Daily Load (TMDL) (listings are available at [www.deq.state.or.us/WQ/assessment/assessment.htm](http://www.deq.state.or.us/WQ/assessment/assessment.htm)); and
- d. The construction activities will disturb less than 1 acre and are part of a common plan of development or sale that will ultimately disturb one acre or more.

## 3. Performance Measures

- a. An owner or operator of automatically covered construction activities must prevent the discharge of significant amounts of sediment to surface waters or conveyance systems leading to surface waters. The following conditions indicate that significant amounts of sediment has left or is likely to leave the site, and are prohibited:
  - i. Earth slides or mud flows;
  - ii. Concentrated flows of stormwater such as rills, rivulets or channels that cause erosion when such flows are not filtered, settled or otherwise treated to remove sediment;
  - iii. Sediment laden or turbid flows of stormwater that are not filtered or settled to remove sediments and turbidity;
  - iv. Deposits of sediment at the construction site in areas that drain to unprotected stormwater inlets or to catch basins that discharge to surface waters. Inlets and catch basins with failing sediment controls due to lack of maintenance or inadequate design are considered unprotected;
  - v. Deposits of sediment from the construction site on any property (including public and private streets) outside of the construction activity covered by this permit. An owner or operator of automatically covered construction activities must not cause or contribute to a violation of in-stream water quality standards.

## 4. Authorized Stormwater Discharges

Subject to compliance with the terms and conditions of this permit, and provided that all necessary controls are implemented to minimize sediment transport, the following stormwater discharges from construction sites are authorized (unless otherwise prohibited by local ordinances):

- a. Stormwater associated with the automatically covered construction activity described in the “Sources Covered” section of the permit.
- b. Stormwater from support activities at the automatically covered construction site (for example, concrete or asphalt operations, equipment staging yards, material storage areas, excavated material disposal areas and borrow areas) provided:
  - i. The support activity is directly related to the construction site covered by this NPDES permit;
  - ii. The support activity is not a commercial operation serving multiple unrelated construction projects by different owners or operators;
  - iii. The support activity does not operate beyond the completion of the construction activity at the last construction project it supports; and
  - iv. Appropriate control measures are used to ensure compliance with discharge and water quality requirements.

## 5. Authorized Non-Stormwater Discharges

If the terms and conditions of this permit are met, all necessary controls are implemented to minimize sediment transport, the discharge is not contaminated, and the discharge is not prohibited by local ordinance, the following non-stormwater discharges from construction sites are authorized:

- a. Water from emergency firefighting activities;
- b. Fire hydrant flushings;
- c. Potable water including water line flushing;
- d. Vehicle washing and external building washing that does not use solvents, detergents or hot water;
- e. Pavement wash waters where stockpiled material, spills or leaks of toxic or hazardous materials have not occurred (unless all stockpiled and spilled material has been removed) and where solvents, detergents or hot water are not used. Directing pavement wash waters into any surface water, storm drain inlet, or stormwater conveyance is prohibited, unless the conveyance is connected to a sediment basin, sediment trap, or similarly effective control;
- f. Water used to control dust;
- g. Air conditioning or compressor condensate;
- h. Construction dewatering activities (including groundwater dewatering and well drilling discharge associated with the automatically covered construction activity), provided that:
  - i. The water is land applied in a way that results in complete infiltration with no potential to discharge to a surface water of the state, or
  - ii. Best Management Practices (BMPs) or an approved treatment system is used to ensure compliance with discharge and water quality requirements;
- i. Foundation or footing drains where flows are not contaminated with process materials such as solvents; and
- j. Landscape irrigation.

## 6. Prohibited Discharges

Discharges of the following are not authorized by this permit:

- a. Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;
- b. Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance; and
- c. Soaps or solvents used in vehicle and equipment washing.
- d. Concrete truck wash-out, hydro-demolition water, and saw-cutting slurry.

### **SCHEDULE B MINIMUM MONITORING AND RECORDKEEPING REQUIREMENTS**

#### 1. Visual Monitoring

Visual monitoring is required when construction will disturb one or more acres.

- a. The following must be monitored visually:
  - i. Discharge point(s). Where discharge points are inaccessible, nearby downstream locations must be inspected to the extent that such inspections are practicable.
  - ii. BMPs.
  - iii. Locations where vehicles enter or exit the site for evidence of off-site sediment tracking.
  - iv. Areas used for storage of materials that are exposed to precipitation for evidence of spillage or other potential to contaminate stormwater runoff.



b. Inspect according to the following schedule:

Site Condition	Minimum Frequency
1. Active period	Weekly when stormwater runoff, including runoff from snow melt, is occurring.  At least once every month, regardless of whether stormwater runoff is occurring.
2. Prior to the site becoming inactive or in anticipation of site inaccessibility	Once to ensure that erosion and sediment control measures are in working order. Any necessary maintenance and repair must be made prior to leaving the site.
3. Inactive periods greater than fourteen (14) consecutive calendar days	Once every month.
4. Periods during which the site is inaccessible due to inclement weather	If practical, inspections must occur daily at a relevant and accessible discharge point or downstream location.
5. Periods during which discharge is unlikely due to frozen conditions.	Monthly. Resume monitoring immediately upon melt, or when weather conditions make discharges likely.

c. Documentation of visual monitoring.

All visual monitoring must document the following:

- i. Visual monitoring date and inspector's name.
- ii. The construction site name or address.
- iii. For each discharge location, record:
  - (1) For turbidity and color, describe any apparent color and the clarity of the discharge, and any apparent difference in comparison with the surface waters.
  - (2) Describe any sheen or floating material, or record that it is absent. If present, it could indicate concern about a possible spill or leakage from vehicles or materials storage.
- iv. BMPs that failed or that are in need of maintenance, including erosion and sediment controls, chemical and waste controls, locations where vehicles enter and exit the site, status of areas that are under temporary or final stabilization, soil stockpile areas, and non-stormwater pollution (for example, paints, oils, fuels, or adhesives) controls.
- v. Location(s) where additional BMPs are needed that did not exist at the time of inspection; and
- vi. Corrective action required and implementation dates.

## 2. Recordkeeping

- a. Visual Monitoring Records Retained Onsite. All inspection records must be retained on site. During inactive periods of greater than seven (7) consecutive calendar days, the records must be retained by the owner/operator but do not need to be at the construction site.
- b. Upon request, the permit registrant must deliver the above records to DEQ, Agent, or the local municipality within three (3) working days of the request.
- c. All records must be retained by the owner/operator for at least three (3) years after project completion.

## SCHEDULE D SPECIAL CONDITIONS

### 1. Standard Conditions

Federal regulations require that the Standard Conditions at 40 CFR §122.41 be applied to all NPDES permits. You are required to comply with those Standard Conditions. In the event of any inconsistency between 40 CFR §122.41 and any other schedule of the permit, Schedules A through D take precedence.

### 2. Other Requirements

This permit does not relieve the owner or operator from other permitting and licensing requirements. Prior to beginning construction activities, the owner/operator must obtain all other necessary approvals.

### 3. Permit-specific Definitions

- a. *1200-CN Jurisdiction* means a jurisdiction in which automatic coverage under the Oregon State 1200-CN permit may apply to eligible activities. A list of these jurisdictions is available at <http://www.deq.state.or.us/wq/stormwater/construction.htm>.
- b. *Best Management Practices or BMPs* means schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural or managerial practices to prevent or reduce the pollution of waters of the state. BMPs include treatment systems, erosion and sediment control, source control, and operating procedures and practices to control site runoff, spillage or leaks, and waste disposal.
- c. *Borrow Area* means the area from which material is excavated to be used as fill material in another area.
- d. *Clean Water Act or CWA* means the Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, and 97-117; USC 1251 et seq.
- e. *Conveyance System* means, for the purposes of this permit, a sewer, ditch, pipe, channel, swale or similar component that is designed to carry water; or any combination of such components.
- f. *DEQ* means the Oregon Department of Environmental Quality.
- g. *Dewatering* means the removal and disposal of surface water or groundwater during site construction.
- h. *Discharge Point* means the location where stormwater leaves the site. It includes the location where stormwater is discharged to surface water or a stormwater conveyance system.
- i. *Erosion* means the movement of soil particles or rock fragments by water or wind.
- j. *Fully Stabilized* means the completion of all soil disturbing activities at the site by the owner/operator, and the establishment of a final vegetative cover, or equivalent permanent stabilization measures (such as riprap, gabions or geotextiles) to prevent erosion.
- k. *Hazardous Materials* means the materials defined in 40 CFR part 302 Designation, Reportable Quantities, and Notification.
- l. *Local Jurisdiction* means any county, city, town, or service district.
- m. *National Pollutant Discharge Elimination System or NPDES* means the national program under Section 402 of the Clean Water Act for regulation of point source discharges of pollutants to waters of the United States.
- n. *Owner or operator* means the owner or operator of any “facility or activity” subject to regulation under the NPDES program. Owners or operators may be individuals or other legal entities.
  - i. Operator for the purposes of this permit means any person associated with a construction project that meets either of the following two criteria:
    - (1) The person has operational control over construction plans and specifications, including the authority to make modifications to those plans and specifications; or

- (2) The person has day-to-day operational control of those activities at a project which are necessary to ensure compliance with a ESCP for the site or other permit conditions (for example, they are authorized to direct workers at a site to carry out activities required by the ESCP or comply with other permit conditions).
- ii. Owner for the purposes of this permit means any person with a legal interest in the permitted activities
- o. *Person* means not only individuals, but also includes, corporations, associations, firms, partnerships, joint stock companies, public and municipal corporations, political subdivisions, the state and any agencies thereof, and the federal government and any agencies thereof.
- p. *Pollutant* as defined in 40 CFR §122.2 means dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, domestic sewage sludge (biosolids), munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, soil, cellar dirt and industrial, municipal, and agricultural waste discharge into water. It does not mean sewage from vessels within the meaning of section 312 of the FWPCA, nor does it include dredged or fill material discharged in accordance with a permit issued under section 404 of the FWPCA.
- q. *Pollution or Water Pollution* as defined by ORS 468B.005(3) means such alteration of the physical, chemical or biological properties of any waters of the state, including change in temperature, taste, color, turbidity, silt or odor of the waters, or such discharge of any liquid, gaseous, solid, radioactive or other substance into any waters of the state, which will or tends to, either by itself or in connection with any other substance, create a public nuisance or which will or tends to render such waters harmful, detrimental or injurious to public health, safety or welfare, or to domestic, commercial, industrial, agricultural, recreational or other legitimate beneficial uses or to livestock, wildlife, fish or other aquatic life or the habitat thereof.
- r. *Sediment* means mineral or organic matter, typically deposited by water, air, or ice.
- s. *Site* means the area where the construction activity is physically located or conducted.
- t. *Stormwater Conveyance* means a sewer, ditch, or swale that is designed to carry stormwater; a stormwater conveyance may also be referred to as a storm drain or storm sewer.
- u. *Stormwater as defined by 40 CFR §122.26(b)(13)* means stormwater runoff, snow melt runoff, and surface runoff and drainage.
- v. *Surface Water* means all water naturally open to the atmosphere (for example, rivers, lakes, reservoirs, ponds, streams, impoundments, oceans, estuaries, springs, etc.).
- w. *Total Maximum Daily Load or TMDL* means a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet state water quality standards. It is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. Percentages of the TMDL are allocated by DEQ to the various pollutant sources.
- x. *Turbidity* means the optical condition of waters caused by suspended or dissolved particles or colloids that scatter and absorb light rays instead of transmitting light in straight lines through the water column. Turbidity may be expressed as nephelometric turbidity units (NTUs) measured with a calibrated turbidity meter.
- y. *Underground Injection Control* means any system, structure, or activity that is created to place fluid below the ground or sub-surface (for example, sumps, infiltration galleries, drywells, trench drains, drill holes, etc.)
- z. *Water or Waters of the State as defined by ORS 468B.005(8)* means lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Pacific Ocean within the territorial limits of the State of Oregon and all other bodies of surface or underground waters, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters which do not combine or effect a junction with natural surface or underground waters), which are wholly or partially within or bordering the state or within its jurisdiction.



Department of Land Use and Transportation  
 Operations and Maintenance Division  
 1400 SW Walnut Street, MS 51  
 Hillsboro, OR 97123  
 Phone: 503-846-7623 / Fax: 503-846-7620

**Inspection Request Line (IVR)**  
**Codes:** 950 Operations Interim, 951 Operations Final  
**IVR:** 503-846-3699  
**Online:** <http://washcooraca.com>

## Permit 202016

<b>Right-of-Way Utility</b>	<b>Issued</b>
-----------------------------	---------------

**Description:**  
 SW Tualatin Sherwood Rd - Utility Trenchless installation of 54" casing and 24" PVC gravity sewer beneath SW Tualatin-Sherwood Rd. Temporary westbound lane closure and sidewalk closure expected for several weeks during the construction window to facilitate material deliveries, and allow for access to an existing sewer manhole in SW Tualatin Sherwood Rd right-of-way. Anticipate 3 each 8" diameter pavement corings to be performed for installation of settlement control points per sheet C-7.

Stormwater improvements as shown on sheet C-10 and C-11 are being coordinated with upcoming Washington County roadway widening project (point of contact: Washington County Project Manager Matt Meiers). Construct New Facility

Street/Road Information	Key Dates
<b>Site Address:</b> 14991 SW TUALATIN SHERWOOD RD	<b>Accepted Date:</b> 09/17/2020
<b>Location:</b> SW Tualatin Sherwood Rd - Utility	<b>Issued Date:</b> 10/15/2020
<b>Nearest Cross Street:</b>	<b>Proposed Start:</b> 06/01/2021
<b>Parcel:</b>	<b>Estimated Completion:</b> 12/31/2021
<b>Subdivision:</b>	<b>Expiration Date:</b> 10/15/2021

<b>Applicant:</b> City of Sherwood 22560 SW Pine St Sherwood OR 97140 5039252309 <a href="mailto:galatib@sherwoodoregon.gov">galatib@sherwoodoregon.gov</a>	<b>Contractor:</b>
---	--------------------

### Special Conditions

1. Please call the inspection request line for start work, sidewalk and curb form inspection, and any other questions you might have regarding this permit. If work is interrupted and restarted call the inspection request line for start.
2. The authorized lane restrictions under this permit are from 9:00AM to 3:30PM.
3. Any damage to the asphalt road surface is to be repaired with an approved asphaltic material. If steel plates are needed, please apply for a steel plate permit at washcooraca.com.
4. All sidewalk repairs are to be full panel replacement. (i.e. joint to joint). The work area is to be barricaded and an ADA compliant alternate pedestrian route provided.
5. All curb/curb and gutter repairs are to be full segment replacement. (i.e. joint to joint).
6. This permit is for Washington County Right-of-Way only, other permits may be required.

7. Please ensure that an alternate ADA path is provided for pedestrians during sidewalk removal and construction.
8. Traffic control must address bike lane if affected.
9. Traffic control must be adjusted to meet conditions in field.
10. Construct a VERTICAL CURB NON-MOUNTABLE and gutter in accordance with Washington County Standard Drawing # 2030.
11. Construct a P.C. CONCRETE SIDEWALK in accordance with Washington County Standard Drawing # 2110.
12. NO VEHICLES OR TRAILERS ARE TO BE PARKED ON SIDEWALKS OR CURBS AT ANY TIME
13. Settlement control points must be removed when done and backfilled to original condition
14. Backfill all excavation sites within Washington County ROW

**Important Notice**

- A) This permit is only valid when issued with the approved plans, the attached General Conditions, the above Special Conditions, and any other specified attachments or requirements.
- B) Additional fees may be required if there is a substantial change in the scope of work requiring further review by Washington County or if more than three site visits are needed for inspection purposes.
- C) If this permit expires without an approved final inspection or if the requirements of this permit have not been met to the satisfaction of Washington County, a notice may be placed in the property record related to the permit status which could delay the issuance or closure of other permits.
- D) Failure to comply with the terms and conditions of this permit may result in a code violation citation or other legal action necessary to enforce the terms of the permit.



**GENERAL CONDITIONS**  
**For Permits To Work in Washington County Right-of-Way**

1. Comply with these General Conditions unless otherwise allowed, in writing, or modified by the Special Conditions or Special Provisions contained within this permit.
2. This permit does not authorize any activity on privately owned property or public rights-of-way not under the control and jurisdiction of Washington County.
3. Failure to comply with any term or condition of this permit shall be cause for the County to revoke, annul, terminate, suspend, revise or amend this permit or issue code violation citation or take any legal action necessary to correct the violation. All costs associated with work stoppage or revocation as provided herein are the responsibility of the Permittee.
4. Follow the direction of Washington County if actual site conditions warrant the need to modify any previously approved construction, traffic control, or erosion control plan. Washington County reserves the right to make changes to the permit and approved supplementary documents including any and all plans at any given time. If submitted plans were prepared by an engineer, submit as built plans to Washington County at project completion.
5. Obtain County approval prior to modifying the scope of the permitted work.
6. Communicate and coordinate, as needed, with adjacent residents, businesses, and other service providers (i.e. utilities, transit providers, garbage haulers, etc.) that may be impacted by the work associated with this permit.
7. Comply with all applicable city, county, state and federal laws and regulations associated with the performance of the work authorized by this permit. Laws and regulations listed in these General Conditions or the Special Provisions are for courtesy purposes only. These listings are not intended to be comprehensive. It is the responsibility of the Permittee and those performing the work to be knowledgeable about all applicable laws and regulations.
8. Washington County has the authority to designate the location where lines, fixtures and facilities may be located, and subject to ORS 758.025 may order the location of any such line, fixture or facility to be changed when deemed expedient by the County. Any line, fixture or facility erected or remaining in a different location upon such road than that designated in any order of the County is a public nuisance and may be abated accordingly.
9. Obtain any other permits, licenses, or authorizations required by other utilities, public agencies, or organizations for performing work authorized under this permit.
10. 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 952-001-0100. You may obtain copies of the rules by calling the center. The telephone number for the Oregon Utility Notification Center is (503) 232-1987, (800) 332-2344, or 811. You can also visit [www.digsafelyoregon.com](http://www.digsafelyoregon.com) for more information. The Oregon Utility Notification Center One Call locates telephone number in the greater Portland Metropolitan area is (503) 246-6699.
11. Permittee shall contact the County, using one of the *Contact Options* below, at least one (1) business day prior to the following milestones:
  - a) Start of construction – For notification purposes only. Formal inspection not required to commence construction. Indicate that inspection request is for start of construction.
  - b) Concrete form inspection – Concrete shall not be placed until forms have passed formal inspection.
  - c) Pre-paving inspection – Paving shall not be performed until site has passed formal inspection.
  - d) A break in construction greater than three (3) days (excluding holidays and weekend) – For notification purposes only.
  - e) Completion of construction – Use "Final" inspection code to request inspection after all permitted work is complete.

Contact Options:

- 1) Phone: (503) 846-3699
- 2) Online: <http://washcooraca.com>

Be prepared to have your permit number and inspection code available for entry into the automated system(s).

12. Thirty (30) days prior to the expiration of the permit the Permittee shall contact the County at 503-846-7623 and provide an update and status of the permitted work, if the work has not been completed. If the work will not be completed prior to permit expiration, the Permittee shall request an extension for the permit or risk having to re-apply for a new permit with new fees and requirements associated with the work.
13. Construct the permitted activity with materials, equipment, labor, and workmanship to meet or exceed the relevant specifications established in the Washington County *Road Design and Construction Standards* (Ordinance #738 as adopted January 27, 2011), the 2018 Oregon Standard Specifications for Construction, and any special conditions or provisions established by this permit. Ensure quality control is maintained for all work performed and correct any work that does not meet the minimum standards and specifications.



**GENERAL CONDITIONS**  
**For Permits To Work in Washington County Right-of-Way**

14. Establish and maintain work zone traffic control in compliance with the *Oregon Temporary Traffic Control Handbook for Operations of Three Days or Less* (December 2011) any time vehicle or pedestrian traffic is influenced by the work. For work requiring devices in place longer than three (3) days, a site specific traffic control plan based on the principles in Part 6 of the MUTCD, the Oregon Supplement and ODOT's 2015 Standard Drawings TM800 – TM871, is required. All traffic control devices shall meet or exceed the NCHRP 350 requirements for crashworthiness. Completed signal shut down requests must be received by the County a minimum of 3 working days prior to any proposed signal shut down.
15. Accommodate all road users at all times including motorists, bicyclists, pedestrians, and those with disabilities or impairments. Install and maintain additional temporary signing and traffic control devices for the control of non-motorized vehicles and pedestrians where a reasonable volume of these users are expected and where work is expected to last longer than one hour. Maintain safe accessibility or provide suitable alternate routes in, through, or around work areas.
16. Limit work & activity (construction, restoration, erosion control, etc) to no more than 1,000 lineal feet at any one time.
17. Impact no more than one consecutive intersection at a time.
18. Do not store or park any equipment, vehicles, or materials in the right-of-way overnight unless approved by Washington County.
19. Utilize construction materials and methods to maintain at least one travel lane at all times. Adjust work zone to ensure no vehicles are stopped, held or restricted for more than fifteen (15) minutes. Lane restrictions may be allowed in accordance with an approved traffic control plan and according to the following table:

Functional Classification	Mon – Fri (except on day preceding holiday)		Day preceding a holiday
	Earliest Start Time	Latest End Time	Latest End Time
Arterial	9:00 a.m.	3:30 p.m.	12:00 p.m.
Collector/ Neighborhood Route	8:30 a.m.	4:00 p.m.	
Local	8:00 a.m.	5:00 p.m.	

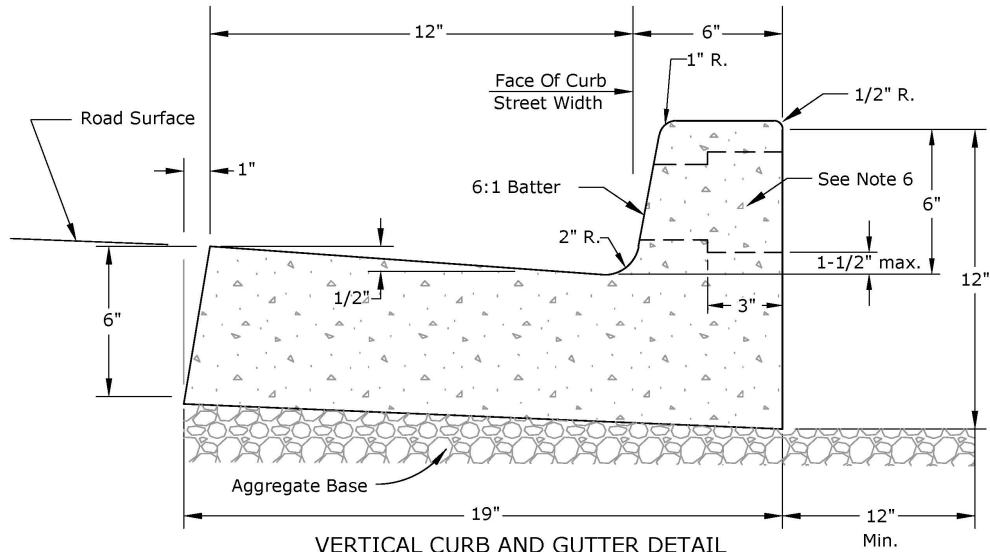
20. Suspend work on the following holidays: **New Year's Day** (Jan 1), **Martin Luther King Day** (3rd Mon in Jan), **President's Day** (3rd Mon in Feb), **Memorial Day** (last Monday in May), **Independence Day** (Jul 4), **Labor Day** (1st Monday in Sept), **Veteran's Day** (Nov 11) **Thanksgiving** (4th Thursday & 4th Friday in Nov), **Christmas Day** (Dec 25).  
 When a holiday falls on a Saturday, the observed holiday is the preceding Friday.  
 When a holiday falls on a Sunday, the observed holiday is the following Monday.
21. Comply with Washington County's *Best Management Practices for Routine Road Maintenance* (December 2010) as well as Clean Water Services' *Erosion Prevention and Sediment Control Standards* and the appropriate best management practices outlined in Clean Water Services' *Design and Construction Standards*.  
  
 Ensure all equipment is clean and leak free with sufficient and appropriate spill prevention and clean up materials on site and the personnel involved with the permitted activity are familiar with and proficient in the use of these materials. When not being actively used for the permitted activity, remove construction equipment from the right-of-way. Do not park, re-fuel, or service equipment or store hazardous materials directly over or uphill from catch basins, drainage inlets, or manholes or within 150 feet of any wetland, waterway, or resource water. When reasonably available, re-fuel over an impervious surface and use absorbent pads to collect spilled fuel.  
  
 Install and maintain appropriate erosion and sediment control devices, in accordance with an approved Erosion and Sediment Control Plan (ESCP) to ensure that all catch basins, drainage inlets, manholes, wetlands, waterways, and resource waters are sufficiently protected from erosion and sediment. In the absence of a formal ESCP, comply with Clean Water Services' *Erosion Prevention and Sediment Control Standards*.
22. Preserve and protect all public and private infrastructure ensuring that these facilities continue to properly function during the course of the permitted activity, including, but not limited to, underground storm drainage systems, open drainage systems, culverts, roof drains, field inlets and drains, irrigation systems, traffic control devices, and illumination.
23. Restore all existing infrastructure, affected by the permit activity, to original or better condition. Restoration includes, but is not limited to, the road surface, base and subgrade, pavement markings, drainage facilities, signs, safety appurtenances, bicycle and pedestrian facilities, vegetation or landscaping and any other feature affected by the activity. Restoration of the right-of-way shall be completed in a timely manner and to the County's satisfaction.
24. Re-establish surfaces to their pre-existing grade at the end of each work day. For Asphaltic surfaces or Portland cement concrete, interim re-establishment shall be with either hot mix or cold mix asphaltic concrete and shall be in place for no longer than fourteen (14) calendar days. Beyond fourteen (14) calendar days, permanent right-of-way restoration shall be used unless approved by the County. STEEL PLATES are NOT an acceptable interim solution unless prior approval has been obtained through Washington County.



**GENERAL CONDITIONS**  
**For Permits To Work in Washington County Right-of-Way**

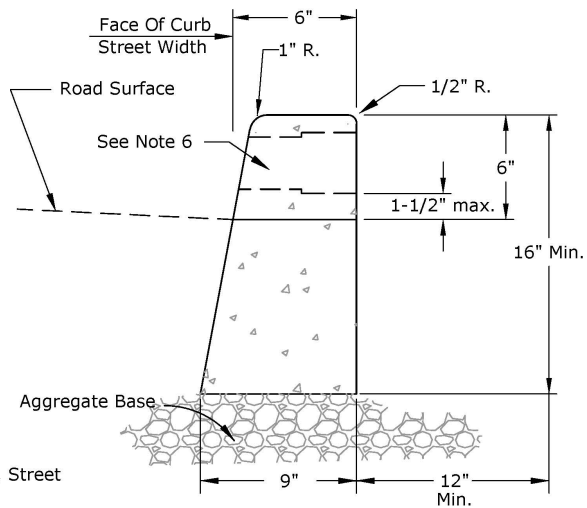
25. Installation of underground utilities or any other buried appurtenance shall be at least thirty (30) inches below grade. All mechanically extracted, cylindrical cores, up to 8" diameter, taken from the paved section of roadway shall be restored according to the County's "Core Hole" Detail.
26. Concrete panels shall not be cut without express written permission from Washington County. If concrete panels, curbs, sidewalks or driveways are disturbed or damaged, replacement of full panels, to the nearest cold joint, shall be required. Prior to pouring concrete. Permittee shall submit concrete mix design for review and approval by Washington County and arrange for a form inspection.
27. Preserve and protect survey monuments, public land corners and any accessory associated with these features. If interference, removal, or destruction is necessary, comply with ORS 209.140 through ORS 209.155. Additionally, utility infrastructure may not be placed within one foot of a survey monument location noted on a subdivision or partition plat, in accordance with ORS 92.044. The Washington County Surveyor can be reached at (503) 846-8723.
28. Comply with Washington County's Noise Control Ordinance established in Chapter 8.24 of the County's *Code of Ordinances*. Acquire a variance to the noise ordinance, when needed.
29. Interaction with the County, other agencies, service providers and the public shall be in a professional, courteous and timely manner.
30. Maintain a complete set of the permit, approved plans, traffic control plans, erosion control plans, and any conditions or special provisions at the job site and have them available for review, upon request.
31. Grant the County immediate access to the permitted work area. The Permittee shall appoint and assign a foreman or competent person that shall be available as the County's point of contact while work is being performed. If this foreman or competent person is unavailable while work is being performed, the Permittee shall provide the County with an alternate. The County reserves the right to enter the work area covered under this permit for any reason.
32. Permits are valid for one year from date of issuance and all work must be completed in that time period. Expired permits, without an approved final inspection, may have a notice placed in their property record related to the permit status.
33. If the requirements for this permit have not been met, there may be a denial or delay with the issuance of other permits.
34. Guarantee all permitted work for a minimum of one year from date of completion. County may require a cash deposit during the guarantee period depending on the type of work. In the event that the Permittee fails to perform warranty work in a timely manner to the satisfaction of Washington County, the deficient work may be corrected, mitigated, or abated by the County. Permittee shall be responsible for all expenses associated with work done by the County to correct, mitigate, or abate a deficiency.
35. Additional fees may be required if there is a substantial change in the scope of work which requires further review by Washington County or if more than three site visits are needed for inspection purposes. Additional inspection fees will be charged in accordance with the adopted fee schedule.
36. Include the permit number in all written and verbal correspondence with the County.
37. Comply with the Right-of-Way Permit Insurance Requirements (i.e. Tier 1, Tier 2, or Tier 3) determined for this permit.





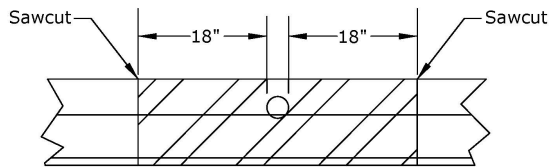
**VERTICAL CURB AND GUTTER DETAIL**

N.T.S.



**VERTICAL CURB DETAIL**

N.T.S.



**DETAIL A**

N.T.S.

**Notes:**

1. Use Oregon Commercial Grade Concrete Per Section 00440.
  - A. Broom Finish
2. Expansion Joints
  - A. Place 1/2" Pre-Molded, Asphalt Impregnated, Non-Extruding Material At:
    - 1) Cold Joints.
    - 2) Each End Of Driveways.
    - 3) Each Side Of Inlet Structures.
    - 4) Each Point Of Tangency Of The Curb.
    - 5) Locations Necessary To Limit Spacing To 200 Feet.
3. Contraction Joints
  - A. Space Not More Than 10 Feet.
  - B. The Depth Of The Joint Shall Be At Least 1/3 Depth Of Concrete.
  - C. Center Weepholes With Contraction Joints.
  - D. Locate Weepholes As Close As Possible To Property Lines.
4. Use 1" - 0" Or 3/4" - 0" Aggregate Base Compacted To 100% Of AASHTO T-99, Method D. Place To Subgrade, Street Structure, Or 4" In Depth, Whichever Is Greater. Extend At Least 12" Behind The Curb.
5. Drainage Blockout
  - A. 3" Dia. Plastic Pipe With Coupling.
  - B. Core Drill Drainage Access Thru Existing Curb Or Vertically Sawcut Curb And Gutter 18" Each Side Of Drain And Repour To Full Depth Of Curb (See Detail A).
6. Vertical Curb Detail Shall Only Be Used For Interim Conditions Or When Approved By The County Engineer.



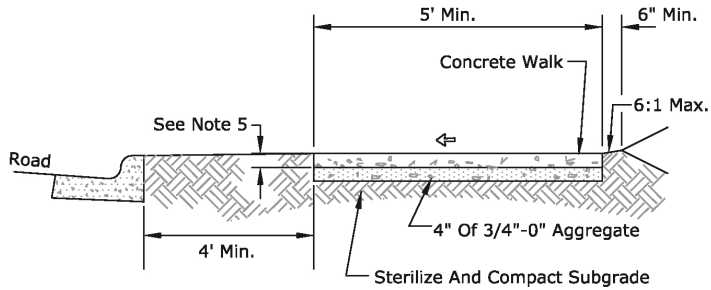
WASHINGTON COUNTY  
DEPARTMENT OF LAND USE &  
TRANSPORTATION  
ENGINEERING SECTION

**VERTICAL CURB AND GUTTER  
NON-MOUNTABLE**

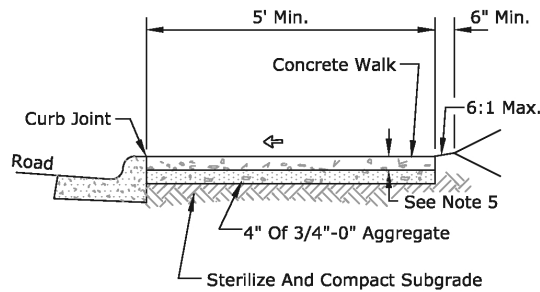
PLOT STAMP: 08/27/19 4:44P ANTHONYD  
CAD: 2030.DWG

EFFECTIVE DATE: 9/01/2019

WASH. CO. # 2030



**SIDEWALK AWAY FROM CURB**




**SIDEWALK ADJACENT TO CURB**

**LEGEND:**

- ↳ Slope 1.5% Max Design
- ↳ Slope 2% Max Finish Grade

**Notes:**

1. Use Oregon Commercial Grade Concrete Per Section 00440.
2. Panel Dimensions To Be Nominal 5 Feet Or As Directed By Engineer. Trowel Finish (shined) Perimeters Of Each Panel. Broom Finish All Panels.
3. Place Expansion Joints Adjacent To Driveway Approaches, Utility Vaults, Drainage Inlets, Sidewalk Ramps, Curb Joints And At Spacing Not To Exceed 100 Feet.
4. Trowel Surfaces At Curb Joints With A Minimum 1/2" Radius.
5. Place 4" Thick Sidewalk. Place 6" Thick Sidewalk When Sidewalk Is Intended As A Portion Of Driveway, Or As Directed By The Engineer.
6. Extend Drain Blockouts In Curbs To Back Of Sidewalk With 3" Dia. Plastic Pipe At 2% Max. Slope. Install Construction Joint Over Pipe.
7. At Each CG-30 And CG-48 Inlet Location, Place A 10 Ft. Long #4 Bar Centered Between Back Of The Inlet Structure And Back Of Walk. Install Joints And Rebar At Direction Of Engineer.
8. Design Slopes May Be Exceeded To Fit Existing Conditions, Not To Exceed Finish Grade Slope.

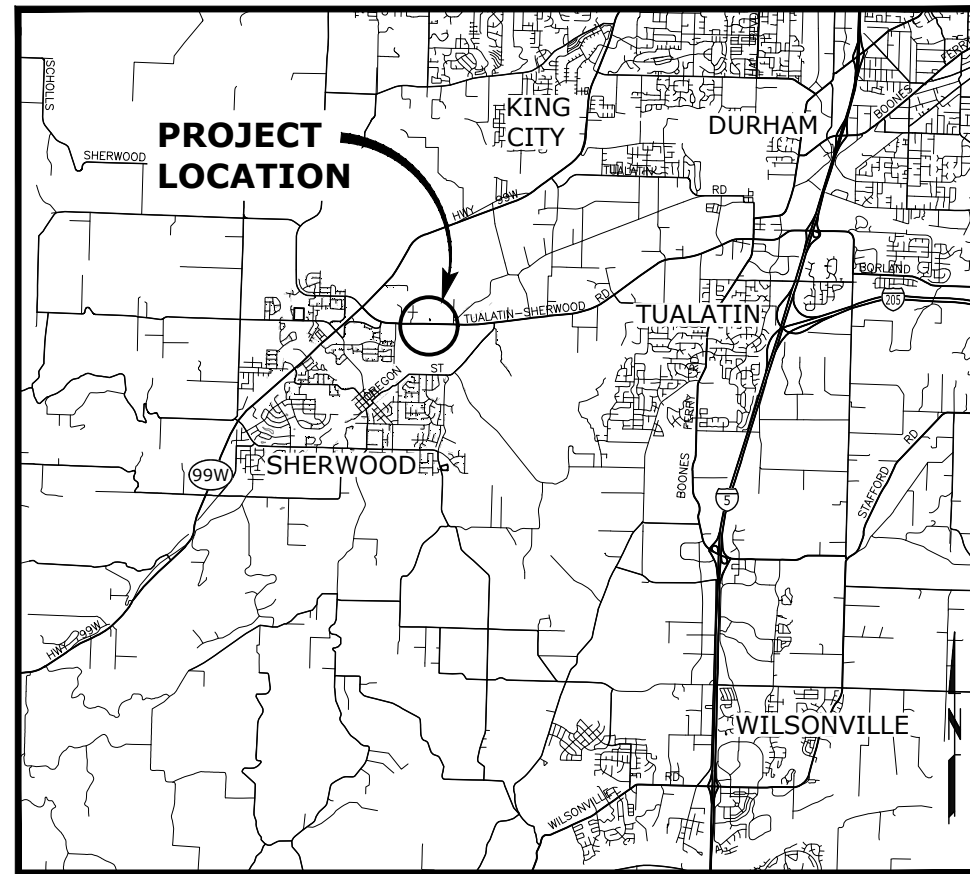
 <p><b>WASHINGTON COUNTY</b> DEPARTMENT OF LAND USE &amp; TRANSPORTATION ENGINEERING SECTION</p>	<p><b>P.C. CONCRETE SIDEWALK DETAIL</b></p>	
<p>PLOT STAMP: 07/23/18 4:38P ANTHONYD CAD: 2110.DWG</p>	<p>EFFECTIVE DATE: <b>8/01/2018</b></p>	<p>WASH. CO. # <b>2110</b></p>



# CITY OF SHERWOOD ROCK CREEK SANITARY TRUNK LINE UPSIZING PROJECT - PHASE I

OCTOBER 2020

PERMIT SET



VICINITY MAP  
SCALE: 1"=5,000'

## INDEX OF DRAWINGS

### GENERAL

- 1 G-1 COVER, INDEX OF DRAWINGS, VICINITY AND LOCATION MAPS
- 2 G-2 GENERAL NOTES
- 3 G-3 ABBREVIATIONS
- 4 G-4 SYMBOLS AND LEGEND
- 5 G-5 SITE/SHEET LAYOUT

### TRAFFIC CONTROL

- 6 TC-1 TRAFFIC CONTROL PLAN SW TUALATIN-SHERWOOD RD
- 7 TC-2 PEDESTRIAN DETOUR PLAN SW TUALATIN-SHERWOOD RD

### EROSION AND SEDIMENT CONTROL

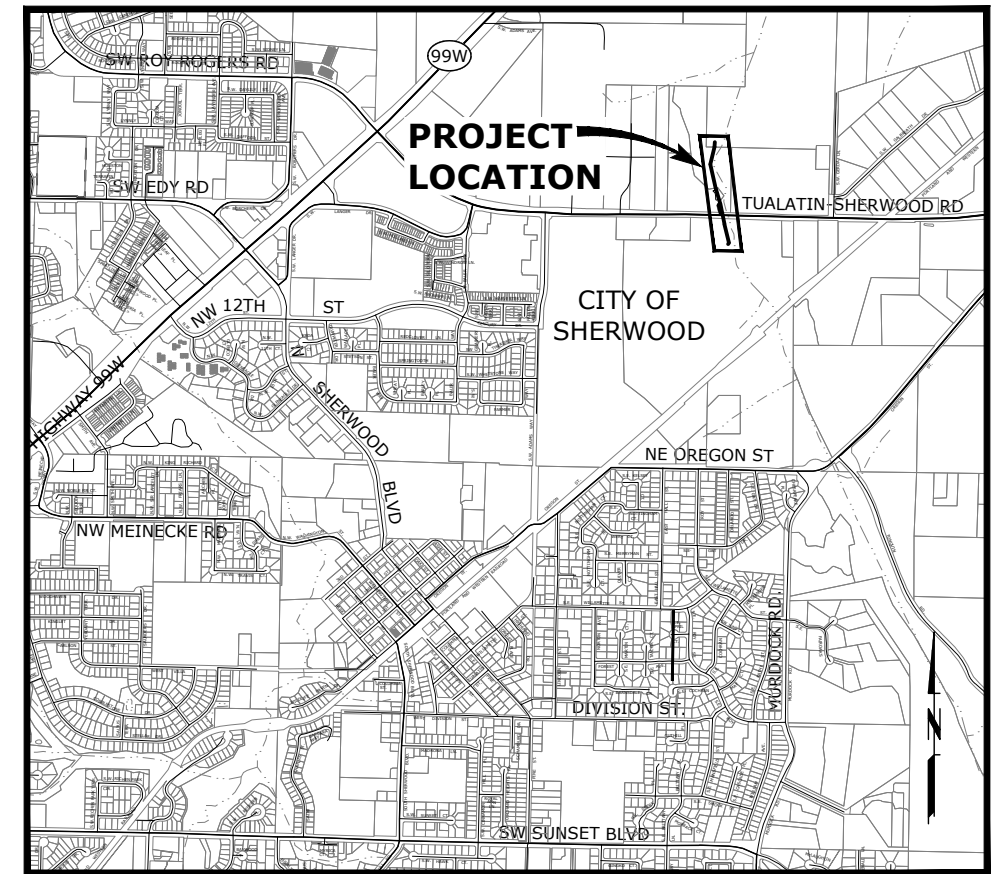
- 8 ESC-1 EROSION AND SEDIMENT CONTROL COVER SHEET AND GENERAL NOTES
- 9 ESC-2 EROSION AND SEDIMENT CONTROL PLAN - 1
- 10 ESC-3 EROSION AND SEDIMENT CONTROL PLAN - 2
- 11 ESC-4 EROSION AND SEDIMENT CONTROL DETAILS - 1
- 12 ESC-5 EROSION AND SEDIMENT CONTROL DETAILS - 2
- 13 ESC-6 DEWATERING PLAN
- 14 ESC-7 DEWATERING DETAILS

### CIVIL

- 15 C-1 TREE PROTECTION AND REMOVAL PLAN - 1
- 16 C-2 TREE PROTECTION AND REMOVAL PLAN - 2
- 17 C-3 SEWER PLAN AND PROFILE STA 1+00 TO STA 5+00
- 18 C-4 SEWER PLAN AND PROFILE STA 5+00 TO STA 10+00
- 19 C-5 SEWER PLAN AND PROFILE STA 10+00 TO STA 14+54
- 20 C-6 SEWER PLAN AND PROFILE STA A1+00 TO STA A2+18 AND SLIPLINE DETAIL
- 21 C-7 SW TUALATIN-SHERWOOD RD TRENCHLESS CROSSING PLAN AND PROFILE
- 22 C-8 TRENCHLESS & SETTLEMENT INSTRUMENTATION SECTIONS & DETAILS
- 23 C-9 EARTH PRESSURE DIAGRAM <TO FOLLOW>
- 24 C-10 SITE GRADING PLAN
- 25 C-11 CIVIL DETAILS - 1
- 26 C-12 CIVIL DETAILS - 2 <TO FOLLOW>
- 27 C-13 CLEAN WATER SERVICES STANDARD DETAILS - 1
- 28 C-14 CLEAN WATER SERVICES STANDARD DETAILS - 2

### LANDSCAPING / SURFACE RESTORATION

- 29 L-1 RESTORATION AND PLANTING PLAN
- 30 L-2 RESTORATION AND PLANTING DETAILS



LOCATION MAP  
SCALE: 1"=1,000'

**murraysmith**

888 SW 5TH AVENUE, SUITE 1170  
PORTLAND, OREGON 97204  
P 503.225.9010



WASHINGTON COUNTY  
LAND USE & TRANSPORTATION  
OPERATIONS AND MAINTENANCE  
REVIEWED BY Brett H.



Know what's below.  
Call before you dig.

THIS DESIGN COMPLIES WITH ORS 92.044 (7) IN THAT NO UTILITY INFRASTRUCTURE IS DESIGNED TO BE WITHIN ONE (1) FOOT OF A SURVEY MONUMENT LOCATION SHOWN ON A SUBDIVISION OR PARTITION PLAT. NO DESIGN EXCEPTION NOR FINAL FIELD LOCATION CHANGES SHALL BE PERMITTED IF THAT CHANGE WOULD CAUSE ANY UTILITY INFRASTRUCTURE TO BE PLACED WITHIN THE PROHIBITED AREA.

ATTENTION: OREGON LAW REQUIRES THE CONTRACTOR TO FOLLOW THE RULES ADOPTED BY THE OREGON UTILITY NOTIFICATION CENTER. THOSE RULES ARE SET FORTH IN OAR 952-001-0010 THROUGH OAR 952-001-0090. THE CONTRACTOR MAY OBTAIN COPIES OF THE RULES BY CALLING THE UTILITY NOTIFICATION CENTER. (NOTE: THE TELEPHONE NUMBER FOR THE OREGON UTILITY NOTIFICATION CENTER IS 503-246-6699.)

## GENERAL NOTES

- CONTRACTOR SHALL OBTAIN ALL NECESSARY LOCAL, COUNTY, STATE, AND UTILITY CONSTRUCTION PERMITS, AND SHALL CONTACT EACH PERMITTING AGENCY AT LEAST TWO (2) BUSINESS DAYS PRIOR TO STARTING WORK. CONTRACTOR SHALL OBTAIN ALL REQUIRED LICENSES BEFORE STARTING CONSTRUCTION.
- THE LOCATIONS OF ALL EXISTING UNDERGROUND FACILITIES SHOWN ON THE PLANS ARE BASED ON A FIELD SURVEY AND INFORMATION SUPPLIED BY UTILITY COMPANIES. LOCATIONS ARE NOT GUARANTEED TO BE COMPLETE OR ACCURATE. THE CONTRACTOR SHALL VERIFY LOCATIONS, ELEVATIONS, TYPE AND SIZES OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTING NEW PIPING/CONDUITS AND SHALL ADJUST NEW PIPING/CONDUITS AS REQUIRED. POTHOLING AND TRENCH EXCAVATION SHALL SUFFICIENTLY PRECEDE LAYING OF PIPE TO ALLOW REQUIRED ELEVATION AND ALIGNMENT ADJUSTMENTS TO BE ACCOMPLISHED WITHOUT REWORK. ADJUSTMENTS SHALL BE EXPECTED AND CONSIDERED INCIDENTAL. CONTRACTOR SHALL NOTIFY ENGINEER IMMEDIATELY OF ANY CONFLICTS NOT SHOWN ON THE PLANS AND SHALL KEEP EXISTING UTILITIES IN SERVICE AND PROTECT THEM DURING CONSTRUCTION. WHERE INTERRUPTION OF EXISTING FACILITIES IS REQUIRED, CONTRACTOR SHALL PROVIDE 72 HOUR NOTICE TO ENGINEER AND THE AFFECTED UTILITY. CONTRACTOR SHALL ARRANGE FOR THE RELOCATION OF ANY IN CONFLICT WITH THE PROPOSED CONSTRUCTION.
- THE CONTRACTOR SHALL COMPLY WITH ALL REQUIREMENTS OF ORS 757.541 TO 757.571. THE CONTRACTOR SHALL NOTIFY EACH UNDERGROUND UTILITY AT LEAST 48 BUSINESS-DAY HOURS, BUT NOT MORE THAN 10 BUSINESS DAYS, PRIOR TO EXCAVATING, BORING, OR POTHOLING.
- NO ADDITIONAL PAYMENT SHALL BE MADE FOR UTILITY RELOCATION COORDINATION OR DELAYS CAUSED BY UTILITY CONFLICTS. ALL COSTS RELATED TO UTILITY COORDINATION AND RELOCATION, INCLUDING ADDITIONAL POTHOLING, ARE TO BE CONSIDERED INCIDENTAL AND INCLUDED IN THE UNIT PRICES OF THE BID. NO ADDITIONAL PAYMENT SHALL BE MADE FOR REWORK AND DELAYS RESULTING FROM FAILURE TO POTHOLE FOR UTILITIES SUFFICIENTLY IN ADVANCE OF WORK.
- NOT USED
- SURVEY DATA COMPILED BY AKS ENGINEERING & FORESTRY. ALL ELEVATIONS SHOWN ARE BASED ON VERTICAL DATUM NAVD 88. CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTION SURVEYS. SEE CONTRACT DOCUMENT FOR SURVEY REQUIREMENTS.
- A LOCAL DATUM PLANE SCALED FROM OREGON STATE PLANE NORTH 3601 NAD83(2011) EPOCH 2010.0000 HAS BEEN ESTABLISHED BY AKS BY HOLDING A PROJECT MEAN GROUND COMBINED SCALE FACTOR OF 1.0001033898 AT A CALCULATED CENTRAL PROJECT POINT WITH GRID VALUES OF (NORTH 453397.31, EAST 7552849.06). THE MERIDIAN CONVERGENCE ANGLE AT THE CALCULATED CENTRAL POINT IS -1°39'09". THE STATE PLANE COORDINATES WERE DERIVED FROM THE TRIMBLE VRS NOW NETWORK.
- ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO THE PLANS AND PROJECT SPECIFICATIONS.
- CONTRACTOR SHALL KEEP AND MAINTAIN A CURRENT SET OF DRAWINGS ON SITE. CONTRACTOR TO KEEP ACCURATE "AS-BUILT" RECORD COPY OF PLANS INDICATING ALL CHANGES IN GRADE, ALIGNMENT, FITTINGS AND MATERIALS INSTALLED AND ANY OTHER UTILITIES OR OBSTACLES NOT SO INDICATED ON THESE PLANS. "AS-BUILT" PLANS TO BE RETURNED TO ENGINEER AT COMPLETION OF PROJECT.
- CONTRACTOR SHALL MAINTAIN ACCESS TO ALL HOMES AND BUSINESSES AT ALL TIMES. CONTRACTOR SHALL MAINTAIN ACCESS FOR MAIL, TRASH COLLECTION AND SCHOOL BUS SERVICES AT ALL TIMES. PROVIDE WRITTEN NOTICE TO ALL PROPERTY OWNERS AT LEAST TWO BUSINESS DAYS IN ADVANCE OF WORK IN AND/OR CROSSING OF DRIVEWAYS.
- CONTRACTOR SHALL NOTIFY THE ENGINEER AND OWNER 48 HOURS BEFORE STARTING CONSTRUCTION, AND 24 HOURS BEFORE RESUMING WORK AFTER SHUTDOWNS EXCEPT FOR NORMAL RESUMPTION OF WORK FOLLOWING SATURDAYS, SUNDAYS, OR HOLIDAYS. CONTRACTOR SHALL PROVIDE WRITTEN NOTICE TO THE ENGINEER A MINIMUM OF 48 HOURS PRIOR TO ANY TESTING OR REQUIRED INSPECTION.
- ANY ALTERATION OR VARIANCE FROM THESE PLANS, EXCEPT MINOR FIELD ADJUSTMENT NEEDED TO MEET EXISTING FIELD CONDITIONS, SHALL FIRST BE APPROVED BY THE ENGINEER. ANY ALTERATIONS OR VARIANCE FROM THESE PLANS SHALL BE DOCUMENTED ON CONSTRUCTION FIELD PRINTS AND TRANSMITTED TO THE ENGINEER. ANY PROPOSED CHANGES IN CONSTRUCTION PLANS MUST BE SUBMITTED IN WRITING AND APPROVED BY ENGINEER PRIOR TO COMMENCING WORK.
- CONTRACTOR SHALL PROTECT ALL PROPERTY CORNERS, SURVEY MONUMENTS AND CONTROL POINTS. SURVEY MONUMENTS OF THIS TYPE DISTURBED DURING CONSTRUCTION SHALL BE REPLACED AT CONTRACTOR'S EXPENSE, WITH APPROPRIATE SURVEYS FILED WITH THE COUNTY SURVEYOR.
- THE CONTRACTOR SHALL DISPOSE OF ALL REMOVED OR REPLACED MATERIAL AND EQUIPMENT IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS.
- ALL STRUCTURES, LOTS, LANDSCAPING, SWALES, DITCHES, SPEED BUMPS, FENCES, WALLS, MAILBOXES, SIGNS, POLES, GUY WIRES, PIPING, AND UTILITIES DISTURBED DURING CONSTRUCTION TO BE RESTORED TO EXISTING CONDITION UNLESS OTHERWISE SPECIFIED. CONTRACTOR SHALL REPAIR ALL UTILITY SERVICES DAMAGED DURING CONSTRUCTION. ALL SUCH REPAIRS SHALL BE CONSIDERED INCIDENTAL TO PIPELINE INSTALLATION.
- CONTRACTOR SHALL PROTECT TRAFFIC AT ALL TIMES DURING CONSTRUCTION. ALL TRAFFIC CONTROL MEASURES SHALL BE APPROVED BY CITY, COUNTY AND STATE AS REQUIRED AND IN PLACE PRIOR TO ANY CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL PLANS TO THE ENGINEER PRIOR TO COMMENCING ANY WORK WITHIN THE PUBLIC RIGHT-OF-WAY. SEE SPECIAL SPECIFICATIONS FOR DETAILS. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING EMERGENCY VEHICLE ACCESS TO ALL PROPERTIES AT ALL TIMES.

- CONSTRUCTION SHALL BE CONFINED TO PERMANENT EASEMENTS, TEMPORARY CONSTRUCTION EASEMENTS, OR PUBLIC RIGHT-OF-WAY ONLY. WORK SHALL NOT ENCR OACH BEYOND THE RIGHT-OF-WAY WITHOUT APPROVAL. IF AREAS OR FEATURES OUTSIDE DESIGNATED CONSTRUCTION ZONES SUSTAIN IMPACT FROM CONTRACTORS ACTIVITIES, CONTRACTOR SHALL RESTORE TO PRECONSTRUCTION CONDITION AT NO COST TO THE CITY.
- CONTRACTOR TO INSTALL PERIMETER FENCE AROUND THE WORK ZONE AND LIMIT ALL CONSTRUCTION ACTIVITY INSIDE THE WORK ZONE. NO EQUIPMENT OR SOIL DISTURBANCE ALLOWED OUTSIDE THE WORK ZONE.
- ALL CONCRETE SHALL BE A MINIMUM OF 3300 PSI STRENGTH.
- NOT USED
- NOT USED
- COMPLY WITH OREGON ADMINISTRATION RULE (OAR) CHAPTER 333 RULES FOR REQUIRED WATERLINE - SEWER LINE SEPARATION AND CROSSING REQUIREMENTS.
- ALL PIPING SHALL HAVE A MINIMUM OF 3 FEET OF COVER FROM TOP OF PIPE TO STREET GRADE OR OTHER FINISH GRADE.
- AT THE END OF EACH WORK DAY, ALL OPEN TRENCHES SHALL BE BACKFILLED OR ADEQUATELY FENCED AND PROTECTED FROM THE PUBLIC, AND ALL TRENCHES WITHIN STREETS SHALL BE TEMPORARILY PAVED OR AC COLD PATCHED TO THE SATISFACTION OF THE ENGINEER.
- THE CONTRACTOR SHALL COMPLY WITH ALL CITY OF SHERWOOD REQUIREMENTS FOR WORK IN AND RESTORATION OF CITY STREETS AND RIGHT-OF-WAYS. SEE CURRENT REVISION OF CITY OF SHERWOOD ENGINEERING DESIGN AND STANDARD DETAILS MANUAL FOR DETAILS.
- CONTRACTOR SHALL INSTALL TEMPORARY CONSTRUCTION ZONE SIGNS AT LOCATIONS TO BE DETERMINED BY ENGINEER 10 DAYS PRIOR TO BEGINNING OF CONSTRUCTION. TEMPORARY SIGNS SHALL BE CONSTRUCTED AS SPECIFIED WITHIN THE SPECIAL SPECIFICATIONS. TEMPORARY SIGNS SHALL BE LOCATED BY ENGINEER.
- NO UNDERGROUND WORK SHALL BE "BURIED" UNTIL INSPECTED AND APPROVED BY THE CITY OR OWNER'S REPRESENTATIVE.
- NOT USED
- ALL WORK SHALL BE CONDUCTED BETWEEN THE HOURS OF 7:00AM AND 6:00PM ON NON-HOLIDAY WEEKDAYS. LANE CLOSURES WILL ONLY BE ALLOWED BETWEEN THE HOURS OF 8:00AM AND 6:00PM ON NON-HOLIDAY WEEKDAYS. NO SUNDAY WORK WILL BE ALLOWED. SATURDAY WORK MAY BE ALLOWED VIA A CITY APPROVED SATURDAY WORK REQUEST. SATURDAY WORK REQUESTS MUST BE SUBMITTED AT LEAST 72 HOURS IN ADVANCE OF DESIRED WORK DAY.
- ALL WORK AND MATERIALS SHALL COMPLY WITH ALL APPLICABLE CITY CODES AND STANDARDS, THE OREGON STATE HEALTH DIVISION ADMINISTRATION RULES, A.P.W.A. STANDARDS, AND CITY OF SHERWOOD ENGINEERING DESIGN AND DETAILS MANUAL.
- NOT USED
- CONTRACTOR SHALL RESTORE ALL EASEMENT AREAS ASSOCIATED WITH CONSTRUCTION AS STIPULATED IN EASEMENT AND CONTRACT DOCUMENTS. CITY OR OWNER'S REPRESENTATIVE SHALL PROVIDE CONTRACTOR WITH REFERENCE COPY OF ALL EASEMENT AGREEMENT CONDITIONS.
- CONTRACTOR TO PROTECT AND MAINTAIN ALL STORM WATER FACILITIES AND STRUCTURES INCLUDING OUTFALLS, PIPES, RIPRAP, AND INLETS. ANY DAMAGE TO STORM WATER FACILITIES SHALL BE REPLACED AT CONTRACTORS EXPENSE.

## EROSION AND SEDIMENT CONTROL NOTES

- CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION AND SEDIMENTATION CONTROL DURING CONSTRUCTION (ANY TIME OF YEAR) PER THE REQUIREMENTS OF THE CITY OF SHERWOOD, WASHINGTON COUNTY AND THE OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY.
- EFFECTIVE EROSION, DUST, SEDIMENTATION AND DRAINAGE CONTROL IS REQUIRED AT ALL TIMES. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROTECTION OF ALL WORK, ADJACENT PROPERTIES AND DOWNSTREAM FACILITIES FROM EROSION AND SILTATION DURING THE COURSE OF THE WORK. ANY DAMAGE RESULTING FROM SUCH EROSION AND SILTATION SHALL BE CORRECTED AT THE SOLE EXPENSE OF THE CONTRACTOR. SEE SPECIFICATIONS.

## ABANDONMENT NOTES

- AFTER SUCCESSFUL COMPLETION, TESTING, ACCEPTANCE AND UTILIZATION OF THE NEW SEWER, THE EXISTING SEWER SHALL BE ABANDONED IN PLACE.
- ALL EXISTING SEWER TO BE ABANDONED IN PLACE SHALL BE FILLED WITH CONTROLLED LOW STRENGTH MATERIAL (CLSM) AS SPECIFIED WITHIN THE SPECIAL SPECIFICATIONS. CLSM SHALL BE PUMPED IN AND VOLUME MEASURED TO ENSURE NO VOIDS ARE REMAINING. CLSM SHALL BE FINISHED FLUSH WITH INSIDE FACE OF WALL FOR ALL EXISTING MANHOLES TO REMAIN.
- MANHOLES NOTED TO BE REMOVED SHALL BE REMOVED IN THEIR ENTIRETY, INCLUDING BASES, SECTIONS, CONES, TOPS AND COVERS. ALL MANHOLE MATERIALS SHALL BE REMOVED FROM THE SITE AND PROPERLY DISPOSED. THE BOTTOM THREE FEET OF MANHOLE EXCAVATION SHALL BE BACKFILLED WITH BENTONITE TO CREATE AN IMPERVIOUS ZONE, THE REMAINING VOID LEFT FROM THE MANHOLE SHALL BE BACKFILLED WITH NATIVE WETLAND SPOILS FROM THE SITE.
- MANHOLES NOTED TO BE ABANDONED SHALL HAVE THEIR CONES, TOPS AND COVERS REMOVED FROM THE SITE AND PROPERLY DISPOSED. THE EXISTING BASE MAY REMAIN AND EITHER BE FILLED WITH LOW DENSITY GROUT (MAXIMUM STRENGTH OF 150 PSI) OR PEA GRAVEL. IF THE CONTRACTOR ELECTS TO UTILIZE PEA GRAVEL, THE MANHOLE BASE SHALL HAVE HOLES DRILLED THROUGH THE BOTTOM TO ALLOW DRAINAGE. THE VOID ABOVE THE MANHOLE BASE SHALL BE BACKFILLED WITH NATIVE WETLAND SPOILS FROM THE SITE.

LANE RESTRICTION HOURS ON TUALATIN SHERWOOD ARE 9AM-3:30PM AND NO SATURDAY LANE RESTRICTIONS WITHOUT WASHCO APPROVAL



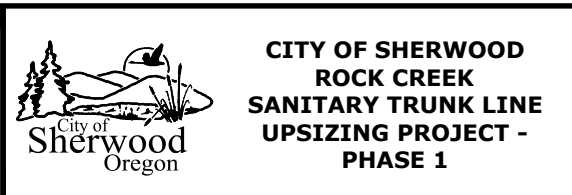
G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-G.dwg G-2 1/22/2020 3:01 PM TAYLOR.SPENCER 23.0s (LMS Tech)

NO.	DATE	BY	REVISION

NOTICE  
0 1/2 1  
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JJU  
DESIGNED  
CAD  
DRAWN  
BVO  
CHECKED

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION  
JANUARY 2020  
**Murraysmith**  
www.murraysmith.us



<b>GENERAL NOTES</b>			
CASE FILE NO.: 19-2481.402	SCALE:	AS SHOWN	DATE: OCTOBER 2020

SHEET  
G-2  
2 of X

## PERMIT SET

G:\PDX\_Projects\1912481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-G.dwg G-3 1/22/2020 3:01 PM TAYLOR.SPENCER 23.0s (LMS Tech)

@	AT
AASHTO	AMERICAN ASSOCIATION OF STATE HIGHWAY & TRANSPORTATION OFFICIALS
AB	ANCHOR BOLT
ABAN(D)	ABANDON(ED)
ABS	ACRYLONITRILE BUTADIENE STYRENE
ABV	ABOVE / ALCOHOL BY VOLUME
AC	ASPHALTIC CONCRETE
ACP	ASPHALTIC CONCRETE PAVING
ADJ	ADJUSTABLE
ADJC	ADJACENT
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHR	ANCHOR
AL	ALUMINUM
ALT	ALTERNATE
AMP	AMPERE
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
APPROX	APPROXIMATE
APPVD	APPROVED
APWA	AMERICAN PUBLIC WORKS ASSOCIATION
ARCH	ARCHITECTURAL
ARV	AIR RELEASE VALVE
ASCE	AMERICAN SOCIETY OF CIVIL ENGINEERS
ASSN	ASSOCIATION
ASSY	ASSEMBLY
ASTM	AMERICAN SOCIETY FOR TESTING & MATERIALS
ATM	ATMOSPHERE
AUTO	AUTOMATIC
AUX	AUXILIARY
AVE	AVENUE
AVG	AVERAGE
AWWA	AMERICAN WATER WORKS ASSOCIATION
B&S	BELL & SPIGOT
BC	BOLT CIRCLE
BD	BOARD
BETW	BETWEEN
BF	BOTH FACE
BFD	BACKFLOW PREVENTION DEVICE
BFILL	BACKFILL
BFV	BUTTERFLY VALVE
BHP	BRAKE HORSEPOWER
BKGD	BACKGROUND
BLDG	BUILDING
BLK	BLOCK
BLVD	BOULEVARD
BM	BENCHMARK / BEAM
BMP	BEST MANAGEMENT PRACTICES
BO	BLOW-OFF
BOC	BACK OF CURB
BS	BOTH SIDES
BSMT	BASEMENT
BTF	BOTTOM FACE
BTU	BRITISH THERMAL UNIT
BV	BALL VALVE
BW	BOTH WAYS
C	CELSIUS
C TO C	CENTER TO CENTER
CARV	COMBINATION AIR RELEASE VALVE
CATV	CABLE TELEVISION
CB	CATCH BASIN
CCP	CONCRETE CYLINDER PIPE
CCW	COUNTER CLOCKWISE
CFM	CUBIC FEET PER MINUTE
CFS	CUBIC FEET PER SECOND
CHAN	CHANNEL
CHEM	CHEMICAL
CHFR	CHAMFER
CHKV	CHECK VALVE
CI	CAST IRON
CIP	CAST IRON PIPE
CIPC	CAST IN PLACE CONCRETE
CISP	CAST IRON SOIL PIPE
CJ	CONSTRUCTION JOINT
CL OR C/L	CENTER LINE
CL2	CHLORINE
CLG	CEILING
CLJ	CONTROL JOINT
CLR	CLEAR
CLSM	CONTROLLED LOW STRENGTH MATERIAL
CMP	CORRUGATED METAL PIPE
CMU	CONCRETE MASONRY UNIT
CND	CONDUIT
CO	CLEANOUT

COL	COLUMN
COMB	COMBINATION
CONC	CONCRETE
CONN	CONNECTION
CONST	CONSTRUCTION
CONT	CONTINUOUS / CONTINUATION
CONTR	CONTRACT(OR)
COORD	COORDINATE
COP	COPPER
CORP	CORPORATION
CORR	CORRUGATED
CP	CONTROL POINT
CPLG	COUPLING
CPVC	CHLORINATED POLYVINYL CHLORIDE
CR	CRUSHED ROCK
CS	COMBINED SEWER
CSP	CONCRETE SEWER PIPE
CT	COURT
CTR	CENTER
CU	CUBIC
CULV	CULVERT
CV	CONTROL VALVE
CW	CLOCKWISE / COLD WATER
CWS	CLEAN WATER SERVICES
CY	CUBIC YARDS
CYL	CYLINDER LOCK
D	DRAIN
DC	DIRECT CURRENT
DEFL	DEFLECTION
DET	DETAIL
DI	DUCTILE IRON
DIA	DIAMETER
DIM	DIMENSION
DIR	DIRECTION
DIST	DISTANCE
DN	DOWN
DR	DRIVE
DS	DOWNSPOUT
DWG	DRAWING
DWL	DOWEL
DWV	DRAIN WASTE AND VENT
DWY	DRIVEWAY
E OR ELEC	ELECTRICAL
EA	EACH
ECC	ECCENTRIC
EF	EACH FACE
EL	ELEVATION
ELB	ELBOW
ENCL	ENCLOSURE
EOP	EDGE OF PAVEMENT
EQ	EQUAL
EQL SP	EQUALLY SPACED
EQUIP	EQUIPMENT
ESMT	EASEMENT
EW	EACH WAY
EXC	EXCAVATE
EXIST	EXISTING
EXP	EXPANSION
EXP BT	EXPANSION BOLT
EXP JT	EXPANSION JOINT
EXT	EXTERIOR
F	FAHRENHEIT
F TO F	FACE TO FACE
FAB	FABRICATE
FB	FLAT BAR
FCA	FLANGED COUPLING ADAPTER
FCO	FLOOR CLEANOUT
FD	FLOOR DRAIN
FDN	FOUNDATION
FEXT	FIRE EXTINGUISHER
FF	FAR FACE
FGL	FIBERGLASS
FH	FIRE HYDRANT
FIN	FINISH(ED)
FIPT	FEMALE IRON PIPE THREAD
FITG	FITTING
FL	FLOOR LINE
FLEX	FLEXIBLE
FLG	FLANGE
FLL	FLOW LINE
FLR	FLOOR
FM	FORCE MAIN
FO	FIBER OPTIC
FOC	FACE OF CONCRETE
FOF	FACE OF FINISH
FOM	FACE OF MASONRY

FOS	FACE OF STUDS
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FRP	FIBERGLASS REINFORCED PLASTIC
FT	FEET / FOOT
FTG	FOOTING
FUT	FUTURE
FXTR	FIXTURE
G	GAS
GA	GAUGE
GAL	GALLON
GALV	GALVANIZED
GC	GROOVED COUPLING
GFA	GROOVED FLANGE ADAPTER
GI	GALVANIZED IRON
GIP	GALVANIZED IRON PIPE
GJ	GRIP JOINT
GL	GLASS
GLV	GLOBE VALVE
GND	GROUND
GPD	GALLONS PER DAY
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GPS	GALLONS PER SECOND
GR	GRADE
GR LN	GRADE LINE
GRTG	GRATING
GV	GATE VALVE
GRVL	GRAVEL
GYP	GYPSUM
HB	HOSE BIBB
HC	HOLLOW CORE
HDPE	HIGH DENSITY POLYETHYLENE
HDR	HEADER
HDWE	HARDWARE
HGR	HANGER
HGT	HEIGHT
HH	HANDHOLD
HM	HOLLOW METAL
HMAC	HOT MIX ASPHALT CONCRETE
HNDRL	HANDRAIL
HOA	HAND-OFF-AUTO
HOR	HAND-OFF-REMOTE
HORIZ	HORIZONTAL
HP	HIGH PRESSURE / HORSEPOWER
HPG	HIGH PRESSURE GAS
HPT	HIGH POINT
HR	HOUR
HSB	HIGH STRENGTH BOLT
HV	HOSE VALVE
HVAC	HEATING, VENTILATION, AIR CONDITIONING
HWL	HIGH WATER LINE
HWY	HIGHWAY
HYD	HYDRANT
HYDR	HYDRAULIC
I&C	INSTRUMENTATION & CONTROL
IAW	IN ACCORDANCE WITH
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IF	INSIDE FACE
IMPVT	IMPROVEMENT
IN	INCH
INCC	INCLUDE(D)(ING)
INFL	INFLUENT
INJ	INJECTION
INSTL	INSTALLATION / INSTALL
INSUL	INSULATION
INTER	INTERCEPTOR
INTR	INTERIOR
INV	INVERT
IP	IRON PIPE
IP T	IRON PIPE THREAD
IR	IRON ROD
IRRIG	IRRIGATION
JT	JOINT
JUNC	JUNCTION
KPL	KICK PLATE
KVA	KILOVOLT AMPERE
KW	KILOWATT
KWY	KEYWAY
L	LENGTH
LAB	LABORATORY
LAV	LAVATORY

LB	POUND
LF	LINEAR FOOT
LIN	LINEAL
LN	LANE
LOC	LOCATION
LONG	LONGITUDINAL
LP	LOW PRESSURE
LPT	LOW POINT
LRG	LARGE
LS	LONG SLEEVE / LUMP SUM
LT	LEFT
LVL	LEVEL
LWL	LOW WATER LINE
MAN	MANUAL
MAT	MATERIAL
MAX	MAXIMUM
MCC	MOTOR CONTROL CENTER
MCP	MASTER CONTROL PANEL
MECH	MECHANICAL
MET	METAL
MFR	MANUFACTURER
MGD	MILLION GALLONS PER DAY
MH	MANHOLE
MIN	MINIMUM
MIPT	MALE IRON PIPE THREAD
MISC	MISCELLANEOUS
MJ	MECHANICAL JOINT
MON	MONUMENT / MONOLITHIC
MOT	MOTOR
MP	MILEPOST
MSL	MEAN SEAL LEVEL
MTD	MOUNTED
NA	NOT APPLICABLE
NC	NORMALLY CLOSED
NF	NEAR FACE
NIC	NOT IN CONTRACT
NO / NO.	NORMALLY OPEN / NUMBER
NOM	NOMINAL
NORM	NORMAL
NRS	NON-RISING STEM
NTS	NOT TO SCALE
O TO O	OUT TO OUT
OC	ON CENTER
OD	OUTSIDE DIAMETER
ODOT	OREGON DEPARTMENT OF TRANSPORTATION
OF	OVERFLOW / OUTSIDE FACE
OHWM	ORDINARY HIGH WATER MARK
OPNG	OPENING
OPP	OPPOSITE
ORIG	ORIGINAL
OVHD	OVERHEAD
P&ID	PROCESS & INSTRUMENTATION DIAGRAM
PC	POINT OF CURVE
PCC	POINT OF COMPOUND CURVE
PCVC	POINT OF CURVATURE ON VERTICAL CURVE
PE	PLAIN END
PERF	PERFORATED
PERM	PERMANENT
PERP	PERPENDICULAR
PG	PRESSURE GAUGE
PH	PIPE HANGER
PI	POINT OF INTERSECTION
PIVC	POINT OF INTERSECTION ON VERTICAL CURVE
PL OR P/L	PROPERTY LINE / PLATE / PLASTIC
PLBG	PLUMBING
PNL	PANEL
POC	POINT OF CURVATURE
POLY	POLYETHYLENE
PP	POWER POLE
PRC	POINT OF REVERSE CURVATURE
PRCST	PRECAST
PREP	PREPARATION
PRESS	PRESSURE
PRKG	PARKING
PROP	PROPERTY
PRV	PRESSURE REDUCING VALVE
PS	PUMP STATION
PSIG	POUNDS PER SQUARE INCH GAUGE
PSL	PIPE SLEEVE
PSPT	PIPE SUPPORT
PT	POINT OF TANGENCY

PTVC	POINT OF TANGENCY ON VERTICAL CURVE
PV	PLUG VALVE
PVC	POLYVINYL CHLORIDE
PVMT	PAVEMENT
PWR	POWER
QTY	QUANTITY
RAD	RADIUS
RC	REINFORCED CONCRETE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD / ROOF DRAIN
RDCR	REDUCER
REF	REFERENCE
REINF	REINFORCE(D)(ING)(MENT)
REQ'D	REQUIRED
RESTR	RESTRAINED
RFCA	RESTRAINED FLANGE COUPLING ADAPTER
RM	ROOM
RND	ROUND
RO	ROUGH OPENING
R/W	RIGHT-OF-WAY
RBPBD	REDUCED PRESSURE BACKFLOW PREVENTION DEVICE
RPM	REVOLUTIONS PER MINUTE
RR	RAILROAD
RST	REINFORCED STEEL
RT	RIGHT
SALV	SALVAGE
SAN	SANITARY
SC	SOLID CORE
SCHED	SCHEDULE
SD	STORM DRAIN
SDL	SADDLE
SDR	STANDARD DIMENSION RATIO
SECT	SECTION
SHLDR	SHOULDER
SHT	SHEET
SIM	SIMILAR
SLP	SLOPE
SLV	SLEEVE
SOLN	SOLUTION
SP	SOIL PIPE / SEWER PIPE
SPCL	SPECIAL
SPEC(S)	SPECIFICATION(S)
SPG	SPACING
SPL	SPOOL
SPRT	SUPPORT
SQ	SQUARE
SQ FT	SQUARE FOOT
SQ IN	SQUARE INCH
SQ YD	SQUARE YARD
SS	SANITARY SEWER
SST	STAINLESS STEEL
ST	STREET
STA	STATION
STD	STANDARD
STL	STEEL
STOR	STORAGE
STR	STRAIGHT
STRUCT	STRUCTURE / STRUCTURAL
SUBMG	SUBMERGED
SUCT	SUCTION
SV	SOLENOID VALVE
S/W	SIDEWALK
SWD	SIDEWATER DEPTH
SWGR	SWITCH GEAR
SYMM	SYMMETRICAL
SYS	SYSTEM
T OR TEL	TELEPHONE
T&B	TOP & BOTTOM
TAN	TANGENCY
TB	THRUST BLOCK
TBM	TEMPORARY BENCHMARK
TC	TOP OF CONCRETE / TOP OF CURB
TCE	TEMPORARY CONSTRUCTION EASEMENT
TDH	TOTAL DYNAMIC HEAD
TEMP	TEMPERATURE / TEMPORARY
T&G	TONGUE & GROOVE
THK	THICK / THICKNESS
THRD	THREAD (ED)
THRU	THROUGH
TP	TEST PIT / TOP OF PAVEMENT / TURNING POINT
TRANS	TRANSITION

TSP	TRI-SODIUM PHOSPHATE
TST	TOP OF STEEL
TW	TOP OF WALL
TYP	TYPICAL
UG	UNDERGROUND
UH	UNIT HEATER
UN	UNION
UON	UNLESS OTHERWISE NOTED
USGS	UNITED STATES GEOLOGIC SURVEY
V	VENT / VOLT
VAC	VACUUM
VB	VACUUM BREAKER
VBOX	VALVE BOX
VC	VERTICAL CURVE
VERT	VERTICAL
VFD	VARIABLE FREQUENCY DRIVE
VOL	VOLUME
VCP	VITRIFIED CLAY PIPE
VTR	VENT THROUGH ROOF
W	WATER
W/	WITH
W/IN	WITHIN
W/O	WITHOUT
W/W	WALL TO WALL
WD	WOOD
WF	WIDE FLANGE
WH	WATER HEATER
WI	WROUGHT IRON
WM	WATER METER
WP	WORKING POINT / WATERPROOFING
WS	WATER SERVICE
WSDOT	WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
WT	WEIGHT
WTP	WATER TREATMENT PLANT
WTRT	WATERTIGHT
WWF	WELED WIRE FABRIC
WWTF	WASTEWATER TREATMENT FACILITY
WWTP	WASTEWATER TREATMENT PLANT
X SECT	CROSS SECTION
XFMR	TRANSFORMER
YD	YARD DRAIN / YARD
YH	YARD HYDRANT
YR	YEAR
ZN	ZINC



# PERMIT SET

NO.	DATE	BY	REVISION

NOTICE

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JJU DESIGNED  
CAD DRAWN  
BVO CHECKED

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION

JANUARY 2020

**Murraysmith**  
www.murraysmith.us



**CITY OF SHERWOOD**  
**ROCK CREEK**  
**SANITARY TRUNK LINE**  
**UPSIZING PROJECT -**  
**PHASE 1**

<b>ABBREVIATIONS</b>	
CASE FILE NO.: 19-2481.402	SCALE: AS SHOWN
DATE: OCTOBER 2020	

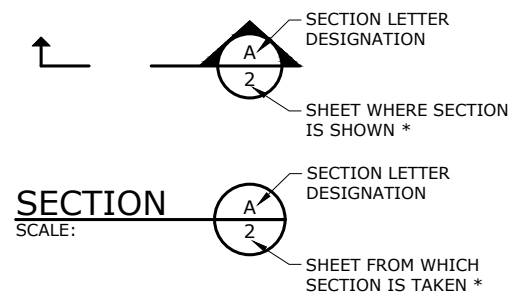
SHEET

G-3

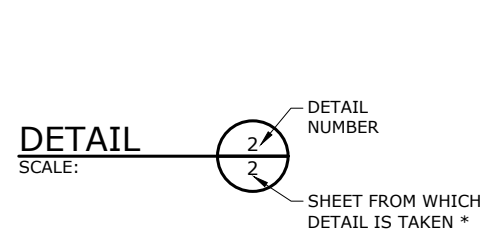
3 of X

# SECTION AND DETAIL DESIGNATIONS

## SECTION DESIGNATIONS



## DETAIL DESIGNATIONS



\* NOTE: IF PLAN AND SECTION FOR DETAIL CALL-OUT AND DETAIL ARE SHOWN ON THE SAME DRAWING, DRAWING NUMBER IS REPLACED WITH A DASH.

# MISCELLANEOUS PIPING SYMBOLS

- METER
- SLIP-ON JOINT PIPE
- RESTRAINED JOINT PIPE

**WASHINGTON COUNTY**  
 LAND USE & TRANSPORTATION  
 OPERATIONS AND MAINTENANCE  
 REVIEWED BY Brett H.

# TOPOGRAPHIC LEGEND

	EXISTING	PROPOSED
WATERLINE	--- 10"W ---	— 12"DI W —
ELECTRICITY	--- E ---	— E —
GAS	--- 4"G ---	— 4"G —
TELEPHONE/TELEMETRY	--- T ---	— T —
CABLE TELEVISION	--- CATV ---	— CATV —
SANITARY SEWER LINE	--- 8"SS ---	— 8"SS —
SANITARY SEWER FORCE MAIN	--- 6"FM ---	— 6"FM —
STORM DRAIN	--- 8"SD ---	— 8"SD —
CULVERT	===	— 18"D —
ABANDON PIPE		+++++
DRAINAGE DITCH/FLOODWAY BOUNDARY	.....	.....
ROCK CREEK OHWM	.....	
VEGETATED CORRIDOR BOUNDARY	— VC —	
WETLAND BOUNDARY	— W —	
BARBED WIRE FENCE	— X —	— X —
CHAINLINK FENCE	— O —	— O —
GUARDRAIL	.....	
CENTERLINE	-----	-----
PROPERTY LINE	-----	-----
EASEMENT	-----	-----
RIGHT-OF-WAY	-----	-----
EDGE OF PAVEMENT/AC	-----	-----
EDGE OF GRAVEL	-----	-----
CURB	=====	=====
SIDEWALK	----- S/W -----	----- S/W -----
STRUCTURE OR FACILITY	[ ]	[ ]
CONTOUR MINOR	-----	-----
CONTOUR MAJOR	----- 200 -----	----- 200 -----
MANHOLE	○	●
CLEAN-OUT	○	●
CATCH BASIN/FIELD INLET	⊞	⊞
VALVE	⊗	⊗
GEOTECHNICAL BORING W/ ID NO.	⊙	⊙
FIRE HYDRANT ASSEMBLY	⊙	⊙
WATER METER	⊞	⊞
PULL BOX/JUNCTION BOX	⊞	⊞
UTILITY POLE	○	○
GUY WIRE	—	—
LIGHT POST	☆	☆
MAILBOX	⊞	⊞
SIGN	⊞	⊞
BENCHMARK	⊙	⊙
TREE DECIDUOUS	☼	☼
TREE CONIFEROUS	☼	☼
TREE TO BE REMOVED	☼	☼
SURFACE ELEVATION	+ 176.63	+ 176.63

G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-G.dwg G-4 1/22/2020 3:01 PM TAYLOR.SPENCER 23.0s (LMS Tech)

NO.	DATE	BY	REVISION

NOTICE  
 0 1/2 1  
 IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JJU  
 DESIGNED  
 CAD  
 DRAWN  
 BVO  
 CHECKED

**PRELIMINARY ONLY**  
 DO NOT USE FOR CONSTRUCTION  
 JANUARY 2020  
 Murraysmith  
 www.murraysmith.us



**CITY OF SHERWOOD**  
**ROCK CREEK**  
**SANITARY TRUNK LINE**  
**UPSIZING PROJECT -**  
**PHASE 1**

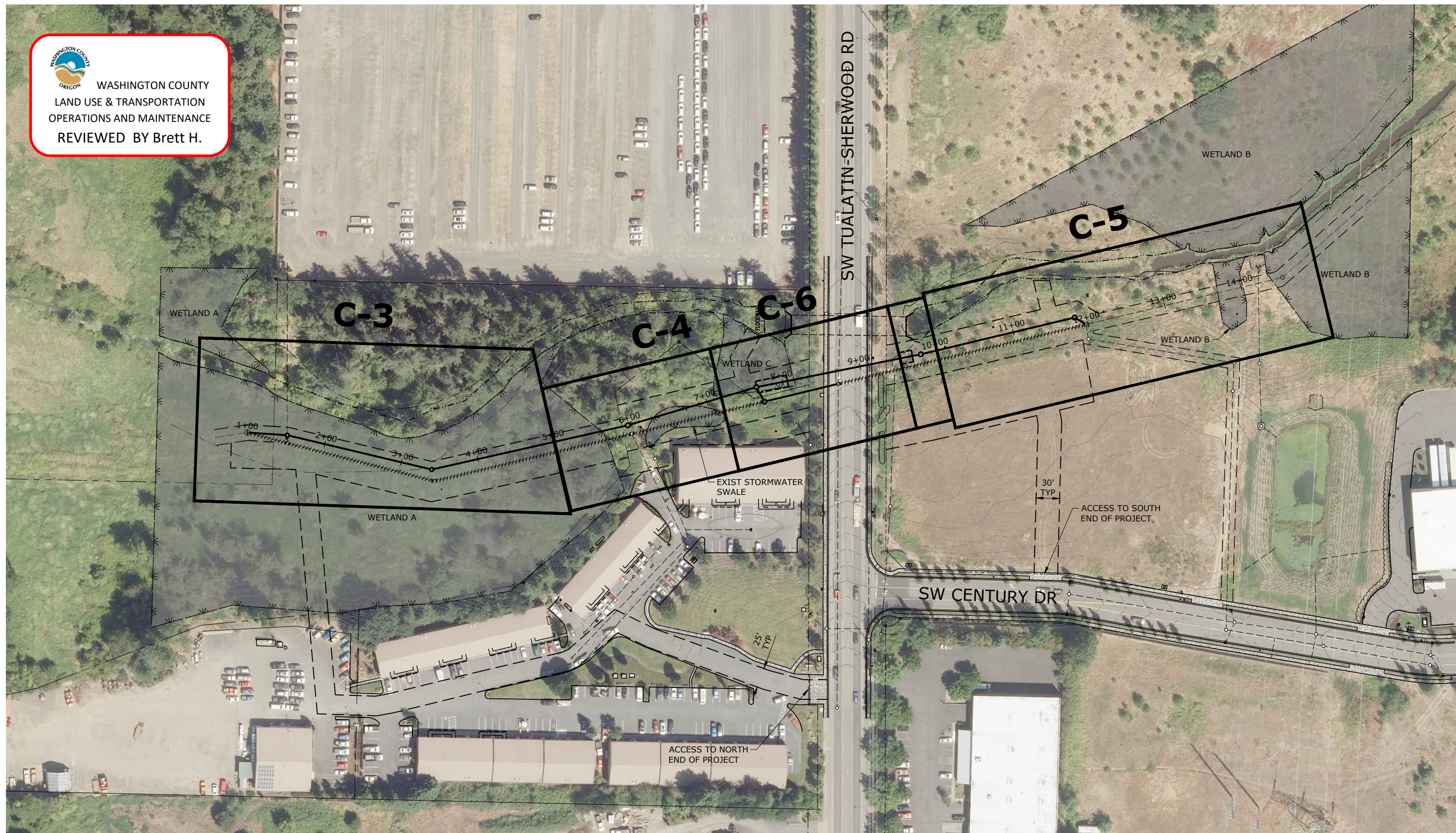
**SYMBOLS AND LEGEND**  
 CASE FILE NO.: 19-2481.402 SCALE: AS SHOWN DATE: OCTOBER 2020

SHEET  
**G-4**  
 4 of X

# PERMIT SET



WASHINGTON COUNTY  
 LAND USE & TRANSPORTATION  
 OPERATIONS AND MAINTENANCE  
 REVIEWED BY Brett H.



PLAN  
 SCALE: 1"=60'



**PERMIT SET**

NO.	DATE	BY	REVISION

NOTICE  
 0 1/2 1  
 IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JJU  
 DESIGNED  
 CAD  
 DRAWN  
 BVO  
 CHECKED

**PRELIMINARY ONLY**  
 DO NOT USE FOR CONSTRUCTION  
 JANUARY 2020  
 Murraysmith  
 www.murraysmith.us



**CITY OF SHERWOOD  
 ROCK CREEK  
 SANITARY TRUNK LINE  
 UPSIZING PROJECT -  
 PHASE 1**

**SITE/SHEET LAYOUT**  
 CASE FILE NO.: 19-2481.402 SCALE: AS SHOWN DATE: OCTOBER 2020

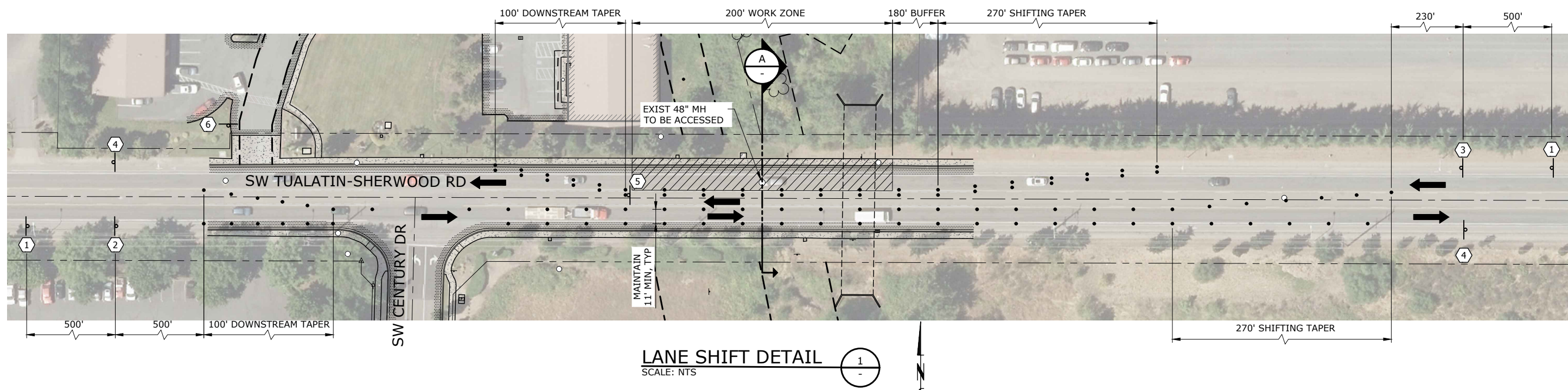
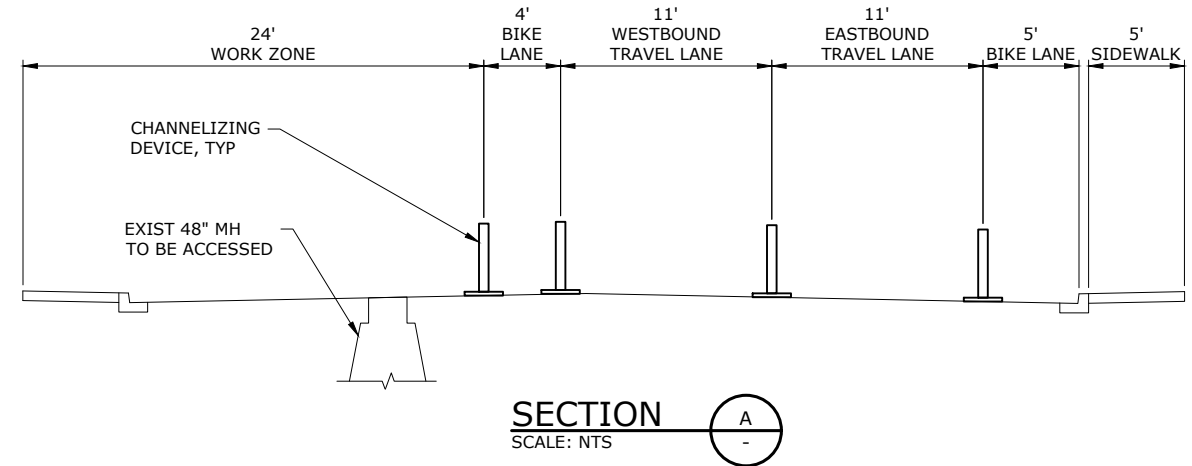
SHEET  
 G-5  
 5 of X

G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-G.dwg G-5 1/22/2020 3:01 PM TAYLOR.SPENCER 23.0s (LMS Tech)





G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-TC.dwg TC-1 12/4/2019 5:41 PM TAYLOR.SPENCER 23.0s (LMS Tech)



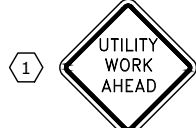



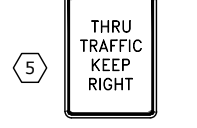
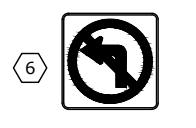
WASHINGTON COUNTY  
LAND USE & TRANSPORTATION  
OPERATIONS AND MAINTENANCE  
REVIEWED BY Brett H.



**LEGEND**

-  TEMPORARY TRAFFIC CONTROL SIGN
-  CHANNELIZING DEVICE
-  DIRECTION OF TRAVEL
-  WORK SPACE

**SIGN LEGEND**

-  W21-7 36"x36"
-  W9-3 36"x36"
-  W24-1L 36"x36"
-  G20-2 36"x18"
-  R4-3A 24"x36"
-  R3-2 24"x24"

**NOTES:**

1. TEMPORARY TRAFFIC CONTROL SHALL BE IN ACCORDANCE WITH THESE PLANS, CITY AND COUNTY REQUIREMENTS, AND THE LATEST VERSIONS OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AND THE OREGON TEMPORARY TRAFFIC CONTROL HANDBOOK, SPECIFICALLY DIAGRAM 430: DIVERSION INTO A CONTINUOUS LEFT TURN LANE.
2. ALL TRAFFIC CONTROL DEVICES (TCD'S) SHALL BE MUTCD COMPLIANT.


**PERMIT SET**

NO.	DATE	BY	REVISION

NOTICE  
0 1/2 1  
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JJU DESIGNED  
CAD DRAWN  
BVO CHECKED

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION  
JANUARY 2020  
Murraysmith  
www.murraysmith.us

**CITY OF SHERWOOD  
ROCK CREEK  
SANITARY TRUNK LINE  
UPSIZING PROJECT -  
PHASE 1**

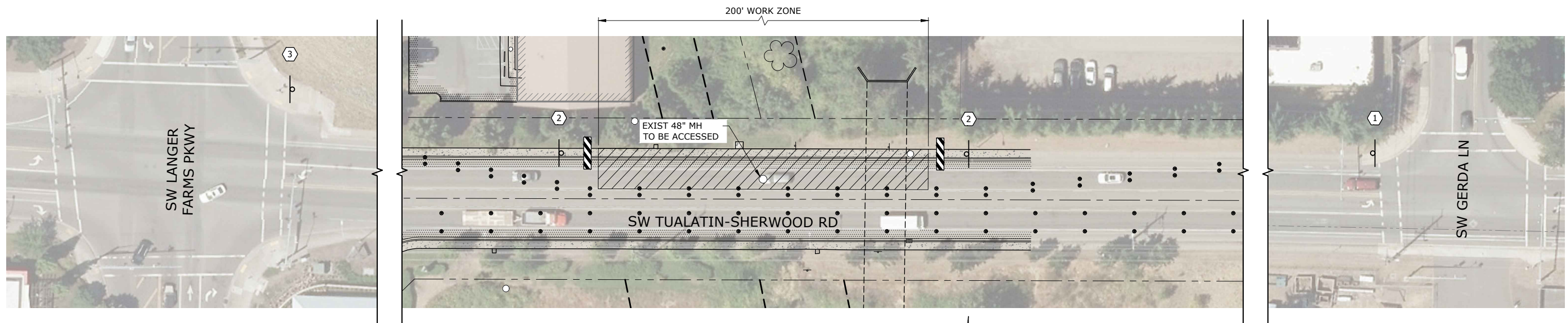
**TRAFFIC CONTROL PLAN  
SW TUALATIN-SHERWOOD ROAD**

CASE FILE NO.: 19-2481.402 SCALE: AS SHOWN DATE: OCTOBER 2020

SHEET  
TC-1  
6 of X






G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-TC.dwg TC-2 12/4/2019 5:41 PM TAYLOR.SPENCER 23.0s (LMS Tech)



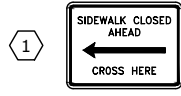


**SIDEWALK DETOUR**  
SCALE: NTS



**LEGEND**

-  TEMPORARY TRAFFIC CONTROL SIGN
-  BARRIER, SEE NOTE 3
-  WORK SPACE

**SIGN LEGEND**

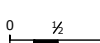
-  R9-11L  
24"x18"
-  R9-9  
24"x12"
-  R9-11R  
24"x18"

**NOTES:**

1. TEMPORARY TRAFFIC CONTROL SHALL BE IN ACCORDANCE WITH THESE PLANS, CITY AND COUNTY REQUIREMENTS, AND THE LATEST VERSION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), SPECIFICALLY FIGURE 6H-28: SIDEWALK DETOUR OR DIVERSION.
2. ALL TRAFFIC CONTROL DEVICES (TCD'S) SHALL BE MUTCD COMPLIANT.
3. BARRICADES SHALL BE TYPE 1 BARRICADES PER MUTCD FIGURE 6F-7 CHANNELIZING DEVICES.

**PERMIT SET**

NO.	DATE	BY	REVISION

NOTICE  
  
 IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JJU  
 DESIGNED  
 CAD  
 DRAWN  
 BVO  
 CHECKED

**PRELIMINARY ONLY**  
 DO NOT USE FOR CONSTRUCTION  
 JANUARY 2020  
**Murraysmith**  
 www.murraysmith.us

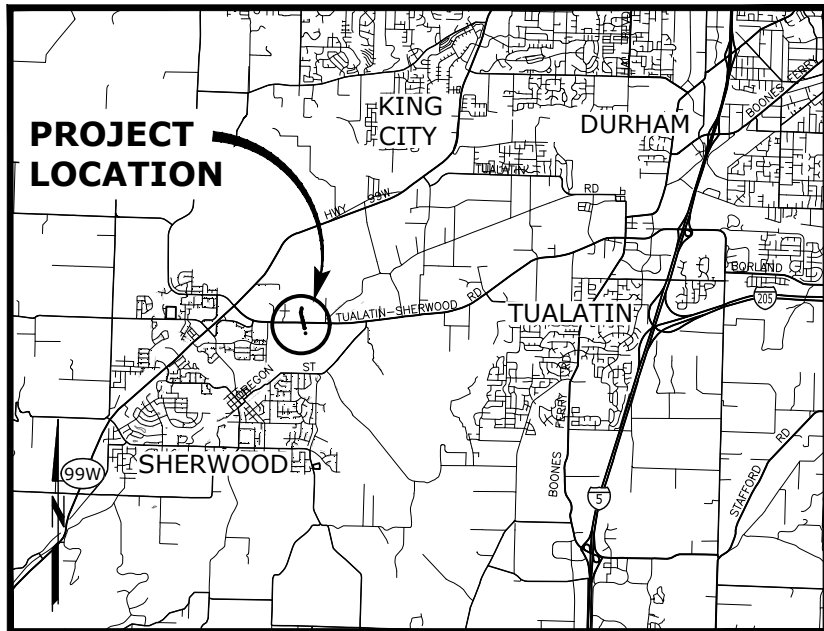


**CITY OF SHERWOOD**  
**ROCK CREEK**  
**SANITARY TRUNK LINE**  
**UPSIZING PROJECT -**  
**PHASE 1**

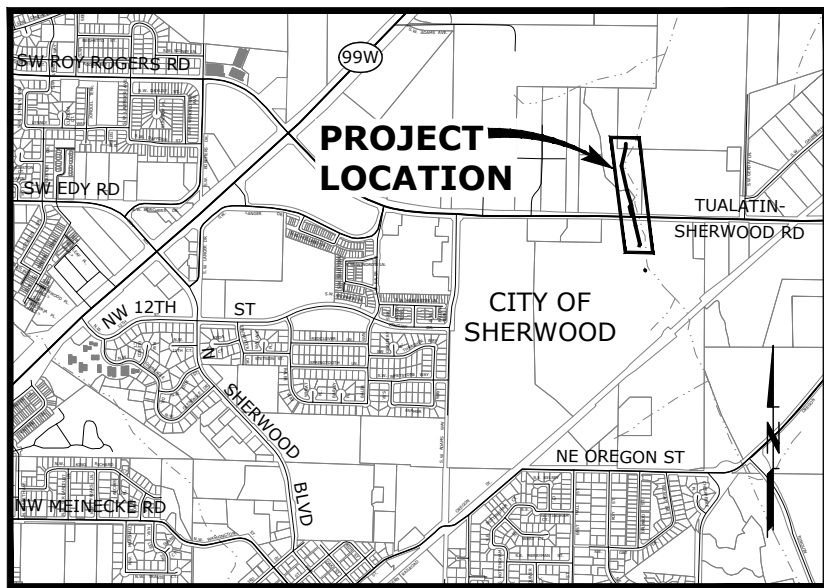
**PEDESTRIAN DETOUR PLAN**  
**SW TUALTIN-SHERWOOD ROAD**  
 CASE FILE NO.: 19-2481.402    SCALE: AS SHOWN    DATE: OCTOBER 2020

SHEET  
 TC-2  
 7 of X

# ESC PLAN FOR SITES 1 TO 5 ACRES



**VICINITY MAP**  
SCALE: 1"=5,000'



**SITE MAP**  
SCALE: 1"=1,000'

**PROPERTY DESCRIPTIONS:**

TAXLOTS 25129A000301, 25129A000400, AND 25129D000150, AND SW TUALATIN-SHERWOOD RD R/W, LOCATED IN THE NORTHEAST AND SOUTHEAST 1/4'S OF SECTION 29, TOWNSHIP 2 SOUTH, RANGE 1 WEST, WILLAMETTE MERIDIAN, WASHINGTON COUNTY, OREGON.

**PROJECT LOCATIONS:**

NORTH AND SOUTH OF SW TUALATIN-SHERWOOD RD, APPROXIMATELY 375 FEET EAST OF SW CENTURY DR, SHERWOOD, WASHINGTON COUNTY, OREGON.

LATITUDE: 45.367302°N, LONGITUDE: -122.828534°W

**ATTENTION EXCAVATORS:**

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 THESE RULES FROM THE CENTER BY CALLING 503-232-1987. IF YOU HAVE ANY QUESTIONS ABOUT THE RULES, YOU MAY CONTACT THE CENTER. YOU MUST NOTIFY THE CENTER AT LEAST TWO BUSINESS DAYS, BEFORE COMMENCING AN EXCAVATION. CALL 503-246-6699.

**DEVELOPER**

DEVELOPER: CITY OF SHERWOOD  
CONTACT: BOB GALATI, PE  
ADDRESS: 22560 SW PINE ST  
CITY/STATE: SHERWOOD, OR 97140  
PHONE/FAX: (503) 925-2308

**PLANNING / ENGINEERING / SURVEYING FIRM**

COMPANY: MURRAYSMITH, INC  
CONTACT: BRENDAN O'SULLIVAN, P.E.  
ADDRESS: 888 SW 5TH AVE, SUITE 1170  
CITY/STATE: PORTLAND, OR 97204  
PHONE: (503) 225-9010 FAX: (866) 274-9807

**NARRATIVE DESCRIPTIONS**

**EXISTING SITE CONDITIONS**

CITY OF SHERWOOD UNDEVELOPED LAND CONTAINING AN 18" DIAMETER SANITARY SEWER LINE AND ASSOCIATED MANHOLE STRUCTURES, WETLANDS, AND FLOODPLAINS ASSOCIATED WITH ROCK CREEK; WASHINGTON COUNTY AND CITY OF SHERWOOD PAVED ROADWAY SURFACES AND RIGHT-OF-WAY

**DEVELOPED CONDITIONS**

SITE WILL BE RETURNED TO PRE-CONSTRUCTION CONDITIONS IMMEDIATELY AFTER CONSTRUCTION OF NEW 24" DIAMETER SANITARY SEWER LINE AND ASSOCIATED MANHOLE STRUCTURES AND ABANDONMENT OF EXISTING 18" DIAMETER SANITARY SEWER LINE. THIS INCLUDES THE PLANTING OF NATIVE TREES, SHRUBS, AND SEED MIXES AND REESTABLISHMENT OF EXISTING CONTOURS AND GRADES.

**NATURE OF CONSTRUCTION ACTIVITY AND ESTIMATED TIME TABLE**

- \* CLEARING (FROM JUNE 1, 2020 TO NOVEMBER 11, 2020)
- \* MASS GRADING (FROM JUNE 1, 2020 TO SEPTEMBER 30, 2020)
- \* UTILITY INSTALLATION (FROM JUNE 1, 2020 TO NOVEMBER 11, 2020)
- \* FINAL STABILIZATION (FROM NOVEMBER 12, 2020 TO DECEMBER 31, 2022)

TOTAL SITE AREA:  
3.9 ACRES (169,300 SQ FT)

TOTAL DISTURBED AREA:  
2.0 ACRES (85,800 SQ FT)

IMPERVIOUS SURFACE AREA:  
EXISTING IMPERVIOUS AREA = 24,100 SQ FT  
PROPOSED IMPERVIOUS AREA = 0 SQ FT

**SITE SOIL CLASSIFICATION:**  
5B - BRIDWELL STONY SILT LOAM  
14 - COVE CLAY  
27 - LABISH MUCKY CLAY  
37B, 37C - QUATAMA LOAM  
43 - WAPATO SILTY CLAY LOAM

THE HAZARD OF EROSION OF ON-SITE SOILS IS SLIGHT. FILL MATERIAL WILL MAINLY BE GENERATED ON-SITE FROM UTILITY TRENCH EXCAVATIONS. THERE WILL BE SOME IMPORT OF GRANULAR MATERIAL USED TO BED THE PIPE AND BACKFILL AROUND MANHOLES. ANY UNUSED EXCAVATED MATERIALS WILL BE HAULED OFF-SITE.

**RECEIVING WATER BODIES:**  
ROCK CREEK AND TUALATIN RIVER DRAINAGE BASINS

**INSPECTION FREQUENCY**

SITE CONDITION	MINIMUM FREQUENCY
1. ACTIVE PERIOD	WEEKLY WHEN STORMWATER RUNOFF, INCLUDING RUNOFF FROM SNOW MELT, IS OCCURRING.  AT LEAST ONCE EVERY MONTH, REGARDLESS OF WHETHER STORMWATER RUNOFF IS OCCURRING.
2. PRIOR TO THE SITE BECOMING INACTIVE OR IN ANTICIPATION OF SITE INACCESSIBILITY.	ONCE TO ENSURE THAT EROSION AND SEDIMENT CONTROL MEASURES ARE IN WORKING ORDER. ANY NECESSARY MAINTENANCE AND REPAIR MUST BE MADE PRIOR TO LEAVING THE SITE.
3. INACTIVE PERIODS GREATER THAN FOURTEEN (14) CONSECUTIVE CALENDAR DAYS.	ONCE EVERY MONTH
4. PERIODS DURING WHICH THE SITE IS INACCESSIBLE DUE TO INCLEMENT WEATHER.	IF PRACTICAL, INSPECTIONS MUST OCCUR DAILY AT A RELEVANT AND ACCESSIBLE DISCHARGE POINT OR DOWNSIDE LOCATION.
5. PERIODS DURING WHICH DISCHARGE IS UNLIKELY DUE TO FROZEN CONDITIONS.	MONTHLY. RESUME MONITORING IMMEDIATELY UPON MELT, OR WHEN WEATHER CONDITIONS MAKE DISCHARGES LIKELY.

- HOLD A PRE-CONSTRUCTION MEETING OF PROJECT CONSTRUCTION PERSONNEL THAT INCLUDES THE INSPECTOR TO DISCUSS EROSION AND SEDIMENT CONTROL MEASURES AND CONSTRUCTION LIMITS.
- ALL INSPECTIONS MUST BE MADE IN ACCORDANCE WITH DEQ 1200-CN PERMIT REQUIREMENTS.
- INSPECTION LOGS MUST BE KEPT IN ACCORDANCE WITH DEQ'S 1200-CN PERMIT REQUIREMENTS.
- RETAIN A COPY OF THE ESCP AND ALL REVISIONS ON SITE AND MAKE IT AVAILABLE ON REQUEST TO DEQ, AGENT, OR THE LOCAL MUNICIPALITY. DURING INACTIVE PERIODS OF GREATER THAN SEVEN (7) CONSECUTIVE CALENDAR DAYS, RETAIN THE ESCP AT THE CONSTRUCTION SITE OR AT ANOTHER LOCATION.



**STANDARD EROSION AND SEDIMENT CONTROL PLAN DRAWING NOTES:**

- ALL PERMIT REGISTRANTS MUST IMPLEMENT THE ESCP. FAILURE TO IMPLEMENT ANY OF THE CONTROL MEASURES OR PRACTICES DESCRIBED IN THE ESCP IS A VIOLATION OF THE PERMIT.
- THE ESCP MEASURES SHOWN ON THIS PLAN ARE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, UPGRADE THESE MEASURES AS NEEDED TO COMPLY WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL EROSION AND SEDIMENT CONTROL REGULATIONS.
- SUBMISSION OF ALL ESCP REVISIONS IS NOT REQUIRED. SUBMITTAL OF THE ESCP REVISIONS IS ONLY UNDER SPECIFIC CONDITIONS. SUBMIT ALL NECESSARY REVISION TO DEQ OR AGENT.
- PHASE CLEARING AND GRADING TO THE MAXIMUM EXTENT PRACTICAL TO PREVENT EXPOSED INACTIVE AREAS FROM BECOMING A SOURCE OF EROSION.
- IDENTIFY, MARK, AND PROTECT (BY FENCING OFF OR OTHER MEANS) CRITICAL RIPARIAN AREAS AND VEGETATION INCLUDING IMPORTANT TREES AND ASSOCIATED ROOTING ZONES, AND VEGETATION AREAS TO BE PRESERVED. IDENTIFY VEGETATIVE BUFFER ZONES BETWEEN THE SITE AND SENSITIVE AREAS (E.G., WETLANDS), AND OTHER AREAS TO BE PRESERVED, ESPECIALLY IN PERIMETER AREAS.
- PRESERVE EXISTING VEGETATION WHEN PRACTICAL AND RE-VEGETATE OPEN AREAS. RE-VEGETATE OPEN AREAS WHEN PRACTICABLE BEFORE AND AFTER GRADING OR CONSTRUCTION. IDENTIFY THE TYPE OF VEGETATIVE SEED MIX USED.
- EROSION AND SEDIMENT CONTROL MEASURES INCLUDING PERIMETER SEDIMENT CONTROL MUST BE IN PLACE BEFORE VEGETATION IS DISTURBED AND MUST REMAIN IN PLACE AND BE MAINTAINED, REPAIRED, AND PROMPTLY IMPLEMENTED FOLLOWING PROCEDURES ESTABLISHED FOR THE DURATION OF CONSTRUCTION, INCLUDING PROTECTION FOR ACTIVE STORM DRAIN INLETS AND CATCH BASINS AND APPROPRIATE NON-STORMWATER POLLUTION CONTROLS.
- ESTABLISH CONCRETE TRUCK AND OTHER CONCRETE EQUIPMENT WASHOUT AREAS BEFORE BEGINNING CONCRETE WORK. DIRECT ALL WASH WATER INTO A PIT OR LEAK-PROOF CONTAINER. HANDLE WASH WATER AS WASTE, CONCRETE DISCHARGE TO WATERS OF THE STATE IS PROHIBITED.
- APPLY TEMPORARY AND/OR PERMANENT SOIL STABILIZATION MEASURES IMMEDIATELY ON ALL DISTURBED AREAS AS GRADING PROGRESSES AND FOR ALL ROADWAYS INCLUDING GRAVEL ROADWAYS.
- ESTABLISH MATERIAL AND WASTE STORAGE AREAS, AND OTHER NON-STORMWATER CONTROLS.
- PREVENT TRACKING OF SEDIMENT ONTO PUBLIC OR PRIVATE ROADS USING BMPs SUCH AS: GRAVELED (OR PAVED) EXITS AND PARKING AREAS, GRAVEL ALL UNPAVED ROADS LOCATED ON-SITE, OR USE AN EXIT TIRE WASH. THESE BMPs MUST BE IN PLACE PRIOR TO LAND-DISTURBING ACTIVITIES.
- WHEN TRUCKING SATURATED SOILS FROM THE SITE, EITHER USE WATER-TIGHT TRUCKS OR DRAIN LOADS ON SITE.
- USE BMPs TO PREVENT OR MINIMIZE STORMWATER EXPOSURE TO POLLUTANTS FROM SPILLS; VEHICLE AND EQUIPMENT FUELING, MAINTENANCE, AND STORAGE; OTHER CLEANING AND MAINTENANCE ACTIVITIES; AND WASTE HANDLING ACTIVITIES. THESE POLLUTANTS INCLUDE FUEL, HYDRAULIC FLUID, AND OTHER OILS FROM VEHICLES AND MACHINERY, AS WELL AS DEBRIS, LEFTOVER PAINTS, SOLVENTS, AND GLUES FROM CONSTRUCTION OPERATIONS.
- IMPLEMENT THE FOLLOWING BMPs WHEN APPLICABLE: WRITTEN SPILL PREVENTION AND RESPONSE PROCEDURES, EMPLOYEE TRAINING ON SPILL PREVENTION AND PROPER DISPOSAL PROCEDURES, SPILL KITS IN ALL VEHICLES, REGULAR MAINTENANCE SCHEDULE FOR VEHICLES AND MACHINERY, MATERIAL DELIVERY AND STORAGE CONTROLS, TRAINING AND SIGNAGE, AND COVERED STORAGE AREAS FOR WASTE AND SUPPLIES.
- USE WATER, SOIL-BINDING AGENT OR OTHER DUST CONTROL TECHNIQUE AS NEEDED TO AVOID WIND-BLOWN SOIL.
- THE APPLICATION RATE OF FERTILIZERS USED TO REESTABLISH VEGETATION MUST FOLLOW MANUFACTURER'S RECOMMENDATIONS TO MINIMIZE NUTRIENT RELEASES TO SURFACE WATERS. EXERCISE CAUTION WHEN USING TIME-RELEASE FERTILIZERS WITHIN ANY WATERWAY RIPARIAN ZONE.
- IF A STORMWATER TREATMENT SYSTEM (FOR EXAMPLE, ELECTRO-COAGULATION, FLOCCULATION, FILTRATION, ETC.) FOR SEDIMENT OR OTHER POLLUTANT REMOVAL IS EMPLOYED, SUBMIT AN OPERATION AND MAINTENANCE PLAN INCLUDING SYSTEM SCHEMATIC, LOCATION OF SYSTEM, LOCATION OF INLET, LOCATION OF DISCHARGE, DISCHARGE DISPERSION DEVICE DESIGN, AND A SAMPLING PLAN AND FREQUENCY) BEFORE OPERATING THE TREATMENT SYSTEM. OBTAIN PLAN APPROVAL BEFORE OPERATING THE TREATMENT SYSTEM. OPERATE AND MAINTAIN THE TREATMENT SYSTEM ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
- AT THE END OF EACH WORKDAY SOIL STOCKPILES MUST BE STABILIZED OR COVERED, OR OTHER BMPs MUST BE IMPLEMENTED TO PREVENT DISCHARGES TO SURFACE WATERS OR CONVEYANCE SYSTEMS LEADING TO SURFACE WATERS.
- CONSTRUCTION ACTIVITIES MUST AVOID OR MINIMIZE EXCAVATION AND CREATION OF BARE GROUND DURING WET WEATHER OCTOBER 01 - MAY 31.
- SEDIMENT FENCE: REMOVE TRAPPED SEDIMENT BEFORE IT REACHES ONE THIRD OF THE ABOVE GROUND FENCE HEIGHT AND BEFORE FENCE REMOVAL.
- OTHER SEDIMENT BARRIERS (SUCH AS BIOBAGS): REMOVE SEDIMENT BEFORE IT REACHES TWO INCHES DEPTH ABOVE GROUND HEIGHT. AND BEFORE BMP REMOVAL.
- CATCH BASINS: CLEAN BEFORE RETENTION CAPACITY HAS BEEN REDUCED BY FIFTY PERCENT. SEDIMENT BASINS AND SEDIMENT TRAPS: REMOVE TRAPPED SEDIMENTS BEFORE DESIGN CAPACITY HAS BEEN REDUCED BY FIFTY PERCENT AND AT COMPLETION OF PROJECT.
- WITHIN 24 HOURS, SIGNIFICANT SEDIMENT THAT HAS LEFT THE CONSTRUCTION SITE, MUST BE REMEDIATED. INVESTIGATE THE CAUSE OF THE SEDIMENT RELEASE AND IMPLEMENT STEPS TO PREVENT A RECURRENCE OF THE DISCHARGE WITHIN THE SAME 24 HOURS. ANY IN-STREAM CLEAN UP OF SEDIMENT SHALL BE PERFORMED ACCORDING TO THE OREGON DIVISION OF STATE LANDS REQUIRED TIMEFRAME.
- THE INTENTIONAL WASHING OF SEDIMENT INTO STORM SEWERS OR DRAINAGE WAYS MUST NOT OCCUR. VACUUMING OR DRY SWEEPING AND MATERIAL PICKUP MUST BE USED TO CLEANUP RELEASED SEDIMENTS.
- PROVIDE PERMANENT EROSION CONTROL MEASURES ON ALL EXPOSED AREAS. DO NOT REMOVE TEMPORARY SEDIMENT CONTROL PRACTICES UNTIL PERMANENT VEGETATION OR OTHER COVER OF EXPOSED AREAS IS ESTABLISHED. HOWEVER, DO REMOVE ALL TEMPORARY EROSION CONTROL MEASURES AS EXPOSED AREAS BECOME STABILIZED, UNLESS DOING SO CONFLICTS WITH LOCAL REQUIREMENTS. PROPERLY DISPOSE OF CONSTRUCTION MATERIALS AND WASTE, INCLUDING SEDIMENT RETAINED BY TEMPORARY BMPs.
- IF VEGETATIVE SEED MIXES ARE SPECIFIED, SEEDING MUST TAKE PLACE NO LATER THAN SEPTEMBER 1; THE TYPE AND PERCENTAGES OF SEED IN THE MIX MUST BE IDENTIFIED ON THE PLANS.
- ALL PUMPING OF SEDIMENT LADEN WATER SHALL BE DISCHARGED OVER AN UNDISTURBED, PREFERABLY VEGETATED AREA, AND THROUGH A SEDIMENT CONTROL BMP I.E. (FILTER BAG).
- ALL EXPOSED SOILS MUST BE COVERED DURING THE WET WEATHER PERIOD, OCTOBER 01 - MAY 31.
- IF WATER OF THE STATE IS WITHIN THE PROJECT SITE OR WITHIN 50 FEET OF THE PROJECT BOUNDARY, MAINTAIN THE EXISTING NATURAL BUFFER WITHIN THE 50-FOOT ZONE FOR THE DURATION OF THE PERMIT COVERAGE, OR MAINTAIN LESS THAN THE ENTIRE EXISTING NATURAL BUFFER AND PROVIDE ADDITIONAL EROSION AND SEDIMENT CONTROL BMPs.

THE PERMITTEE IS REQUIRED TO MEET ALL THE CONDITIONS OF THE 1200-CN PERMIT. THIS ESCP AND GENERAL CONDITIONS HAVE BEEN DEVELOPED TO FACILITATE COMPLIANCE WITH THE 1200-CN PERMIT REQUIREMENTS. IN CASES OF DISCREPANCIES OR OMISSIONS, THE 1200-CN PERMIT REQUIREMENTS SUPERCEDE REQUIREMENTS OF THIS PLAN.

**BMP MATRIX FOR CONSTRUCTION PHASES**  
REFER TO DEQ GUIDANCE MANUAL FOR A COMPREHENSIVE LIST OF AVAILABLE BMP'S.

	CLEARING	MASS GRADING	UTILITY INSTALLATION	STREET CONSTRUCTION	FINAL STABILIZATION	WET WEATHER (OCT. 1 - MAY 31ST)
<b>EROSION PREVENTION</b>						
PRESERVE NATURAL VEGETATION	**X	X	X		X	X
GROUND COVER			X		X	X
HYDRAULIC APPLICATIONS					X	
PLASTIC SHEETING						
MATTING						
DUST CONTROL	X	X	X		X	X
TEMPORARY/PERMANENT SEEDING					X	X
BUFFER ZONE	**X	X	X		X	X
OTHER:						
<b>SEDIMENT CONTROL</b>						
SEDIMENT FENCE (PERIMETER)	**X	**X	X		X	X
SEDIMENT FENCE (INTERIOR)	**X	**X	X		X	X
STRAW WATTLES			X		X	X
FILTER BERM	**X	X	X		X	X
INLET PROTECTION	**X	**X	X		X	X
DEWATERING			X		X	X
SEDIMENT TRAP					X	X
NATURAL BUFFER ENCROACHMENT	X	X	X		X	X
COMPOST SOCK					X	X
OTHER:						
<b>RUN OFF CONTROL</b>						
CONSTRUCTION ENTRANCE	**X	X	X		X	X
PIPE SLOPE DRAIN						
OUTLET PROTECTION						
SURFACE ROUGHENING					X	
CHECK DAMS						
OTHER:						
<b>POLLUTION PREVENTION</b>						
PROPER SIGNAGE	X	X	X		X	X
HAZ WASTE MGMT	X	X	X			
SPILL KIT ON-SITE	X	X	X		X	X
CONCRETE WASHOUT AREA						
OTHER:						

- \* SIGNIFIES ADDITIONAL BMP'S REQUIRED FOR WORK WITHIN 50' OF WATER OF THE STATE.
- \*\* SIGNIFIES BMP THAT WILL BE INSTALLED PRIOR TO ANY GROUND DISTURBING ACTIVITY.

**RATIONALE STATEMENT**

A COMPREHENSIVE LIST OF AVAILABLE BEST MANAGEMENT PRACTICES (BMP) OPTIONS BASED ON DEQ'S GUIDANCE MANUAL HAS BEEN REVIEWED TO COMPLETE THIS EROSION AND SEDIMENT CONTROL PLAN. SOME OF THE ABOVE LISTED BMP'S WERE NOT CHOSEN BECAUSE THEY WERE DETERMINED TO NOT EFFECTIVELY MANAGE EROSION PREVENTION AND SEDIMENT CONTROL FOR THIS PROJECT BASED ON SPECIFIC SITE CONDITIONS, INCLUDING SOIL CONDITIONS TOPOGRAPHIC CONSTRAINTS, ACCESSIBILITY TO THE SITE, AND OTHER RELATED CONDITIONS, AS THE PROJECT PROGRESSES AND THERE IS A NEED TO REVISE THE ESC PLAN, AN ACTION PLAN WILL BE SUBMITTED.

INITIAL \_\_\_\_\_

**PERMITTEE'S SITE INSPECTOR:** ANDY STIRLING

COMPANY/AGENCY: CITY OF SHERWOOD

PHONE: (503) 925-2307

FAX: N/A

E-MAIL: stirling@sherwoodoregon.gov

DESCRIPTION OF EXPERIENCE: CESCL CERTIFICATION ID# ECO-3-6071946

EXPIRES 7/7/2022

**SHEET INDEX**  
**EROSION AND SEDIMENT CONTROL PLANS**

- ESC-1 EROSION AND SEDIMENT CONTROL COVER SHEET AND GENERAL NOTES
- ESC-2 EROSION AND SEDIMENT CONTROL PLAN - 1
- ESC-3 EROSION AND SEDIMENT CONTROL PLAN - 2
- ESC-4 EROSION AND SEDIMENT CONTROL DETAILS - 1
- ESC-5 EROSION AND SEDIMENT CONTROL DETAILS - 2
- ESC-6 DEWATERING PLAN
- ESC-7 DEWATERING DETAILS

**PERMIT SET**

G:\PDX\_Projects\1912481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-ESC-1.dwg ESC-1 1/22/2020 1:59 PM TAYLOR.SPENCER 23.0s (LMS Tech)

<p>NO. DATE BY REVISION</p>		<p>NOTICE</p> <p>IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE</p>	<p>JJU DESIGNED</p> <p>CAD DRAWN</p> <p>BVO CHECKED</p>	<p><b>PRELIMINARY ONLY</b> DO NOT USE FOR CONSTRUCTION</p> <p>JANUARY 2020</p> <p><b>Murraysmith</b> www.murraysmith.us</p>		<p><b>CITY OF SHERWOOD</b> <b>ROCK CREEK</b> <b>SANITARY TRUNK LINE</b> <b>UPSIZING PROJECT -</b> <b>PHASE 1</b></p>	<p><b>EROSION AND SEDIMENT CONTROL</b> <b>COVER SHEET AND GENERAL NOTES</b></p>	<p>SHEET</p> <p>ESC-1</p> <p>8 of X</p>
<p>CASE FILE NO.: 19-2481.402</p>		<p>SCALE: AS SHOWN</p>	<p>DATE: OCTOBER 2020</p>					

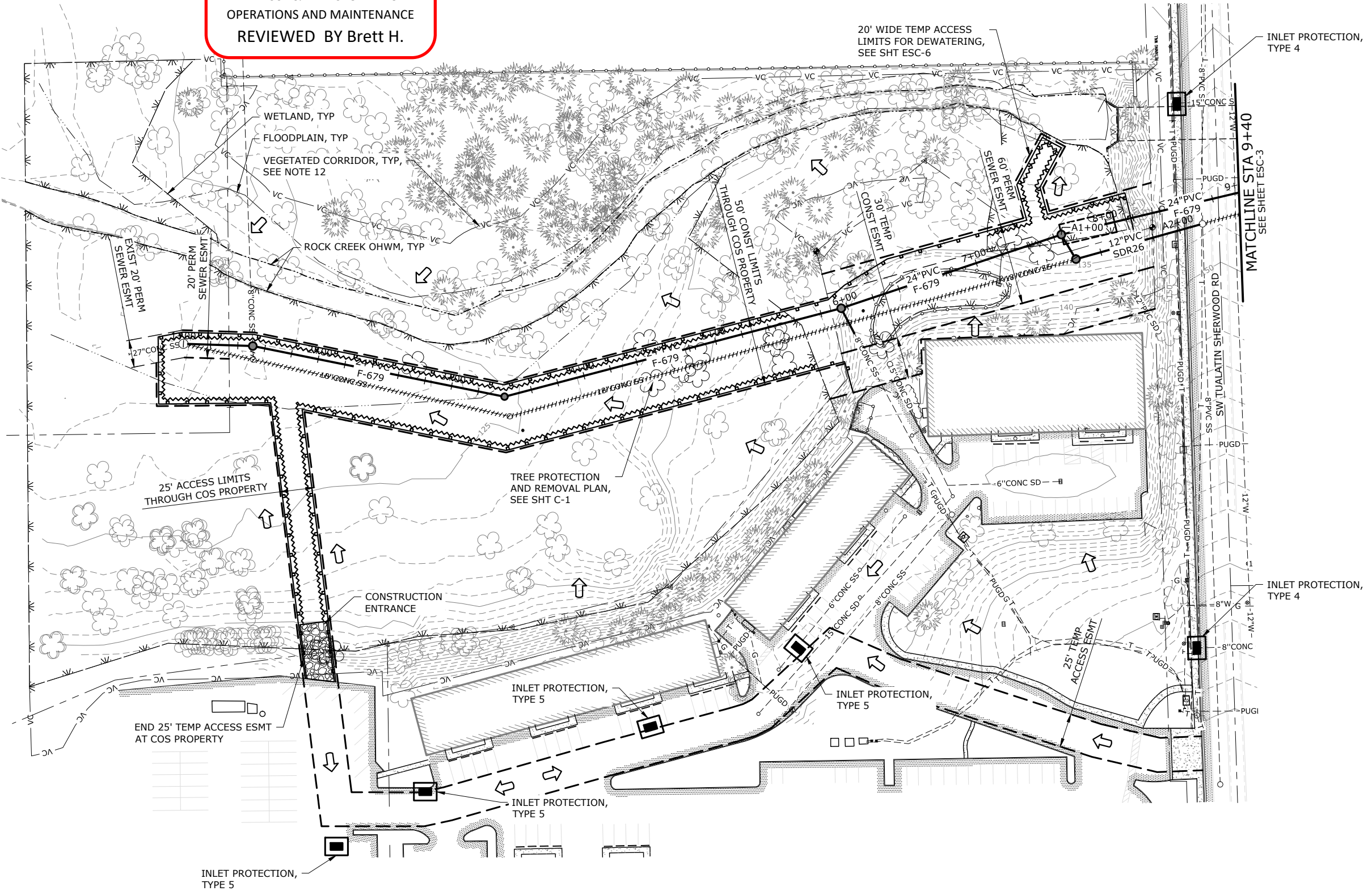
**LEGEND**

- DRAINAGE FLOW DIRECTION
- SEDIMENT FENCING
- COMPOST FILTER BERM
- CONSTRUCTION ENTRANCE
- INLET PROTECTION

**NOTES:**

1. ALL BASE ESC MEASURES (INLET PROTECTION, PERIMETER SEDIMENT CONTROL, GRAVEL CONSTRUCTION ENTRANCES, ETC.) MUST BE IN PLACE, FUNCTIONAL, AND APPROVED IN AN INITIAL INSPECTION, PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
2. SEDIMENT BARRIERS APPROVED FOR USE INCLUDE SEDIMENT FENCE; BERMS CONSTRUCTED OUT OF MULCH, CHIPPINGS, OR OTHER SUITABLE MATERIAL; STRAW WATTLES; OR OTHER APPROVED MATERIALS.
3. SENSITIVE RESOURCES INCLUDING, BUT NOT LIMITED TO, TREES, WETLANDS, AND RIPARIAN PROTECTION AREAS SHALL BE CLEARLY DELINEATED WITH ORANGE CONSTRUCTION FENCING OR CHAIN LINK FENCING IN A MANNER THAT IS CLEARLY VISIBLE TO ANYONE IN THE AREA. NO ACTIVITIES ARE PERMITTED TO OCCUR BEYOND THE CONSTRUCTION BARRIER.
4. CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES INCLUDING, BUT NOT LIMITED TO, TIRE WASHES AND DAILY STREET SWEEPING AND VACUUMING OF SW CENTURY DRIVE AND THE TEMPORARY ACCESS EASEMENT THROUGH BUSINESS PARK MAY BE REQUIRED TO INSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.
5. RUN-ON AND RUN-OFF CONTROLS SHALL BE IN PLACE AND FUNCTIONING PRIOR TO BEGINNING SUBSTANTIAL CONSTRUCTION ACTIVITIES. RUN-ON AND RUN-OFF CONTROL MEASURES INCLUDE SLOPE DRAINS (WITH OUTLET PROTECTION), CHECK DAMS, SURFACE ROUGHENING, AND BANK STABILIZATION.
6. SEED USED FOR TEMPORARY OR PERMANENT SEEDING SHALL ADHERE TO THE SPECIFICATIONS, UNLESS OTHERWISE AUTHORIZED.
7. STOCKPILED SOIL SHALL BE COVERED WITH PLASTIC SHEETING OR STRAW MULCH. SEDIMENT FENCE IS REQUIRED AROUND THE PERIMETER OF THE STOCKPILE.
8. AREAS SUBJECT TO WIND EROSION SHALL USE APPROPRIATE DUST CONTROL MEASURES INCLUDING THE APPLICATION OF A FINE SPRAY OF WATER, PLASTIC SHEETING, STRAW MULCHING, OR OTHER APPROVED MEASURES.
9. LIMIT SPEED OF VEHICLES ON SITE AND MOISTEN HAUL ROADS AS NECESSARY TO CONTROL DUST.
10. ACTIVE INLETS TO STORM WATER SYSTEMS SHALL BE PROTECTED THROUGH THE USE OF APPROVED INLET PROTECTION MEASURES. ALL INLET PROTECTION MEASURES ARE TO BE REGULARLY INSPECTED AND MAINTAINED AS NEEDED.
11. CONTRACTOR SHALL INSTALL INLET PROTECTION ON ALL INLETS WITHIN AREA OF PROJECT IMPROVEMENTS AS SHOWN ON SHEET ESC-2 AND ESC-3. ADDITIONAL INLETS NOT SHOWN ON THIS PLAN MAY BE PRESENT.
12. VEGETATED CORRIDOR BOUNDARY IS NOT SHOWN FOR CLARITY WHERE IT SHARES A BOUNDARY WITH WETLAND AND/OR ROCK CREEK ORDINARY HIGH WATER MARK.

**WASHINGTON COUNTY**  
 LAND USE & TRANSPORTATION  
 OPERATIONS AND MAINTENANCE  
 REVIEWED BY Brett H.



**PLAN**  
SCALE: 1"=40'

G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-ESC.dwg ESC-2 1/22/2020 3:47 PM TAYLOR.SPENCER 23.0s (LMS Tech)

NO.	DATE	BY	REVISION

**NOTICE**

0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JJU  
DESIGNED  
CAD  
DRAWN  
BVO  
CHECKED

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION

JANUARY 2020

**Murraysmith**  
www.murraysmith.us



**CITY OF SHERWOOD**  
**ROCK CREEK**  
**SANITARY TRUNK LINE**  
**UPSIZING PROJECT -**  
**PHASE 1**

**EROSION AND SEDIMENT CONTROL**

**PLAN - 1**

CASE FILE NO.: 19-2481.402    SCALE: AS SHOWN    DATE: OCTOBER 2020


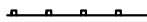

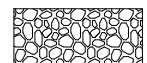

SHEET

**ESC-2**

9 of X

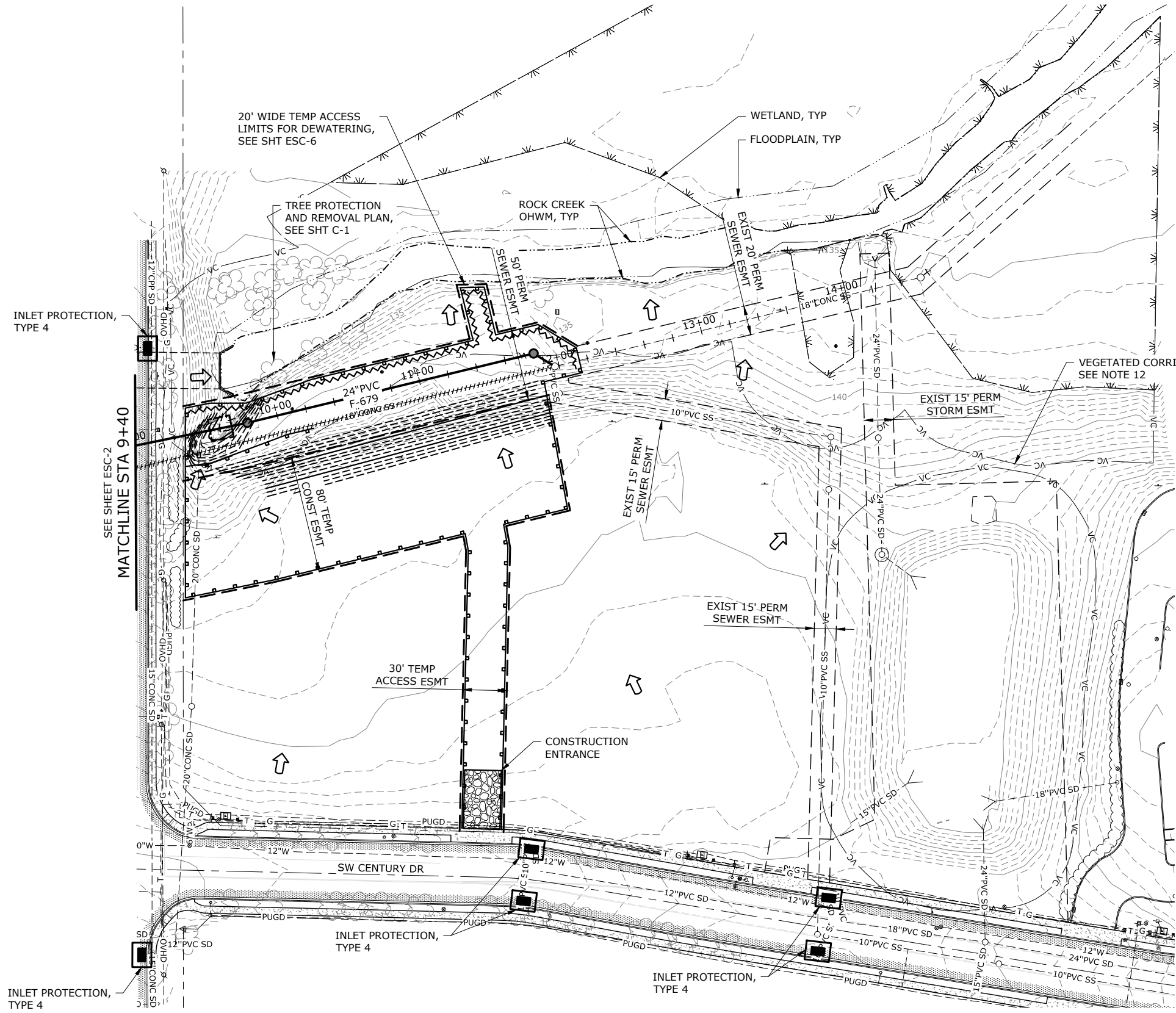
**PERMIT SET**

**LEGEND**

- DRAINAGE FLOW DIRECTION 
- SEDIMENT FENCING 
- COMPOST FILTER BERM 
- CONSTRUCTION ENTRANCE 
- INLET PROTECTION 

**NOTES:**

1. ALL BASE ESC MEASURES (INLET PROTECTION, PERIMETER SEDIMENT CONTROL, GRAVEL CONSTRUCTION ENTRANCES, ETC.) MUST BE IN PLACE, FUNCTIONAL, AND APPROVED IN AN INITIAL INSPECTION, PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
2. SEDIMENT BARRIERS APPROVED FOR USE INCLUDE SEDIMENT FENCE; BERMS CONSTRUCTED OUT OF MULCH, CHIPPINGS, OR OTHER SUITABLE MATERIAL; STRAW WATTLES; OR OTHER APPROVED MATERIALS.
3. SENSITIVE RESOURCES INCLUDING, BUT NOT LIMITED TO, TREES, WETLANDS, AND RIPARIAN PROTECTION AREAS SHALL BE CLEARLY DELINEATED WITH ORANGE CONSTRUCTION FENCING OR CHAIN LINK FENCING IN A MANNER THAT IS CLEARLY VISIBLE TO ANYONE IN THE AREA. NO ACTIVITIES ARE PERMITTED TO OCCUR BEYOND THE CONSTRUCTION BARRIER.
4. CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES INCLUDING, BUT NOT LIMITED TO, TIRE WASHES AND DAILY STREET SWEEPING AND VACUUMING OF SW CENTURY DRIVE AND THE TEMPORARY ACCESS EASEMENT THROUGH BUSINESS PARK MAY BE REQUIRED TO INSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.
5. RUN-ON AND RUN-OFF CONTROLS SHALL BE IN PLACE AND FUNCTIONING PRIOR TO BEGINNING SUBSTANTIAL CONSTRUCTION ACTIVITIES. RUN-ON AND RUN-OFF CONTROL MEASURES INCLUDE SLOPE DRAINS (WITH OUTLET PROTECTION), CHECK DAMS, SURFACE ROUGHENING, AND BANK STABILIZATION.
6. SEED USED FOR TEMPORARY OR PERMANENT SEEDING SHALL ADHERE TO THE SPECIFICATIONS, UNLESS OTHERWISE AUTHORIZED.
7. STOCKPILED SOIL SHALL BE COVERED WITH PLASTIC SHEETING OR STRAW MULCH. SEDIMENT FENCE IS REQUIRED AROUND THE PERIMETER OF THE STOCKPILE.
8. AREAS SUBJECT TO WIND EROSION SHALL USE APPROPRIATE DUST CONTROL MEASURES INCLUDING THE APPLICATION OF A FINE SPRAY OF WATER, PLASTIC SHEETING, STRAW MULCHING, OR OTHER APPROVED MEASURES.
9. LIMIT SPEED OF VEHICLES ON SITE AND MOISTEN HAUL ROADS AS NECESSARY TO CONTROL DUST.
10. ACTIVE INLETS TO STORM WATER SYSTEMS SHALL BE PROTECTED THROUGH THE USE OF APPROVED INLET PROTECTION MEASURES. ALL INLET PROTECTION MEASURES ARE TO BE REGULARLY INSPECTED AND MAINTAINED AS NEEDED.
11. CONTRACTOR SHALL INSTALL INLET PROTECTION ON ALL INLETS WITHIN AREA OF PROJECT IMPROVEMENTS AS SHOWN ON SHEET ESC-2 AND ESC-3. ADDITIONAL INLETS NOT SHOWN ON THIS PLAN MAY BE PRESENT.
12. VEGETATED CORRIDOR BOUNDARY IS NOT SHOWN FOR CLARITY WHERE IT SHARES A BOUNDARY WITH WETLAND AND/OR ROCK CREEK ORDINARY HIGH WATER MARK.



**PLAN**  
SCALE: 1"=40'


**WASHINGTON COUNTY**  
 LAND USE & TRANSPORTATION  
 OPERATIONS AND MAINTENANCE  
 REVIEWED BY Brett H.

G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-ESC.dwg ESC-3 1/22/2020 3:47 PM TAYLOR.SPENCER 23.0s (LMS Tech)

NO.	DATE	BY	REVISION

NOTICE  
0 1/2 1  
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE


JJU DESIGNED  
CAD DRAWN  
BVO CHECKED

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION

JANUARY 2020

**Murraysmith**  
www.murraysmith.us



  
**CITY OF SHERWOOD**  
**ROCK CREEK**  
**SANITARY TRUNK LINE**  
**UPSIZING PROJECT -**  
**PHASE 1**

**EROSION AND SEDIMENT CONTROL**

**PLAN - 2**

CASE FILE NO.: 19-2481.402 SCALE: AS SHOWN DATE: OCTOBER 2020

SHEET

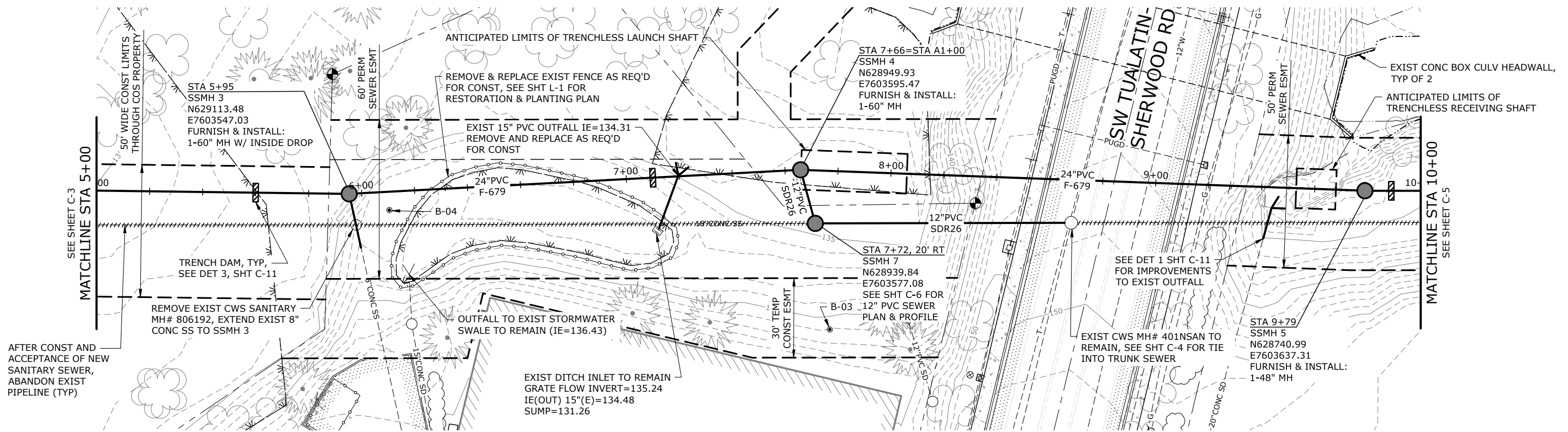
ESC-3

10 of X

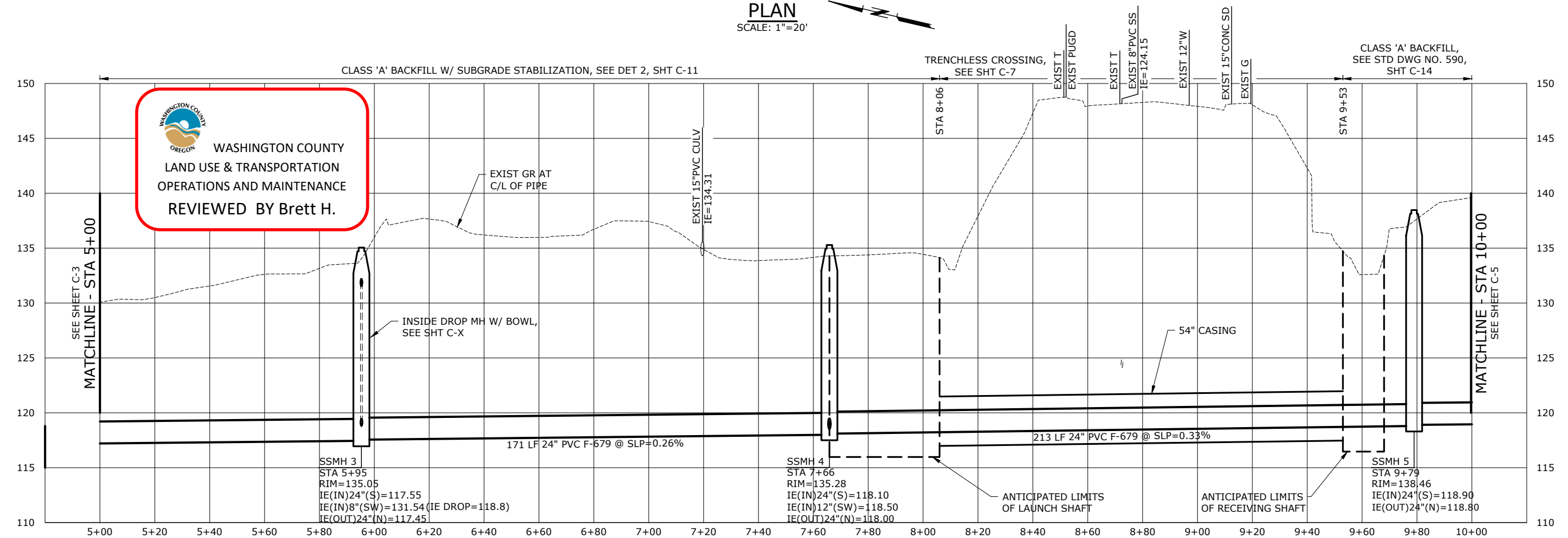
**PERMIT SET**



G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-C.dwg C-4 12/24/2019 9:59 AM TAYLOR.SPENCER 23.05 (LMS Tech)



**PLAN**  
SCALE: 1"=20'



**PROFILE**  
SCALE: 1"=20' HORIZ, 1"=5' VERT

**WASHINGTON COUNTY**  
 LAND USE & TRANSPORTATION  
 OPERATIONS AND MAINTENANCE  
 REVIEWED BY Brett H.

**PERMIT SET**

NO.	DATE	BY	REVISION

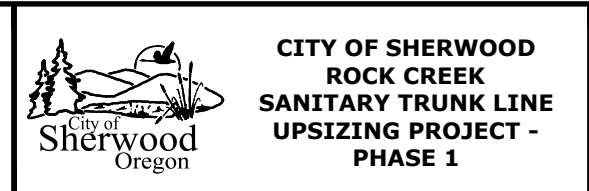
**NOTICE**  
 0 1/2 1  
 IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JJU  
 DESIGNED  
 CAD  
 DRAWN  
 BVO  
 CHECKED

**PRELIMINARY ONLY**  
 DO NOT USE FOR CONSTRUCTION

JANUARY 2020

**Murraysmith**  
 www.murraysmith.us



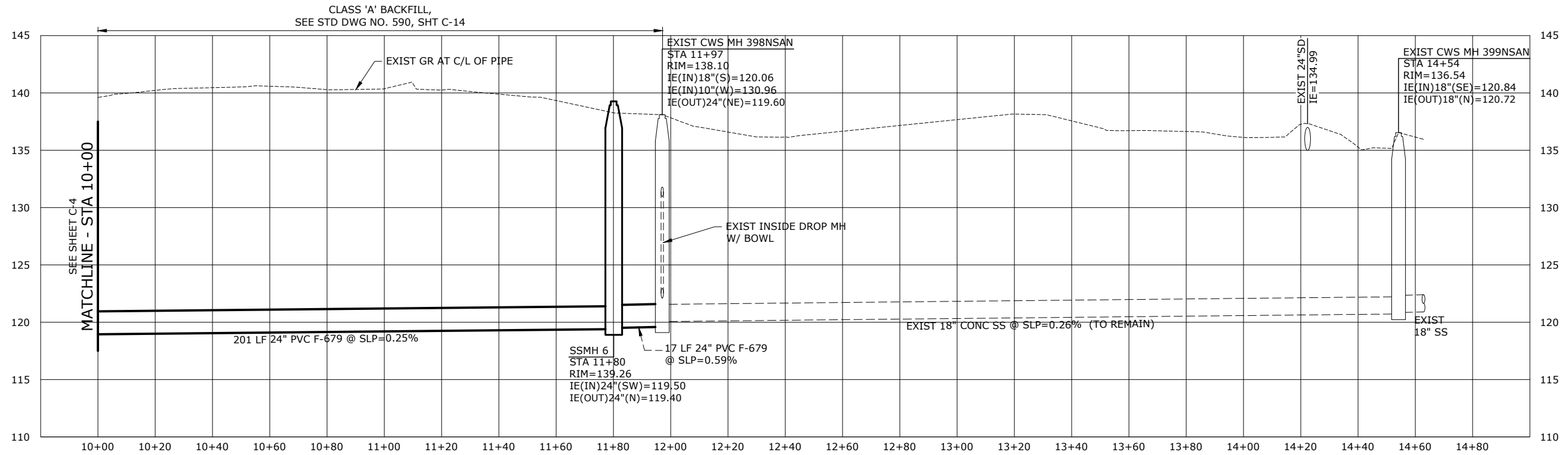
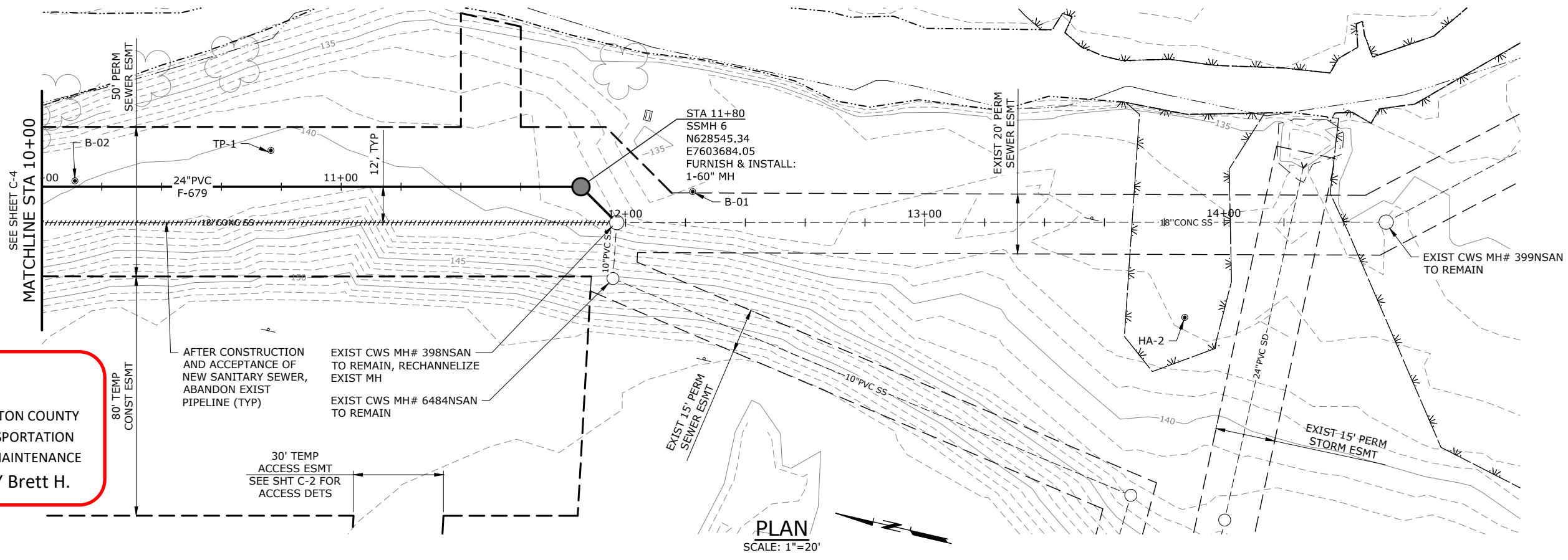
**SEWER PLAN AND PROFILE**  
**STA 5+00 TO STA 10+00**

CASE FILE NO.: 19-2481.402    SCALE: AS SHOWN    DATE: OCTOBER 2020

SHEET  
**C-4**  
 18 of X

G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-C.dwg C-5 12/24/2019 9:59 AM TAYLOR.SPENCER 23:05 (LMS Tech)

**WASHINGTON COUNTY**  
**LAND USE & TRANSPORTATION**  
**OPERATIONS AND MAINTENANCE**  
**REVIEWED BY Brett H.**



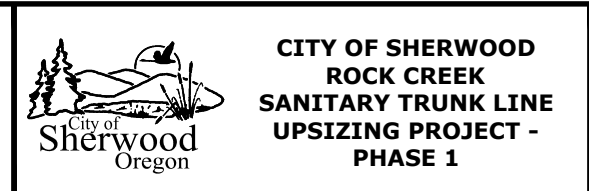
**PROFILE**  
 SCALE: 1"=20' HORIZ, 1"=5' VERT

**PERMIT SET**

NO.	DATE	BY	REVISION

**NOTICE**  
 0 1/2 1  
 IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

**PRELIMINARY ONLY**  
 DO NOT USE FOR CONSTRUCTION  
 JANUARY 2020  
**Murraysmith**  
 www.murraysmith.us



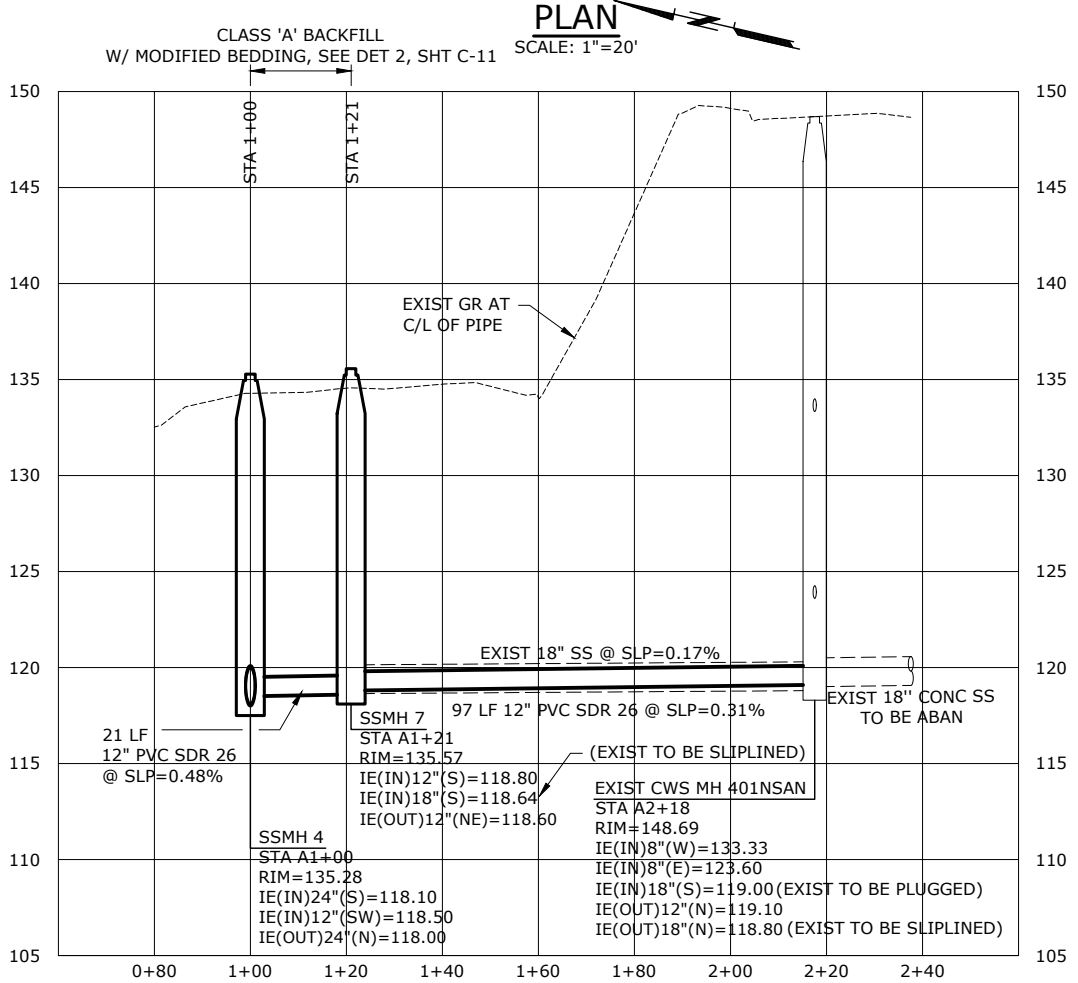
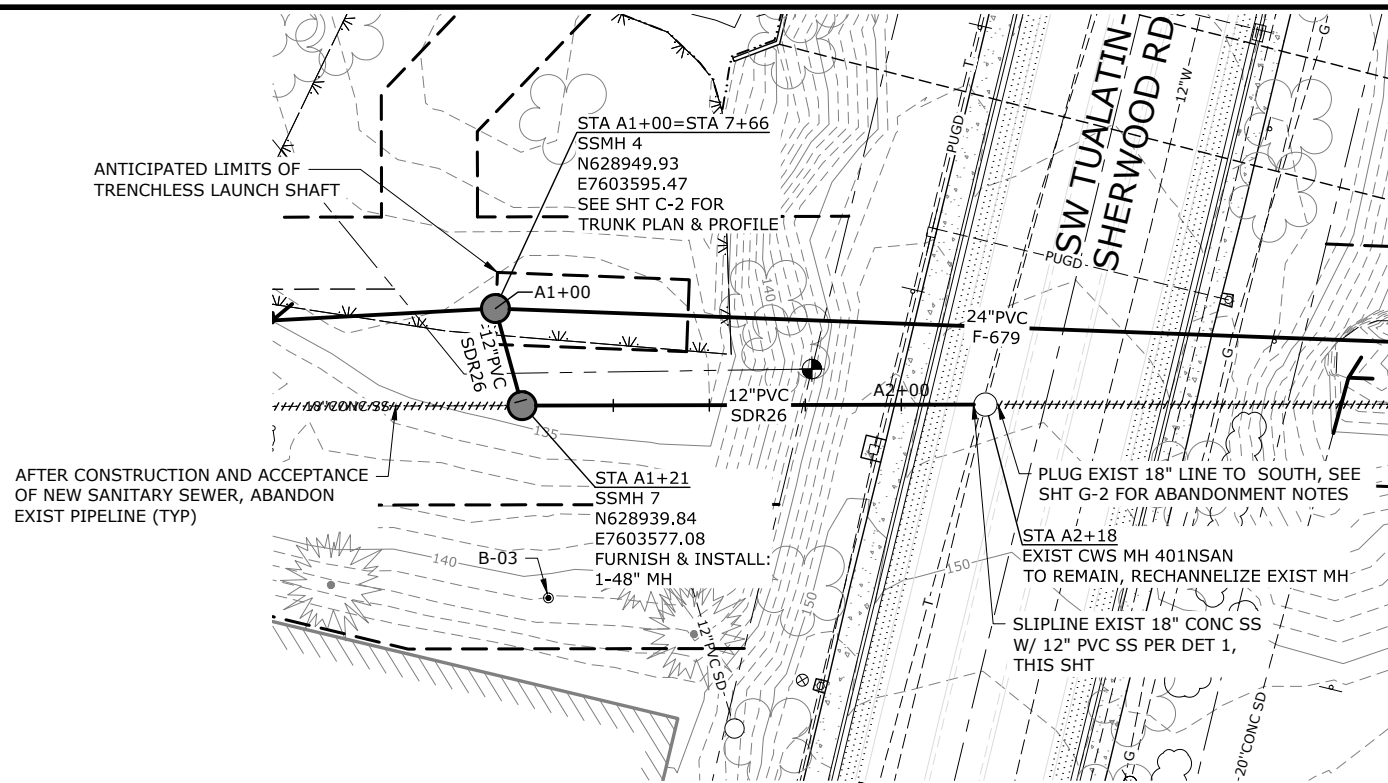
**CITY OF SHERWOOD**  
**ROCK CREEK**  
**SANITARY TRUNK LINE**  
**UPSIZING PROJECT -**  
**PHASE 1**

**SEWER PLAN AND PROFILE**  
**STA 10+00 TO STA 14+54**

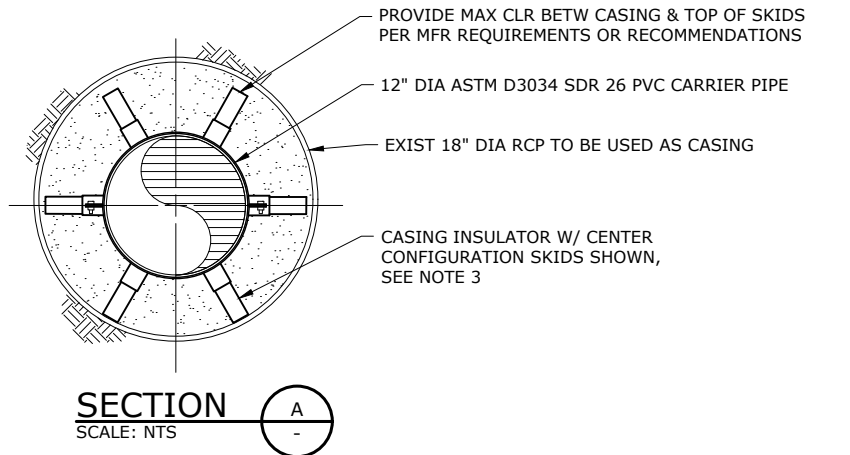
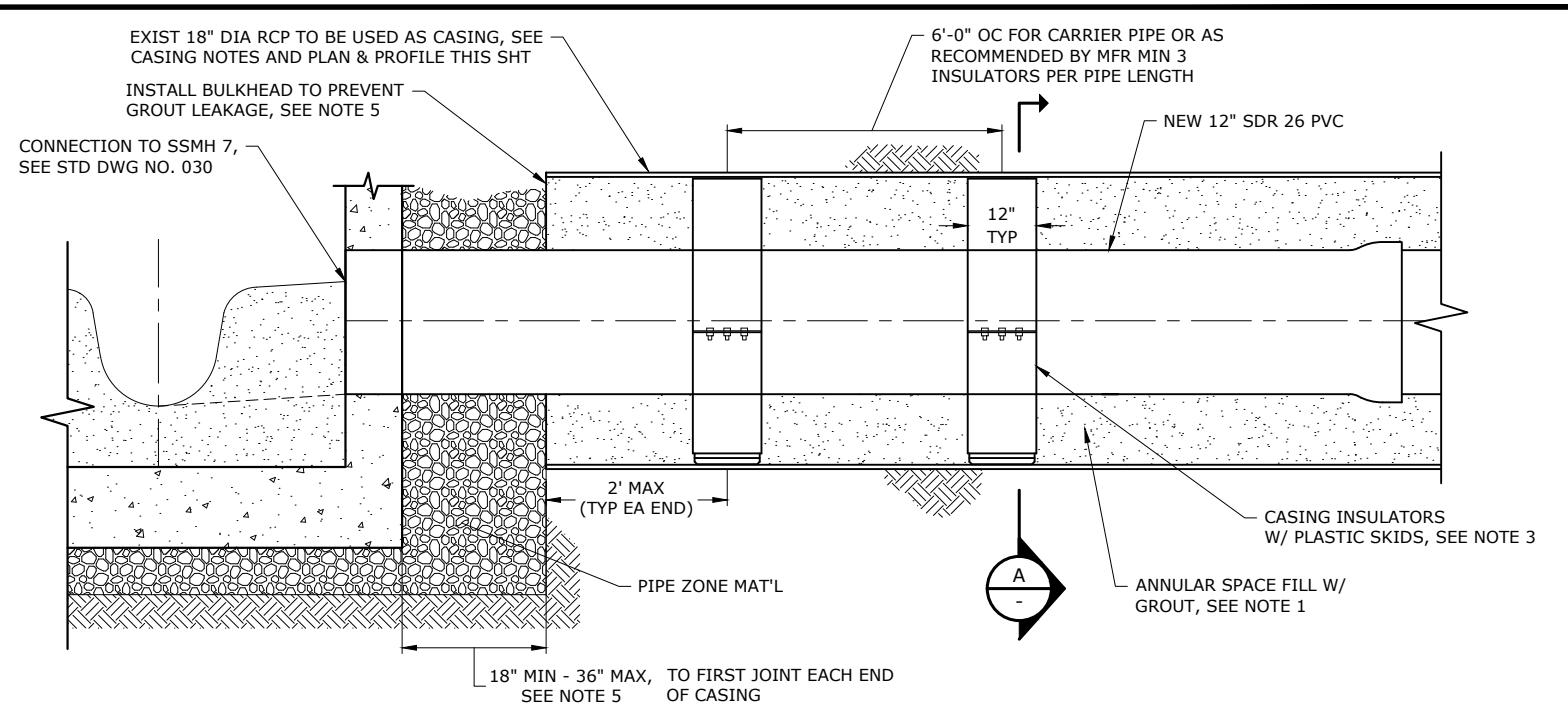
CASE FILE NO.: 19-2481.402 SCALE: AS SHOWN DATE: OCTOBER 2020

SHEET  
**C-5**  
 19 of X

G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-C.dwg C-6 12/24/2019 9:59 AM TAYLOR.SPENCER 23:05 (LMS Tech)



**PROFILE 'A'**  
SCALE: 1"=20' HORIZ, 1"=5' VERT



**SECTION**  
SCALE: NTS

**SLIPLINE DETAIL**  
SCALE: NTS

- CASING NOTES:**
- ANNULAR SPACE BETWEEN 18" DIAMETER RCP AND 12" DIAMETER PVC CARRIER PIPE TO BE FILLED WITH GROUT PER SPECIFICATIONS. GROUT TO BE FINISHED FLUSH WITH EXISTING MANHOLE WALL AT CONNECTION TO CWS MANHOLE 401 NSAN TO PROVIDE A WATERTIGHT SEAL.
  - PROVIDE 2" MINIMUM CLEARANCE BETWEEN CASING AND CARRIER PIPE BELLS AND APPURTENANCES.
  - CONTRACTOR TO VERIFY CASING SIZES PRIOR TO SIZING AND ORDERING CASING INSULATORS. CUSTOM CASING INSULATORS WILL BE REQUIRED TO ACHIEVE SPECIFIED GRADE, SEE SPECIFICATIONS.
  - MANHOLE BENCH AND CHANNEL TO BE CONSTRUCTED FOR NEW SEWER INVERT ELEVATIONS, SEE DET X, SHT C-X <TO FOLLOW>.
  - INSTALL 3/4"-0 CRUSHED ROCK WITHIN PIPE ZONE BETWEEN BULKHEAD AND MANHOLE WALL.

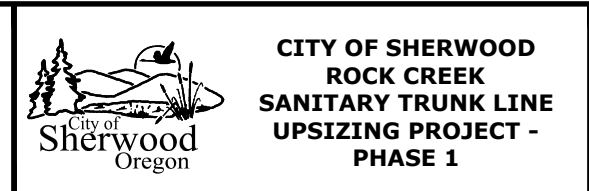
WASHINGTON COUNTY  
OREGON  
WASHINGTON COUNTY  
LAND USE & TRANSPORTATION  
OPERATIONS AND MAINTENANCE  
REVIEWED BY Brett H.

**PERMIT SET**

NO.	DATE	BY	REVISION

NOTICE  
0 1/2 1  
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION  
JANUARY 2020  
Murraysmith  
www.murraysmith.us



**CITY OF SHERWOOD  
ROCK CREEK  
SANITARY TRUNK LINE  
UPSIZING PROJECT -  
PHASE 1**

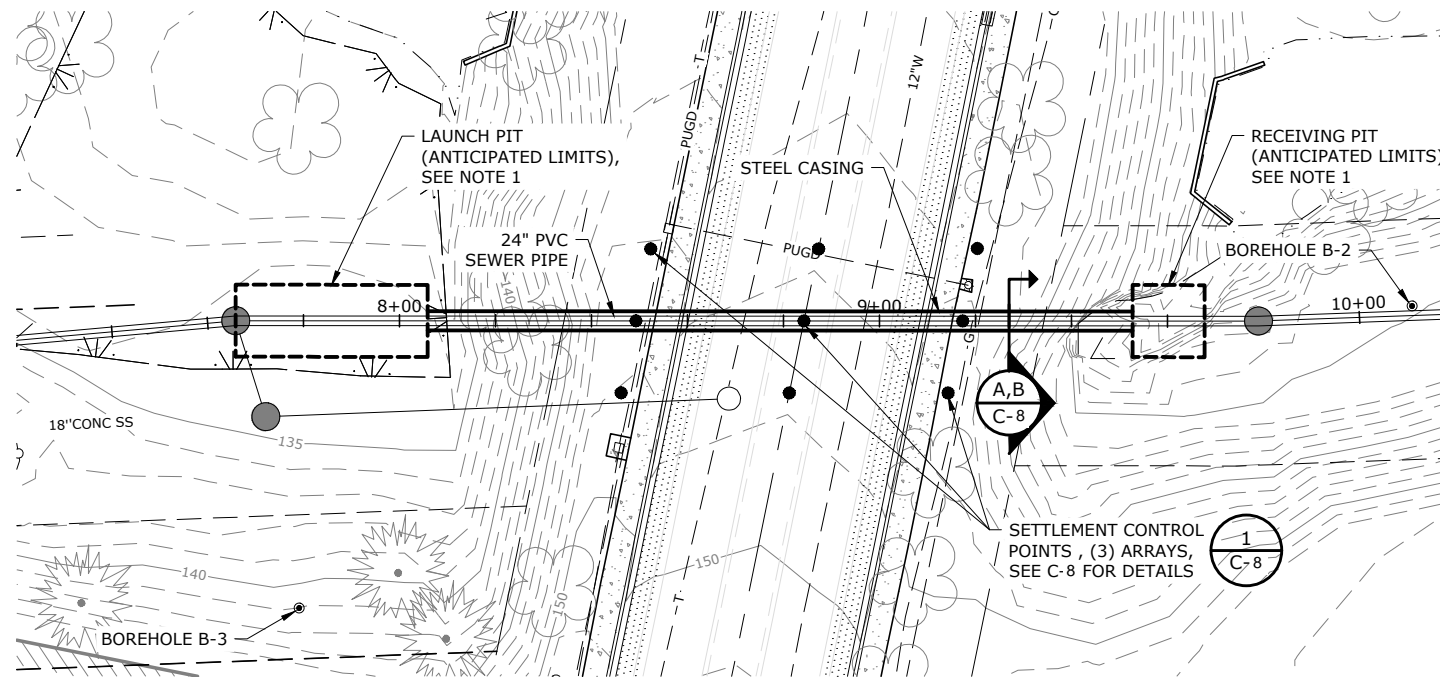
**SEWER PLAN AND PROFILE  
STA A1+00 TO STA A2+18  
AND SLIPLINE DETAIL**

CASE FILE NO.: 19-2481.402 SCALE: AS SHOWN DATE: OCTOBER 2020

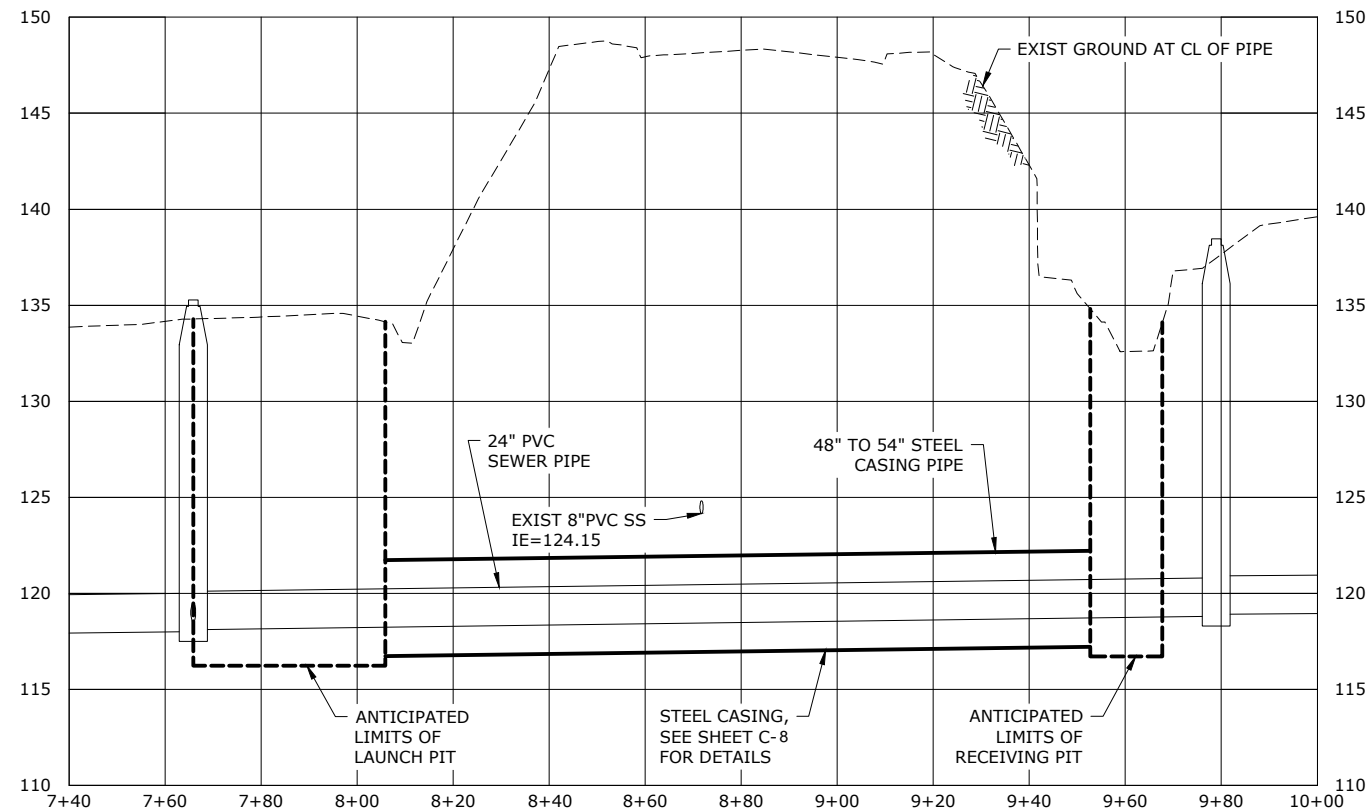
SHEET  
C-6  
20 of X



C:\Users\Lita\Box\Jobs\5993.0 Rock Creek Sanitary Trunk Line Upsizing Project - Phase 1\CADD\19-2481-OR-C7\_McMJAC.dwg C-7 11/26/2019 3:23 PM LITA 23.1s (LMS Tech)



**CROSSING PLAN STA 7+40 TO 10+00**  
SCALE: 1"=20'



**CROSSING PROFILE STA 7+40 TO 10+00**  
SCALE: 1"=20' HORIZ, 1"=5' VERT

**NOTES:**

- CONTRACTOR TO DETERMINE SIZE AND CONFIGURATION OF LAUNCH AND RECEIVING PITS BASED ON SELECTED MEANS AND METHODS FOR CONSTRUCTION.



WASHINGTON COUNTY  
LAND USE & TRANSPORTATION  
OPERATIONS AND MAINTENANCE  
REVIEWED BY Brett H.



NO.	DATE	BY	REVISION

**NOTICE**  
0 1/2 1  
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED  
CAD  
DRAWN  
CHECKED

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION  
JANUARY 2020  
Murraysmith  
www.murraysmith.us



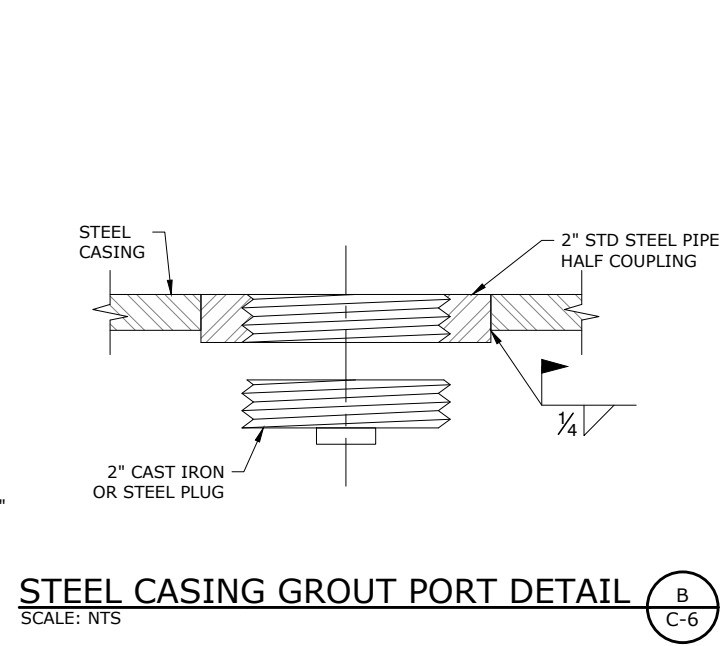
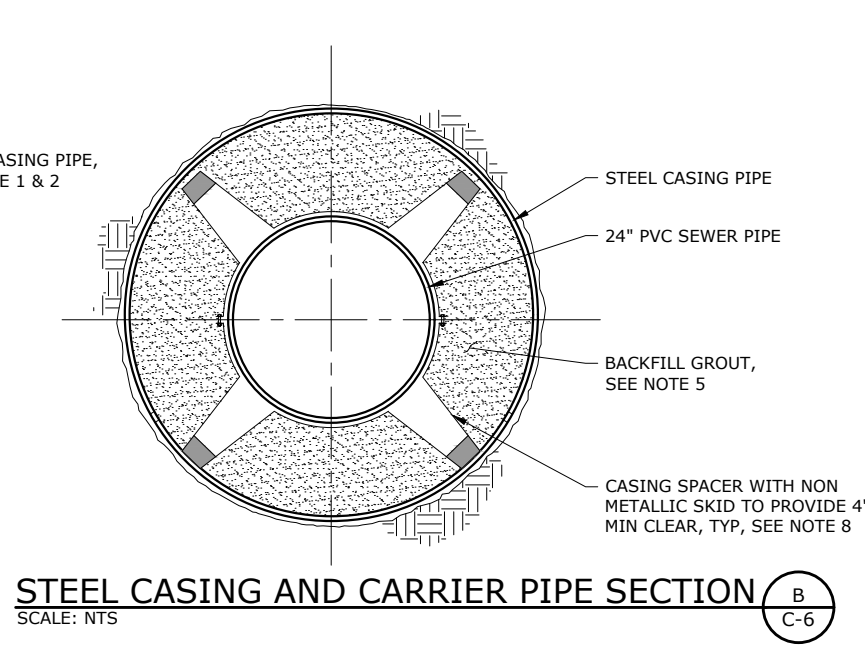
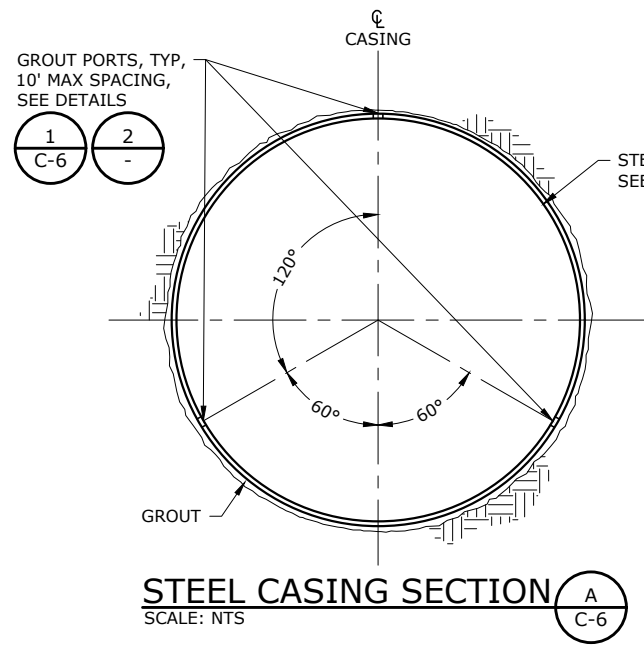
**CITY OF SHERWOOD  
ROCK CREEK  
SANITARY TRUNK LINE  
UPSIZING PROJECT -  
PHASE 1**

**SW TUALATIN-SHERWOOD RD  
TRENCHLESS CROSSING  
PLAN AND PROFILE**

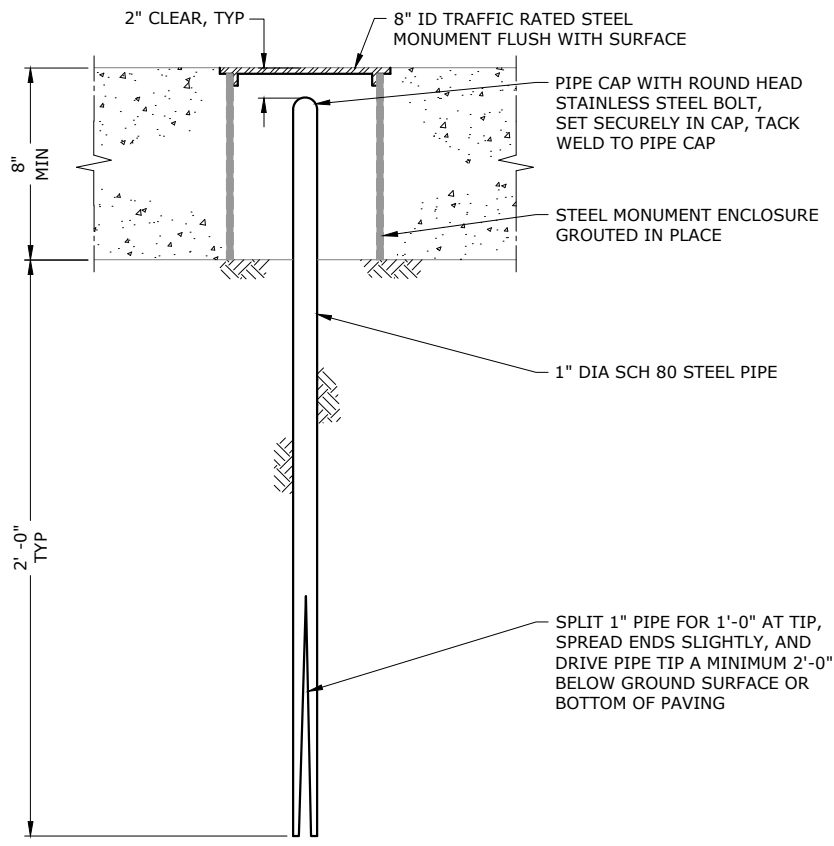
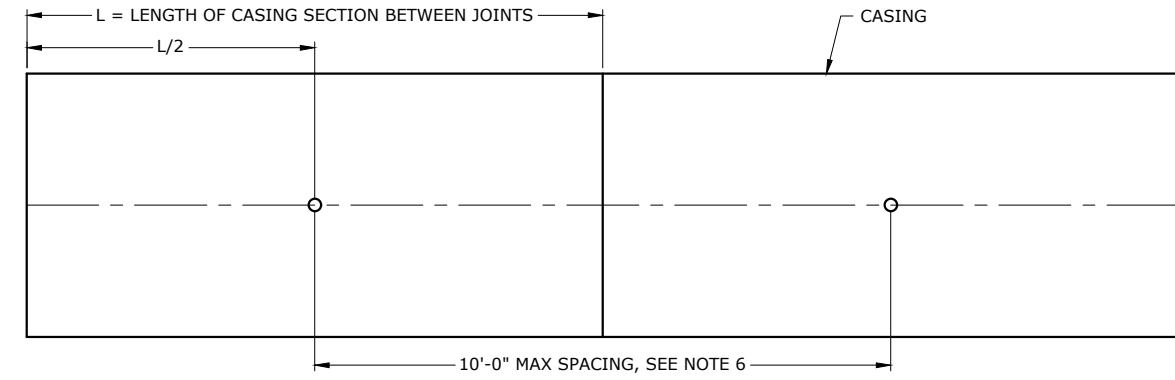
PROJECT NO.: 19-2481.402 SCALE: AS SHOWN DATE: OCTOBER 2020

SHEET  
C-7  
21 of X

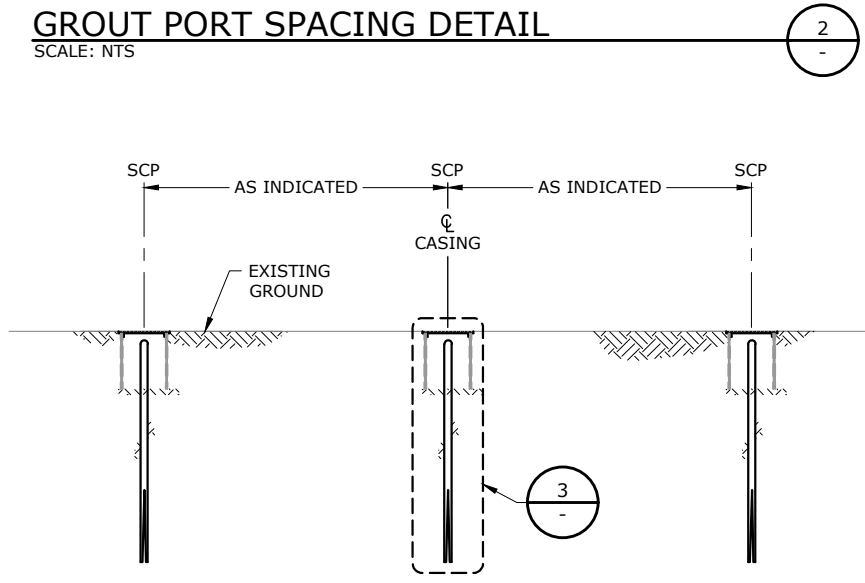
C:\Users\Lita\Box\Jobs\5993.0 Rock Creek Sanitary Trunk Line Upsizing Project - Phase 1\CADD\19-2481-OR-C8\_McMJAC.dwg C-8 11/26/2019 3:26 PM LITA 23:1s (LMS Tech)



- STEEL CASING AND GROUT PORT NOTES:**
1. STEEL CASING SHALL HAVE A MINIMUM WALL THICKNESS OF 0.5". MINIMUM CASING PIPE THICKNESS HAS BEEN SIZED FOR ANTICIPATED EARTH PRESSURES AND LIVE LOADS. CONTRACTOR IS RESPONSIBLE FOR INCREASING THE THICKNESS FOR INSTALLATION LOADS AS NECESSARY BASED ON THE CONTRACTOR'S SELECTED MEANS AND METHODS.
  2. THE DIAMETER OF STEEL CASING SHALL BE DETERMINED BY CONTRACTOR IN ORDER TO ALLOW FOR PERSONNEL ACCESS TO BREAK UP AND REMOVE BOULDERS.
  3. SEE SPECIAL SPECIFICATION S-61 FOR STEEL CASING PIPE REQUIREMENTS.
  4. SEE SPECIAL SPECIFICATION S-61 FOR TRENCHLESS INSTALLATION REQUIREMENTS.
  5. MINIMUM ANNULAR CLEARANCE BETWEEN CASING AND SEWER PIPE SHALL BE 4".
  6. PROVIDE ONE SET OF 3 GROUT PORTS PER CASING SECTION OR 10' ON CENTER WHICHEVER RESULTS IN A CLOSER SPACING.
  7. GROUT ANNULAR SPACE OUTSIDE CASING PER REQUIREMENTS IN SPECIAL SPECIFICATION S-61.
  8. CASING SPACERS SHALL BE ADJUSTABLE TO ALLOW SEWER PIPE TO BE INSTALLED AT THE REQUIRED LINE AND GRADE WHILE MAINTAINING MINIMUM BACKFILL REQUIREMENTS.



WASHINGTON COUNTY  
LAND USE & TRANSPORTATION  
OPERATIONS AND MAINTENANCE  
REVIEWED BY Brett H.



- SETTLEMENT CONTROL POINT NOTES:**
1. INSTRUMENTATION INSTALLATION METHODS, EQUIPMENT, MATERIALS, TIMING, TOLERANCES AND INSTRUMENTATION MONITORING, AND THE REPORTING RESULTS SHALL COMPLY WITH THE REQUIREMENTS OF SPECIAL SPECIFICATION S-61.
  2. MONITORING OF THE SETTLEMENT CONTROL POINTS SHALL BE CONTINUED AT LEAST 2 WEEKS AFTER THE CASING INSTALLATION. THEN THE SETTLEMENT CONTROL POINTS SHALL BE REMOVED AND BACKFILLED TO RESTORE THE ORIGINAL SURFACE CONDITION.
  3. ADJUST INSTRUMENT AND MONITORING LOCATIONS AS APPROVED OR DIRECTED BY THE OWNER'S REPRESENTATIVE TO AVOID EXISTING UTILITIES AND MINIMIZE CONFLICTS WITH CONSTRUCTION OPERATIONS.
  4. PRIOR TO CONSTRUCTION, OBTAIN PERMITS AND COMPLY WITH REQUIREMENTS OF THE AGENCIES, OWNERS, UTILITIES, AND OTHER ENTITIES WITH JURISDICTION OVER ACCESS AND INSTALLATION OF THE INSTRUMENTATION.

**McMILLEN JACOBS ASSOCIATES**  
**PERMIT SET**

NO.	DATE	BY	REVISION

**NOTICE**  
0 1/2 1  
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION  
JANUARY 2020  
**Murraysmith**  
www.murraysmith.us

**murraysmith**

**CITY OF SHERWOOD**  
**ROCK CREEK**  
**SANITARY TRUNK LINE**  
**UPSIZING PROJECT -**  
**PHASE 1**

**TRENCHLESS & SETTLEMENT**  
**INSTRUMENTATION**  
**SECTIONS & DETAILS**

PROJECT NO.: 19-2481.402 SCALE: NOT TO SCALE DATE: OCTOBER 2020

SHEET  
C-8  
22 of X

G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-C DETS.dwg C-10 12/6/2019 11:00 AM TAYLOR.SPENCER 23.0s (LMS Tech)

STORMWATER OUTFALL  
PLAN, SEE DET 1, SHT C-11

CLASS 200 RIPRAP

SEE SHTS C-4 AND C-5 FOR  
SEWER PLAN AND PROFILE

 WASHINGTON COUNTY  
LAND USE & TRANSPORTATION  
OPERATIONS AND MAINTENANCE  
REVIEWED BY Brett H.

PLAN  
SCALE: 1"=10'

NOTES:  
1. INSTALL JUTE MATTING ON DISTURBED SLOPES  
GREATER THAN 2H:1V.

**PERMIT SET**

NO.	DATE	BY	REVISION

NOTICE  
0 1/2 1  
IF THIS BAR DOES  
NOT MEASURE 1"  
THEN DRAWING IS  
NOT TO SCALE

JJU  
DESIGNED  
CAD  
DRAWN  
BVO  
CHECKED

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION  
JANUARY 2020  
**Murraysmith**  
www.murraysmith.us

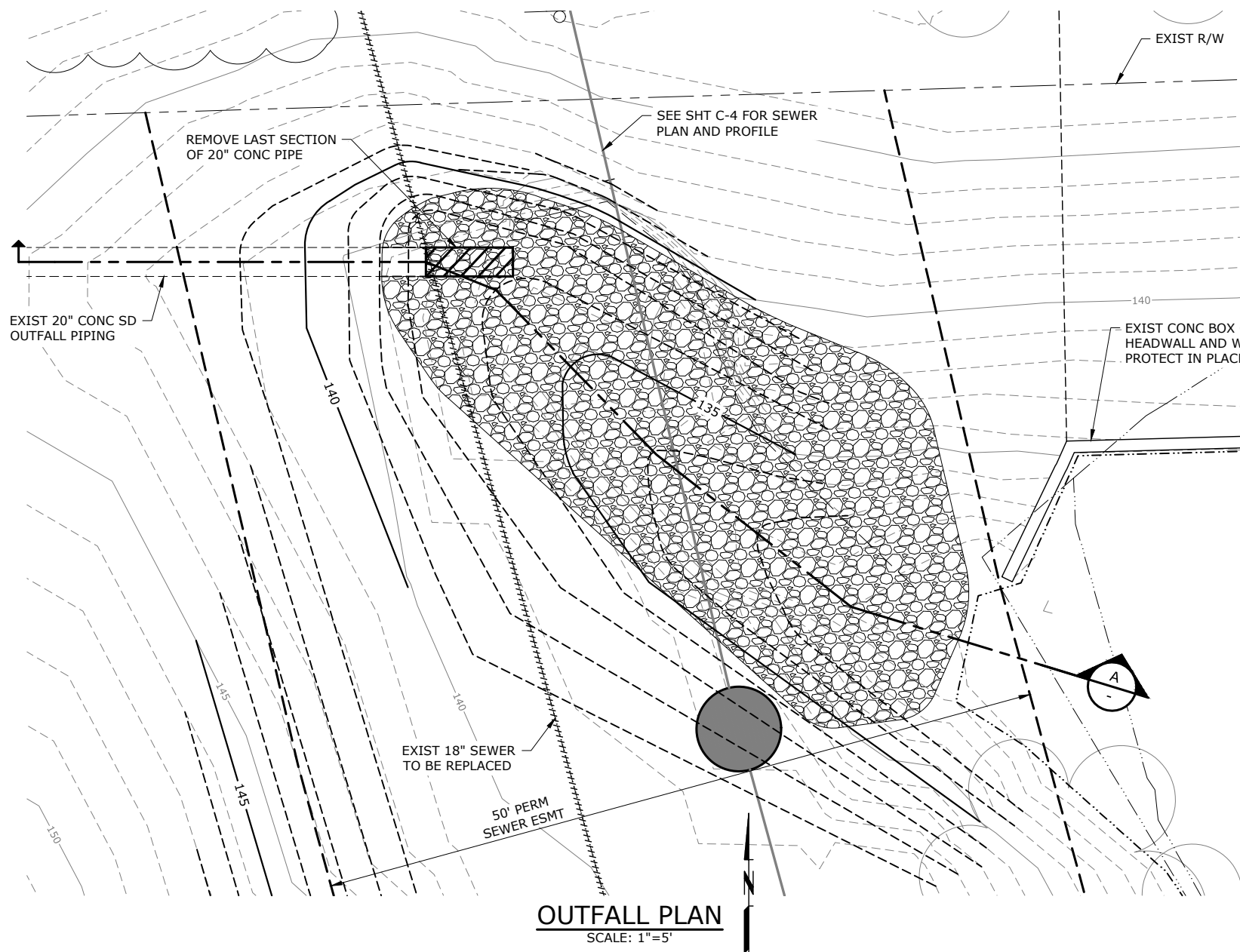


**CITY OF SHERWOOD  
ROCK CREEK  
SANITARY TRUNK LINE  
UPSIZING PROJECT -  
PHASE 1**

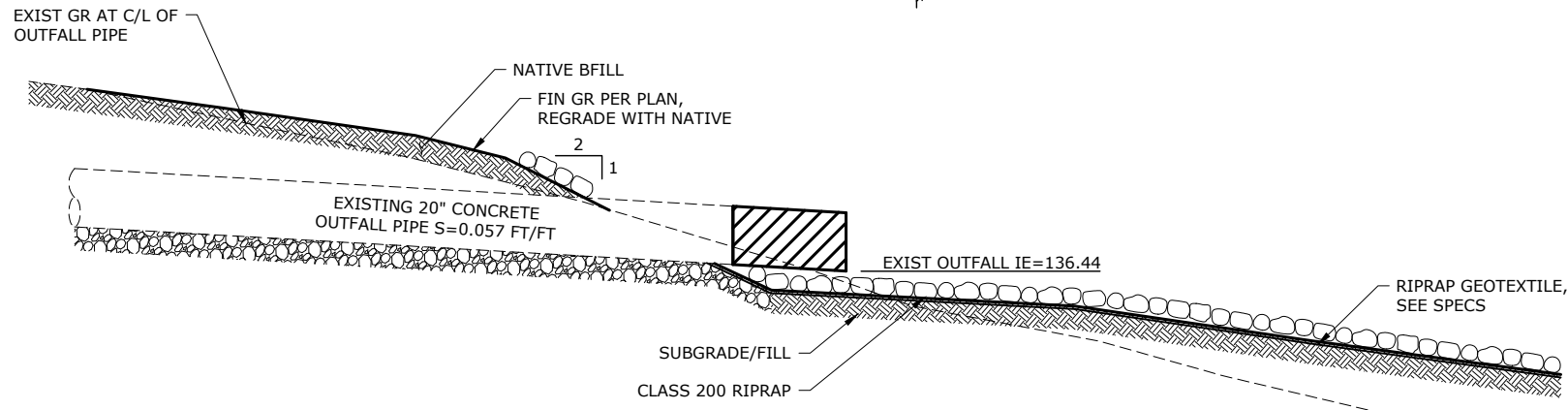
**SITE GRADING PLAN**  
CASE FILE NO.: 19-2481.402 SCALE: AS SHOWN DATE: OCTOBER 2020

SHEET  
C-10  
24 of X

G:\PDX\_Projects\19\2481 - Rock Creek Trunk Upsizing Phase 1\CAD\Sheets\19-2481-OR-C DETS.dwg C-11 12/6/2019 11:00 AM TAYLOR.SPENCER 23.0s (LMS Tech)

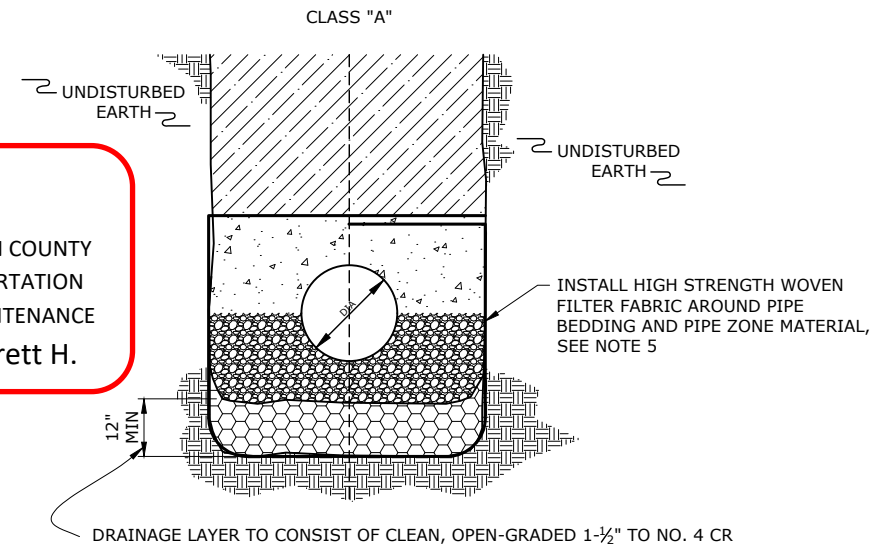


**OUTFALL PLAN**  
SCALE: 1"=5'



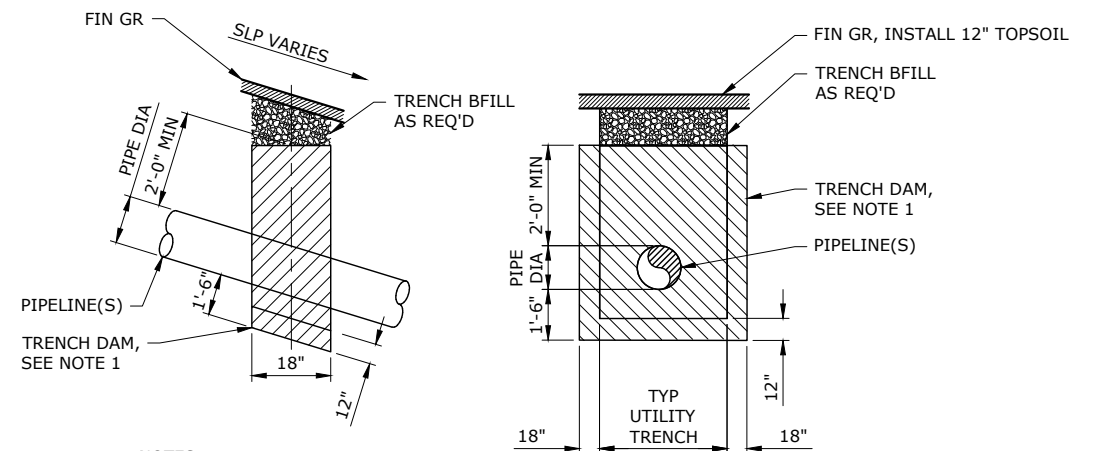
**OUTFALL SECTION**  
SCALE: NTS

WASHINGTON COUNTY  
OREGON  
**WASHINGTON COUNTY  
LAND USE & TRANSPORTATION  
OPERATIONS AND MAINTENANCE  
REVIEWED BY Brett H.**



1. BEDDING AND PIPE ZONE MATERIAL SHALL BE COMPACTED TO 90% OF THE MODIFIED PROCTOR DRY DENSITY VALUE (ASTM D1557). COMPACTION OF BEDDING MATERIAL SHALL BE ACCOMPLISHED WITHOUT VIBRATORY COMPACTION METHODS.
2. THE TRENCH WIDTH AT THE SURFACE OF THE GROUND SHALL BE KEPT TO A MINIMUM NECESSARY TO INSTALL THE PIPE IN A SAFE MANNER.
3. THE MINIMUM TRENCH WIDTH IN THE PIPE ZONE SHALL PROVIDE A CLEAR WORKING SPACE OF SIX INCHES OUTSIDE THE MAXIMUM OUTSIDE DIAMETER OF THE PIPE BEING INSTALLED.
4. IN ALL CASES, TRENCHES SHALL BE OF SUFFICIENT WIDTH TO ALLOW FOR SHORING, PROPER JOINING OF PIPE, AND BACKFILLING OF MATERIAL ALONG THE SIDES OF THE PIPE.
5. HIGH STRENGTH WOVEN FILTER FABRIC SHALL BE MIRAFT RS5280I OR APPROVED EQUAL.

**TRENCH WITH SUBGRADE STABILIZATION**  
SCALE: NTS



- NOTES:**
1. CONSTRUCT TRENCH DAMS WITH BENTONITE, DO NOT USE TOPSOIL FOR FILLING BENTONITE.
  2. TRENCH DAMS SHALL BE INSTALLED IN PIPELINE TRENCH ON SLOPED GRADES. APPROX LOCATION OF TRENCH DAMS ARE SHOWN ON PLAN SHEETS. COORDINATE EXACT LOCATION W/ FIELD ENGINEER.

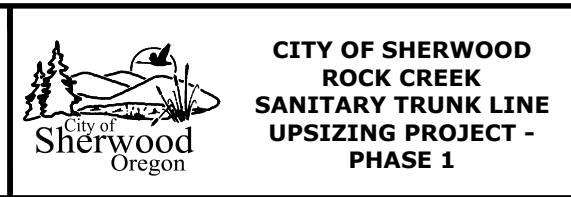
**TYPICAL TRENCH DAM**  
SCALE: NTS

**PERMIT SET**

NO.	DATE	BY	REVISION

NOTICE	JJU
0 1/2 1	DESIGNED
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE	CAD
	DRAWN
	BVO
	CHECKED

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION  
JANUARY 2020  
**Murraysmith**  
www.murraysmith.us



CASE FILE NO.: 19-2481.402	SCALE: AS SHOWN	DATE: OCTOBER 2020
----------------------------	-----------------	--------------------

SHEET  
**CIVIL DETAILS - 1**  
C-11  
25 of X



# Commercial Activities Special Use Permit Application

*Larry Klimek 9/21/20*  
**For Official Use Only:**

Refuge Name: Tualatin River National Wildlife Refuge  
Address: 19255 SW Pacific Highway, Sherwood OR 97140  
Attn: (Refuge Official) Larry Klimek  
E-Mail: larry\_klimek@fws.gov  
Phone #: (503) 625-5944

Approved Permit #: TRNWR\_2020\_005  
Station #: FF01RTL00  
Permit Term: from 9/21/20 to 11/30/20

**Note: We do not require all information for each use. See instructions at the end of the notice and contact the refuge to determine applicability of a particular item.**

- 1a) Identify the type of Permit you are applying for: New   Renewal  Modification  Other
- 1b) Have you applied, or do you intend to apply, to any other refuges for this same activity?  Yes  No
- 1c) If yes, which refuges?

## Applicant Information

2) Full Name: Robert Galati 3) Title: City Engineer

4) Business Name: City of Sherwood

5) Physical Address: 22560 SW PINE STREET  
City/State/Zip: SHERWOOD, OR 97140

6) Mailing Address: (if different than above)   
City/State/Zip:

7) Business Phone #: (503) 925-2303 8) Business Fax #:

9) E-mail: GALATIB@SHERWOODOREGON.GOV 10) Business Tax ID #:

11a) Within the past 5 years, has the company (entity), its owners, or any employees who have or will be expected to operate on the refuge, been convicted, pled nolo contendere, forfeited collateral, or are currently under charges for any violations of any State, Federal, or local law, or regulations related to fish and wildlife or permit activities?  Yes  No

11b) If you answered "YES" to question #11a, provide the individual's name, date of charge, charge(s), location of incident, court, and action taken for each violation.

12) List **known** assistants/subcontractors/subpermittees: (Only required if the assistants/subcontractors/subpermittees will be operating on the refuge without the permittee being present. If unknown at time of application we may require this under "special conditions" to permit before approval.)

Name/Business	Address	Phone #
Brendan O'Sullivan / Murraysmith	888 SW 5th Avenue, Suite 1170, Portland, OR 97204	(503) 225-9010
Stuart Myers / MB&G	707 SW Washington Street Suite 1300, Portland Oregon 97205	(503) 224-3445
Cathy Bialas / HRA	1825 SE 7th Avenue, Portland Oregon 97214	(503) 247-1319

**Activity Information:**

13a) Choose a Commercial Activity: **Guided Recreation**  Audio/Visual Recording  Recreation Events  Cabins   
 Transportation Services  Agricultural Use  Marine Salvage/Storage  Mineral Lease  Other

13b) Specify Type of Activity if 'Other' was chosen: Utility (sewer) upsizing - temporary construction access

**Note:** Depending on the activity for which you are requesting a permit, we may ask you for the following activity information. Please contact the refuge where the activity is being conducted to determine what information is required.

14) Describe activity by specifically identifying timing (occupancy timeline), frequency, and how the activity is expected to proceed:

This permit is to provide temporary construction access to City of Sherwood and it's contractors for the purpose of constructing a new sewer line and abandoning an existing sewer line in accordance with the Rock Creek Sanitary Trunk Line Upsizing Project - Phase I contract documents.

This project will occur from June 1st to November 30th, 2020. All work within the extents of the Rock Creek OHWM must be completed without the use of mechanical means and occur within the in-water work window (July 15th to September 30th). Hours of construction will be from 7:00 a.m. to 7:00 p.m., Monday through Friday, excluding holidays. All timeline, cleanup, and other major events are outlined in the contract documents.

15) Specifically identify location(s) and/or attach a map: (GPS location(s) preferred)

Southwest corner of Tax Lot 2S19A000100. Area of impact is approximately 105 SF or 0.002 acres. See Sheet C-1 and C-3 of Rock Creek Upsizing Project Drawing set (attached) for specific location, and area of impact.

16) If drones are necessary, describe why the drone is needed and provide specifics on how it will be used:

Drones are not required.

17) For Guided Operations estimate number of clients if applicable: Per Day  Per Season

18) Inquire with refuge if Plan of Operation is required. Is a Plan of Operation attached? Yes  No  N/A

19) Inquire with refuge if a trip schedule is required. Is a trip schedule attached? Yes  No  N/A

**License/Insurance Coverage/Certification/Permit**

**Note: Contact the refuge where the activity is going to be conducted to determine if we will require any type of license(s), insurance(s), certification(s), or permit(s). We may process this Special Use Permit while the applicant obtains them.**

20) List and attach a copy of any **licenses** you have for equipment operation (i.e., aviation or commercial boats), pesticide application(s), transporters, or others, if required:

License Type	Number	Expiration Date
Licenses to be Identified. (All required licenses to be provided by City or Contractor, as applicable.)		

21) List and attach any **insurance coverage(s)** you have such as general liability, aviation, grounding liability, contaminants applicator, medical evacuation, or others, if required:

Insurance Type	Carrier	Expiration Date
Insurance to be provided. (All required insurance to be provided by City or Contractor, as applicable.)		

22) List and attach any **certifications** you have such as rat free, hull inspections, CPR/First Aid, or others, if required:

Certificate Type	Expiration Date
Certifications to be provided. (All required certifications to be provided by City or Contractor, as applicable.)	

23) List and attach other Federal, State, or Tribal **permits**, if required:

Permit Type	Permit Number	Expiration Date
Washington County Utility Right of Way Permit	TBD, will provide once received.	
DEQ 1200-CN Erosion Control Permit	TBD, will provide once received.	
DSL/CORP Removal/Fill Permit	62459-RF	June 2022
Clean Water Services Service Provider Letter	20-000667	April 2022
Oregon DEQ Nationwide 401 Water Quality Certification	2013-128-1	June 2022

## Logistics and Transportation

**Note: We do not require all information for each use. See instructions at the end of the notice and contact the refuge to determine applicability of a particular item.**

24a) Does the activity require personnel to stay overnight on the refuge? Yes  No  N/A

24b) If yes, list names of personnel involved:

List Names	List Names	List Names	List Names

25) Identify and describe all major equipment/gear and materials needed for activity, if required:

Full-sized excavator required for trench excavation, existing sewerline removal and abandonment, and new sewerline install.

26a) Provide detailed information on the logistics for onsite, intersite, and/or ship-to-shore transportation to or on the refuge, if required:

Delivery and staging of pipe, manholes and other appurtenances, as well as staging of imported and native fill will be accomplished outside of Refuge Property.

26b) Provide descriptions, license plate and/or identification numbers of vehicles used for onsite transportation, if required:

Vehicle Type	Plate/I.D./Registration #	Vehicle Type	Plate/I.D./Registration #
<small>Vehicles to be identified</small>			

26c) Provide descriptions, license plate and/or identification numbers of vehicles used for intersite transportation, if required:

Vehicle Type	Plate/I.D./Registration #	Vehicle Type	Plate/I.D./Registration #
<small>Vehicles to be identified</small>			

26d) Provide descriptions, license plate and/or identification numbers of vehicles used for ship to shore transportation, if required:

Vehicle Type	Plate/I.D./Registration #	Vehicle Type	Plate/I.D./Registration #
<small>Vehicles to be identified</small>			



27a) Is fuel cache needed? Yes  No  N/A

27b) Specific location(s) of fuel caches: (GPS Coordinates preferred)

N/A

28) Is a Safety Plan attached?  
Yes  No  N/A

### Work and Living Accommodations

29) Specifically describe onsite work and/or living accommodations, including spike camps:

Onsite work will occur during the hours and days listed above. There are no living accommodations available.

30) Specifically describe on or offsite hazardous material storage or other on or offsite material storage space: (Including on and offsite fuel caches.)

1) The permittee will submit an Emergency Spill Response Plan and a Pollution Control Plan that will identify specific hazard containment measures for equipment to be used within 150 feet of Water Quality Sensitive Areas. 2) All refueling must be done in a designated and confined area with spill containment measures nearby. 3) All handling of hazardous material shall be performed off of Refuge lands. 4) Conditions specified in the Rock Creek Sanitary Trunk Line Upsizing Project - Phase I contract documents.

**Sign, date, and print this form and return it to the refuge for processing. By signing this application, I agree my operations will conform to the information I have provided in this application, and I understand that any deviations or changes to this information must receive prior written approval.**

31) Signature of Applicant: Bob Galati Digitally signed by Bob Galati  
DN: cn=Bob Galati, o=City of Sherwood,  
ou=Engineering,  
email=galati.b@sherwoodoregon.gov, c=US  
Date: 2020.07.14 15:10:24 -0700 Date of Application: 9/17/2020

## NOTICES

No Members of Congress or Resident Commissioner shall participate in any part of this contract or to any benefit that may arise from it, but this provision shall not pertain to this contract if made with a corporation for its general benefit.

The Permittee agrees to be bound by the equal opportunity "nondiscrimination in employment" clause of Executive Order 11246.

## PRIVACY ACT STATEMENT

**Authority:** The information requested is authorized by the National Wildlife Refuge System Administration Act (16 U.S.C. 668dd-ee) and the Refuge Recreation Act (16 U.S.C. 460k-460k-4).

**Purpose:** To collect the applicant's information to process permits allowing for commercial activities such as: guiding hunters, anglers or other outdoor users; commercial filming; agriculture; rental of cabins and trapping while on the National Wildlife Refuge System.

**Routine Uses:** The information will be used by the refuge's administrative office for processing Commercial Activity Special Use permits. More information about the routine uses may be found in the Systems of Records Notice, FWS-5 National Wildlife Refuge Special Use Permits.

**Disclosure:** Providing the information is voluntary. However, submission of information is required to process and approve commercial activity usage on the National Wildlife Refuge System.

## PAPERWORK REDUCTION ACT STATEMENT

We are collecting this information subject to the Paperwork Reduction Act (44 U.S.C. 3501) to evaluate the qualifications, determine eligibility, and document permit applicants and to respond to requests made under the Freedom of Information Act and the Privacy Act of 1974. The information that you provide is required to obtain or retain a benefit; however, failure to provide all required information is sufficient cause for the U.S. Fish and Wildlife Service to deny a permit. False, fictitious, or fraudulent statements or representations made in the application may be grounds for revocation of the Special Use Permit and may be punishable by fine or imprisonment (18 U.S.C. 1001). According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. OMB has approved this information collection and assigned control number 1018-0102.

## ESTIMATED BURDEN STATEMENT

The public reporting burden for this information collection varies based on the requested specific refuge use. We estimate the relevant public reporting burden for the Commercial Activity Special Use Permit Application form to average 4 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Service Information Collection Clearance Officer, Division of Policy, Performance, and Management Programs, Fish and Wildlife Service, Mail Stop BPHC, 5275 Leesburg Pike, Falls Church, VA 22041-3803. Please do not send your completed form to this address.

## GENERAL CONDITIONS AND REQUIREMENTS

1) **Responsibility of Permittee:** The permittee, by operating on the premises, shall be considered to have accepted these premises with all facilities, fixtures, or improvements in their existing condition as of the date of this permit. At the end of the period specified or upon earlier termination, the permittee shall give up the premises in as good order and condition as when received except for reasonable wear, tear, or damage occurring without fault or negligence. The permittee will fully repay the Service for any and all damage directly or indirectly resulting from negligence or failure on his/her part, and/or the part of anyone of his/her associates, to use reasonable care.

2) **Operating Rules and Laws:** The permittee shall keep the premises in a neat and orderly condition at all times, and shall comply with all municipal, county, and State laws applicable to the operations under the permit as well as all Federal laws, rules, and regulations governing national wildlife refuges and the area described in this permit. The permittee shall comply with all instructions applicable to this permit issued by the refuge official in charge. The permittee shall take all reasonable precautions to prevent the escape of fires and to suppress fires and shall render all reasonable assistance in the suppression of refuge fires.

3) **Use Limitations:** The permittee's use of the described premises is limited to the purposes herein specified and does not, unless provided for in this permit, allow him/her to restrict other authorized entry onto his/her area; and allows the U.S. Fish and Wildlife Service to carry on whatever activities are necessary for: (1) protection and maintenance of the premises and adjacent lands administered by the U.S. Fish and Wildlife Service; and (2) the management of wildlife and fish using the premises and other U.S. Fish and Wildlife Service lands.

4) Transfer of Privileges: This permit is not transferable, and no privileges herein mentioned may be sublet or made available to any person or interest not mentioned in this permit. No interest hereunder may accrue through lien or be transferred to a third party without the approval of the Regional Director of the U.S. Fish and Wildlife Service and the permit shall not be used for speculative purposes.

5) Compliance: The U.S. Fish and Wildlife Service's failure to require strict compliance with any of this permit's terms, conditions, and requirements shall not constitute a waiver or be considered as a giving up of the U.S. Fish and Wildlife Service's right to thereafter enforce any of the permit's terms or conditions.

6) Conditions of Permit not Fulfilled: If the permittee fails to fulfill any of the conditions and requirements set forth herein, the U.S. Fish and Wildlife Service shall retain all money paid under this permit to be used to satisfy as much of the permittee's obligation as possible.

7) Payments: All payment shall be made on or before the due date to the local representative of the U.S. Fish and Wildlife Service by a postal money order or check made payable to the U.S. Fish and Wildlife Service.

8) Termination Policy: At the termination of this permit the permittee shall immediately give up possession to the U.S. Fish and Wildlife Service representative, reserving, however, the rights specified in paragraph 11 below. If he/she fails to do so, he/she will pay the U.S. Fish and Wildlife Service, as liquidated damages, an amount double the rate specified in this permit for the entire time possession is withheld. Upon yielding possession, the permittee will still be allowed to reenter as needed to remove his/her property as stated in paragraph 11 below. The acceptance of any fee for the liquidated damages or any other act of administration relating to the continued tenancy is not to be considered as an affirmation of the permittee's action nor shall it operate as a waiver of the U.S. Fish and Wildlife Service's right to terminate or cancel the permit for the breach of any specified condition or requirement.

9) Revocation Policy: The Regional Director of the U.S. Fish and Wildlife Service may revoke this permit without notice for noncompliance with the terms hereof, or for violation of general and/or specific laws or regulations governing national wildlife refuges, or for nonuse. It is at all times subject to discretionary revocation by the Director of the Service. Upon such revocation the U.S. Fish and Wildlife Service, by and through any authorized representative, may take possession of said premises for its own and sole use, and/or may enter and possess the premises as the agent of the permittee and for his/her account.

10) Damages: The U.S. Fish and Wildlife Service shall not be responsible for: any loss or damage to property including but not limited to crops, animals, and machinery; injury to the permittee or his/her relatives or to the officers, agents, employees, or any other(s) who are on the premises from instructions; the sufferance from wildlife or employees or representatives of the U.S. Fish and Wildlife Service carrying out their official responsibilities. The permittee agrees to hold the U.S. Fish and Wildlife Service harmless from any and all claims for damages or losses that may arise to be incident to the flooding of the premises resulting from any associated government river and harbor, flood control, reclamation, or Tennessee Valley Authority activity.

11) Removal of Permittee's Property: Upon the expiration or termination of this permit, if all rental charges and/or damage claims due to the U.S. Fish and Wildlife Service have been paid, the permittee may, within a reasonable period as stated in the permit or as determined by the U.S. Fish and Wildlife Service official in charge, but not to exceed 60 days, remove all structures, machinery, and/or equipment, etc., from the premises for which he/she is responsible. Within this period the permittee also must remove any other of his/her property including his/her acknowledged share of products or crops grown, cut, harvested, stored, or stacked on the premises. Upon failure to remove any of the above items within the aforesaid period, they shall become the property of the U.S. Fish and Wildlife Service.

### INSTRUCTIONS FOR COMPLETING APPLICATION

You may complete the application portion verbally, in person, or electronically and submit to the refuge for review. Note: Please read instructions carefully as not all information is required for each activity. Contact the specific refuge headquarters office where the activity is going to be conducted to determine applicability of a particular item. We may add special conditions or permit stipulations to permit prior to approval.

1a-c) Identify if permit application is for new, renewal, or modification of an existing permit, whether or not you have or will be applying to another refuge for the same activity, and for which refuge(s). Permit renewals may not need all information requested. Contact the specific refuge headquarters office where the activity is going to be conducted to determine applicability of this requirement.

2-9) Provide applicant and/or business full name, organization or business name (if applicable), physical and mailing address, phone, fax, and e-mail.

10) Provide tax identification number of business or individual.

11a-11b) Check box answering the question regarding any violations of State, Federal, or local law, or regulations related to fish and wildlife or permit activities, if required. If **you answered yes to question 11a**, supply the detailed information requested in question 11b. Contact the specific refuge headquarters office where the activity is going to be conducted to determine if we require information on violations of State, Federal, or local law, or regulations related to fish and wildlife or permit activities.

12) Provide the names and addresses of known assistants, subcontractors, or subpermittees. We may require names and address if the assistants, subcontractors, or subpermittees will be operating on the refuge without the permittee being present. Volunteers, assistants, subcontractors, or subpermittees that are accompanied by the permittee need not be identified.

- 13) Activity type: identify commercial activity type (such as, guided recreation, audio/visual recording, recreational events, agriculture activities such as haying, grazing, crop planting, logging, beekeeping, and other agricultural products, building or occupying cabins, or other commercial uses). Describe other commercial uses if not one of the listed categories. Applicants in Alaska should contact the specific refuge headquarters office where the activity is going to be conducted if you have questions regarding commercial or subsistence activities.
- 14) Describe Activity: provide detailed information on the activity, including timing and occupancy timeline, frequency, how the activity is expected to proceed, etc. Permit renewals may not need activity descriptions if the activity is unchanged from previous permit. Most repetitive activities do not require an activity description for each visit. Contact the specific refuge headquarters office where the activity is going to be conducted to determine applicability of this requirement.
- 15) Location: identify specific location (GPS coordinates preferred) if not at a named facility, and/or attach a map with location. Most repetitive activities may not require identification of a location. In addition, permit renewals may not require a location if the activity is essentially unchanged from the previous permit. Contact the specific refuge headquarters office where the activity is going to be conducted to determine if a location is required.
- 16) If a drone will be used for this activity, describe in detail why the drone is necessary to complete the activity and provide specifics on how the drone will be used.
- 17) Estimate number of clients per day or per season.
- 18) Attach a Plan of Operation, if required. Most repetitive activities do not require a Plan of Operations for each visit. In addition, permit renewals may not require a Plan of Operations if the activity is essentially unchanged from the previous permit. Contact the specific refuge headquarters office listed where the activity is going to be conducted to determine if a Plan of Operations is required.
- 19) Attach trip schedule, if required. Most repetitive activities will require trip schedules for each visit. Contact the specific refuge headquarters office where the activity is going to be conducted to determine if trip schedules are required.
- 20) Specifically identify types and numbers of licenses and attach a copy, as required. Contact the specific refuge headquarters office where the activity is going to be conducted to determine the types of licenses required, and to coordinate the simultaneous application for multiple types of licenses. We may process this Special Use Permit while licenses are being sought, but we may or may not issue the Special Use Permit until appropriate licenses are obtained.
- 21) Specifically identify names, types, carriers of insurance, and attach copies if required. Contact the specific refuge headquarters office where the activity is going to be conducted to determine the types of insurance required, and to coordinate obtaining several types of insurance simultaneously with this permit. We may or may not issue this Special Use Permit while other types of insurance are being obtained.
- 22) Specifically identify types and numbers of other certifications and attach copies if required. Contact the specific refuge headquarters office where the activity is going to be conducted to determine the types of certifications required, and to coordinate the simultaneous application of multiple certifications. We may or may not issue this Special Use Permit while other certifications are being obtained.
- 23) Specifically identify types and numbers of other State, Federal or tribal permits and attach copies, if required. Contact the specific refuge headquarters office where the activity is going to be conducted to determine the types of permits required, and to coordinate the simultaneous application of multiple State, Federal or tribal permits. We may process this Special Use Permit while other State, Federal or tribal permits are being sought, but we may or may not issue the Special Use Permit until other appropriate State, Federal or tribal permits are obtained.
- 24a-24b) Provide name(s) of any personnel required to stay overnight, if applicable.
- 25) Identify all equipment and materials that will be used, if required. Most repetitive activities do not require a list of equipment. In addition, permit renewals may not require a list of equipment if the event is essentially unchanged from the previous permit. Contact the specific refuge headquarters office where the activity is going to be conducted to determine if a list of equipment is required.
- 26a-26d) Describe and provide vehicle descriptions and license plate or identification numbers of all vehicles, including boats and airplanes, if required. Motor vehicle descriptions are only required for permittee vehicle, and/or if the vehicle will be operated on the refuge without the permittee being present. Motor vehicles that are accompanied by the permittee as part of a group (convoy) activity need not be identified if cleared in advance by refuge supervisor. Specifically describe ship-to-shore, intersite (between islands, camps, or other sites) and onsite transportation mechanisms, and license plate or identification numbers, if required.
- 27a-27b) Identify specific location(s) of fuel cache(s) (GPS coordinates preferred), if required.
- 28a-28b) Attach safety plan if required. Contact the specific refuge headquarters office where the activity is going to be conducted to determine if we require a safety plan.
- 29) Specifically describe onsite work and/or living accommodations, if required. Include descriptions and locations (GPS coordinates preferred) of spike camps or other remote work and/or living accommodations that are not part of the base of operations. Contact the specific refuge headquarters office where the activity is going to be conducted to determine if we require descriptions of on-site work and/or living accommodations.

30) Specifically describe onsite or offsite hazardous material storage, or other material storage space (including on and offsite fuel caches), if required. Contact the specific refuge headquarters office where the activity is going to be conducted to determine if we require descriptions of hazardous material storage or other on-site material storage.

31) Print the application (if using the fillable version). Date and sign the application and return to refuge for processing. By signing this application, you agree your operations will conform to the information you have provided in this application, and understand that any deviations or changes to this information must receive prior written approval. The refuge official will review and, if approved, fill out a Special Use Permit, sign, and return a copy to you for signature and acceptance.

**SUPPLEMENTAL INSTRUCTIONS FOR USE OF FORM 3-1383-C FOR  
APPLICATIONS FOR COOPERATIVE AGRICULTURE OPPORTUNITIES ON THE NWRS**

14) Describe how your proposed activity, based on your background, knowledge and experience, meets the objective criteria by which the Service will evaluate your application as outlined in the Service's Notice of Cooperative Agricultural Opportunity (Notice). In addition, if applicable, please identify how your proposed activity is different from the description of the cooperative agricultural opportunity outlined in the Notice.

18) Does not need to be filled out at time of application. However, this section must be filled out, in coordination with the Service, after the opportunity is awarded and before applicant begins any cooperative agricultural on the NWRS.

Logistics and Transportation

24a-30) Do not need to be filled out at time of application. However, these sections must be filled out, in coordination with the Service, after the opportunity is awarded and before applicant begins any cooperative agricultural on the NWRS.

**THIS APPLICATION FORM IS NOT VALID AS A PERMIT  
BUT MAY BE USED AS A REFERENCE DOCUMENT ATTACHED TO THE OFFICIAL PERMIT.  
ONLY OFFICIAL REFUGE PERSONNEL MAY ASSIGN A VALID PERMIT NUMBER AND PERMIT TERM  
TO THIS APPLICATION FORM AFTER THE PERMIT HAS BEEN APPROVED.**

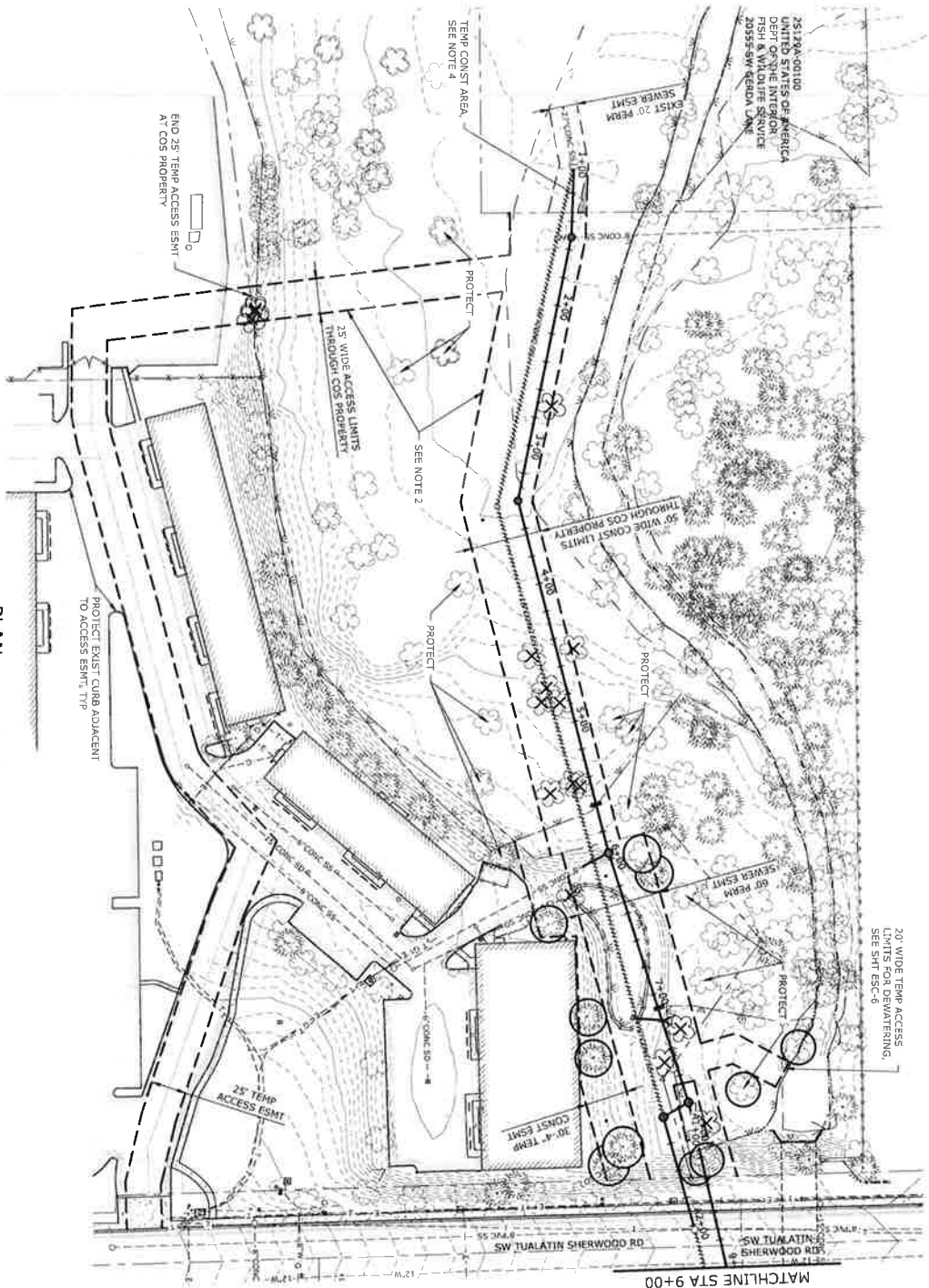




- NOTES:**
1. TREE PROTECTION FENCING SHALL BE PLACED AT OR OUTSIDE OF DRILLHOLE.
  2. INSTALL ORANGE NO WORK FENCE AT EASEMENT AND CONSTRUCTION LIMITS PER DETAIL 1, SHEET ESC-5, TYPICAL.
  3. TREE TRUNK DIAMETER MEASURED AT BREAST HEIGHT. TREE REMOVAL SCHEDULE ENTRIES WITH MULTIPLE TRUNKS LISTED SEPARATE TREES WITH MULTIPLE TRUNKS.
  4. STAGING OF MATERIALS, EQUIPMENT AND CONSTRUCTION SHALL BE LIMITED TO THE TEMPORARY CONSTRUCTION AREA ON THE DEPARTMENT OF THE INTERIOR PROPERTY.

**TREE REMOVAL SCHEDULE**

TREE TYPE	QUANTITY (EA)	TREE TRUNK DIA (IN), SEE NOTE 3
DECIDUOUS	7	6
DECIDUOUS	1	6.7/6
DECIDUOUS	1	6.5
DECIDUOUS	2	7
DECIDUOUS	1	9.5
DECIDUOUS	1	11
DECIDUOUS	1	12
DECIDUOUS	1	15.7/16
DECIDUOUS	1	17



**PLAN**  
SCALE: 1" = 40'

**90% SUBMITTAL**

NO.	DATE	BY	REVISION

**NOTICE**

IF THIS SEAL DOES NOT MEASURE 1" X 1" TO SCALE

DESIGNED: JIU  
DRAWN: DAWN  
CHECKED: BLO

**PRELIMINARY ONLY**  
DO NOT USE FOR CONSTRUCTION  
FEBRUARY 2020  
MurraySmith



**CITY OF SHERWOOD  
ROCK CREEK  
SANITARY TRUNK LINE  
UPSIZING PROJECT -  
PHASE 1**

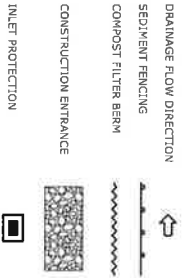
**TREE PROTECTION AND  
REMOVAL PLAN - 1**

PROJECT NO.: 19-2481-002 SCALE: AS SHOWN DATE: FEBRUARY 2020



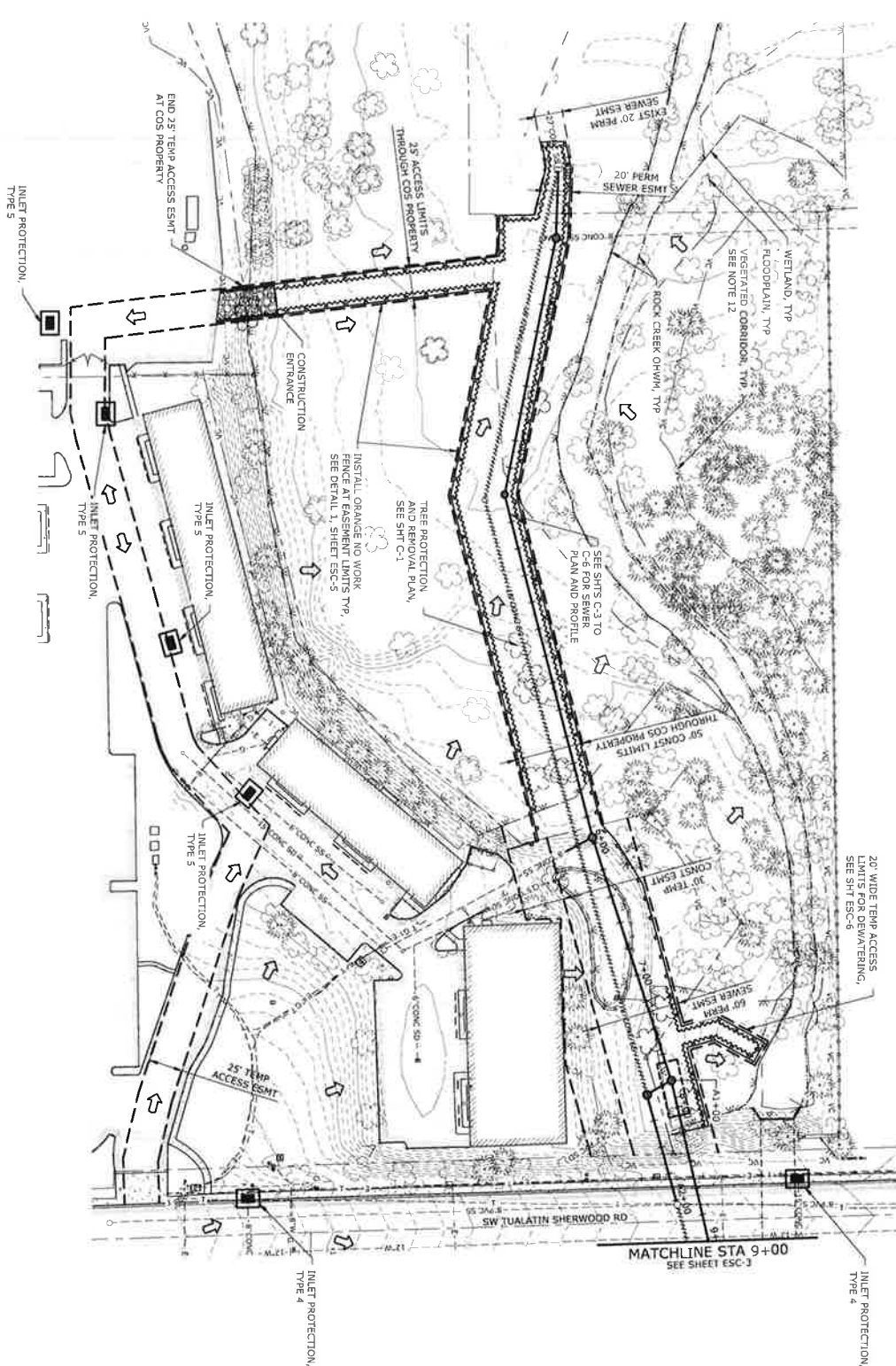


**LEGEND**



**NOTES:**

1. ALL BASE ESC MEASURES (INLET PROTECTION, PERIMETER SEDIMENT CONTROL, GRASS CONSTRUCTION, ETC.) MUST BE IN PLACE, FUNCTIONAL, AND APPROVED IN AN INITIAL INSPECTION, PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
2. SEDIMENT BARRIERS APPROVED FOR USE INCLUDE: CHIPPINGS, OR OTHER SUITABLE MATERIAL, COMPOST SOCKS, STRAW MATS, OR OTHER APPROVED MATERIALS.
3. SENSITIVE RESOURCES INCLUDING, BUT NOT LIMITED TO, TREES, WETLANDS, AND RIPARIAN PROTECTION AREAS SHALL BE CLEARLY DELINEATED WITH ORANGE CONSTRUCTION FENCE AND THE TEMPORARY ACCESS EASEMENT THROUGH BUSINESS PARK MAY BE REQUIRED TO INSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.
4. CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES DAILY STREET SWEEPING AND VACUUMING OF SW CENTURY DRIVE AND THE TEMPORARY ACCESS EASEMENT THROUGH BUSINESS PARK MAY BE REQUIRED TO INSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.
5. RUN-ON AND RUN-OFF CONTROLS SHALL BE IN PLACE AND FUNCTIONING PRIOR TO BEGINNING SUBSTANTIAL CONSTRUCTION ACTIVITIES. RUN-ON AND RUN-OFF CONTROL MEASURES INCLUDE SLOPE DRAINS (WITH OUTLET PROTECTION), CHECK DAMS, SURFACE ROUGHENING, AND BANK STABILIZATION.
6. SEED USED FOR TEMPORARY OR PERMANENT SEEDING SHALL BE SUITABLE TO THE SPECIFICATIONS, UNLESS OTHERWISE AUTHORIZED.
7. STOCKPILED SOIL SHALL BE COVERED WITH PLASTIC SHEETING OR STRAW MULCH. SEDIMENT FENCE IS REQUIRED AROUND THE PERIMETER OF THE STOCKPILE.
8. AREAS SUBJECT TO WIND EROSION SHALL USE APPROPRIATE DUST CONTROL MEASURES INCLUDING THE APPLICATION OF A FINE SPRAY OF WATER, PLASTIC SHEETING, STRAW MULCHING, OR OTHER APPROVED MEASURES.
9. LIGHT SPEED OF VEHICLES ON SITE AND HOISTER HAUL ROADS AS NECESSARY TO CONTROL DUST.
10. ACTIVE INLETS TO STORM WATER SYSTEMS SHALL BE PROTECTED THROUGH THE USE OF APPROVED INLET PROTECTION MEASURES. ALL INLET PROTECTION MEASURES ARE TO BE REGULARLY INSPECTED AND MAINTAINED AS NEEDED.
11. CONTRACTOR SHALL INSTALL INLET PROTECTION ON ALL INLETS WITHIN AREA OF PROJECT IMPROVEMENTS AS SHOWN ON SHEET ESC-2 AND ESC-3. ADDITIONAL INLETS NOT SHOWN ON THIS PLAN MAY BE PRESENT.
12. VEGETATED CORRIDOR BOUNDARY IS NOT SHOWN FOR CLARITY WHERE IT SHARES A BOUNDARY WITH WETLAND AND/OR ROCK CREEK ORDINARY HIGH WATER MARK.



**PLAN**  
SCALE: 1" = 40'

**90% SUBMITTAL**

NO.	DATE	BY	REVISION

NOTICE  
0 1/2 1  
IF THIS BAR DOES NOT SCALE  
NOT TO SCALE

2021  
DESIGNED BY  
EDWARD  
CHECKED BY  
BIO  
PRELIMINARY ONLY  
FEBRUARY 2020  
MurraySmith



**CITY OF SHERWOOD**  
**ROCK CREEK**  
**SANITARY TRUNK LINE**  
**UPSIZING PROJECT -**  
**PHASE 1**

**EROSION AND SEDIMENT CONTROL**  
**PLAN - 1**  
PROJECT NO.: 19-2481-002 | SCALE: AS SHOWN | DATE: FEBRUARY 2020  
SHEET  
ESC-2  
9 of X



## Service Provider Letter

This form and the attached conditions will serve as your Service Provider Letter in accordance with Clean Water Services Design and Construction Standards (R&O 19-5, as amended by R&O 19-22).

Jurisdiction: City of Sherwood Review Type: Tier 2 Analysis  
 Site Address: 20555 SW Gerda Ln SPL Issue Date: April 14, 2020  
 / Location: Sherwood, OR 97140 SPL Expiration Date: April 14, 2022

**Applicant Information:**

Name: BOB GALATI  
 Company: CITY OF SHERWOOD  
 Address: 22560 SW PINE ST  
SHERWOOD OR 97140  
 Phone/Fax: (503) 925-2303  
 E-mail: galatib@sherwoodoregon.gov

**Owner Information:**

Name: \_\_\_\_\_  
 Company: CITY OF SHERWOOD  
 Address: 22560 SW PINE ST  
SHERWOOD OR 97140  
 Phone/Fax: (503) 925-2303  
 E-mail: galatib@sherwoodoregon.gov

**Tax lot ID**

2S129A000100, 300, 301,  
& 400

**Development Activity**

Rock Creek Sanitary Sewer Trunk Line Upsizing

**Pre-Development Site Conditions:**

Sensitive Area Present:  On-Site  Off-Site  
 Vegetated Corridor Width: Variable  
Good/Marginal/Degraded  
 Vegetated Corridor Condition: \_\_\_\_\_

**Post Development Site Conditions:**

Sensitive Area Present:  On-Site  Off-Site  
 Vegetated Corridor Width: Variable

Enhancement of Remaining  
 Vegetated Corridor Required:

Square Footage to be enhanced: 67,936

**Encroachments into Pre-Development Vegetated Corridor:**

Type and location of Encroachment:	Square Footage:
<u>Manholes (Permanent encroachment; No mitigation required under 100 SF)</u>	<u>76</u>
<u>Sanitary sewer line (Temporary encroachment; Restoration and planting in-place required)</u>	<u>26,277</u>

**Mitigation Requirements:**

Type/Location	Sq. Ft./Ratio/Cost
<u>Temporary encroachments mitigated in-place</u>	<u>26,277</u>

Conditions Attached  Development Figures Attached ( 7 )  Planting Plan Attached  Geotech Report Required

**This Service Provider Letter does NOT eliminate the need to evaluate and protect water quality sensitive areas if they are subsequently discovered on your property.**

**In order to comply with Clean Water Services water quality protection requirements the project must comply with the following conditions:**

1. No structures, development, construction activities, gardens, lawns, application of chemicals, uncontained areas of hazardous materials as defined by Oregon Department of Environmental Quality, pet wastes, dumping of materials of any kind, or other activities shall be permitted within the sensitive area or Vegetated Corridor which may negatively impact water quality, except those allowed in R&O 19-5, Chapter 3, as amended by R&O 19-22.
2. Prior to any site clearing, grading or construction the Vegetated Corridor and water quality sensitive areas shall be surveyed, staked, and temporarily fenced per approved plan. During construction the Vegetated Corridor shall remain fenced and undisturbed except as allowed by R&O 19-5, Section 3.06.1, as amended by R&O 19-22 and per approved plans.
3. **Prior to any activity within the sensitive area, the applicant shall gain authorization for the project from the Oregon Department of State Lands (DSL) and US Army Corps of Engineers (USACE). The applicant shall provide Clean Water Services or its designee (appropriate city) with copies of all DSL and USACE project authorization permits.**
4. An approved Oregon Department of Forestry Notification is required for one or more trees harvested for sale, trade, or barter, on any non-federal lands within the State of Oregon.
5. **Prior to ground disturbing activities, an erosion control permit is required. Appropriate Best Management Practices (BMP's) for Erosion Control, in accordance with Clean Water Services' Erosion Prevention and Sediment Control Planning and Design Manual, shall be used prior to, during, and following earth disturbing activities.**
6. Prior to construction, a Stormwater Connection Permit from Clean Water Services or its designee is required pursuant to Ordinance 27, Section 4.B.
7. Activities located within the 100-year floodplain shall comply with R&O 19-5, Section 5.10, as amended by R&O 19-22.
8. Removal of native, woody vegetation shall be limited to the greatest extent practicable.
9. **Should final development plans differ significantly from those submitted for review by Clean Water Services, the applicant shall provide updated drawings, and if necessary, obtain a revised Service Provider Letter.**
10. The Vegetated Corridor width for sensitive areas within the project site shall be a minimum of 50 feet wide, as measured horizontally from the delineated boundary of the sensitive area.
11. For Vegetated Corridors up to 50 feet wide, the applicant shall enhance the entire Vegetated Corridor to meet or exceed good corridor condition or as approved in attached figures consistent with Linear Development Projects as defined in R&O 19-5, Section 3.12 and 3.14.2, Table 3-3, as amended by R&O 19-22.
12. **Removal of invasive non-native species by hand is required in all Vegetated Corridors rated ""good."" Replanting is required in any cleared areas larger than 25 square feet using low impact methods. The applicant shall calculate all cleared areas larger than 25 square feet prior to the preparation of the required Vegetated Corridor enhancement/restoration plan.**
13. Prior to any site clearing, grading or construction, the applicant shall provide Clean Water Services with a Vegetated Corridor enhancement/restoration plan. Enhancement/restoration of the Vegetated Corridor shall be provided in accordance with R&O 19-5, Appendix A, as amended by R&O 19-22, and shall include planting specifications for all Vegetated Corridor, including any cleared areas larger than 25 square feet in Vegetated Corridor rated ""good.""
14. Prior to installation of plant materials, all invasive vegetation within the Vegetated Corridor shall be removed per methods described in Clean Water Services' Integrated Pest Management Plan, 2019. During removal of invasive vegetation care shall be taken to minimize impacts to existing native tree and shrub species.
15. Clean Water Services and/or City shall be notified 72 hours prior to the start and completion of enhancement/restoration activities. Enhancement/restoration activities shall comply with the

guidelines provided in Planting Requirements (R&O 19-5, Appendix A, as amended by R&O 19-22).

16. **Maintenance and monitoring requirements shall comply with R&O 19-5, Section 2.12.2, as amended by R&O 19-22. If at any time during the warranty period the landscaping falls below the 80% survival level, the owner shall reinstall all deficient planting at the next appropriate planting opportunity and the two year maintenance period shall begin again from the date of replanting.**
17. **Performance assurances for the Vegetated Corridor shall comply with R&O 19-5, Section 2.07.2, Table 2-1 and Section 2.11, Table 2-2, as amended by R&O 19-22.**
18. **Clean Water Services will require an easement over the Water Quality Sensitive Area and Vegetated Corridor conveying storm and surface water management to Clean Water Services or the City that would prevent the owner of the Vegetated Corridor from activities and uses inconsistent with the purpose of the corridor and any easements therein.**

#### **FINAL PLANS**

19. **Final construction plans shall include landscape plans.** In the details section of the plans, a description of the methods for removal and control of exotic species, location, distribution, condition and size of plantings, existing plants and trees to be preserved, and installation methods for plant materials is required. Plantings shall be tagged for dormant season identification and shall remain on plant material after planting for monitoring purposes.
20. **A Maintenance Plan shall be included on final plans** including methods, responsible party contact information, and dates (minimum two times per year, by June 1 and September 30).
21. **Final construction plans shall clearly depict the location and dimensions of the sensitive area and the Vegetated Corridor** (indicating good, marginal, or degraded condition). Sensitive area boundaries shall be marked in the field.
22. Protection of the Vegetated Corridors and associated sensitive areas shall be provided by the installation of permanent fencing and signage between the development and the outer limits of the Vegetated Corridors. **Fencing and signage details to be included on final construction plans.**

**This Service Provider Letter is not valid unless CWS-approved site plan is attached.**

**Please call (503) 681-3653 with any questions.**



**Lindsey Obermiller  
Environmental Plan Review**

**Attachments ( 7 )**



COLOR COPY

CWS FILE NO. 20-000667

Approved  
Clean Water Services  
FOR ENVIRONMENTAL REVIEW

By *[Signature]* Date 04/14/2020

SPL ATTACHMENT 2 OF 7

**Summary of Permanent VC Encroachment**  
 Non-Native Scrub-Shrub, Degraded = 13 sf  
 Riparian Forested, Degraded = 35 sf  
 Riparian Forested, Good = 28 sf

**Summary of Temporary VC Encroachment**  
 Herbaceous Maintained, Degraded = 1,696 sf  
 Non-Native Scrub-Shrub, Degraded = 6,863 sf  
 Riparian Forested, Degraded = 13,766 sf  
 Riparian Forested, Good = 3,490 sf  
 Riparian Forested, Marginal = 462 sf

**Summary of Proposed Enhancement**  
 Degraded Condition VC = 25,225 sf  
 Good Condition VC = 44,725 sf  
 Marginal Condition VC = 3,090 sf

Parcel Owned by  
City of Sherwood

Parcel Owned by  
U.S. Dept. of Interior  
(USFWS)

Parcel Owned by  
TMK Properties LLC

Riparian Forested  
Vegetated Corridor

0300

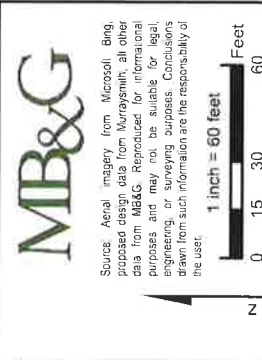
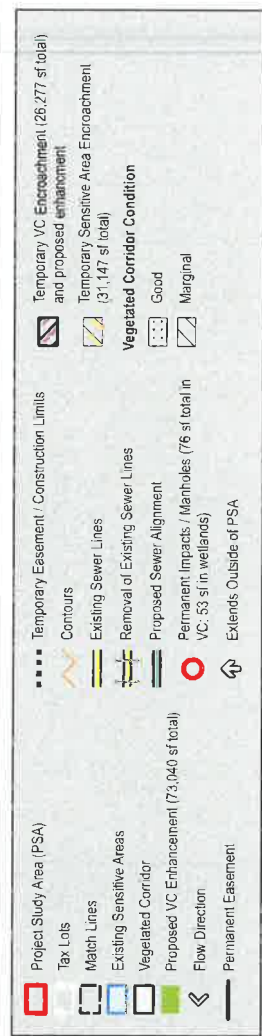
Temporary easement:  
Construction staging area

Permanent 20-foot wide  
sewer easement

Riparian Forested  
Vegetated Corridor

Figure 2b.

**Figure 3a.  
Proposed Development and  
Final Conditions Figure**



Rock Creek Sanitary Trunk Upsizing Project  
 City of Sherwood  
 Washington County, Oregon







DEPARTMENT OF THE ARMY  
U.S. ARMY CORPS OF ENGINEERS, PORTLAND DISTRICT  
P.O. BOX 2946  
PORTLAND, OR 97208-2946

February 26, 2020

Regulatory Branch  
Corps No. NWP-2013-128-1

Bob Galati  
City of Sherwood  
22560 SW Pine Street  
Sherwood, OR 97410  
GalatiB@SherwoodOregon.gov

Dear Mr. Galati:

The U.S. Army Corps of Engineers (Corps) received your request for Department of the Army authorization to replace a trunk line. The project is in Rock Creek and wetlands on SW Tualatin-Sherwood Road in Sherwood, Washington County, Oregon at Latitude and Longitude 45.637302, -122.828534.

This letter verifies your project as depicted on the enclosed drawings (Enclosure 1) is authorized by Nationwide Permit (NWP) No. 12, Utility Line Activities (*Federal Register, January 6, 2017, Vol. 82, No. 4*) provided you obtain a 401 Water Quality Certification (WQC) decision from the Oregon Department of Environmental Quality (DEQ). You are not authorized to begin work in waters of the U.S. until you obtain and submit to our office a 401 WQC decision or waiver.

The project includes the total discharge of up to 2,180 cubic yards of fill over 0.74 of wetlands for the Rock Creek Sanitary Trunk Line Upsizing project. Permanent impacts include 26 cubic yards of fill over 37 square feet of Wetland A and 16 cubic yards of fill over 27 square feet of Wetland C. Temporary impacts include 1,711 cubic yards of fill over 0.67 acre of Wetland A, 427 cubic yards of fill over 0.07 acre of Wetland C, and 98 cubic yards of fill (sand bags) over 0.07 acre below the ordinary high water mark of Rock Creek. Temporary impacts in Rock Creek are for dewatering the stream.

The project consists of constructing a new 24-inch diameter PVC trunk line to replace the existing 18-inch trunk line. The new line segment would be approximately 1,097 linear feet and would be constructed parallel to the existing trunk line that parallels the west side of Rock Creek. The proposed trunk line would be located immediately east of the existing trunk line alignment. It would be constructed by open trenching, except where a trenchless crossing is required to construct the new trunk line under SW Tualatin-Sherwood Road.

The new trunk line would require seven manholes, and would result in the removal of three existing manholes associated with the existing trunk line. Three new manholes would be constructed in Wetlands A and C, and two existing manholes would be removed from Wetland A. Construction of the new manholes would not result in impacts to wetlands or waters. The sewer line's depth of cover would range from five to 20 feet (approximate depth of trench excavation would range from eight to 23 feet). Decommissioning the existing trunk line would be completed by removing three existing manholes and backfilling their voids with native soil. The decommissioned trunk line would be left in place, filled with controlled low strength material (CLSM) concrete and capped with grout at the existing pipe ends to avoid water seepage into the decommissioned line.

In order for this authorization to be valid, you must ensure the work is performed in accordance with the enclosed Nationwide Permit 12 Terms and Conditions (Enclosure 2); any 401 Water Quality Certification conditions, as applicable (see below); and the following special conditions:

a. Permittee shall fully plant and seed all disturbed areas with a broadcast of a native mix immediately following completion of construction and reseed as necessary to establish vegetation for erosion control. Permittee shall follow the Restoration and Planting Plan identified in Enclosure 1 Pages 31 and 32.

b. All in-water work shall be performed during the in-water work period of July 15 – September 30, to minimize impacts to aquatic species. Exceptions to this time period requires specific approval from the Corps and the National Marine Fisheries Service.

c. This Corps permit does not authorize you to take an endangered species in particular those species identified in Enclosure 3. In order to legally take a listed species, you must have separate authorization under the Endangered Species Act (ESA) (e.g., an ESA Section 10 permit, or a biological opinion under ESA Section 7, with "incidental take" provisions with which you must comply). The National Marine Fisheries Service (NMFS) Stormwater, Transportation and Utilities programmatic biological opinion dated March 14, 2014 (NMFS Reference Number NWR-2013-10411), contains the mandatory terms and conditions to implement the reasonable and prudent measures that are provided in the "incidental take" statement associated with the opinion. Your authorization under this Corps permit is conditional upon your compliance with all of the applicable mandatory terms and conditions associated with the incidental take statement. Failure to comply with the applicable terms and conditions associated with incidental take of this opinion, where a take of the listed species occurs, would constitute an unauthorized take, and it would also constitute noncompliance with your Corps permit. The NMFS is the appropriate authority to determine compliance with the terms and conditions of its opinion and with the ESA.

d. Permittee shall fully implement all applicable Project Design Criteria (PDC) of the SLOPES V Stormwater, Transportation and Utilities programmatic biological opinion. A detailed list of the PDCs are enclosed (Enclosure 3). The applicable PDCs for the project include numbers: 6-7, 13-14, 18, 20-23, 25-27, 30-31, 34, 37, and 38.

The requirements of the Endangered Species Act were met through a programmatic biological opinion as listed in the special condition above. The complete text of the biological opinion is available for your review at <https://www.nwp.usace.army.mil/environment/>. Please note, you must submit an *Action Completion Report, Fish Salvage Report, and Site Restoration/Compensatory Mitigation Report* form which are provided in Enclosure 3. Please submit the reports and any other reports associated with this permit to either the letterhead address above or by email to [cenwp.notify@usace.army.mil](mailto:cenwp.notify@usace.army.mil). For submittals by email, the email subject line shall include the Corps project number listed above and the name of the county where the project is located.

We have reviewed your project pursuant to the requirements of the Endangered Species Act, the Magnuson-Stevens Fishery Conservation and Management Act and the National Historic Preservation Act. We have determined the project complies with the requirements of these laws provided you comply with all of the permit general and special conditions.

At this time, the DEQ has not completed a 401 WQC decision for this project. Before proceeding with the work authorized by this NWP, you must obtain a 401 WQC or certification waiver from the DEQ. Please contact the DEQ regarding this requirement at: 401 Water Quality Permit Coordinator, Oregon Department of Environmental Quality, 700 NE Multnomah Street, Suite 600, Portland, Oregon, 97232, by telephone at (503) 229-5623, or visit <https://www.oregon.gov/deq/wq/wqpermits/Pages/Section-401-Nationwide.aspx>. After obtaining a 401 WQC or a waiver for certification, you must submit a copy of the 401 WQC or waiver to our office. The conditions of the 401 WQC will become conditions of this NWP verification. This NWP verification will become effective upon our receipt of the 401 WQC. You may then proceed with construction.

The proposed work is not authorized by this NWP if the DEQ denies the 401 WQC. Please contact us if the 401 WQC is denied.

If the DEQ has not provided you with a 401 WQC decision by April 16, 2020 or the DEQ has not coordinated with the Corps to establish a time extension to provide the 401 WQC, your requirement to obtain a 401 WQC becomes waived. You may then proceed with construction. We will notify you if the time period for DEQ to provide the 401 WQC is extended.


The verification of this NWP is valid until March 18, 2022, unless the NWP is modified, reissued, or revoked prior to that date. If the authorized work has not been completed by that date and you have commenced or are under contract to commence this activity before March 18, 2022, you will have until March 18, 2023, to complete the activity under the enclosed terms and conditions of this NWP. If the work cannot be completed by March 18, 2023, you will need to obtain a new NWP verification or authorization by another type of Department of the Army permit.

Our verification of this NWP is based on the project description and construction methods provided in your permit application. If you propose changes to the project, you must submit revised plans to this office and receive our approval of the revisions prior to performing the work. Failure to comply with all terms and conditions of this NWP verification invalidates this authorization and could result in a violation of Section 404 of the Clean Water Act. You must also obtain all local, state, and other federal permits that apply to this project.

Upon completing the authorized work, you must fill out and return the enclosed *Compliance Certification* form (Enclosure 4). We would like to hear about your experience working with the Portland District, Regulatory Branch. Please complete a customer service survey form at the following address:  
[http://corpsmapu.usace.army.mil/cm\\_apex/f?p=regulatory\\_survey](http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey).

If you have any questions regarding this NWP verification, please contact Ms. Carrie Bond by telephone at (503) 808-4387, or by email at [Carrie.L.Bond@usace.army.mil](mailto:Carrie.L.Bond@usace.army.mil).

FOR THE COMMANDER, AARON L. DORF, COLONEL, CORPS OF ENGINEERS,  
DISTRICT COMMANDER:

Date:  
 2020.02.26  
07:52:38 -08'00'

For: William D. Abadie  
Chief, Regulatory Branch

Enclosures

cc:

Mason, Bruce, and Girard, Inc. (Stuart Myers, [smyers@masonbruce.com](mailto:smyers@masonbruce.com))  
Oregon Department of State Lands (Huffman)  
Oregon Department of Environmental Quality ([401applications@deq.state.or.us](mailto:401applications@deq.state.or.us))



# United States Department of Interior



FISH AND WILDLIFE SERVICE  
Tualatin River National Wildlife Refuge Complex  
19255 SW Pacific Hwy  
Sherwood OR 97140  
Ph: 503-625-5944 Fax: 503-625-5947

City of Sherwood Sewer Line-Onion Flats  
Tualatin River NWR  
Special Use Permit TRNWR-2020-005  
Special Condition Requirements

- 1) The Project Leader and/or Deputy Project Leader are to be notified at least 48 hours prior to the work being completed.
- 2) Prior to accessing the site, the permittee, or their designee, must clean vehicles, field equipment, boots, and clothing to minimize the introduction of plant parts, seeds, or mud that may contain seeds or plant parts, to prevent the spread of invasive plant species.
- 3) Herbicide use is not permitted.
- 4) Permittee, or their designee, should be cognizant of ground nesting birds, nests, and eggs and take precautions to avoid damage or disturbance when working on site between April and July 15.
- 5) Area of disturbance will be limited to the immediate area required for the project as shown as the Temporary Construction Area on the attached sheet C-1. Off-road access is not permitted. Permittee must remain on established dirt roads or within the designated area.
- 6) The Endangered Species Act of 1973 (16 U.S.C. 1531-1544) “prohibits unauthorized taking, possession, sale, and transport of endangered species” or any part thereof.
- 7) Removal of any plants (not targeted as part of weed abatement by permittee), animals, or artifacts, or parts thereof, including shells and feathers, from the Refuge is prohibited. As stated in the code of federal regulations “disturbing, injuring, spearing, poisoning, destroying, collecting or attempting to disturb, injure, spear, poison, destroy or collect any plant or animal on any national wildlife refuge is prohibited...” (50 CFR 27.51).
- 8) The Permittee, or their designee, will be responsible for removing all equipment, posts, stakes, flagging and other materials from Refuge land at the end of the project unless authorized in the Special Use Permit. All pipes or tubing that will be temporarily installed, and left unattended, must have the open ends capped or covered.
- 9) Keys and combinations issued for Refuge building or gate access must be safeguarded by the permittee and their designee. Keys may not be duplicated, and combinations and keys may only be used by the applicant and subcontractors identified in this SUP.
- 10) Any equipment or vehicles to be left on site overnight must have prior authorization by the Project Leader and/or Deputy Project Leader.

- 11) A complete copy of the approved SUP must be in the possession of the permittee, and their designee, at all times while on the Refuge.
- 12) Work associated with this SUP may only be conducted Monday – Friday between 7 a.m. – 7 p.m. Prior written approval is required for any work that may need to occur outside of this time frame, including federal holidays.
- 13) Permittee agrees to repair any damage to roads or habitat as a result of planned activities.
- 14) Dogs are not permitted on the Refuge.
- 15) This SUP may be revoked at any time if the aforementioned conditions are not adhered to by the permittee or their designee.