DEPARTMENT OF
ECOLOGY
State of Washington

PROJECT MANUAL

INVITATION FOR BIDS IFB XXXX TCP

PROJECT:

JACOBSON TERMINALS PROPERTY
INTERIM REMEDIAL ACTION

LOCATION:

SEATTLE, KING COUNTY, WASHINGTON

BID OPENING:

3:00 PM P.D.T., [DAY], [DATE], 20XX

DIRECTOR:	Maia Bellon
PROGRAM MANAGER:	James Pendowski
SECTION MANAGER:	XXXXXXXXXXXXXXXXXXX
PROJECT MANAGER:	XXXXXXXXXXXXXXXXXXX
DATE:	[MONTH] 20XX

CERTIFICATION OF TECHNICAL SPECIFICATIONS

Technical specifications in this document were prepared by the design professionals listed below for Divisions 02 through 33, as applicable. The names and stamps of the professional engineers and the specific sections for which they are responsible are presented below. Division 00 and 01 are not technical specifications and do not require certification.

1. Divisions 02, 31, 32, and 33.

____

Peter R. Smiltins, P.E.
Hart Crowser Inc., Seattle, Washington

END OF SECTION

DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS

00 01 05 – Certification of Technical Specifications
00 01 10 – Table of Contents
00 11 00 – Invitation for Bids Announcement
00 21 00 – Instructions to Bidders
00 22 13 – Supplemental Bidder Responsibility Criteria
00 31 24 – Environmental Assessment Information
00 41 00 – Bid Proposal Form
00 41 43 – Summary of Pay Items and Quantities
00 43 43 – Prevailing Wages
00 72 00 – General Conditions
00 73 00 – Supplemental Conditions
00 73 19 – Health and Safety Requirements

DIVISION 01 – GENERAL REQUIREMENTS

01 10 00 – Summary
01 14 13 – Access to Site
01 18 00 – Project Utility Sources
01 20 00 – Price and Payment Procedures
01 22 00 – Unit Prices
01 26 13 – Requests for Interpretation (RFI)
01 31 19 – Project Meetings
01 33 00 – Submittal Procedures
01 35 29 – Health, Safety, and Emergency Response Procedures
01 35 43 – Environmental Procedures
01 35 43.10 – Green Construction Practices
01 41 00 – Regulatory Requirements
01 42 00 – References
01 45 00 – Contractor Quality Control
01 50 00 – Temporary Facilities and Controls
01 56 26 – Temporary Fencing
01 57 13 – Temporary Erosion and Sedimentation Control
01 60 00 – Product Requirements
01 71 23 – Field Engineering
01 74 00 – Cleaning and Waste Management
01 77 00 – Closeout Procedures
01 80 00 – Archaeological Monitoring During Excavation

DIVISION 02 – EXISTING CONDITIONS

02 22 43 – Existing Conditions Assessments
02 41 13 – Selective Site Demolition
02 61 13 – Excavation and Handling of Contaminated Soil

DIVISION 31 – EARTHWORK

31 23 16 – Excavation
31 23 19 – Construction Dewatering
31 23 23 – Fill

DIVISION 32 – EXTERIOR IMPROVEMENTS

32 12 00 – Paving

DIVISION 33 – UTILITIES

33 00 00 – Existing Underground Utilities
33 70 00 – Overhead Electrical Utilities

APPENDICES

APPENDIX A – REGULATORY INFORMATION AND PROJECT DOCUMENTS

A01 – Draft State Environmental Policy Act (SEPA) Checklist

A02 – Draft Interim Action Work Plan

A03 – Data Gaps Report

A04 – Groundwater Monitoring Well and Injection Point Installation Logs

APPENDIX B – PERMITS AND EXEMPTIONS

B01 – Hydraulic Project Approval

APPENDIX C – CULTURAL RESOURCES

C01 – Archaeological Monitoring and Inadvertent Discovery Plan

APPENDIX D – CONSTRUCTION DRAWINGS

D01 – Construction Drawings

END OF TABLE OF CONTENTS

DEPARTMENT OF
ECOLOGY
State of Washington

INVITATION FOR BIDS

IFB XXXX TCP

SEALED BIDS will be accepted for IFB XXXX TCP "JACOBSON TERMINALS PROPERTY INTERIM REMEDIAL ACTION" by the State of Washington, Department of Ecology (Ecology), until 3:00 p.m. P.D.T. on [DAY], [DATE], 20XX.

Bid proposals may be submitted by regular mail to:

Attn: Joseph Ward, P.E.
Department of Ecology
Toxics Cleanup Program
PO BOX 47600
Olympia, WA 98504-7600

Bid proposals may be submitted by UPS, Express Mail, or hand-delivered to Ecology Headquarters receptionist at:

Attn: Joseph Ward, P.E.
300 Desmond Drive SE
Lacey, WA 98503

PROJECT LOCATION: The site is located at 5350 30th Avenue NW, Seattle, King County, WA.

ESTIMATED BID RANGE: $3,300,000 – $4,300,000

PRE-BID MEETING AND PROJECT WALKTHROUGH: A pre-bid meeting (including site walk) will be held at:

When: 10:00 a.m. P.D.T., [DAY], [DATE], 20XX

Where: [LOCATION NAME]
[ADDRESS]
[ADDRESS]

Meet at the XXXXXXXXX

While the pre-bid meeting is voluntary, it is highly recommended that all prospective Bidders attend this meeting. Bidders who do not attend the voluntary pre-bid meeting must rely solely on the bid documents/Project Manual describing the work to prepare their bid.

Note: The site may not be fully accessible to people with disabilities. Please contact [ECOLOGY SITE MANAGER] at [PHONE NUMBER] at least five days before the scheduled pre-bid date if special accommodations are required for your attendance.

NOTICE TO BIDDERS:

A. <u>GENERAL</u>: Upon contract award, the construction and successful completion of this project as defined in the Project Manual shall be the responsibility of a Contractor registered in the State of Washington.

   This responsibility extends to work accomplished by subcontractors, vendors, and material and equipment suppliers through agreements with the Contractor. The Contractor shall assure that all personnel performing work in connection with this contract are familiar with the Project Manual including applicable procedures (including payment procedures), instructions, and technical requirements of this contract to ensure that construction proceeds to final completion and acceptance in an orderly manner.

   All work shall be done in accordance with the best modern construction practices and under the supervision of capable superintendents, foremen, and workmen fully experienced in their field of work.

B. <u>SCHEDULE</u>: The project will be Substantially Complete within <u>120</u> calendar days from the date of the Notice to Proceed. The Work will occur within an active marine terminal facility, which will continue business operations during execution of the Work. Construction is intended to be performed and completed during the facility's off-peak business period, which typically occurs during the winter season. The construction window shall be limited to November 1, 2017, to February 29, 2017, to minimize adverse impacts to the facility's business operations. Bidders shall take into account the effects of these schedule limitations in preparing their respective bids.

C. VOLUNTARY MWBE GOALS: Voluntary numerical MWBE participation goals of 10% MBE and 6% WBE have been established for this project. Achievement of these goals is encouraged. However, unless required by federal statutes, regulations, grants, or contract terms referenced in the contract documents, no preferences will be included in the evaluation of bids, no minimum level of MWBE participation shall be required as a condition for receiving an award or completion of the contract work, and bids will not be rejected or considered non-responsive on that basis. Bidders may contact the Office of Minority and Women's Business Enterprise to obtain information on certified firms.

D. APPRENTICESHIP UTILIZATION REQUIREMENTS: RCW 39.04.320 requires 15% **Apprenticeship Participation** for all projects estimated to cost one million dollars or more. This project requires 15% apprenticeship utilization as a percentage of total labor hours. Bidders may contact the Department of Labor and Industries, Specialty Compliance Services Division, Apprenticeship Section, P.O. Box 44530, Olympia, WA 98504-4530, by phone (360) 902-5320, or the region coordinator, Karla Tuttle, by e-mail at Karla.Tuttle@lni.wa.gov, to obtain information on available apprenticeship programs.

E. BIDDER RESPONSIBILITY CRITERIA WILL BE EVALUATED FOR THIS PROJECT: See Division 00 Section 00 21 00 "Instructions to Bidders" and Section 00 22 13 "Supplemental Bidder Responsibility Criteria" for the mandatory and supplemental bidder responsibility criteria for this project.

F. Ecology reserves the right to accept or reject any or all bid proposals and to waive informalities.

PROJECT SCOPE: Work includes but is not limited to the removal of PCB-contaminated soil at the Jacobson Terminals property by excavating contaminated soil, transporting and disposing of contaminated soil at a Subtitle C landfill, excavation backfilling with clean imported material, and regrading and resurfacing the work area to pre-construction conditions. Because planned excavation depths extend below the water table, construction dewatering, or dewatering of excavated soil, may be required. Water generated from the dewatering process will be appropriately treated and discharged to sanitary sewer. Underground utilities affected by the work will be bypassed/rerouted and subsequently restored following completion of the soil removal work.

Project technical questions or comments may be directed to Eugene Freeman, Project Manager, Toxics Cleanup Program, (425) 649-7191, or email at eufr4614@ecy.wa.gov.

To request bid specifications, please contact Joseph Ward, P.E., at (360) 407-7210 or email at Joe.Ward@ecy.wa.gov, or access bid documents electronically through the Department of Ecology's on-line FTP site ([FTP SITE ADDRESS]).

NOTES:

1. The Project Manual includes bid specifications, appendices, plans, and addenda, which are available through the Department of Ecology's on-line FTP site. This on-line FTP site provides Bidders with fully usable electronic documents.

END OF INVITATION FOR BIDS

1.01 BIDDERS – GENERAL

A. "**Bidder**" is an entity or person who submits a bid proposal for the work stipulated in the contract documents.

B. The Bidder must be registered by the Washington State Department of Labor and Industries in accordance with RCW 18.27.020. Insert the contractor registration number, expiration date, Uniform Business Identifier (UBI) number, and federal tax identification number on the Bid Proposal Form in the applicable spaces.

C. "**Owner**" is the Washington State Department of Ecology.

1.02 EXPLANATION TO PROSPECTIVE BIDDERS

A. In accordance with *RCW 39.04.380* effective March 30, 2012, the State of Washington is enforcing a **Reciprocal Preference for Resident Contractors**. Any public works bid received from a nonresident contractor from a state that provides an in-state percentage bidding preference, a comparable percentage disadvantage must be applied to the bid of that nonresident contractor.

A nonresident contractor from a state that provides a percentage bid preference means a contractor that:

1. Is from a state that provides a percentage bid preference to its resident contractors bidding on public works contracts.
2. At the time of bidding on a public works project, does not have a physical office located in Washington.

The state of residence for a nonresident contractor is the state in which the contractor was incorporated or, if not a corporation, the state where the contractor's business entity was formed.

All nonresident contractors will be evaluated for out of state bidder preference. If the state of the nonresident contractor provides an in-state contractor preference, a comparable percentage disadvantage will be applied to their bid prior to contract award.

This section does not apply to public works procured pursuant to *RCW 39.04.155, 39.04.280*, or any other procurement exempt from competitive bidding.

B. Any prospective Bidder desiring an explanation or interpretation of the solicitation, drawings, specifications, etc., must submit a request in writing to the Owner no later than seven (7) calendar days before the bid due date. Oral explanations or instructions given before the award of a contract will not be binding. Any information given to a prospective Bidder concerning a solicitation will be furnished promptly to all other prospective Bidders by addendum to the solicitation, if that information is necessary in submitting bids or if the lack of it would be prejudicial to other prospective Bidders.

C. In accordance with the legislative findings and policies set forth in Chapter 39.19 RCW, the state of Washington encourages participation in all of its contracts by MWBE firms certified by the Office of Minority and Women's Business Enterprises (OMWBE). Participation may be either on a direct basis in response to this invitation or as a subcontractor to a Bidder. However, unless required by federal statutes, regulations, grants, or contract terms referenced in the contract documents, no preference will be included in the evaluation of bids, no minimum level of MWBE participation shall be required as a condition for receiving an award and bids will not be rejected or considered non-responsive on that basis. Any affirmative action requirements set forth in federal regulations or statutes included or referenced in the contract documents will apply.

D. In accordance with RCW 39.04.320, the state of Washington requires 15% Apprenticeship Participation for all projects estimated to cost one million dollars or more. On applicable projects the Invitation for Bid and Bid Proposal Form shall establish a minimum required percentage of apprentice labor hours compared to the total labor hours. Bidders may contact the Department of Labor and Industries, Specialty Compliance Services Division, Apprenticeship Section, P.O. Box 44530, Olympia, WA 98504-4530, by phone (360) 902-5320, and e-mail at thum235@lni.wa.gov, to obtain information on available apprenticeship programs.

1.03 PREPARATION OF BIDS – CONSTRUCTION

A. Bids must be (1) submitted on the bid proposal forms, or copies of forms, furnished by the Owner or Owner's agent, and (2) signed in ink. The person signing a bid must initial each change appearing on any bid form. If the bid is made by a corporation, it shall be signed by the corporation's authorized designee. The address of the Bidder shall be typed or printed on the bid form in the space provided.

B. The bid form may require Bidders to submit bid prices for one or more items on various bases, including (1) lump sum base bid; (2) lump sum bid alternate prices; (3) unit prices; or (4) any combination of items 1 through 3.

C. Substitute bid proposals will not be considered unless this solicitation authorizes their submission.

D. Bid proposals that are incomplete, or that are conditioned in any way, or that contain erasures, alterations, or items not called for in the contract documents, or do not conform to the call for bids, may be rejected as non-responsive at the discretion of the Owner unless the law requires that the omission be deemed non-responsive.

E. Only the amounts and information asked for on the Bid Proposal Form and the plans and specifications furnished will be considered as the bid. Bid amounts include all taxes imposed by law, except for Washington State Sales Tax unless noted otherwise.

F. Each Bidder shall bid upon the work exactly as specified and as provided in the Bid Proposal Form and as clarified above. The Bidder shall bid upon all alternates if alternates are indicated on the Bid Proposal Form. When bidding on alternates for which there is no charge, the Bidder shall write the words “no charge” in the space provided on the Bid Proposal Form. Failure to bid on alternates may disqualify the bid.

1.04 BID GUARANTEE

A. When the sum of the base bid plus all additive bid alternates is $35,000.00 or less, bid security is not required.

When the sum of the base bid plus all additive alternates is greater than $35,000.00, a bid guarantee in the amount of 5% of the base bid amount is required. Failure of the Bidder to provide bid guarantee when required shall render the bid non-responsive.

B. Acceptable forms of bid guarantee are a bid bond or postal money order, or certified check or cashier’s check made payable to the Washington State Treasurer. Ecology will return bid guarantees (other than bid bond) to unsuccessful Bidders as soon as practicable, but not sooner than the execution of a contract with the successful Bidder. The successful Bidder's bid guarantee will be returned to the successful Bidder with its official notice to proceed with the work of the contract.

C. The Bidder will allow 30 days from bid opening date for acceptance of its bid by the Owner. The Bidder will return to the Owner a signed contract, insurance certificate, and bond or bond waiver within 15 days after receipt of the contract. If the apparent successful Bidder fails to sign all contractual documents or provide the bond and insurance as required or return the documents within 15 days after receipt of the contract, the Owner may terminate the award of the contract.

D. In the event that a Bidder discovers an error in its bid following the bid opening, the Bidder may request to withdraw its bid under the following conditions:

1. Written notification is received by the Owner within 24 hours following bid opening.

2. The Bidder provides written documentation of the claimed error to the satisfaction of the Owner within 72 hours following the bid opening.

3. The Owner will approve or disapprove the request for withdrawal of the bid in writing. If the Bidder's request for withdrawal of its bid is approved, the Bidder will be released from further obligation to the Owner without penalty. If it is disapproved, the Owner may retain the Bidder's bid guarantee.

1.05 ADDITIVE OR DEDUCTIVE BID ITEMS

A. The low Bidder, for purposes of award, shall be the responsive Bidder offering the low aggregate amount for the base bid item, plus any additive or deductive bid alternates selected by the Owner, and within funds available for the project.

B. The Bidder agrees to hold all bid alternate prices for sixty (60) days from date of bid opening.

1.06 ACKNOWLEDGEMENT OF ADDENDA

A. Bidders shall acknowledge receipt of any addendum to the invitation for bids by including the signed addendum with the Bid Proposal Form.

Failure to acknowledge and include addenda with the Bid Proposal Form may result in the bid being declared non-responsive.

1.07 SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK

A. The Bidder acknowledges that it has taken steps necessary to (1) ascertain the nature and conditions bearing upon transportation, disposal, handling, and storage of materials; (2) the availability of labor, water, electric power, and road; (3) uncertainties of weather, river stages, tides, or similar physical conditions at the site; (4) the conformation and conditions of the ground; and (5) the character of equipment and facilities needed preliminary to and during the work. The Bidder also acknowledges that it has satisfied itself as to character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including exploratory work done by the Owner, as well as from the drawings and specifications made a part of this contract. Any failure of the Bidder to take the actions described and acknowledged in this paragraph will not relieve the Bidder from responsibility for estimating properly the difficulty and cost of successfully performing the work.

1.08 BID AMOUNTS

A. The bid prices shown for each item on the bid proposal shall include all labor, material, equipment, overhead, and compensation to complete all of the work for that item.

B. The actual cost of a building permit (only) and any public utility hookup fees will be a direct reimbursement to the Contractor or paid directly to the permitting agency by the Owner. Fees for these permits should not be included by the Bidder in the bid amount.

C. The Bidder agrees to hold the base bid prices for sixty (60) days from date of bid opening.

1.09 TAXES

A. The bid amounts shall not include Washington State Sales Tax (WSST). All other taxes imposed by law shall be included in the bid amount. The Owner will include WSST in progress payments. The Contractor shall pay the WSST to the Department of Revenue and shall furnish proof of payment to the Owner if requested.

NOTE: Contractor must bond for contract amount plus the WSST.

1.10 SUBMISSION OF BIDS

A. Bid Proposals must be submitted on or before the time specified in the Invitation for Bids.

B. If the base bid and the sum of the additive and/or deductive alternates is one million dollars or more, the Bid Proposal shall comply with the following requirements:

1. Pursuant to *RCW 39.30.060*, if the base bid and the sum of the additive and/or deductive alternates is one million dollars or more, the Bidder shall provide names of the Subcontractors with whom the Bidder will subcontract for performance of heating, ventilation, and air conditioning (HVAC), plumbing, and electrical work.
2. The Bidder can name itself for the performance of this work.
3. The Bidder shall not list more than one Subcontractor for each category of work identified UNLESS Subcontractors vary with bid alternates, in which case the Bidder must indicate which Subcontractor will be used for which alternate.
4. Failure of the Bidder to submit as part of the bid the NAMES of such Subcontractor(s) or to name itself to perform such work shall render the Bidder's bid non-responsive and, therefore, void.
5. If no heating, ventilation, and air conditioning (HVAC), plumbing, and electrical work will be performed as part of the project, and the project value is one million dollars or more, the Bidder shall submit the subcontractor utilization form with the Bid Proposal Form and include the word “none” on the form.

C. The Bid Proposal shall be submitted in a sealed envelope addressed to the office specified in the Advertisement for Bids. The envelope shall have printed on the outside:

1. The Invitation for Bid number and project description.
2. The name and address of the Bidder.
3. Identification as Bid Proposal.

D. Prior to the bid opening, the Owner's representative will designate the official bid clock. Any part of the bid proposal not received prior to the times specified, per the designated bid clock, will not be considered and the bid will be returned to the Bidder unopened.

E. A bid may be withdrawn in person by a Bidder's authorized representative before the opening of the bids. Bidder(s) representative will be required to show ID and sign on bid summary sheet before it will be released.

F. People with disabilities who wish to request special accommodation (e.g., sign language interpreters, Braille, etc.) need to contact the Owner's Project Manager ten (10) days prior to the scheduled bid opening.

1.11 BID RESULTS

A. Within one day after the Bid Opening, Bidders may obtain bid results from the Owner by calling (360) 407-7210 or by accessing the Owner's FTP site where results will be posted in the specific Invitation for Bid project folder.

1.12 LOW RESPONSIBLE BIDDER

A. **Mandatory Responsibility Criteria**: Before award of a public works contract, a Bidder must meet the following mandatory responsibility criteria under *RCW 39.04.350 (1)* to be considered a responsible Bidder and qualified to be awarded a public works project. The Bidder must:

1. At the time of bid submittal, have a certificate of registration in compliance with *Chapter 18.27 RCW*;
2. Have a current state unified business identifier number;
3. If applicable, have industrial insurance coverage for the Bidder's employees working in Washington as required in *Title 51 RCW*; an employment security department number as required in *Title 50 RCW*; and a state excise tax registration number as required in *Title 82 RCW*;
4. Not be disqualified from bidding on any public works contract under *RCW 39.06.010* or *39.12.065(3)*; and
5. If bidding on a public works project subject to the apprenticeship utilization requirements in *RCW 39.04.320*, not have been found out of compliance by the Washington state apprenticeship and

training council for working apprentices out of ratio, without appropriate supervision, or outside their approved work processes as outlined in their standards of apprenticeship under *Chapter 49.04 RCW* for the one-year period immediately preceding the date of the bid solicitation.

B. **Supplemental Responsibility Criteria**: In addition to the mandatory Bidder responsibility, the Owner may adopt relevant supplemental criteria for determining Bidder responsibility applicable to a particular project which the Bidder must meet (RCW 39.04.350 (2)).

1. If applicable, the Owner shall consider an overall accounting of the attached supplemental criteria for determining Bidder responsibility found in **DIVISION 00, SECTION 00 22 13 – SUPPLEMENTAL BIDDER RESPONSIBILITY CRITERIA.**

2. At least seven (7) days prior to the bid submittal deadline, a potential Bidder may request that the Owner modify the supplemental responsibility criteria. The Owner will evaluate the information submitted by the potential Bidder and respond before the bid submittal deadline. If the evaluation results in a change of the criteria, the Owner will issue an addendum to the bidding documents identifying the new criteria.

3. Upon Owner's request, the apparent low Bidder must supply the requested responsibility information within two (2) business days of request by Owner. Withholding information or failure to submit all the information requested within the time provided may render the bid non-responsive.

4. If the Owner determines that the apparent low Bidder is not responsible, the Owner will notify the Bidder of its preliminary determination in writing.

5. Within three (3) days after receipt of the preliminary determination, the Bidder may withdraw its bid or request a hearing with the Owner where the Bidder may appeal the preliminary determination and present additional information to the Owner. The Owner will schedule a hearing within three (3) working days of receipt of the Bidder's request.

6. The Owner will issue a Final Determination after reviewing information presented at the hearing.

7. If the Owner determines a Bidder to be not responsible, the Owner will provide, in writing, the reasons for the determination. If the final determination affirms that the Bidder is not responsible, the Owner will not execute a contract with any other Bidder until two (2) business days after the Bidder determined to be not responsible has received the final determination.

8. The Owner's Final Determination is specific to this project, and will have no effect on other or future projects.

1.13 BID EVALUATION AND CONTRACT AWARD

A. The Owner will evaluate bids for responsiveness and the Bidder for responsibility.

1. A bid will be considered responsive if it meets the following requirements:

a. It is received at the proper time and place.

b. It meets the stated requirements of the bid proposal.

c. It is submitted by a licensed/registered Contractor within the state of Washington at the time of bid opening and is not banned from bidding by the Department of Labor and Industries.

d. It is accompanied by a bid guarantee, if required.

2. A Bidder will be considered responsible if it meets the following requirements:

a. It meets the mandatory responsibility criteria established in *RCW 39.04.350* and an overall accounting of the supplemental responsibility criteria established for the project.

B. The Owner reserves the right to accept or reject any or all bid proposals and to waive informalities.

1. IF inconsistencies or errors are noted in the bid proposal prices, **prices shown in words shall have precedence over prices shown in figures.** The **unit and lump sum prices shall have precedence over their total amounts;** and the **total amounts shall have precedence over the total bid**.

C. The Owner may negotiate bid price adjustments with the low responsive Bidder, including changes in the contract documents, to bring the bid within the available funding per RCW 39.04.015.

D. The apparent low Bidder, for purpose of award, shall be the responsive and responsible Bidder offering the low aggregate amount for the base bid plus any selected additive or deductive bid alternates, and meeting all other bid submittal requirements.

E. **Reciprocal Preference for Resident Contractors**. For a public works bid received from a nonresident Contractor from a state that provides an in-state percentage bidding preference, a Comparable Percentage Disadvantage (CPD) will be applied to the bid of that nonresident contractor. The CPD is the in-state contractor percent advantage provided by the contractor's home state.

For the purpose of determining the successful Bidder, multiply the Nonresident Contractor bid amount by the CPD. The "bid amount" shall be the total of the base bid and all accepted alternate bid items. The CPD shall be added to the Nonresident Contractor bid amount, which equates to the Nonresident Disadvantage Total. The Nonresident Disadvantage Total shall be compared to the Washington contractor bid amounts. The Bidder with the lowest total shall be the successful Bidder. See example below.

EXAMPLE:

Alaska Nonresident Contractor Bid Amount	$100,000
Multiplied by the Alaska CPD	x 0.05
Alaska CPD Total	$ 5,000

Alaska Nonresident Contractor Bid Amount	$100,000
Alaska CPD Total	$ 5,000
Nonresident Disadvantage Total	$105,000*

* **Note**: If the Nonresident Disadvantage Total is lower than all other Washington contractor bid amounts, the Alaska Nonresident Contractor is the successful Bidder and will be awarded a contract for the bid amount of $100,000.

If the Nonresident Disadvantage Total is higher than a Washington contractor bid amount, the successful Washington Bidder will be awarded a contract for the bid amount.

F. The Contract will only become effective when signed by the Owner. Prior to the Owner's signature, any and all costs incurred shall be the sole responsibility of the Bidder.

1.14 DIVISION 00 REFERENCE DOCUMENTS

A. Invitation for Bid and/or Advertisement for Bid

B. Supplemental Responsibility Criteria (if applicable)

C. Bid Proposal Form

D. Subcontractor Utilization Form (for projects over $1 million)

E. Washington State Prevailing Wage Rates

Note: American Institute of Architects (AIA) Payment Bond and Performance Bond forms (A312) are required. These forms will not be provided by the Owner.

END OF INSTRUCTIONS TO BIDDERS

1.01 DESCRIPTION

A. This section contains supplemental Bidder responsibility criteria specific to this Project to affirm that the Bidder is a qualified bidder and can document relevant experience that demonstrates its capability to successfully perform the work required on this project.

B. Non-compliance with the specified instructions in this section may result in a Bidder determined to not be responsible by Ecology, in accordance with *RCW 39.04.350(2)*.

C. Information shall be provided by the apparent low Bidder in written form within 2 working days upon receiving the request for this supplemental Bidder responsibility information from Ecology.

1.02 COMPLETION OF SIMILAR PROJECTS

A. Based on the size, complexity, project management requirements and public scrutiny of this Project, Ecology requires a Bidder to provide written documentation that demonstrates successfully completing previous, relevant projects of a similar size and scope to this Project.

B. The Bidder shall submit a list of at least three previous public agency public works projects in Washington, involving a combination of earthwork, site, and landscape restoration that were completed successfully by the Bidder within the past six (6) calendar years of the date of this Project Manual that meet the conditions described herein.

C. For the purpose of defining whether a previous project meets Ecology's criteria for previous project experience involving relevant projects of similar size and scope, a previous project must meet the following:

1. At least one of the projects listed shall have included excavation and disposal of contaminated soil at permitted landfills from upland areas, and included the use of on-site environmental controls to contain any contaminants on the project work site.

2. Bidder must have successfully completed the projects listed, which will be based on assessments obtained from owner representatives of these projects by Ecology.

3. Qualifying projects submitted by the Bidder will identify and document the steps Bidder implemented in order to coordinate and execute work safely and successfully in close proximity to members of the public and/or people who were not construction personnel.

4. At least one of the projects must have an awarded project contract value over $1,000,000 where the Bidder was the General Contractor.

a. Environmental Service contracts and on-call contracts are not qualifying projects.

D. The information on previous projects provided by Bidder shall include, at a minimum, the following:

1. Project name
2. Project location
3. Project dates
4. Awarded project contract amount
   a. This shall be the amount of the Bidder's contracted portion of work Bidder performed or provided by agreement with Subcontractors for the listed project.
   b. Awarded project contract amount for one project must be greater than $1,000,000.
   c. On-call contracts do not satisfy this requirement.
5. Final project contract amount
   a. This shall be the amount of the Bidder's contracted portion of work Bidder performed or provided by agreement with Subcontractors for the listed project.
6. Owner name and name of project owner's representative.
7. Owner's representative phone number, address, email address, and/or any other contact information Bidder can provide.
8. A description of the scope of the project and how that project is similar to this Project, including the close interactions with the public involved in the project.
9. Bidder's assessment of its performance on the listed projects, including but not limited to the following:
   a. Quality control.
   b. Safety record.
   c. Timeliness of performance.
   d. Use of skilled personnel.
   e. Management of Subcontractors.
   f. Availability of and use of appropriate equipment.
   g. Compliance with contract documents.
   h. Apprenticeship utilization requirements identified for the project and actual apprentice participation used on this project.

10. Incomplete information submitted by the Bidder for past project history may result in Ecology determining the Bidder to be not responsible at the discretion of Ecology, based on information that can be obtained from Ecology's evaluation of information obtained through other means.

E. Ecology may check references for one or more previous projects and/or contact one or more owner's representatives indicated in the Bidder's previous project information, or another representative designated by that previous owner, who can provide an assessment of the Bidder's performance on that past project.

1. Ecology may evaluate an assessment provided by the previous project's owner based on, but not limited to, the following:
    a. Quality control.
    b. Safety record.
    c. Timeliness of performance.
    d. Use of skilled personnel.
    e. Management of Subcontractors.
    f. Availability of and use of appropriate equipment.
    g. Compliance with contract documents.
    h. Apprenticeship utilization.

2. Ecology may determine that a Bidder is not a responsible Bidder if reference checks or assessments identify one or more of the following:
    a. The Bidder and/or the submitted projects do not meet the supplemental Bidder responsibility criteria to the satisfaction of Ecology.
    b. Documented concerns specific to the Bidder's performance on past projects identified as meeting the supplemental Bidder responsibility criteria, which may include any element of the assessment of that Bidder's performance including quality of construction, adherence to project schedules, Bidder's management of Subcontractors, and Bidder's safety record on the project.
    c. Bidder failed to meet established apprenticeship utilization requirements.

F. In addition to the information requested above, Bidder shall provide a brief but well thought out plan that describes how it intends to meet the apprenticeship utilization requirements established for this project and which Bidder will be required to meet if awarded the contract for this project.

END OF SECTION

PART 1 –GENERAL

1.01 DESCRIPTION OF WORK

Materials excavated during the Work may be designated as Dangerous Waste under state regulations (Chapter 173-303 WAC), which the Contractor shall handle, manage, and dispose in accordance with the requirements of Chapter 173-303 WAC and the Toxic Substances Control Act (TSCA) regulations (40 CFR Part 761).

1.02 SITE CONDITIONS

The Project Site resides at the northern end of the Jacobson Terminals property. The property is bordered by the Lake Washington Ship Canal to the east and south, the Seaborn property to the east, the Army Corps of Engineers (Corps) property to the west, and the City of Seattle (City) property to the north. A former Burlington Northern Railroad right of way runs through the City property and contains active railroad tracks. North of the City property and railroad tracks is the Market Street property, which consists of commercial businesses.

A historical release of transformer oil containing polychlorinated biphenyl compounds (PCBs) and trichlorobenzene on the northern portion of the Jacobson Terminals property created a plume of PCBs and several chlorinated benzene compounds in groundwater. Elevated concentrations of PCBs and chlorinated benzenes above applicable cleanup levels were identified in soil samples up to 30 feet below ground surface downgradient of where the presumed transformer oil release occurred.

Historical releases of metals, low- and high-pH solutions, and solvents occurred on the Market Street and City properties during former industrial operations on these properties. The releases created localized exceedances of metals in soil and groundwater and an extensive groundwater plume of tetrachloroethene (PCE) and associated degradation products (trichloroethene [TCE], cis-1,2-dichloroethene [cis-DCE], and vinyl chloride). Before installation of a treatment wall, the plume extended from the Market Street and City properties onto the Corps and Jacobson Terminals properties. A separate area of chlorinated solvents, on the City property downgradient of the Market Street treatment wall, was identified as the likely source of chlorinated solvent impacts on the Terminals property.

The results of historical environmental investigations indicate that the contaminants of concern (COCs) in the interim action area include:

- PCBs in soil;

- Tri-, di-, and chlorobenzene in soil and groundwater;
- Chlorinated solvents (PCE, TCE, cis-DCE, and vinyl chloride) in soil and groundwater; and
- Scattered metal (arsenic, cadmium, and lead) occurrences in soil and groundwater.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

Name of Contractor: ____

BID PROPOSAL

State of Washington
Department of Ecology

Submit by mail to:

Attn: Joseph Ward, P.E.
Department of Ecology
Toxics Cleanup Program
PO BOX 47600
Olympia, WA 98504-7600

Submit by Express Mail or hand-deliver to Ecology Headquarters receptionist at:

Attn: Joseph Ward, P.E.
300 Desmond Drive SE
Lacey, Washington 98503

Bids not received by the specified date and time will not be accepted and will be returned unopened to the Bidder.

Having carefully examined the site of the proposed work, and having carefully considered all conditions affecting the work, the undersigned proposes to furnish all labor, materials, equipment, necessary and incidental, and to perform all work as required by and in accordance with the project manual, for the amount shown for the schedule identified below:

TOTAL BASE BID (including Trench Excavation Safety Provisions)
(**Not** including Washington State Sales Tax)

$______________________________
(Total Base Bid price in numbers only)

____ **U.S. Dollars**
(Total Base Bid price written out in words)

TRENCH EXCAVATION SAFETY PROVISIONS $ __________
(Included in Total Base Bid above)

If the bid amount contains any work that requires trenching exceeding a depth of 4 feet, all costs for trench safety shall be **included** in the Base Bid **and indicated above** for adequate trench safety systems in compliance with Chapter 39.04 RCW, Chapter 49.17 RCW, and WAC 296-155-650. Bidder must include a lump sum dollar amount in blank above (even if the value is $0.00) to be responsive.

Evaluation of Bids: The evaluation of bids and determination of the lowest responsive Bidder will be based on the Total Base Bid (including Trench Excavation Safety Provisions).

Name of Contractor: ____________________

Ecology reserves the right to accept or reject any or all bid prices within sixty (60) days of the bid date.

TABLE 1: TOTAL BASE BID SCHEDULE OF PRICES
(**Not** including Washington State Sales Tax)

BID ITEM NO.	BID ITEM DESCRIPTION	UNIT	QTY	UNIT COST ($)	TOTAL (in numbers, $)
LS1	Mobilization and Demobilization	LS	1	N/A	
LS2	General Requirements	LS	1	N/A	
LS3	Health and Safety	LS	1	N/A	
LS4	Field Engineering	LS	1	N/A	
LS5	Temporary Facilities and Controls	LS	1	N/A	
LS6	Site Work	LS	1	N/A	
LS7	Underground Utilities Bypass and Restoration	LS	1	N/A	
LS8	Construction Dewatering and Treatment	LS	1	N/A	
LS9	Project Closeout	LS	1	N/A	
UB1a	Loading, Transport, and Off-Site Disposal of Contaminated Material – Subtitle C Landfill	Tons	4,180		
UB1b	Loading, Transport, and Off-Site Disposal of Contaminated Material – Incineration	Tons	460		
	Total Base Bid (including trench safety provisions)				

*Note: **Trench Excavation Safety Provisions**: If the bid amount contains any work that requires trenching exceeding a depth of four feet, all costs for trench safety shall be included in the appropriate Base Bid items for adequate trench safety systems in compliance with Chapter 39.04 RCW, Chapter 49.17 RCW, and WAC 296-155-650.*

Unit Prices: The Unit Prices listed in Table 2 will be used, as described in **SECTION 01 22 00 – UNIT PRICES**, to adjust the contract amount (increase or decrease) in the event of a change in the contract scope affecting these items of work. All prices provided shall be the complete cost for this unit price bid item, including overhead and profit, but not Washington State sales tax. The Bidder will propose a price for each item. Failure to propose a price for each item may render the bid non-responsive.

Name of Contractor: ____________________

Ecology reserves the right to accept or reject any or all unit prices within sixty (60) days of the bid date.

TABLE 2: SCHEDULE OF UNIT PRICES
(**Not** including Washington State Sales Tax)

ITEM NO.	ITEM OF WORK	UNIT	UNIT PRICE (price in dollars)
UB2	Excavation	Cubic Yard (CY) in place	$ Per CY
UB3	Imported Clean Fill Material	Cubic Yard (CY) in place	$ Per CY
UB4	Construction Dewatering Effluent Treatment	Gallons	$ Per Gallon

Contract Time: The undersigned agrees to achieve Substantial Completion within 120 calendar days after the date of Notice to Proceed. Final Completion shall be achieved within 60 calendar days after the date of Substantial Completion.

Liquidated Damages: The undersigned agrees to pay Ecology as liquidated damages $1,500 per calendar day for each calendar day past Substantial Completion that it is in default, and that Ecology can deduct this sum from progress payments on this contract until Substantial Completion is achieved.

Apprenticeship Utilization: The apprentice labor hours required for this project are 15% of the total labor hours. By submitting this bid, the undersigned agrees to this level of required apprenticeship utilization.

Receipt of Addenda: Bidder shall acknowledge any addenda issued to this Invitation for Bids by submitting a signed copy of the addenda with the bid proposal. Failure to do so will render the Bidder's bid non-responsive.

Ecology reserves the right to accept or reject any or all bid proposals and to waive informalities.

Name of Contractor: ____

Name of Firm ____

NOTE: *If Bidder is a corporation, identify the State of Incorporation; if a partnership, give full names and addresses of all parties below. Attach an additional page if necessary.*

Signed by ______________________________, Official Capacity __________________

Print Name ______________________________

Address ____

City ________________________ State ________ Zip Code ____________________

Date ______________ Telephone ____________________ FAX ____________________

Washington Contractor's Registration No./Expiration Date: ________________________

Federal Tax ID #: ____________________ e-mail address: ____________________

Washington UBI Number: ______________________________

Name of Contractor: ______________________________

SUBCONTRACTOR UTILIZATION FORM

If the base bid and the sum of any additive bid alternates is one million dollars or more, the Bidder shall provide names of the Subcontractors with whom the Bidder will **directly** subcontract for the performance of HVAC (heating, ventilation, and air conditioning), plumbing, or electrical work. If the Bidder intends to perform the work, the Bidder must enter its name for that category of work.

The Bidder shall not list more than one Subcontractor for each category of work identified UNLESS Subcontractors vary with bid alternates/schedules, in which case the Bidder must indicate which Subcontractor will be used for which alternate/schedule.

If there is no work under these categories on this project, the Bidder is to write the words "None" in the table below.

Failure of the Bidder to submit the NAMES of such contractors or to name itself to perform such work or enter the word "None" shall render the Bidder's bid non-responsive and, therefore, void.

Name of Firm	Work to Be Performed

END OF BID PROPOSAL FORM

GENERAL: The following list of major items of construction has been included for Bidder's convenience in preparing a bid proposal. Exclusion of items from this summary does not indicate exclusion from project. For lump sum items, the Bidder is cautioned that the Project Manual is the only source for measurement of project quantities, and the Project Manual has been detailed for this purpose. In preparing a bid proposal, Bidder should note apparent discrepancies between the list below and the Project Manual and consult with Ecology for verification.

TRENCH EXCAVATION SAFETY PROVISIONS: If the bid amount contains any work that requires trenching exceeding a depth of 4 feet, all costs for trench safety shall be included in the Base Bid and indicated on the Bid Proposal for adequate trench safety systems in compliance with *Chapter 39.04 RCW, Chapter 49.17 RCW,* and *Chapter 296-155-650 WAC*. **Bidder must include a lump sum dollar amount in the blank on the Bid Proposal Form (even if the value is $0.00) to be responsive.**

TOTAL BASE BID

The following is a breakdown of work included in the Total Base Bid for "Jacobson Terminals Property Interim Remedial Action":

The **Total Base Bid** is a lump sum bid amount that includes all costs, including overhead and profit, for the Bidder to provide all labor, materials, and equipment necessary for the remediation of contaminated soil and site restoration of the Jacobson Terminals Property as specified in the Project Manual, including but not limited to the activities described in A through I below.

Upon contract award, Items A through I will be the Contractor's basis of developing the cost items for the contract's Schedule of Values.

A. Bid Item No. LS1 – MOBILIZATION AND DEMOBILIZATION

1. This item consists of the preparatory work and operations performed by the Contractor including but not limited to those necessary for the movement of its personnel, equipment, supplies, and incidentals to the Project Site; for the establishment of its offices, buildings, and other facilities necessary for work on the Project; for premiums on bonds and insurance for the Project; and for other work and operations that it must perform or documented costs it must incur before beginning production work at the Project Site.

    a. Mobilization and Demobilization shall not exceed **five percent** (5%) of the value of the total base bid in the contract's Schedule of Values.

b. Payment will be a percentage of the lump sum amount provided in the Schedule of Values based upon the percentage of actual construction completed at the time of the payment estimate.

c. Mobilization/demobilization payment in the first progress payment shall not exceed 50% for this item.

B. Bid Item No. LS2 – GENERAL REQUIREMENTS

1. This item consists of full compensation, including overhead and profit, for project administration, supervision, coordination of the Contractor's, Subcontractors', and suppliers' work; coordination and meetings with Ecology; and the development, submittal, and implementation of required work plans and other required submittals, all as specified in **DIVISION 00** and **DIVISION 01** of the Project Manual, and not identified as a separate pay item for the contract's Schedule of Values.

2. Payment will be a percentage of the lump sum amount provided in the Schedule of Values based upon the percentage of actual construction completed at the time of the payment estimate.

C. Bid Item No. LS3 – HEALTH AND SAFETY

1. Payment for HEALTH AND SAFETY will be full compensation, including overhead and profit, for the cost of labor, tools, equipment, materials, and incidentals necessary to meet the requirements of the health and safety provisions for all work for this project required by the Health and Safety Plan. The work includes compliance with all laws, regulations, and ordinances with respect to safety, noise, dust, fire and police action, civil disobedience, security, or traffic as defined in **SECTION 01 35 29 – HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES.**

2. Health and Safety will be paid as a percentage of the lump sum amount provided in the Schedule of Values based upon the percentage of work completed under this item at the time of the payment estimate.

D. Bid Item No. LS4 – FIELD ENGINEERING

1. This item consists of full compensation, including overhead and profit, for providing all labor, tools, equipment, materials, and incidentals required for field engineering, including verifying survey reference points, for conducting pre-construction, progress, and post-construction surveys as shown on the drawings and described in **SECTION 01 71 23 – FIELD ENGINEERING**.

2. Field Engineering will be paid as a percentage of the lump sum amount provided in the Schedule of Values based upon the percentage actual work completed under this item at the time of the payment estimate.

E. Bid Item No. LS5 – TEMPORARY FACILITIES AND CONTROLS

1. This item consists of full compensation, including overhead and profit, for providing all labor, tools, equipment, materials, and incidentals necessary to implement the temporary facilities and controls work requirements described in **SECTION 01 50 00 – TEMPORARY FACILITIES AND CONTROLS**, **SECTION 01 56 26 – TEMPORARY FENCING**, and **SECTION 01 57 13 – TEMPORARY EROSION AND SEDIMENTATION CONTROL**, which include but are not limited to site access controls and temporary fencing, temporary erosion and sedimentation controls, temporary traffic controls, utilities, establishing access and staging areas, site maintenance and housekeeping, air pollution control, noise abatement, and decontamination facility requirements.

2. Payment will be a percentage of the lump sum amount provided in the Schedule of Values based upon actual work completed under this item at the time of the payment estimate.

F. Bid Item No. LS6 – SITE WORK

1. SITE WORK consists of full compensation, including overhead and profit, for providing all labor, tools, equipment, materials, and incidentals necessary to complete the site work as shown on the drawings and described in the Project Manual. SITE WORK includes but is not limited to documenting existing conditions, selective demolition, well abandonment, off-site disposal of demolition debris, excavation and stockpiling of contaminated materials, furnishing imported clean fill material, backfilling and compaction, grading, paving, and restoration/construction of site features.

2. The basis-of-bid quantities for SITE WORK are:

   Excavated Material: 3,100cubic yards in-place volume.
   Imported Clean Fill Material: 3,100 cubic yards in-place volume.

3. If there is an approved or Ecology-directed increase or decrease in quantities for excavated material and for clean imported fill material from the "basis of bid" quantities above, the contract sum will be adjusted (increased or decreased) by applying **Unit Price UB2 (Excavation) and/or Unit Price UB3 (Imported Clean Fill Material).**

4. Payment will be a percentage of the lump sum amount provided in the Schedule of Values based upon actual work completed under this item at the time of the payment estimate.

G. Bid Item No. LS7 – UNDERGROUND UTILITIES BYPASS AND RESTORATION

1. UNDERGROUND UTILITIES BYPASS AND RESTORATION consists of full compensation, including overhead and profit, for providing all labor, tools, equipment, materials, and incidentals necessary to complete the utility work described in **DIVISION 33 – UTILITIES**, which includes but is not limited to delineation of underground utilities within the Project Site and adjacent rights of way, acquiring necessary permits from applicable utility agencies, implementing bypass of underground utilities, removal of underground utilities from the excavation area, and restoration of underground utilities following completion of the excavation and backfilling work.
2. This pay item includes applicable permitting fees.
3. Payment will be a percentage of the lump sum amount provided in the Schedule of Values based upon actual work completed under this item at the time of the payment estimate.

H. Bid Item No. LS8 – CONSTRUCTION DEWATERING AND TREATMENT

1. CONSTRUCTION DEWATERING consists of full compensation, including overhead and profit, for providing all labor, tools, equipment, materials, and incidentals necessary to perform, at a minimum, the below listed items of work, as described in **SECTION 31 23 19 – CONSTRUCTION DEWATERING**, which may be identified further in separate sections of these specifications and/or on the plans.
   a. Preparation of a Dewatering Plan described in **SECTION 31 23 19**.
   b. Provide labor, equipment, and materials to design and construct/provide a construction dewatering and water treatment system as described in **SECTION 31 23 19**. Contractor shall be prepared to treat dewatering effluent at the direction of Ecology to meet the requirements of the King County treatment facility.
2. Payment will be a percentage of the lump sum amount provided in the Schedule of Values based upon actual work completed under this item at the time of the payment estimate.

I. Bid Item No. LS9 – PROJECT CLOSEOUT

1. PROJECT CLOSEOUT consists of full compensation for providing all labor, tools, equipment, materials, and incidentals necessary to complete and deliver the documents as specified in **SECTION 01 77 00 – CLOSEOUT PROCEDURES**.

2. PROJECT CLOSEOUT will be paid at 100% of the lump sum amount provided in the Schedule of Values upon achieving Final Completion.

UNIT PRICE BID ITEMS

ITEM	DESCRIPTION	UNIT OF MEASURE
UB1	**LOADING, TRANSPORT, AND OFF-SITE DISPOSAL OF CONTAMINATED MATERIAL**	**PER TON**

A. The unit price for Loading, Transport, and Off-Site Disposal of Contaminated Material consists of full compensation, including overhead and profit, for providing all labor, tools, equipment, materials, and incidentals necessary to characterize, load, transport, and dispose of excavated soil at a RCRA Subtitle C permitted landfill facility and/or an EPA-approved incineration facility approved to handle these wastes as described in **SECTION 02 61 13 – EXCAVATION AND HANDLING OF CONTAMINATED SOIL** and **SECTION 31 23 16 – EXCAVATION**. Costs will include equipment, materials, and labor necessary to dry out and/or amend material stockpile for the purpose of passing the paint filter test (SW-846 Method 9095A) prior to loading.

1. This pay item includes transportation and off-site disposal costs/tipping fees.

2. The basis-of-bid quantities for this item of work are:

   a. **Landfill disposal: <u>3,800</u> tons**

   b. **Incineration: <u>420</u> tons**

3. The quantity for payment for completed work will be based on the actual tonnage, as verified by weight tickets of all material transported to the off-site disposal facility.

4. Contractor shall notify Ecology if it anticipates overrunning the basis of bid quantity for a decision on how to proceed. All quantities shall be verified and paid based on weight tickets from the disposal facility using a state-certified scale.

5. Assumed tonnage, as shown on bid form, is based on design excavation volume multiplied by a factor of 1.5 to convert to tons. In case the actual tonnage disposed of varies from that assumed, supplied unit rates will be used to adjust total cost. Ecology or Ecology's Representative must verify or otherwise concur with pay adjustments.

UB2 EXCAVATION PER CUBIC YARD (IN PLACE)

A. This unit price will be used to adjust the contract sum when there is an increase or decrease in the basis of bid quantity in the Total Base Bid for excavation.

1. This unit price will be full compensation, including overhead and profit, for providing the labor, tools, equipment, materials, and incidentals necessary for this work.
2. This unit price is provided in case project conditions increase or decrease the scope of the excavation work.
3. Field survey will determine actual quantities used for excavation and the corresponding adjustment to the contract sum that will be made using this unit price.
4. If the full estimated bid quantities for excavation provided in the Project Manual are not required because structures or other constraints prevent the Contractor from reaching the full excavation depths indicated in the Project Manual, then Contractor shall credit back to Ecology the value of the unrequired excavation at the stated Unit Price for UB2.

UB3 IMPORTED CLEAN FILL MATERIAL PER CUBIC YARD (IN PLACE)

A. This unit price will be used to adjust the contract sum when there is an increase or decrease in the basis of bid quantities in the Total Base Bid for imported clean fill material, including backfilling and compaction.

1. This unit price will be full compensation, including overhead and profit, for providing the labor, tools, equipment, materials, and incidentals necessary for this work. This unit price bid item includes backfilling and compaction of the imported clean fill material.
2. This unit price is provided in case project conditions increase or decrease the scope for imported clean fill material, including backfilling and compaction.
3. Field survey will determine actual quantities used for imported clean fill material, including backfilling and compaction and the corresponding adjustment to the contract sum that will be made using this unit price.

4. If the full estimated bid quantities for imported clean fill provided in the Project Manual are not required because structures or other constraints prevent the Contractor from reaching the full excavation depths indicated in the Project Manual, then Contractor shall credit back to Ecology the value of the imported clean fill material not required at the stated Unit Price for UB3.

UB4 CONSTRUCTION DEWATERING EFFLUENT TREATMENT PER GALLON

A. The unit price for Construction Dewatering consists of full compensation, including overhead and profit, for providing all labor, materials, and incidentals necessary to characterize, treat, and properly dispose the effluent generated from the construction dewatering process, as described in **SECTION 31 23 19 – CONSTRUCTION DEWATERING**. Contractor shall be prepared to treat dewatering effluent at the direction of Ecology to meet the requirements of the King County treatment facility.

1. This pay item includes disposal fees and/or sanitary sewer connection and discharge fees.
2. The basis of bid quantity for this item of work is **25,000 gallons per day**.
3. Payment will be based on the total gallons treated and discharged at the direction of Ecology.

END OF SECTION

PREVAILING WAGES

The State of Washington prevailing wage rates are applicable for this public works project, which is located in King County. Prevailing wages may be found at the following website address of the Department of Labor and Industries:

https://fortress.wa.gov/lni/wagelookup/prvWagelookup.aspx.

The prevailing wages for this project are those that are in effect on the date that the bids are due.

Upon request, Ecology will provide a copy of the applicable prevailing wages for this project. Please contact the Contracts Officer, Joseph Ward, at (360) 407-7210 or at Joe.Ward@ecy.wa.gov if you need to request a copy.

END OF SECTION

PART 1 – GENERAL CONDITIONS

1.01 Definitions
1.02 Order of Precedence
1.03 Execution and Intent

PART 2 – INSURANCE AND BONDS

2.01 Contractor's Liability Insurance
2.02 Coverage Limits
2.03 Insurance Coverage Certificates
2.04 Payment and Performance Bonds
2.05 Alternative Surety
2.06 Builder’s Risk

PART 3 – TIME/SCHEDULE

3.01 Progress and Completion
3.02 Construction Schedule
3.03 Ecology’s Right to Suspend the Work for Convenience
3.04 Ecology’s Right to Stop Work for Cause
3.05 Delay
3.06 Notice to Ecology of Labor Disputes
3.07 Damages for Failure to Achieve Timely Completion

PART 4 – SPECIFICATIONS, DRAWINGS, AND OTHER DOCUMENTS

4.01 Discrepancies and Contract Document Review
4.02 Project Record
4.03 Shop Drawings
4.04 Organization of Specifications
4.05 Ownership and Use of Drawings, Specifications, and Other Documents

PART 5 – PERFORMANCE

5.01 Contractor Control and Supervision
5.02 Permits, Fees, and Notices
5.03 Permits and Royalties
5.04 Prevailing Wages
5.05 Hours of Labor
5.06 Nondiscrimination
5.07 Safety Precautions
5.08 Operations, Material Handling, and Storage Area
5.09 Prior Notice of Excavation

5.10 Unforeseen Physical Conditions
5.11 Protection of Existing Structures, Equipment, Vegetation, Utilities, and Improvements
5.12 Layout of Work
5.13 Material and Equipment
5.14 Offshore Items
5.15 Availability and Use of Utility Services
5.16 Test and Inspection
5.17 Correction of Nonconforming Work
5.18 Cleanup
5.19 Access to Work
5.20 Other Contracts
5.21 Subcontractors and Suppliers
5.22 Warranty of Construction
5.23 Indemnification

PART 6 – PAYMENT AND COMPLETION

6.01 Contract Sum
6.02 Schedule of Values
6.03 Application for Payment
6.04 Progress payments
6.05 Payments Withheld
6.06 Retainage and Bond Claim Rights
6.07 Substantial Completion
6.08 Prior Occupancy
6.09 Final Completion, Acceptance, and Payment

PART 7 – CHANGES

7.01 Change in the Work
7.02 Change in the Contract Sum
7.03 Change in the Contract Time

PART 8 – CLAIMS AND DISPUTE RESOLUTION

8.01 Claims Procedure
8.02 Arbitration
8.03 Claims Audits

PART 9 – TERMINATION OF THE WORK

9.01 Termination by Ecology for Cause
9.02 Termination by Ecology for Convenience

PART 10 – MISCELLANEOUS PROVISIONS

10.01 Governing Law
10.02 Successors and Assigns
10.03 Meaning of Words
10.04 Rights and Remedies
10.05 Contractor Registration
10.06 Time Computations
10.07 Record Retention
10.08 Third-Party Agreements
10.09 Antitrust Assignment
10.10 Headings and Captions

PART 1 – GENERAL CONDITIONS

1.01 DEFINITIONS

A. “Application for Payment” means a written request submitted by Contractor to A/E for payment of Work completed, in accordance with the Contract Documents and approved Schedule of Values, supported by such substantiating data as Ecology or A/E may require.

B. “Architect”, “Engineer”, or “A/E” means a person or entity lawfully entitled to practice architecture or engineering, representing Ecology within the limits of its delegated authority.

C. “Change Order” means a written instrument signed by Ecology and Contractor stating their agreement upon all of the following: (1) a change in the Work; (2) the amount of the adjustment in the Contract Sum, if any; and (3) the extent of the adjustment in the Contract Time, if any.

D. “Claim” means Contractor's exclusive remedy for resolving disputes with Ecology regarding the terms of a Change Order or a request for equitable adjustment, as more fully set forth in Part 8 – CLAIMS AND DISPUTE RESOLUTION.

E. “Contract Award Amount” is the sum of the Base Bid and any accepted Alternates.

F. “Contract Documents” means the Project Manual, the Invitation for Bid, Advertisement for Bids, Instructions to Bidders, completed Bid Form, General Conditions, Modifications to the General Conditions, Supplemental Conditions, Public Works Contract, other Special Forms, Drawings and Specifications, and all addenda and modifications thereof.

G. “Contract Sum” means the total amount payable by Ecology to Contractor for performance of the Work in accordance with the Contract Documents, including all taxes imposed by law and properly chargeable to the work, except Washington State sales tax.

H. “Contract Time” means the number of calendar days allotted in the Contract Documents for achieving Substantial Completion of the Work.

I. “Contractor” means the person or entity who has agreed with Ecology to perform the Work in accordance with the Contract Documents.

J. “Days” unless otherwise specified day(s) shall mean calendar days.

K. “Drawings” are the graphic and pictorial portions of the Contract Documents showing the design, location, and dimensions of the Work, and may include plans, elevations, sections, details, schedules, and diagrams.

L. “Ecology” means the Washington State Department of Ecology (Ecology) or its authorized representative with the authority to enter into, administer, and/or terminate the Work in accordance with the Contract Documents and make related determinations and findings.

M. “Final Acceptance” means the written acceptance issued to Contractor by Ecology after Contractor has completed the requirements of the Contract Documents, as more fully set forth in Section 6.09B.

N. “Final Completion” means that the Work is fully and finally completed in accordance with the Contract Documents, as more fully set forth in Section 6.09A.

O. “Force Majeure” means those acts entitling Contractor to request an equitable adjustment in the Contract Time, as more fully set forth in paragraph 3.05A.

P. “Notice” means a written notice that has been delivered in person to the individual or a member of the firm or entity or to an officer of the corporation for which it was intended or, if delivered or sent by registered or certified mail, to the last business address known to the party giving notice.

Q. “Notice to Proceed” means a notice from Ecology to Contractor that defines the date on which the Contract Time begins.

R. “Person” means a corporation, partnership, business association of any kind, trust, company, or individual.

S. “Prior Occupancy” means Ecology or Property Owner use of all or parts of the Project before Substantial Completion, as more fully set forth in Section 6.08A.

T. “Progress Schedule” means a schedule of the Work, in a form satisfactory to Ecology, as further set forth in Section 3.02

U. "Project" means the total construction of which the Work performed in accordance with the Contract Documents may be the whole or a part and which may include construction by Ecology or by separate contractors.

V. "Project Record" means the separate set of Drawings and Specifications as further set forth in paragraph 4.02A.

W. "Property Owner" means the owner of the property, other than Ecology, on which the work under the contract will occur.

X. "Schedule of Values" means a written breakdown allocating the total Contract Sum to each principle category of Work, in such detail as requested by Ecology.

Y. "Specifications" are that portion of the Contract Documents consisting of the written requirements for materials, equipment, construction systems, standards, and workmanship for the Work, and performance of related services.

Z. "Subcontract" means a contract entered between the Contractor and a Subcontractor for the purpose of obtaining supplies, materials, equipment, or services of any kind for, or in connection with, the Work.

AA. "Subcontractor": Any person other than the Contractor who agrees to furnish or furnishes any supplies, materials, equipment, or services of any kind in connection with the Work.

BB. "Substantial Completion" means that stage in the progress of the Work when the construction is sufficiently complete, as more fully set forth in Section 6.07.

CC. "Work" means the construction and services required by the Contract Documents, and includes, but is not limited to, labor, materials, supplies, equipment, services, permits, and the manufacture and fabrication of components, performed, furnished, or provided in accordance with the Contract Documents.

1.02 ORDER OF PRECEDENCE

Any conflict or inconsistency in the Contract Documents will be resolved by giving the documents precedence in the following order:

A. Signed Public Works Contract, including any Change Orders

B. Supplemental Conditions

C. Modifications to the General Conditions

D. General Conditions

E. Specifications: Provisions in Division 01 shall take precedence over provisions of any subsequent divisions.

F. Drawings: In case of conflict within the Drawings, large-scale drawings shall take precedence over small-scale drawings.

G. Signed and Completed Bid Form

H. Instruction to Bidders

I. Invitation for Bids/Advertisement for Bids

1.03 EXECUTION AND INTENT

Contractor Representations: Contractor makes the following representations to Ecology:

A. Contract Sum reasonable. The Contract Sum is reasonable compensation for the Work and the Contract Time is adequate for the performance of the Work, as represented by the Contract Documents.

B. Contractor familiar with project. Contractor has carefully reviewed the Contract Documents, visited and examined the Project site, become familiar with the local conditions in which the Work is to be performed, and satisfied itself as to the nature, location, character, quality and quantity of the Work, labor, materials, equipment, goods, supplies, services, and other items to be furnished and all other requirements of the Contract Documents, as well as the surface and subsurface conditions and other matters that may be encountered at the Project site or affect performance of the Work or the cost or difficulty thereof.

C. Contractor financially capable. Contractor is financially solvent, able to pay its debts as they mature, and possesses sufficient working capital to complete the Work and perform Contractor's obligations required by the Contract Documents.

D. Contractor can complete work. Contractor is able to furnish the plant, tools, materials, supplies, equipment, and labor required to complete the Work and perform the obligations required by the Contract Documents and has sufficient experience and competence to do so.

PART 2 – INSURANCE AND BONDS

2.01 CONTRACTOR'S LIABILITY INSURANCE

General insurance requirements: Prior to commencement of the Work, Contractor shall obtain all the insurance required by the Contract Documents and provide evidence satisfactory to Ecology that such insurance has been procured. Review of the Contractor's insurance by Ecology will not relieve or decrease the liability of Contractor. Companies writing the insurance to be obtained by this section will be licensed to do business under Chapter 48 RCW or comply with the Surplus Lines Law of the State of Washington. Contractor shall include in its bid the cost of all insurance and bonds required to complete the base bid work and accepted alternates. Insurance carriers providing insurance in accordance with the Contract Documents will be rated “A + VII” or better by A.M. Best, and ratings will be indicated on the insurance certificates.

A. Term of insurance coverage. Contractor shall maintain the following insurance coverage during the Work and for one year after Final Acceptance. Contractor shall also maintain the following insurance coverage during the performance of any corrective Work required by Section 5.17.

   1. Commercial General Liability (CGL) on an Occurrence Form. Coverage shall include, but not be limited to:

      a. Completed operations/products liability

      b. Explosion, collapse, and underground

      c. Employer's liability coverage

   2. Automobile Liability Insurance: Automotive liability

B. Industrial Insurance compliance. Contractor shall comply with the Washington State Industrial Insurance Act, and, if applicable, the Federal Longshoremen's and Harbor Workers' Act, and the Jones Act.

C. Insurance to protect for the following: All insurance coverages will protect against claims for damages for personal and bodily injury or death, as well as claims for property damage, which may arise from operations in connection with the Work whether such operations are by Contractor or any Subcontractor.

D. Ecology as Additional insured: All insurance coverages will be endorsed to include Ecology as an additional named insured for Work performed in accordance with the Contract Documents, and all insurance certificates will evidence Ecology as an additional insured.

2.02 COVERAGE LIMITS

Insurance amounts: The coverage limits will be as follows:

A. Limits of Liability will not be less than $1,000,000 Combined Single Limit for Bodily Injury and Property Damage (other than Automobile liability) Each Occurrence; Personal Injury and Advertising Liability Each Occurrence.

B. $2,000,000 Combined Single Limit Annual General Aggregate.

C. $2,000,000 Annual Aggregate for Products and Completed Operations Liability.

D. $1,000,000 Combined Single Limit for Automobile Bodily Injury and Property Damage Liability, Each Accident or Loss.

2.03 INSURANCE COVERAGE CERTIFICATES

A. Certificate required: Prior to the commencement of the Work, Contractor shall furnish to Ecology a completed Certificate of Insurance coverage.

B. List Project info: All insurance certificates will name Ecology's Project number and Project title.

C. Cancellation provisions: All insurance certificates will specifically require 45 days prior notice to Ecology of cancellation or any material change, except 30 days for surplus line insurance.

2.04 PAYMENT AND PERFORMANCE BONDS

Conditions for bonds: Payment and performance bonds for 100% of the Contract Award Amount, plus state sales tax, shall be furnished for the Work, using the Payment Bond and Performance Bond form published by and available from the American Institute of Architects (AIA) – form A312. Prior to execution of a Change Order that, cumulatively with previous Change Orders, increases the Contract Award Amount by 15% or more, the Contractor shall provide either new payment and performance bonds for the revised Contract Sum, or riders to the existing payment and performance bonds increasing the amount of the bonds. The Contractor shall likewise provide additional bonds or riders when subsequent Change Orders increase the Contract Sum by 15% or more. No payment or performance bond is required if the Contract Sum is $35,000 or less, and Contractor agrees that Ecology may, in lieu of the bond, retain 50 percent of the Contract Sum for the period allowed by RCW 39.08.010.

2.05 ALTERNATIVE SURETY

When alternative surety required: Contractor shall promptly furnish payment and performance bonds from an alternative surety as required protecting Ecology and persons supplying labor or materials required by the Contract Documents if:

A. Ecology has a reasonable objection to the surety; or

B. Any surety fails to furnish reports on its financial condition if requested by Ecology.

2.06 BUILDER'S RISK (APPLIES ONLY TO ECOLOGY PROJECTS THAT INCLUDE PERMANENT OR TEMPORARY BUILDINGS)

A. Contractor to buy Property Insurance: Contractor shall purchase and maintain property insurance in the amount of the Contract Sum including all Change Orders for the Work on a replacement cost basis until Final Completion. The insurance shall cover the interest of Ecology, Contractor, and any Subcontractors, as their interests may appear.

B. Losses covered: Contractor property insurance shall be placed on an "all risk" basis and insure against the perils of fire and extended coverage and physical loss or damage including theft, vandalism, malicious mischief, collapse, false work, temporary buildings, debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for A/Es' services and expenses required as a result of an insured loss.

C. Waiver of subrogation rights: Ecology and Contractor waive all subrogation rights against each other, any Subcontractors, A/E, A/Es' subconsultants, separate contractors described in Section 5.20, if any, and any of their Subcontractors, for damages caused by fire or other perils to the extent covered by property insurance obtained pursuant to this section or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by Ecology as fiduciary. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

PART 3 – TIME AND SCHEDULE

3.01 PROGRESS AND COMPLETION

Contractor to meet schedule: Contractor shall diligently prosecute the Work, with adequate forces, achieve Substantial Completion within the Contract Time, and achieve Final Completion within a reasonable period thereafter.

3.02 CONSTRUCTION SCHEDULE

A. Preliminary Progress Schedule: Unless otherwise provided in Division 01, Contractor shall, within 14 days after issuance of the Notice to Proceed, submit a preliminary Progress Schedule. The Progress Schedule shall show the sequence in which Contractor proposes to perform the Work, and the dates on which Contractor plans to start and finish major portions of the Work, including dates for shop drawings and other submittals, and for acquiring materials and equipment.

B. Form of Progress Schedule: Unless otherwise provided in Division 01, the Progress Schedule will be in the form of a bar chart, or a critical path method analysis, as specified by Ecology. The preliminary Progress Schedule may be general, showing the major portions of the Work, with more specific Progress Schedules in subsequent months as directed by Ecology.

C. Ecology comments on Progress Schedule: Ecology shall return comments on the preliminary Progress Schedule to Contractor within 14 days of receipt. Review by Ecology of Contractor's schedule does not constitute an approval or acceptance of Contractor's construction means, methods, or sequencing, or its ability to complete the Work within the Contract Time. Contractor shall revise and resubmit its schedule, as necessary. Ecology may withhold progress payments until a Progress Schedule has been submitted that meets the requirements of this section.

D. Monthly updates and compliance with Progress Schedule: Contractor shall utilize and comply with the Progress Schedule. On a monthly basis, or as otherwise directed by Ecology, Contractor shall submit an updated Progress Schedule at its own expense to Ecology indicating actual progress. If, in the opinion of Ecology, Contractor is not in conformance with the Progress Schedule for reasons other than acts of Force Majeure as identified in Section 3.05, Contractor shall take such steps as are necessary to bring the actual completion dates of its work activities into conformance with the Progress Schedule, and if directed by Ecology, Contractor shall submit a corrective action plan or revise the Progress Schedule to reconcile with the actual progress of the Work.

E. Contractor to notify Ecology of delays: Contractor shall promptly notify Ecology in writing of any actual or anticipated event that is delaying or could delay achievement of any milestone or performance of any critical path activity of the Work. Contractor shall indicate the expected duration of the delay, the anticipated effect of the delay on the Progress Schedule, and the action being or to be taken to correct the problem. Provision of such notice does not relieve Contractor of its obligation to complete the Work within the Contract Time.

3.03 ECOLOGY'S RIGHT TO SUSPEND THE WORK FOR CONVENIENCE

A. Ecology may suspend work: Ecology may, at its sole discretion, order Contractor, in writing, to suspend all or any part of the Work for up to 90 days, or for such longer period as mutually agreed.

B. Compliance with suspension – Ecology's options: Upon receipt of a written notice suspending the Work, Contractor shall immediately comply with its terms and take all reasonable steps to minimize the incurrence of cost of performance directly attributable to such suspension. Within a period up to 90 days after the notice is delivered to Contractor, or within any extension of that period to which the parties shall have agreed, Ecology shall either:

1. Cancel the written notice suspending the Work; or
2. Terminate the Work covered by the notice as provided in the termination provisions of Part 9 – TERMINATION OF THE WORK.

C. Resumption of Work: If a written notice suspending the Work is canceled or the period of the notice or any extension thereof expires, Contractor shall resume the Work.

D. Equitable adjustment for suspensions: Contractor shall be entitled to an equitable adjustment in the Contract Time, or Contract Sum, or both, for increases in the time or cost of performance directly attributable to such suspension, provided Contractor complies with all requirements set forth in Part 7 – CHANGES.

3.04 ECOLOGY'S RIGHT TO STOP THE WORK FOR CAUSE

A. Ecology may stop Work for Contractor's failure to perform: If Contractor fails or refuses to perform its obligations in accordance with the Contract Documents, Ecology may order Contractor, in writing, to stop the Work, or any portion thereof, until satisfactory corrective action has been taken.

B. No Equitable Adjustment for Contractor's failure to perform: Contractor shall not be entitled to an equitable adjustment in the Contract Time or Contract Sum for any increased cost or time of performance attributable to Contractor's failure or refusal to perform or from any reasonable remedial action taken by Ecology based upon such failure.

3.05 DELAY

A. Force Majeure actions not a default: Force Majeure defined: Any delay in or failure of performance by Ecology or Contractor, other than the payment of money, shall not constitute a default hereunder if and to the extent the cause for such delay or failure of performance was unforeseeable and beyond the control of the party (“Force Majeure”). Acts of Force Majeure include, but are not limited to:

1. Acts of God or the public enemy;
2. Acts or omissions of any government entity;
3. Fire or other casualty for which Contractor is not responsible;
4. Quarantine or epidemic;
5. Strike or defensive lockout;
6. Unusually severe weather conditions that could not have been reasonably anticipated; and
7. Unusual delay in receipt of supplies or products which were ordered and expedited and for which no substitute reasonably acceptable to Ecology was available.

B. Contract time adjustment for Force Majeure: Contractor shall be entitled to an equitable adjustment in the Contract Time for changes in the time of performance directly attributable to an act of Force Majeure, provided it makes a request for equitable adjustment according to Section 7.03. Contractor shall not be entitled to an adjustment in the Contract Sum resulting from an act of Force Majeure.

C. Contract Time or Contract Sum adjustment if Ecology at fault: Contractor shall be entitled to an equitable adjustment in Contract Time, and may be entitled to an equitable adjustment in Contract Sum, if the cost or time of Contractor's performance is changed due to the fault or negligence of Ecology, provided the Contractor makes a request according to Section 7.02 and 7.03.

D. No Contract Time or Contract Sum adjustment if Contractor at fault: Contractor shall not be entitled to an adjustment in Contract Time or in the Contract Sum for any delay or failure of performance to the extent such delay or failure was caused by Contractor or anyone for whose acts Contractor is responsible.

E. Contract Time adjustment only for concurrent fault: To the extent any delay or failure of performance was concurrently caused by Ecology and Contractor, Contractor shall be entitled to an adjustment in the Contract Time for that portion of the delay or failure of performance that was concurrently caused, provided it makes a request for equitable adjustment according to Section 7.03, but shall not be entitled to an adjustment in Contract Sum.

F. Contractor to mitigate delay impacts: Contractor shall make all reasonable efforts to prevent and mitigate the effects of any delay, whether occasioned by an act of Force Majeure or otherwise.

3.06 NOTICE TO ECOLOGY OF LABOR DISPUTES

A. Contractor to notify Ecology of labor disputes: If Contractor has knowledge that any actual or potential labor dispute is delaying or threatens to delay timely performance in accordance with the Contract Documents, Contractor shall immediately give notice, including all relevant information, to Ecology.

B. Pass through notification provisions to Subcontractors: Contractor agrees to insert a provision in its Subcontracts and to require insertion in all sub-subcontracts, that in the event that timely performance of any such contract is delayed or threatened by delay by any actual or potential labor dispute, the Subcontractor or Sub-subcontractor shall immediately notify the next higher tier Subcontractor or Contractor, as the case may be, of all relevant information concerning the dispute.

3.07 DAMAGES FOR FAILURE TO ACHIEVE TIMELY COMPLETION

A. Liquidated Damages:

1. Reason for Liquidated Damages: Timely performance and completion of the Work is essential to Ecology and time limits stated in the Contract Documents are of the essence. Ecology will incur serious and substantial damages if Substantial Completion of the Work does not occur within the Contract Time. However, it would be difficult if not impossible to determine the exact amount of such damages. Consequently, provisions for liquidated damages are included in the Contract Documents.

2. Calculation of Liquidated Damages amount: The liquidated damage amounts set forth in the Contract Documents will be assessed not as a penalty, but as liquidated damages for breach of the Contract Documents. This amount is fixed and agreed upon by and between the Contractor and Ecology because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages Ecology would in such event sustain. This amount shall be construed as the actual amount of damages sustained by Ecology, and may be retained by Ecology and deducted from periodic payments to the Contractor.

3. Contractor responsible even if Liquidated Damages assessed: Assessment of liquidated damages shall not release Contractor from any further obligations or liabilities pursuant to the Contract Documents.

B. Actual Damages:

1. Calculation of Actual Damages: Actual damages will be assessed for failure to achieve Final Completion within the time provided. Actual damages will be calculated on the basis of direct architectural, administrative, and other related costs attributable to the Project from the date when Final Completion should have been achieved, based on the date Substantial Completion is actually achieved, to the date Final Completion is actually achieved. Ecology may offset these costs against any payment due Contractor.

PART 4 – SPECIFICATIONS, DRAWINGS, AND OTHER DOCUMENTS

4.01 DISCREPANCIES AND CONTRACT DOCUMENT REVIEW

A. Specifications and Drawings are basis of the Work: The intent of the Specifications and Drawings is to describe a complete Project to be constructed in accordance with the Contract Documents. Contractor shall furnish all labor, materials, equipment, tools, transportation, permits, and supplies, and perform the Work required in accordance with the Drawings, Specifications, and other provisions of the Contract Documents.

B. Parts of the Contract Documents are complementary: The Contract Documents are complementary. What is required by one part of the Contract Documents shall be binding as if required by all. Anything mentioned in the Specifications and not shown on the Drawings, or shown on the Drawings and not mentioned in the Specifications, shall be of like effect as if shown or mentioned in both.

C. Contractor to report discrepancies in Contract Documents: Contractor shall carefully study and compare the Contract Documents with each other and with information furnished by Ecology. If during the performance of the Work Contractor finds a conflict, error, inconsistency, or omission in the Contract Documents, it shall promptly and before proceeding with the Work affected thereby, report such conflict, error, inconsistency, or omission to A/E in writing.

D. Contractor knowledge of discrepancy in documents-responsibility: Contractor shall do no Work without applicable Drawings, Specifications, or written modifications, or Shop Drawings where required, unless instructed to do so in writing by Ecology. If Contractor performs any construction activity, and it knows or reasonably should have known that any of the Contract Documents contain a conflict, error, inconsistency, or omission, Contractor shall be responsible for the performance and shall bear the cost for its correction.

E. Contractor to perform work implied by Contract Documents: Contractor shall provide any work or materials the provision of which is clearly implied and is within the scope of the Contract Documents even if the Contract Documents do not mention them specifically.

F. Interpretation questions referred to A/E. Questions regarding interpretation of the requirements of the Contract Documents will be referred to the A/E.

4.02 PROJECT RECORD

A. Contractor to maintain Project Record Drawings and Specifications: Contractor shall legibly mark in ink on a separate set of the Drawings and Specifications all actual construction including depths of foundations, horizontal and vertical locations of internal and underground utilities and appurtenances referenced to permanent visible and accessible surface improvements, field changes of dimensions and details, actual suppliers, manufacturers and trade names, models of installed equipment, and Change Order proposals. This separate set of Drawings and Specifications will be the "Project Record."

B. Update Project Record weekly and keep on site. The Project Record will be maintained on the project site throughout the construction and will be clearly labeled "PROJECT RECORD." The Project Record will be updated at least weekly noting all changes and will be available to Ecology at all times.

C. Final Project Record to A/E before Final Acceptance. Contractor shall submit the completed and finalized Project Record to A/E prior to Final Acceptance.

4.03 SHOP DRAWINGS

A. Definition of Shop Drawings. “Shop Drawings” means documents and other information required to be submitted to A/E by Contractor pursuant to the Contract Documents, showing in detail the proposed fabrication and assembly of structural elements and the installation (i.e., form, fit, and attachment details) of materials and equipment. Shop drawings include, but are not limited to, drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, samples, and similar materials furnished by Contractor to explain in detail specific portions of the Work required by the Contract Documents. For materials and equipment to be incorporated into the Work, Contractor submittal shall include the name of the manufacturer, the model number, and other information concerning the performance, capacity, nature, and rating of the item. When directed, Contractor shall submit all samples at its own expense. Ecology may duplicate, use, and disclose shop drawings provided in accordance with the Contract Documents.

B. Approval of Shop Drawings by Contractor and A/E. Contractor shall coordinate all shop drawings and review them for accuracy, completeness, and compliance with the Contract Documents and shall indicate its approval thereon as evidence of such coordination and review. Where required by law, shop drawings shall be stamped by an appropriate professional licensed by the State of Washington. Shop drawings submitted to A/E without evidence of Contractor's approval shall be returned for resubmission. Contractor shall review, approve, and submit shop drawings with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of Ecology or separate contractors. Contractor's submittal schedule shall allow a reasonable time for A/E review. A/E shall review, approve, or take other appropriate action on the shop drawings. Contractor shall perform no portion of the Work requiring submittal and review of shop drawings until the respective submittal has been reviewed and the A/E has approved or taken other appropriate action. Ecology and A/E shall respond to shop drawing submittals with reasonable promptness. Any Work by Contractor shall be in accordance with reviewed shop drawings. Submittals made by Contractor that are not required by the Contract Documents may be returned without action.

C. Contractor not relieved of responsibility when Shop Drawings approved. Approval or other appropriate action with regard to shop drawings by Ecology or A/E shall not relieve Contractor of responsibility for any errors or omissions in such shop drawings, nor from responsibility for compliance with the requirements of the Contract Documents. Unless specified in the Contract Documents, review by Ecology or A/E shall not constitute an approval of the safety precautions employed by Contractor during construction, or constitute an approval of Contractor's means or methods of construction. If Contractor fails to obtain approval before installation, and the item or work is subsequently rejected, Contractor shall be responsible for all costs of correction.

D. Variations between Shop Drawings and Contract Documents. If shop drawings show variations from the requirements of the Contract Documents, Contractor shall describe such variations in writing, separate from the shop drawings, at the time it submits the shop drawings containing such variations. If A/E approves any such variation, an appropriate Change Order shall be issued. If the variation is minor and does not involve an adjustment in the Contract Sum or Contract Time, a Change Order need not be issued; however, the modification shall be recorded on the Project Record.

E. Contractor to submit 5 copies of Shop Drawings. Unless otherwise provided in DIVISION 01, Contractor shall submit to A/E for approval 5 copies of all shop drawings. Unless otherwise indicated, 3 sets of all shop drawings shall be retained by A/E, and 2 sets shall be returned to Contractor.

4.04 ORGANIZATION OF SPECIFICATIONS

A. Specification organization by trade: Specifications are prepared in sections that conform generally with trade practices. These sections are for Ecology and Contractor convenience and shall not control Contractor in dividing the Work among the Subcontractors or in establishing the extent of the Work to be performed by any trade.

4.05 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS, AND OTHER DOCUMENTS

A. A/E, not Contractor, owns Copyright of Drawings and Specifications: Drawings, Specifications, and other documents prepared by A/E are instruments of A/E's service through which the Work to be executed by Contractor is described. Neither Contractor nor any Subcontractor shall own or claim a copyright in the Drawings, Specifications, and other documents prepared by A/E, and A/E shall be deemed the author of them and will, along with any rights of Ecology, retain all common law, statutory, and other reserved rights, in addition to the copyright. All copies of these documents, except Contractor's set, shall be returned or suitably accounted for to A/E, on request, upon completion of the Work.

B. Drawings and Specifications to be used only for this Project: The Drawings, Specifications, and other documents prepared by the A/E, and copies thereof furnished to Contractor, are for use solely with respect to this Project. They are not to be used by Contractor or any Subcontractor on other projects or for additions to this Project outside the scope of the Work without the specific written consent of Ecology and A/E. Contractor and Subcontractors are granted a limited license to use and reproduce applicable portions of the Drawings, Specifications, and other documents prepared by A/E appropriate to and for use in the execution of their Work.

C. Shop Drawing license granted to Ecology: Contractor and all Subcontractors grant a nonexclusive license to Ecology, without additional cost or royalty, to use for its own purposes (including reproduction) all shop drawings, together with the information and diagrams contained therein, prepared by Contractor or any Subcontractor. In providing shop drawings, Contractor and all Subcontractors warrant that they have authority to grant to Ecology a license to use the shop drawings, and that such license is not in violation of any copyright or other intellectual property right. Contractor agrees to defend and indemnify Ecology and Ecology's Representative pursuant to the indemnity provisions in Section 5.23 from any violations of copyright or other intellectual property rights arising out of Ecology use of the shop drawings hereunder, or to secure for Ecology, at Contractor's own cost, licenses in conformity with this section.

D. Shop Drawings to be used only for this Project: The shop drawings and other submittals prepared by Contractor, Subcontractors, or its or their equipment or material suppliers, and copies thereof furnished to Contractor, are for use solely with respect to this Project. They are not to be used by Contractor or any Subcontractor on other projects or for additions to this Project outside the scope of the Work without the specific written consent of Ecology. The Contractor, Subcontractors of any tier, and material or equipment suppliers are granted a limited license to use and reproduce applicable portions of the shop drawings and other submittals appropriate to and for use in the execution of their Work under the Contract Documents.

PART 5 – PERFORMANCE

5.01 CONTRACTOR CONTROL AND SUPERVISION

A. Contractor responsible for means and methods of construction: Contractor shall supervise and direct the Work, using its best skill and attention, and shall perform the Work in a skillful manner. Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the Work, unless the Contract Documents give other specific instructions concerning these matters. Contractor shall disclose its means and methods of construction when requested by Ecology.

B. Competent Superintendent required: Performance of the Work shall be directly supervised by a competent superintendent who has authority to act for Contractor. The superintendent must be satisfactory to Ecology and shall not be changed without the prior written consent of Ecology. Ecology may require Contractor to remove the superintendent from the Work or Project site, if Ecology reasonably deems the superintendent incompetent, careless, or otherwise objectionable, provided Ecology has first notified Contractor in writing and allowed a reasonable period for transition.

C. Contractor responsible for acts and omissions of self and agents: Contractor shall be responsible to Ecology for acts and omissions of Contractor, Subcontractors, and their employees and agents.

D. Contractor to employ competent and disciplined workforce: Contractor shall enforce strict discipline and good order among Contractor's employees and other persons performing the Work. Contractor shall not permit employment of persons not skilled in tasks assigned to them. Contractor's employees will at all time conduct business in a manner that assures fair, equal, and nondiscriminatory treatment of all persons. Ecology may, by written notice, request Contractor to remove from the Work or Project site any employee Ecology reasonably deems incompetent, careless, or otherwise objectionable.

E. Contractor to keep project documents on site: Contractor shall keep on the Project site a copy of the Drawings, Specifications, addenda, reviewed shop drawings, and permits and permit drawings.

F. Contractor to comply with ethical standards: Contractor shall ensure that its owner(s) and employees, and those of its Subcontractors, comply with the Executive Conflict of Interest Act, RCW 42.18, which, among other things, prohibits state employees from having an economic interest in any Public Works Contract that was made by, or supervised by, that employee. Contractor shall remove at its sole cost and expense any of its, or its Subcontractors' employees if they are in violation of this Act.

5.02 PERMITS, FEES, AND NOTICES

A. Contractor to obtain and pay for permits: Unless otherwise provided in the Contract Documents, Contractor shall pay for and obtain all permits, licenses, and inspections necessary for proper execution and completion of the Work. Prior to Final Acceptance, the approved, signed permits will be delivered to Ecology.

B. Allowances for permit fees: If allowances for permits or utility fees are called for in the Contract Documents and set forth in Contractor's bid, and the actual costs of those permits or fees differ from the allowances in the Contract Documents, the difference will be adjusted by Change Order.

C. Contractor to comply with all applicable laws: Contractor shall comply with and give notices required by all federal, state, and local laws, ordinances, rules, regulations, and lawful orders of public authorities applicable to performance of the Work.

5.03 PATENTS AND ROYALTIES

A. Payment, indemnification, and notice: Contractor is responsible for, and shall pay, all royalties and license fees. Contractor shall defend, indemnify, and hold Ecology and Ecology's Representative harmless from any costs, expenses, and liabilities arising out of the infringement by Contractor of any patent, copyright, or other intellectual property right used in the Work; however, provided that Contractor gives prompt notice, Contractor shall not be responsible for such defense or indemnity when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents. If Contractor has reason to believe that use of the required design, process, or product constitutes an infringement of a patent or copyright, it will promptly notify Ecology of such potential infringement.

5.04 PREVAILING WAGES

A. Contractor to pay Prevailing Wages: Contractor shall pay the prevailing rate of wages to all workers, laborers, or mechanics employed in the performance of any part of the Work in accordance with RCW 39.12 and the rules and regulations of the Department of Labor and Industries (L&I). The schedule of prevailing wage rates for the locality or localities of the Work, as determined by the Industrial Statistician of L&I, is by reference made a part of the Contract Documents as though fully set forth herein.

B. Statement of Intent to Pay Prevailing Wages: Before payment is made by Ecology for any work performed by the Contractor and Subcontractors whose work is included in the application for payment, the Contractor shall submit, or shall have previously submitted to Ecology for the Project, a Statement of Intent to Pay Prevailing Wages, approved by the Department of Labor and Industries, certifying the rate of hourly wage paid and to be paid each classification of laborers, workers, or mechanics employed upon the Work by Contractor and Subcontractors. Such rates of hourly wage shall not be less than the prevailing wage rate.

C. Affidavit of Wages Paid: Prior to release of retainage, the Contractor shall submit to Ecology an Affidavit of Wages Paid, approved by the Department of Labor and Industries, for the Contractor and every Subcontractor, of any tier, that performed work on the project.

D. Disputes: Disputes regarding prevailing wage rates shall be referred for arbitration to the Director of Labor and Industries. The arbitration decision will be final and conclusive and binding on all parties involved in the dispute as provided for by RCW 39.12.060.

E. Statement with pay application: Post Statements of Intent at job site: Each Application for Payment submitted by Contractor shall state that prevailing wages have been paid in accordance with the pre-filed statement(s) of intent, as approved. Copies of the approved intent statement(s) will be posted on the job site with the address and telephone number of the Industrial Statistician of the Department of Labor and Industries where a complaint or inquiry concerning prevailing wages may be made.

F. Contractor to pay for Statements of Intent and Affidavits: In compliance with CHAPTER 296-127 WAC, Contractor shall pay to the Department of Labor and Industries the currently established fee(s) for each statement of intent and/or affidavit of wages paid submitted to the Department of Labor and Industries for certification.

G. Certified Payrolls: Consistent with WAC 296-127-320, the Contractor and any Subcontractor shall submit a certified copy of payroll records if requested.

5.05 HOURS OF LABOR

A. Overtime: Contractor shall comply with all applicable provisions of RCW 49.28, and they are incorporated herein by reference. Pursuant to that statute no laborer, worker, or mechanic employed by Contractor, any Subcontractor, or any other person performing or contracting to do the whole or any part of the Work will be permitted or required to work more than eight hours in any one calendar day, provided that in cases of extraordinary emergency, such as danger to life or property, the hours of work may be extended, but in such cases the rate of pay for time employed in excess of eight hours of each calendar day will be not less than one and one-half times the rate allowed for this same amount of time during eight hours of service.

B. 4-10 Agreements: Notwithstanding the preceding paragraph, RCW 49.28 permits a Contractor or Subcontractor in any public works contract subject to those provisions, to enter into an agreement with its employees in which the employees work up to ten hours in a calendar day. No such agreement may provide that the employees work ten-hour days for more than four calendar days per week. Any such agreement is subject to approval by the employees. The overtime provisions of RCW 49.28 will not apply to the hours, up to forty hours per week, worked pursuant to any such agreement.

5.06 NONDISCRIMINATION

A. Discrimination prohibited by applicable laws: Discrimination in all phases of employment is prohibited by, among other laws and regulations, Title VII of the Civil Rights Act of 1964, the Vietnam Era Veterans

Readjustment Act of 1974, Sections 503 and 504 of the Vocational Rehabilitation Act of 1973, the Equal Employment Act of 1972, the Age Discrimination Act of 1967, the Americans with Disabilities Act of 1990, the Civil Rights Act of 1991, Presidential Executive order 11246, Executive Order 11375, the Washington State Law Against Discrimination, RCW 49.60, and Gubernatorial Executive Order 85-09. These laws and regulations establish minimum requirements for affirmative action and fair employment practices that the Contractor must meet.

B. During Performance of the Work:

1. Protected Classes: Contractor shall not discriminate against any employee or applicant for employment because of race, creed, color, national origin, sex, sexual orientation, age, marital status, or the presence of any physical, sensory, or mental disability, Vietnam era veteran status, or disabled veteran status, nor commit any other unfair practices as defined in RCW 49.60.

2. Advertisements to state nondiscrimination: Contractor shall, in all solicitations or advertisements for employees placed by or for it, state that all qualified applicants will be considered for employment without regard to race, creed, color, national origin, sex, sexual orientation, age, marital status, or the presence of any physical, sensory, or mental disability.

3. Contractor to notify unions and others of nondiscrimination: Contractor shall send to each labor union, employment agency, or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice advising the labor union, employment agency, or workers' representative of Contractor's obligations according to the Contract Documents and RCW 49.60.

4. Ecology and State access to Contractor records: Contractor shall permit access to its books, records, and accounts, and to its premises by Ecology, and by the Washington State Human Rights Commission, for the purpose of investigation to ascertain compliance with this section of the Contract Documents.

5. Pass through provisions to Subcontractors: Contractor shall include the provisions of this section in every Subcontract.

5.07 SAFETY PRECAUTIONS

A. Contractor responsible for safety: Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Work.

B. Contractor safety responsibilities: In carrying out its responsibilities according to the Contract Documents, Contractor shall protect the lives and health of employees performing the Work and other persons who may be affected by the Work; prevent damage to materials, supplies, and equipment whether on site or stored off site; and prevent damage to other property at the site or adjacent thereto. Contractor shall comply with all applicable laws, ordinances, rules, regulations, and orders of any public body having jurisdiction for the safety of persons or property, or to protect them from damage, injury, or loss; will erect and maintain all necessary safeguards for such safety and protection; and will notify owners of adjacent property and utilities when prosecution of the Work may affect them.

C. Contractor to maintain safety records: Contractor shall maintain an accurate record of exposure data on all incidents relating to the Work resulting in death, traumatic injury, occupational disease, or damage to property, materials, supplies, or equipment. Contractor shall immediately report any such incident to Ecology. Ecology shall, at all times, have a right of access to all records of exposure.

D. Contractor to provide HazMat training: Contractor shall provide all persons working on the Project site with information and training on hazardous chemicals in their work at the time of their initial assignment, and whenever a new hazard is introduced into their work area.

1. Information: At a minimum, Contractor shall inform persons working on the Project site of:

   a. WAC: The requirements of Chapter 296-62 WAC, General Occupational Health Standards and as may be included in Division 01 – General Requirements.

   b. Presence of hazardous chemicals: Any operations in their work area where hazardous chemicals are present.

   c. Hazard communications program: The location and availability of written hazard communication programs, including the required list(s) of hazardous chemicals and Material Safety Data Sheets (MSDS) required by Chapter 296-62 WAC.

2. Training: At a minimum, Contractor shall provide training for persons working on the project site, which includes:

   a. Detecting hazardous chemicals: Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.).

b. Hazards of chemicals: The physical and health hazards of the chemicals in the work area.

c. Protection from hazards: The measures such persons can take to protect themselves from these hazards, including specific procedures Contractor, or its Subcontractors, or others have implemented to protect those on the Project site from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used.

d. Hazard communications program: The details of the hazard communication program developed by Contractor or its Subcontractors, including an explanation of the labeling system and the MSDS, and how employees can obtain and use the appropriate hazard information.

E. Hazardous, toxic, or harmful substances: Contractor's responsibility for hazardous, toxic, or harmful substances will include the following duties:

1. Illegal use of dangerous substances: Contractor shall not keep, use, dispose, transport, generate, or sell on or about the Project site any substances now or hereafter designated as, or which are subject to regulation as, hazardous, toxic, dangerous, or harmful by any federal, state, or local law, regulation, statute or ordinance (hereinafter collectively referred to as “hazardous substances”), in violation of any such law, regulation, statute, or ordinance, but in no case will any such hazardous substance be stored more than 90 days on the Project site.

2. Contractor notifications of spills, failures, inspections, and fines: Contractor shall promptly notify Ecology of all spills or releases of any hazardous substances that are otherwise required to be reported to any regulatory agency and pay the cost of cleanup. Contractor shall promptly notify Ecology of all failures to comply with any federal, state, or local law, regulation, or ordinance; all inspections of the Project site by any regulatory entity concerning the same; all regulatory orders or fines; and all responses or interim cleanup actions taken by or proposed to be taken by any government entity or private party on the Project site.

F. Public safety and traffic: All Work will be performed with due regard for the safety of the public. Contractor shall perform the Work so as to cause a minimum of interruption of vehicular traffic or inconvenience to pedestrians. All arrangements to care for such traffic will be Contractor's responsibilities. All expenses involved in the maintenance of traffic by way of detours will be borne by Contractor.

G. Contractor to act in an emergency: In an emergency affecting the safety of life or the Work or of adjoining property, Contractor is permitted to act, at its discretion, to prevent such threatened loss or injury, and Contractor shall so act if so authorized or instructed.

H. No duty of safety by Ecology or A/E: Nothing provided in this section will be construed as imposing any duty upon Ecology or A/E with regard to, or as constituting any express or implied assumption of control or responsibility over, Project site safety, or over any other safety conditions relating to employees or agents of Contractor or any of its Subcontractors, or the public.

5.08 OPERATIONS, MATERIAL HANDLING, AND STORAGE AREAS

A. Limited storage areas: Contractor shall confine all operations, including storage of materials, to Ecology-approved areas.

B. Temporary buildings and utilities at Contractor expense: Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be provided by Contractor only with the consent of Ecology and without expense to Ecology. The temporary buildings and utilities shall be removed by Contractor at its expense upon completion of the Work.

C. Roads and vehicle loads: Contractor shall use only established roadways or temporary roadways authorized by Ecology. When materials are transported in prosecuting the Work, vehicles will not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by federal, state, or local law or regulation.

D. Ownership and reporting by Contractor of demolished materials: Ownership and control of all materials or facility components to be demolished or removed from the Project site by Contractor shall immediately vest in Contractor upon severance of the component from the facility or severance of the material from the Project site. Contractor shall be responsible for compliance with all laws governing the storage and ultimate disposal. Contractor shall provide Ecology with a copy of all manifests and receipts evidencing proper disposal when required by Ecology or applicable law.

E. Contractor responsible for care of materials and equipment on site: Contractor shall be responsible for the proper care and protection of its materials and equipment delivered to the Project site. Materials and equipment may be stored on the premises subject to approval of Ecology. When Contractor uses any portion of the Project site as a shop, Contractor shall be responsible for any repairs, patching, or cleaning arising from such use.

F. Contractor responsible for loss of materials and equipment: Contractor shall protect and be responsible for any damage or loss to the Work, or to the materials or equipment until the date of Substantial Completion, and shall repair or replace without cost to Ecology any damage or loss that may occur, except damages or loss caused by the acts or omissions of Ecology. Contractor shall also protect and be responsible for any damage or loss to the Work, or to the materials or equipment, after the date of Substantial Completion, and shall repair or replace without cost to Ecology any such damage or loss that might occur, to the extent such damages or loss are caused by the acts or omissions of Contractor, or any Subcontractor.

5.09 PRIOR NOTICE OF EXCAVATION

A. Excavation defined: Use of locator services: "Excavation" means an operation in which earth, rock, or other material on or below the ground is moved or otherwise displaced by any means, except the tilling of soil less than 12 inches in depth for agricultural purposes, or road ditch maintenance that does not change the original road grade or ditch flow line. Before commencing any excavation, Contractor shall provide notice of the scheduled commencement of excavation to all owners of underground facilities and utilities through locator services.

5.10 UNFORESEEN PHYSICAL CONDITIONS

A. Notice requirement for concealed or unknown conditions: If Contractor encounters conditions at the site that are subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents, or unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then Contractor shall give written notice to Ecology promptly before conditions are disturbed and in no event later than seven (7) days after the first observance of the conditions.

B. Adjustment in Contract Time and Contract Sum: If such conditions differ materially and cause a change in Contractor's cost of, or time required for, performance of any part of the Work, the Contractor may be entitled to an equitable adjustment in the Contract Time or Contract Sum or both, provided it makes a request thereof as provided in Part 7 – CHANGES.

5.11 PROTECTION OF EXISTING STRUCTURES, EQUIPMENT, VEGETATION, UTILITIES, AND IMPROVEMENTS

A. Contractor to protect and repair property: Contractor shall protect from damage all existing structures, equipment, improvements, utilities, and vegetation at or near the Project site, and on adjacent property of a third party, the locations of which are made known to or should be known by Contractor. Contractor shall repair any damage, including that to the property of a third party, resulting from failure to comply with the requirements of the Contract Documents or failure to exercise reasonable care in performing the Work. If Contractor fails or refuses to repair the damage promptly, Ecology may have the necessary work performed and charge the cost to Contractor.

B. Tree and vegetation protection: Contractor shall only remove trees when specifically authorized to do so, and will protect vegetation that will remain in place.

5.12 LAYOUT OF WORK

A. Advanced planning of the Work: Contractor shall plan and lay out the Work in advance of operations so as to coordinate all work without delay or revision.

B. Layout responsibilities: Contractor shall lay out the Work from Ecology-established baselines and benchmarks indicated on the Drawings, and shall be responsible for all field measurements in connection with the layout. Contractor shall furnish, at its own expense, all stakes, templates, platforms, equipment, tools, materials, and labor required to lay out any part of the Work. Contractor shall be responsible for executing the Work to the lines and grades that may be established. Contractor shall be responsible for maintaining or restoring all stakes and other marks established.

5.13 MATERIAL AND EQUIPMENT

A. Contractor to provide new and equivalent equipment and materials: All equipment, material, and articles incorporated into the Work shall be new and of the most suitable grade for the purpose intended, unless otherwise specifically provided in the Contract Documents. References in the Specifications to equipment, material, articles, or patented processes by trade name, make, or catalog number, shall be regarded as establishing a standard quality and shall not be construed as limiting competition. Contractor may, at its option, use any equipment, material, article, or process that, in the judgment of A/E, is equal to that named in the

Specifications, unless otherwise specifically provided in the Contract Documents.

B. Contractor responsible for fitting parts together: Contractor shall do all cutting, fitting, or patching that may be required to make its several parts fit together properly, or receive or be received by work of others set forth in, or reasonable implied by, the Contract Documents. Contractor shall not endanger any work by cutting, excavating, or otherwise altering the Work and shall not cut or alter the work of any other Contractor unless approved in advance by Ecology.

C. Owner may reject defective Work: Should any of the Work be found defective, or in any way not in accordance with the Contract Documents, this work, in whatever stage of completion, may be rejected by Ecology.

5.14 AVAILABILITY AND USE OF UTILITY SERVICES

A. Owner to provide and charge for utilities: Unless otherwise provided in the Contract Documents, the utility service consumed shall be charged to or paid for by Contractor at prevailing rates charged to Owner. Contractor shall carefully conserve any utilities furnished.

B. Contractor to install temporary connections and meters: Contractor shall, at its expense and in a skillful manner satisfactory to Ecology, install and maintain all necessary temporary connections and distribution lines, together with appropriate protective devices and all meters required to measure the amount of each utility used for the purpose of determining charges. Prior to the date of Final Acceptance, Contractor shall remove all temporary connections, distribution lines, meters, and associated equipment and materials.

5.15 TESTS AND INSPECTION

A. Contractor to provide for all testing and inspection of Work: Contractor shall maintain an adequate testing and inspection program and perform such tests and inspections as are necessary or required to ensure that the Work conforms to the requirements of the Contract Documents. Contractor shall be responsible for inspection and quality surveillance of all its Work and all Work performed by any Subcontractor. Unless otherwise provided, Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to Ecology, or with the appropriate public authority, and will bear all related costs of tests, inspections, and approvals. Contractor shall give Ecology timely notice of when and where tests and inspections are to be made. Contractor shall maintain complete inspection records and make them available to Ecology.

B. Ecology may conduct tests and inspections: Ecology may, at any reasonable time, conduct such inspections and tests, as it deems necessary to ensure that the Work is in accordance with the Contract Documents. Ecology will promptly notify Contractor if an inspection or test reveals that the Work is not in accordance with the Contract Documents. Unless the subject items are expressly accepted by Ecology, such Ecology inspection and tests are for the sole benefit of Ecology and do not:

1. Constitute or imply acceptance
2. Relieve Contractor of responsibility for providing adequate quality control measures
3. Relieve Contractor of responsibility for risk of loss or damage to the Work, materials, or equipment
4. Relieve Contractor of its responsibility to comply with the requirements of the Contract Documents
5. Impair Ecology's right to reject defective or nonconforming items or to avail itself of any other remedy to which it may be entitled.

C. Inspections or inspectors do not modify Contract Documents: Neither observations by an inspector retained by Ecology, the presence or absence of such inspector on the site, nor inspections, tests, or approvals by others, shall relieve Contractor from any requirement of the Contract Documents, nor is any such inspector authorized to change any term or condition of the Contract Documents.

D. Contractor responsibilities on inspections: Contractor shall promptly furnish, without additional charge, all facilities, labor, material, and equipment reasonably needed for performing such safe and convenient inspections and tests as may be required by Ecology. Ecology may charge Contractor any additional cost of inspection or testing when Work is not ready at the time specified by Contractor for inspection or testing, or when prior rejection makes re-inspection or retest necessary. Ecology shall perform its inspections and tests in a manner that will cause no undue delay in the Work.

5.16 CORRECTION OF NONCONFORMING WORK

A. Work covered by Contractor without inspection: If a portion of the Work is covered contrary to the requirements of the Contract Documents, it must, if required in writing by Ecology, be uncovered for Ecology observation and be replaced at the Contractor's expense and without change in the Contract Time.

B. Payment provisions for uncovering covered Work: If any time prior to Final Completion Ecology desires to examine the Work or any portion of it that has been covered, Ecology may request to see such Work, and it will be uncovered by Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an adjustment in the Contract Sum for the costs of uncovering and replacement, and if completion of the Work is thereby delayed, an adjustment in the Contract Time, provided it makes a request therefore as provided in Part 7 – CHANGES. If such Work is not in accordance with the Contract Documents, the Contractor shall pay the costs of examination and reconstruction.

C. Contractor to correct and pay for non-conforming Work: Contractor shall promptly correct Work found by Ecology not to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed, or completed. Contractor shall bear all costs of correcting such nonconforming Work, including additional testing and inspections.

D. Contractor's compliance with warranty provisions: If, within one year after the date of Substantial Completion of the Work, or designated portion thereof, or within one year after the date for commencement of any system warranties established under Section 6.08, or within the terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, Contractor shall correct it promptly after receipt of written notice from Ecology to do so. Ecology shall give such notice promptly after discovery of the condition. This period of one year shall be extended, with respect to portions of Work first performed after Substantial Completion, by the period of time between Substantial Completion and the actual performance of the Work. Contractor's duty to correct with respect to Work repaired or replaced shall run for one year from the date of repair or replacement. Obligations under this paragraph shall survive Final Acceptance.

E. Contractor to remove non-conforming Work: Contractor shall remove from the Project site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by Contractor nor accepted by Ecology.

F. Ecology may charge Contractor for non-conforming Work: If Contractor fails to correct nonconforming Work within a reasonable time after written notice to do so, Ecology may replace, correct, or remove the nonconforming Work and charge the cost thereof to the Contractor.

G. Contractor to pay for damaged Work during correction: Contractor shall bear the cost of correcting destroyed or damaged Work, whether completed or partially completed, caused by Contractor's correction or removal of Work which is not in accordance with the requirements of the Contract Documents.

H. No Period of limitation on other requirements: Nothing contained in this section will be construed to establish a period of limitation with respect to other obligations that Contractor might have according to the Contract Documents. Establishment of the time period of one year, as described in Section *5.17D,* relates only to the specific obligation of Contractor to correct the Work, and has no relationship to the time within which the Contractor's obligation to comply with the Contract Documents may be sought to be enforced, including the time within which such proceedings may be commenced.

I. Ecology may accept non-conforming Work and charge Contractor: If Ecology prefers to accept Work that is not in accordance with the requirements of the Contract Documents, Ecology may do so instead of requiring its removal and correction, in which case the Contract sum may be reduced as appropriate and equitable.

5.17 CLEANUP

A. Contractor to keep site clean and leave it clean: Contractor shall at all times keep the Project site, including hauling routes, infrastructures, utilities, and storage areas, free from accumulations of waste materials. Before completing the Work, Contractor shall remove from the premises its rubbish, tools, scaffolding, equipment, and materials. Upon completing the Work, Contractor shall leave the Project site in a clean, neat, and orderly condition satisfactory to Ecology. If Contractor fails to clean up as provided herein, and after reasonable notice from Ecology, Ecology may do so and the cost thereof will be charged to Contractor.

5.18 ACCESS TO WORK

A. Ecology and A/E access to Work site: Contractor shall provide Ecology and A/E access to the Work in progress wherever located.

5.19 OTHER CONTRACTS

A. Ecology may award other contracts: Contractor to cooperate: Ecology may undertake or award other contracts for additional work at or near the Project site. Contractor shall reasonably cooperate with the other contractors and Ecology's employees and will carefully adapt scheduling and perform the Work in accordance with Contract Documents to reasonably accommodate the other work.

5.20 SUBCONTRACTORS AND SUPPLIERS

A. Subcontractor Responsibility: The Contractor shall include the language of this paragraph in each of its first tier subcontracts, and shall require each of its Subcontractors to include the same language of this section in each of their subcontracts, adjusting only as necessary the terms used for the contracting parties. Upon request of Ecology, the Contractor shall promptly provide documentation to Ecology demonstrating that the Subcontractor meets the Subcontractor responsibility criteria below. The requirements of this paragraph apply to all Subcontractors regardless of tier. At the time of subcontract execution, the Contractor shall verify that each of its first tier Subcontractors meets the following bidder responsibility criteria:

1. Have a current certificate of registration as a Contractor in compliance with chapter 18.27 RCW, which must have been in effect at the time of subcontract bid submittal.
2. Have a current Washington Unified Business Identified (UBI) number.
3. If applicable, have:
   a. Industrial Insurance (workers' compensation) coverage for the Subcontractor's employees working in Washington, as required in Title 51 RCW.
   b. A Washington Employment Security Department number, as required in Title 50 RCW.
   c. A Washington Department of Revenue state excise tax registration number, as required in Title 82 RCW.
   d. An electrical Contractor license, if required by Chapter 19.28 RCW.
   e. An elevator Contractor license, if required by Chapter 70.87 RCW.
4. Not be disqualified from bidding on any public works contract under RCW 39.06.010 or 39.12.065 (3).
5. On a project subject to the apprenticeship utilization requirements in RCW 39.04.320, not have been found out of compliance by the Washington State Apprenticeship and Training Council for working apprentices out of ratio, without appropriate supervision, or outside their approved work processes as outlined in their standards of apprenticeship under chapter 49.04 RCW for the one-year period immediately preceding the date of Ecology's first advertisement of the project.

B. Provide names of Subcontractors and use qualified firms: Before submitting the first Application for Payment, Contractors shall furnish in writing to Ecology the names, addresses, and telephone numbers of all Subcontractors, as well as suppliers providing materials in excess of $2,500. Contractor shall utilize Subcontractors and suppliers that are experienced and qualified, and meet the requirements of the Contract Documents, if any. Contractor shall not utilize any Subcontractor or supplier to whom or Ecology's Representative has a reasonable objection, and will obtain Ecology's written consent before making any substitutions or additions.

C. Subcontracts in writing and pass-through provision: All Subcontracts must be in writing. By appropriate written agreement, Contractor shall require each Subcontractor, so far as applicable to the Work to be performed by the Subcontractor, to be bound to Contractor by terms of the Contract Documents, and to assume toward Contractor all the obligations and responsibilities that Contractor assumes toward Ecology in accordance with the Contract Documents. Each Subcontract shall preserve and protect the rights of Ecology and Ecology's Representative in accordance with the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights. Where appropriate, Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. However, nothing in this paragraph shall be construed to alter the contractual relations between Contractor and its Subcontractors with respect to insurance or bonds.

D. Coordination of Subcontractors: Contractor responsible for Work: Contractor shall schedule, supervise, and coordinate the operations of all Subcontractors. No Subcontracting of any of the Work shall relieve Contractor from its responsibility for the performance of the Work in accordance with the Contract Documents or any other obligations of the Contract Documents.

E. Automatic assignment of subcontracts: Each subcontract agreement for a portion of the Work is hereby assigned by Contractor to Ecology provided that:

1. Effective only after termination and Ecology approval: The assignment is effective only after termination by Ecology for cause pursuant to Section 9.01 and only for those Subcontracts which Ecology accepts by notifying the Subcontractor in writing; and

2. Ecology assumes Contractor's responsibilities: After the assignment is effective, Ecology will assume all future duties and obligations toward the Subcontractor which Contractor assumed in the Subcontract.

3. Impact of bond: The assignment is subject to the prior rights of the surety, if any, obligated under any bond provided in accordance with the Contract Documents.

5.21 WARRANTY OF CONSTRUCTION

A. Contractor warranty of Work: In addition to any special warranties provided elsewhere in the Contract Documents, Contractor warrants that all Work conforms to the requirements of the Contract Documents and is free of any defect in equipment, material, or design furnished, or workmanship performed by Contractor.

B. Contractor Responsibilities: With respect to all warranties, express or implied, for Work performed or materials furnished according to the Contract Documents, Contractor shall:

1. Obtain warranties: Obtain all warranties that would be given in normal commercial practice;

2. Warranties for benefit of Ecology: Require all warranties to be executed, in writing, for the benefit of Ecology;

3. Enforcement of warranties: Enforce all warranties for the benefit of Ecology, if directed by Ecology; and

4. Contractor responsibility for Subcontractor warranties: Be responsible to enforce any Subcontractor's, manufacturer's, or supplier's warranty should they extend beyond the period specified in the Contract Documents.

C. Warranties beyond Final Acceptance: The obligations under this section will survive Final Acceptance.

5.22 INDEMNIFICATION

A. Contractor to Indemnify Ecology and Property Owner: Contractor shall defend, indemnify, and hold Ecology and Ecology's Representative, A/E, and Property Owner harmless from and against all claims, demands, losses, damages, or costs, including but not limited to damages arising out of bodily injury or death to persons and damage to property, caused by or resulting from:

1. Sole negligence of Contractor: The sole negligence of Contractor or any of its Subcontractors;

2. Concurrent negligence: The concurrent negligence of Contractor, or any Subcontractor, but only to the extent of the negligence of Contractor or such Subcontractor, and

3. Patent Infringement: The use of any design, process, or equipment that constitutes an infringement of any United States patent presently issued, or violates any other proprietary interest, including copyright, trademark, and trade secret.

B. Employee action and RCW Title 51: In any action against Ecology and any other entity indemnified in accordance with this section by any employee of Contractor, its Subcontractors, Sub-subcontractors, agents, or anyone directly or indirectly employed by any of them, the indemnification obligation of this section shall not be limited by a limit on the amount or type of damages, compensation, or benefits payable by or for Contractor or any Subcontractor under RCW Title 51, the Industrial Insurance Act, or any other employee benefit acts. In addition, Contractor waives immunity as to Ecology, A/E, and Property Owner only, in accordance with RCW Title 51.

PART 6 – PAYMENTS AND COMPLETION

6.01 CONTRACT SUM

A. Ecology shall pay Contract Sum: Ecology shall pay Contractor the Contract Sum plus state sales tax for performance of the Work in accordance with the Contract Documents.

6.02 SCHEDULE OF VALUES

A. Contractor to submit Schedule of Values: Before submitting its first Application for Payment, Contractor shall submit to Ecology for approval a breakdown allocating the total Contract Sum to each principle category of work, if a lump sum bid, or for each bid item identified in the bid proposal, in such detail as requested by Ecology ("Schedule of Values"). The approved Schedule of Values shall identify costs under each bid item in the bid proposal. If the bid proposal is a single lump sum value, then the Schedule of Values shall include appropriate amounts for demobilization, record drawings, operation and maintenance manuals, and any other requirements for Project closeout, and shall be used by Ecology as the basis for progress payments. Payment for Work will be made only for and in accordance with those items included in the Schedule of Values.

6.03 APPLICATION FOR PAYMENT

A. Monthly Application for Payment and substantiation: At monthly intervals, unless determined otherwise by Ecology, Contractor shall submit to Ecology an itemized Application for Payment for Work completed in accordance with the Contract Documents and the approved Schedule of

Values. Each application shall be supported by such substantiating data as Ecology may require.

B. Contractor certifies Subcontractors paid: By submitting an Application for Payment, Contractor is certifying that all Subcontractors have been paid, less earned retainage in accordance with RCW 60.28.010, as their interests appeared in the last preceding certificate of payment. By submitting an Application for Payment, Contractor is recertifying that the representations set forth in Section 1.03 are true and correct, to the best of Contractor's knowledge, as of the date of the Application for Payment.

C. Reconciliation of Work with Progress Schedule: At the time it submits an Application for Payment, Contractor shall analyze and reconcile, to the satisfaction of Ecology, the actual progress of the Work with the Progress Schedule.

D. Payment for material delivered to site or stored off site: If authorized by Ecology, the Application for Payment may include request for payment for material delivered to the Project site and suitably stored, or for completed preparatory work. Payment may similarly be requested for material stored off the Project site, provided Contractor complies with or furnishes satisfactory evidence of the following:

1. Suitable facility or location: The material will be placed in a warehouse that is structurally sound, dry, lighted, and suitable for the materials to be stored.

2. Facility or location within 10 miles of Project: The facility or location is located within a 10-mile radius of the Project. Other locations may be utilized if approved in writing by Ecology.

3. Facility or location exclusive to Project's materials: Only materials for the Project are stored within the warehouse (or secure portion of a facility or location set aside for the Project).

4. Insurance provided on materials in facility or location: Contractor furnishes Ecology a Certificate of Insurance extending Contractor's insurance coverage for damage, fire, and theft to cover the full value of all materials stored or in transit.

5. Facility or location locked and secure: The warehouse (or secure portion thereof) is continuously under lock and key, and only Contractor's authorized personnel shall have access.

6. Ecology right of access to facility or location: Ecology shall at all times have the right of access in company of Contractor.

7. Contractor assumes total responsibility for stored materials: The Contractor and its surety assume total responsibility for the stored materials.

8. Contractor provides documentation and Notice when materials moved to site: Contractor furnishes to Ecology certified lists of materials stored, bills of lading, invoices, and other information as may be required, and shall also furnish Notice to Ecology when materials are moved from storage to the Project site.

6.04 PROGRESS PAYMENTS

A. Ecology to pay within 30 Days: Ecology will make progress payments, in such amounts as Ecology determines are properly due, within 30 days after receipt of a properly executed Application for Payment. Ecology will notify Contractor in accordance with RCW 39.76 if the Application for Payment does not comply with the requirements of the Contract Documents.

B. Withholding retainage: Options for retainage: Ecology will retain 5 percent of the amount of each progress payment until a minimum of 45 days after Final Acceptance and receipt of all documents required by law or the Contract Documents including, at Ecology's request, consent of surety to release of the retainage. In accordance with RCW 60.28, Contractor may request that monies reserved be retained in a fund by Ecology, deposited by Ecology in a bank or savings and loan, or placed in escrow with a bank or trust company to be converted into bonds and securities to be held in escrow with interest to be paid to Contractor. Ecology may permit Contractor to provide an appropriate bond in lieu of the retained funds.

C. Title passes to Ecology upon payment: Title to all Work and materials covered by a progress payment shall pass to Ecology at the time of such payment free and clear of all liens, claims, security interests, and encumbrances. Passage of title shall not, however, relieve Contractor from any of its duties and responsibilities for the Work or materials, or waive any rights of Ecology to insist on full compliance by Contractor with the Contract Documents.

D. Interest on unpaid balances: Payments due and unpaid in accordance with the Contract Documents will bear interest as specified in RCW 39.76.

6.05 PAYMENTS WITHHELD

A. Ecology's right to withhold payment: Ecology may withhold or, on account of subsequently discovered evidence, nullify the whole or part of any payment to such extent as may be necessary to protect Ecology from loss or damage for reasons including but not limited to:

1. Non-compliant work: Work not in accordance with the Contract Documents;

2. Remaining Work to cost more than unpaid balance: Reasonable evidence that the Work required by the Contract Documents cannot be completed for the unpaid balance of the Contract Sum;

3. Ecology correction or completion of Work: Work by Ecology to correct defective Work or complete the Work in accordance with Section 5.17;

4. Contractor's failure to perform: Failure to perform in accordance with the Contract Documents; or

5. Contractor's negligent acts or omissions: Cost or liability that may occur to Ecology as the result of Contractor's fault or negligent acts or omissions.

B. Ecology to notify Contractor of withholding for unsatisfactory performance: In any case where part or all of a payment is going to be withheld for unsatisfactory performance, Ecology shall notify Contractor in accordance with RCW 39.76.

6.06 RETAINAGE AND BOND CLAIM RIGHTS

A. Chapters 39.08 RCW and 60.28 RCW incorporated by reference: Chapters 39.08 RCW and 60.28 RCW, concerning the rights and responsibilities of Contractor and Ecology with regard to performance and payment bonds and retainage, are made a part of the Contract Documents by reference as though fully set forth herein.

6.07 SUBSTANTIAL COMPLETION

A. Substantial Completion defined: Substantial Completion is the stage in the progress of the Work (or portion thereof designated and approved by Ecology) when the construction is sufficiently complete, in accordance with the Contract Documents, so that Ecology and Property Owner have full and unrestricted use and benefit of the facilities/improvements (or portions thereof designated and approved by Ecology) and can fully occupy the Work (or the designated portion thereof) for the use for which it is intended. All Work other than incidental corrective or punch list work shall be completed. Substantial Completion shall not have been achieved if all systems and parts are not functional, if utilities are not connected and operating normally, if all required occupancy permits have not been issued, or if the Work is not accessible by normal vehicular and pedestrian traffic routes. The date Substantial Completion is achieved will be established in writing by Ecology. Contractor may request an early date of Substantial Completion, which must be approved by Change Order. Ecology's or Property Owner's occupancy of the Work or designated portion thereof does not necessarily indicate that Substantial Completion has been achieved.

6.08 PRIOR OCCUPANCY

A. Prior occupancy defined: Restrictions: Ecology may, upon written notice thereof to Contractor, take possession of or use any completed or partially completed portion of the Work ("prior occupancy") at any time prior to Substantial Completion. Unless otherwise agreed in writing, prior occupancy will not be deemed an acceptance of any portion of the Work; accelerate the time for any payment to Contractor; prejudice any rights of Ecology provided by any insurance, bond, guaranty, or the Contract Documents; relieve Contractor of the risk of loss or any of the obligations established by the Contract Documents; establish a date for termination or partial termination of the assessment of liquidated damages; or constitute a waiver of claims.

B. Damage: Duty to repair and warranties: Notwithstanding anything in the preceding paragraph, Ecology shall be responsible for loss or damage to the Work resulting from its prior occupancy. Contractor's one-year duty to repair and any system warranties shall begin on building or equipment systems activated and used by Ecology as agreed in writing by Ecology and Contractor.

6.09 FINAL COMPLETION, ACCEPTANCE, AND PAYMENT

A. Final Completion defined: Final Completion shall be achieved when the Work is fully and finally complete in accordance with the Contract Documents. The date Final Completion is achieved will be established by Ecology in writing, but in no case shall constitute Final Acceptance which is a subsequent, separate, and distinct action.

B. Final Acceptance defined: Final Acceptance shall be achieved when the Contractor has completed the requirements of the Contract Documents. The date Final Acceptance is achieved shall be established by Ecology in writing. Prior to Final Acceptance, Contractor shall in addition to all other requirements in the Contract Documents, submit to Ecology a written notice of any outstanding disputes or claims between Contractor and any of its Subcontractors, including the amounts and other details thereof. Neither Final Acceptance, nor final payment, shall release Contractor or its sureties from any obligations of these Contract Documents or the payment and performance bonds, or constitute a waiver of any claims by Ecology arising from Contractor's failure to perform the Work in accordance with the Contract Documents

C. Final payment waivers Claim rights: Acceptance of final payment by Contractor or any Subcontractor shall constitute a waiver and release to Ecology of all claims by Contractor or any such Subcontractor for an increase in the Contract Sum or the Contract Time, and for every act or omission of Ecology relating to or arising out of the Work, except for those Claims made in accordance with the procedures, including the time limits, set forth in Part 8.

PART 7 – CHANGES

7.01 CHANGES IN THE WORK

A. Changes in Work, Contract Sum, and Contract Time by Change Order: Ecology may at any time and without notice to Contractor's surety, order additions, deletions, revisions, or other changes in the Work. These changes in the Work will be incorporated into the Contract Documents through the execution of Change Orders. If any change in the Work ordered by Ecology causes an increase or decrease in the Contract Sum or the Contract Time, an equitable adjustment will be made as provided in Section 7.02 or 7.03, respectively, and such adjustment(s) shall be incorporated into a Change Order.

B. Ecology may request COP from Contractor: If Ecology desires to order a change in the Work, it may request a written Change Order proposal (COP) from Contractor. Contractor shall submit a Change Order proposal within fourteen (14) days of the request from Ecology, or within such other period as mutually agreed. Contractor's Change Order proposal shall be full compensation for implementing the proposed change in the Work, including any adjustment in the Contract Sum or Contract Time, and including compensation for all delays in connection with such change in the Work and for any expense or inconvenience, disruption of schedule, or loss of efficiency or productivity occasioned by the change in the Work.

C. COP negotiations: Upon receipt of the Change Order proposal, or a request for equitable adjustment in the Contract Sum or Contract Time, or both, as provided in Sections 7.02 and 7.03, Ecology may accept or reject the proposal, request further documentation, or negotiate acceptable terms with Contractor. Pending agreement on the terms of the Change Order, Ecology may direct Contractor to proceed immediately with the Change Order Work. Contractor shall not proceed with any change in the Work until it has obtained Ecology approval. All Work done pursuant to any Ecology Representative-directed change in the Work will be executed in accordance with the Contract Documents.

D. Change Order as full payment and final settlement: If Ecology and Contractor reach agreement on the terms of any change in the Work, including any adjustment in the Contract Sum or Contract Time, such agreement shall be incorporated in a Change Order. The Change Order shall constitute full payment and final settlement of all claims for time and for direct, indirect, and consequential costs, including costs of delays, inconvenience, disruption of schedule, or loss of efficiency or productivity, related to any Work either covered or affected by the Change Order, or related to the events giving rise to the request for equitable adjustment.

E. Failure to agree upon terms of Change Order, Final offer, and Claims: If Ecology and Contractor are unable to reach agreement on the terms of any change in the Work, including any adjustment in the Contract Sum or Contract Time, Contractor may at any time, in writing, request a final offer from Ecology. Ecology shall provide Contractor with its written response within 30 days of Contractor's request. Ecology may also provide Contractor with a final offer at any time. If Contractor rejects Ecology's final offer or the parties are otherwise unable to reach agreement, Contractor's only remedy will be to file a Claim as provided in Part 8.

7.02 CHANGE IN THE CONTRACT SUM

A. General Application:

1. Contract Sum changes only by Change Order: The Contract Sum shall only be changed by a Change Order. Contractor shall include any request for a change in the Contract Sum in its Change Order Proposal.

2. Ecology fault or negligence as basis for change in Contract Sum: If the cost of Contractor's performance is changed due to the fault or negligence of Ecology or anyone for whose acts Ecology is responsible, Contractor shall be entitled to make a request for an equitable adjustment in the Contract Sum in accordance with the following procedure. No change in the Contract Sum will be allowed to the extent that Contractor's changed cost of performance is due to the fault or negligence of Contractor or anyone for whose acts Contractor is responsible; the change is concurrently caused by Contractor and Ecology; or the change is caused by an act of force majeure, as defined in Section 3.05.

   a. Notice and record keeping for equitable adjustment: A request for an equitable adjustment in the Contract Sum will be based on written notice delivered to Ecology within 7 days of the occurrence of the event-giving rise to the request. For purposes of this part, "occurrence" means when Contractor knew, or in its diligent prosecution of the Work should have known, of the event-giving rise to the request. If Contractor believes it is entitled to an adjustment in the Contract Sum, Contractor shall immediately notify Ecology and begin to keep and maintain complete, accurate, and specific daily records. Contractor shall give Ecology access to any such records and, if requested, will promptly furnish copies of such records to Ecology.

b. Content of notice for equitable adjustment: Failure to comply: Contractor shall not be entitled to any adjustment in the Contract Sum for any occurrence of events or costs that occurred more than 7 days before Contractor's written notice to Ecology. The written notice will set forth, at a minimum, a description of: the event giving rise to the request for an equitable adjustment in the Contract Sum; the nature of the impacts to Contractor and its Subcontractors of any tier, if any; and, to the extent possible, the amount of the adjustment in Contract Sum requested. Failure to properly give such written notice shall, to the extent Ecology's interests are prejudiced, constitute a waiver of Contractor's right to an equitable adjustment.

c. Contractor to provide supplemental information: Within 30 days of the occurrence of the event giving rise to the request, unless Ecology agrees in writing to allow an additional period of time to ascertain more accurate data, Contractor shall supplement written notice provided in accordance with Subparagraph "a." above with additional supporting data. Such additional data shall include, at a minimum the amount of compensation requested, itemized in accordance with the procedure set forth herein; specific facts, circumstances, and analysis that confirms not only that Contractor suffered the damages claimed, but that the damages claimed were actually a result of the act, event, or condition complained of and that the Contract Documents provide entitlement to an equitable adjustment to Contractor for such act, event, or condition; and documentation sufficiently detailed to permit an informed analysis of the request by Ecology. When the request for compensation relates to a delay or other change in Contract Time, Contractor shall demonstrate the impact on the critical path, in accordance with Section 7.03 C. Failure to provide such additional information and documentation within the time allowed or within the format required shall, to the extent that

Ecology’s interests are prejudiced, constitute a waiver of Contractor's right to an equitable adjustment.

d. Contractor to proceed with Work as directed: Pending final resolution of any request made in accordance with this paragraph, unless otherwise agreed in writing, Contractor shall proceed diligently with performance of the Work.

e. Contractor to combine requests for same event together: Any requests by Contractor for an equitable adjustment in the Contract Sum and in the Contract Time that arise out of the same event(s) shall be submitted together.

3. Methods for calculating Change Order amount: The value of any work covered by a Change Order or of any request for an equitable adjustment in the Contract Sum, will be determined by one of the following methods:

a. Fixed price: On the basis of a fixed price as determined in paragraph 7.02 B.

b. Unit Prices: By application of unit prices to the quantities of the items involved as determined in paragraph 7.02 C.

c. Time and Materials: On the basis of time and material as determined in paragraph 7.02 D.

4. Fixed price method is default: Ecology may direct otherwise: When Ecology has requested Contractor to submit a Change Order proposal, Ecology may direct Contractor as to which method in Subparagraph 3 above to use when submitting its proposal. Otherwise, Contractor shall determine the value of the Work, or of a request for an equitable adjustment, on the basis of the fixed price method.

B. Change Order Pricing – Fixed Price

Procedures: When the fixed price method is used to determine the value of any Work covered by a Change Order or of a request for an equitable adjustment in the Contract Sum, the following procedures shall apply:

1. Breakdown and itemization of details on COP: Contractor's Change Order proposal or request for adjustment in the Contract Sum shall be accompanied by a complete itemization of the costs including labor, materials, Subcontractor costs, and overhead and profit. The costs will be itemized in the manner set forth below and will be submitted on breakdown sheets in a form approved by Ecology.

2. Use of industry standards in calculating costs: All costs will be calculated based on appropriate industry standard methods of calculating labor, material quantities, and equipment costs.

3. Costs contingent on Ecology's actions: If any of Contractor's pricing assumptions are contingent upon anticipated actions of Ecology, Contractor shall clearly state them in the proposal or request for an equitable adjustment.

4. Markups on additive and deductive Work: The cost of any additive or deductive changes in the Work shall be calculated as set forth below, except that overhead and profit shall not be included on deductive changes in the Work. Where a change in the Work involves additive and deductive work by the same Contractor or Subcontractor, small tools, overhead, profit, bond, and insurance markups will apply to the net difference.

5. Breakdown not required if change less than $1,000: If the total cost of the change in the Work or request for equitable adjustment does not exceed $1,000, Contractor shall not be required to submit a breakdown if the description of the change in the Work or request for equitable adjustment is sufficiently definitive for Ecology to determine fair value.

6. Breakdown required if change between $1,000 and $2,500: If the total cost of the change in the Work or request for equitable adjustment is between $1,000 and $2,500, Contractor may submit a breakdown in the following level of detail if the description of the change in the Work or if the request for equitable adjustment is sufficiently definitive to permit Ecology to determine fair value:

   a. Lump sum labor;

   b. Lump sum material;

   c. Lump sum equipment usage;

   d. Overhead and profit as set forth below; and

   e. Insurance and bond costs as set forth below.

7. Components of increased cost: Any request for adjustment of Contract Sum based upon the fixed price method shall include only the following items:

   a. Craft Labor Costs: These are the labor costs determined by multiplying the estimated or actual additional number of craft hours needed to perform the change in the Work by the hourly labor costs. Craft hours should cover direct labor as well as indirect labor due to trade inefficiencies. The hourly costs will be based on the following:

1) Basic Wages and Benefits: Hourly rates and benefits as stated on the Department of Labor and Industries approved "statement of intent to pay prevailing wages" or a higher amount if approved by Ecology. Direct supervision will be a reasonable percentage not to exceed 15 percent of the cost of direct labor. No supervision markup shall be allowed for a working supervisor's hours.

2) Worker's Insurance: Direct contributions to the State of Washington for industrial insurance, medical aid, and supplemental pension by the class and rates established by the Department of Labor and Industries.

3) Federal Insurance: Direct contributions required by the Federal Insurance Compensation Act, Federal Unemployment Tax Act, and the State Unemployment Compensation Act.

4) Travel Allowance: Travel allowance and/or subsistence, if applicable, not exceeding those allowances established by regional labor union agreements, which are itemized and identified separately.

5) Safety: Costs incurred due to the Washington Industrial Safety and Health Act, which will be a reasonable percentage not to exceed 2 percent of the sum of the amounts calculated in paragraphs 1), 2), and 3) above.

b. Material Costs: This is an itemization of the quantity and cost of materials needed to perform the change in the Work. Material costs shall be developed first from actual known costs, second from supplier quotations or if these are not available, from standard industry pricing guides. Material costs will consider all available discounts. Freight costs, express charges, or special delivery charges shall be itemized.

c. Equipment Costs: This is an itemization of the type of equipment and the estimated or actual length of time the construction equipment appropriate for the Work is or will be used on the change in the Work. Costs will be allowed for construction equipment only if used solely for the changed Work or for additional rental costs actually incurred by the Contractor. Equipment charges shall be developed from the current edition of one of the following sources:

1) Associated General Contractors – Washington State Department of Transportation Equipment Rental Agreement, current edition, on the Contract execution date.

2) The National Electrical Contractors Association for equipment used on electrical work.

3) The Mechanical Contractors Association of America for equipment used on mechanical work.

4) The Equipment Watch Rental Rate Blue Book shall be used as a basis for establishing rental rates of equipment not listed in the above sources. The maximum rate for standby equipment shall not exceed that shown in the AGC-WSDOT Equipment Rental Agreement, current edition on the Contract execution date.

d. Allowance for Small Tools, Expendables, and Consumable Supplies: Small tools consist of tools that cost $250 or less and are normally furnished by the performing Contractor. The maximum rate for small tools will not exceed the following:

1) 3% for Contractor: For Contractor, 3% of direct labor costs.

2) 5% for Subcontractors: For Subcontractors, 5% of direct labor costs.

3) Expendables and consumable supplies directly associated with the change in Work must be itemized.

e. Subcontractor Costs: This is defined as payments Contractor makes to Subcontractors for changed Work performed by Subcontractors of any tier. The Subcontractors' cost of Work shall be calculated and itemized in the same manner as prescribed herein for Contractor.

f. Allowance for Overhead: This is defined as costs of any kind attributable to direct and indirect delay, acceleration, or impact, added to the total cost to Ecology of any change in the Contract Sum. If the Contractor is compensated under

Section 7.03 D, the amount of such compensation shall be reduced by the amount Contractor is otherwise entitled to under this subsection (f). This allowance shall compensate Contractor for all non-craft labor, temporary construction facilities, field engineering, schedule updating, as-built drawings, home office cost, B & O taxes, office engineering, estimating costs, additional overhead because of extended time, and any other cost incidental to the change in the Work. It shall be strictly limited in all cases to a reasonable amount, mutually acceptable, or if none can be agreed upon to an amount not to exceed the rates below:

1) Projects less than $3 million: For projects where the Contract Award Amount is under $3 million, the following shall apply:

   a) Contractor markup on Contractor Work: For Contractor, for any Work actually performed by Contractor's own forces, 16% of the first $50,000 of cost, and 4% of the remaining cost, if any.

   b) Subcontractor markup for Subcontractor Work: For each Subcontractor (including lower tier Subcontractors), for any Work actually performed by its own forces, 16% of the first $50,000 of the cost, and 4% of the remaining cost, if any.

   c) Contractor markup for Subcontractor Work: For Contractors, for any Work performed by its Subcontractor(s), 6% of the first $50,000 of the amount due each Subcontractor and 4% of the remaining amount, if any.

   d) Subcontractor markup for lower tier Subcontractor Work: For each Subcontractor, for any Work performed by its Subcontractor(s) of any lower tier, 4% of the first $50,000 of the amount due the sub-Subcontractor and 2% of the remaining amount, if any.

   e) Basis of cost applicable for markup: The cost to which overhead and profit is to be applied will be determined in accordance with paragraphs 7.02 B 7a.-e.

2) Projects more than $3 million: For projects where the Contract Award Amount is equal to or exceeds $3 million, the following shall apply:

a) Contractor markup on Contractor Work: For Contractor, for any Work actually performed by Contractor's own forces, 12% of the first $50,000 of cost, and 4% of the remaining cost, if any.

b) Subcontractor markup for Subcontractor Work: For each Subcontractor (including lower tier Subcontractors), for any Work actually performed by its own forces, 12% of the first $50,000 of the cost, and 4% of the remaining cost, if any.

c) Contractor markup for Subcontractor Work: For Contractors, for any Work performed by its Subcontractor(s), 4% of the first $50,000 of the amount due each Subcontractor and 2% of the remaining amount, if any.

d) Subcontractor markup for lower tier Subcontractor Work: For each Subcontractor, for any Work performed by its Subcontractor(s) of any lower tier, 4% of the first $50,000 of the amount due the Sub-subcontractor and 2% of the remaining amount, if any.

e) Basis of cost applicable for markup: The cost to which overhead and profit is to be applied will be determined in accordance with paragraph 7.02B 7a.-e.

Allowance for profit: Allowance for profit is an amount to be added to the cost of any change in contract sum, but not to the cost of change in Contract Time for which Contractor has been compensated pursuant to the conditions set forth in Section 7.03. It shall be limited to a reasonable amount, mutually acceptable, or if none can be agreed upon, to an amount not to exceed the rates below:

1) Contractor/Subcontractor markup for self-performed Work: For Contractor or Subcontractor of any tier for work performed by their forces, 6% of the cost developed in accordance with Section 7.02B 7a.-e.

2) Contractor/Subcontractor markup for Work performed at lower tier: For Contractor or Subcontractor of any tier for work performed by a Subcontractor of a lower tier, 4% of the subcontract cost developed in accordance with Section 7.02B 7a.-e.

b. Insurance and bond premiums: Cost of change in insurance or bond premium. This is defined as:

1) Contractor's Liability Insurance: The cost of any changes in Contractor's liability insurance arising directly from execution of the Change Order; and

2) Payment and Performance Bond: The cost of the additional premium for Contractor's bond arising directly from the changed Work.

3) The costs of any change in insurance or bond premium shall be added after overhead and allowance for profit are calculated in accordance with subparagraph "f" and "g" above.

C. Change Order Pricing – Unit Prices

1. Content of Ecology authorization: Whenever Ecology authorizes Contractor to perform Work on a unit-price basis, Ecology's authorization will clearly state:

a. Scope: Scope of work to be performed;

b. Reimbursement Basis: Type of reimbursement including pre-agreed rates for material quantities; and

c. Reimbursement Limit: Cost limit of reimbursement.

2. Contractor responsibilities: Contractor shall:

a. Cooperate with Ecology and assist in monitoring the Work being performed. As requested by Ecology, Contractor shall identify workers assigned to the Change Order Work and areas in which they are working;

b. Leave access as appropriate for quantity measurement; and

c. Not exceed any cost limit(s) without Ecology's prior written approval.

3. Cost breakdown consistent with Fixed Price requirements: Contractor shall submit costs in accordance with paragraph 7.02B and satisfy the following requirements:

a. Unit prices must include overhead, profit, bond and insurance premiums: Unit prices shall include reimbursement for all direct and indirect costs of the Work, including overhead, profit, bond, and insurance costs; and

b. Ecology verification of quantities: Quantities must be supported by field measurement statements signed by Ecology.

D. Change Order Pricing – Time and Material Prices

1. Content of Ecology authorization: Whenever Ecology authorizes Contractor to perform work on a time-and-material basis, Ecology's authorization will clearly state:

   a. Scope: Scope of work to be performed;

   b. Reimbursement basis: Type of reimbursement including pre-agreed rates, if any, for material quantities or labor; and

   c. Reimbursement limit: Cost limit of reimbursement.

2. Contractor responsibilities: Contractor shall:

   a. Identify workers assigned: Cooperate with Ecology and assist in monitoring the Work being performed. As requested by Ecology, identify workers assigned to the Change Order Work and areas in which they are working.

   b. Provide daily timesheets: Identify on daily timesheets all labor performed in accordance with this authorization. Submit copies of daily timesheets within 2 working days for Ecology's review.

   c. Allow Ecology to measure quantities: Leave access as appropriate for quantity measurement.

   d. Perform Work efficiently: Perform all Work in accordance with this section as efficiently as possible.

   e. Not exceed Ecology's cost limit: Not exceed any cost limit(s) without Ecology's prior written approval.

3. Cost breakdown consistent with Fixed Price requirements: Contractor shall submit costs in accordance with paragraph 7.02 B and additional verification supported by:

   a. Timesheets: Labor detailed on daily timesheets; and

   b. Invoices: Invoices for material.

7.03 CHANGE IN THE CONTRACT TIME

A. COP requests for Contract Time: The Contract Time shall only be changed by a Change Order. Contractor shall include any request for a change in the Contract Time in its Change Order proposal.

B. Time extension permitted if not Contractor's fault: If the time of Contractor's performance is changed due to an act of Force Majeure, or due to the fault or negligence of Ecology or anyone for whose acts Ecology is responsible, Contractor will be entitled to make a request for an equitable adjustment in the Contract Time in accordance with the following procedure. No adjustment in the Contract Time will be allowed to the extent Contractor's changed time of performance is due to the fault or negligence of Contractor, or anyone for whose acts Contractor is responsible.

1. Notice and record keeping for Contract Time request: A request for an equitable adjustment in the Contract Time shall be based on written notice delivered within 7 days of the occurrence of the event-giving rise to the request. If Contractor believes it is entitled to adjustment of Contract Time, Contractor will immediately notify Ecology and begin to keep and maintain complete, accurate, and specific daily records. Contractor will give Ecology access to any such record and, if requested, will promptly furnish copies of such record to Ecology.

2. Timing and Content of Contractor's Notice: Contractor shall not be entitled to an adjustment in the Contract Time for any events that occurred more than 7 days before Contractor's written notice to Ecology. The written notice shall set forth, at a minimum, a description of: the event giving rise to the request for an equitable adjustment in the Contract Time; the nature of the impacts to Contractor and its Subcontractors of any tier, if any; and, to the extent possible, the amount of the adjustment in Contract Time requested. Failure to properly give such written notice shall, to the extent Ecology's interests are prejudiced, constitute a waiver of Contractor's right to an equitable adjustment.

3. Contractor to provide supplemental information: Within 30 days of the occurrence of the event giving rise to the request, unless Ecology agrees in writing to allow an additional period of time to ascertain more accurate data, Contractor shall supplement the written notice provided in accordance with Section 7.03 B.2 with additional supporting data. Such additional data shall include, at a minimum, the amount of delay claimed, itemized in accordance with the procedure set forth herein; specific facts, circumstances, and

analysis that confirms not only that Contractor suffered the delay claimed, but that the delay claimed was actually a result of the act, event, or condition complained of; and that the Contract Documents provide entitlement to an equitable adjustment in Contract Time for such act, event, or condition; and supporting documentation sufficiently detailed to permit an informed analysis of the request by Ecology. Failure to provide such additional information and documentation within the time allowed or within the format required shall, to the extent Ecology's interests are prejudiced, constitute a waiver of Contractor's right to an equitable adjustment.

4. Contractor to proceed with Work as directed: Pending final resolution of any request in accordance with this paragraph, unless otherwise agreed in writing, Contractor will proceed diligently with performance of the Work.

C. Contractor to demonstrate impact on critical path of schedule: Any change in the Contract Time covered by a Change Order or based on a request for an equitable adjustment in the Contract Time shall be limited to the change in the critical path of Contractor's schedule attributable to the change of Work or event(s) giving rise to the request for equitable adjustment. Any Change Order proposal or request for an adjustment in the Contract Time shall demonstrate the impact on the critical path of the schedule. Contractor shall be responsible for showing clearly on the Progress Schedule that the change or event had a specific impact on the critical path, and, except in case of concurrent delay, was the sole cause of such impact and could not have been avoided by re-sequencing of the Work or other reasonable alternatives.

D. Cost of change in Contract Time: Contractor may request compensation for the cost of a change in Contract Time in accordance with this paragraph, 7.03 D, subject to the following conditions:

1. Must be solely fault of Ecology or A/E: The change in Contract Time shall solely be caused by the fault or negligence of Ecology or A/E;

2. Procedures: Contractor shall follow the procedure set forth in paragraph 7.03 B;

3. Demonstrate impact on critical path: Contractor shall establish the extent of the change in Contract Time in accordance with paragraph 7.03 C, and

4. Limitations on daily costs: The daily cost of any change in Contract Time will be limited to the items below, less the amount of any change in the Contract Sum that the Contractor may otherwise be

entitled to pursuant to Section 7.02 B 7f., for any change in the Work that contributed to this change in Contract Time:

a. Non-productive supervision or labor: Cost of nonproductive field supervision or labor extended because of the delay;

b. Weekly meetings and indirect activities: Cost of weekly meetings or similar indirect activities extended because of the delay;

c. Temporary facilities or equipment rental: Cost of temporary facilities or equipment rental extended because of the delay;

d. Insurance premiums: Cost of insurance extended because of the delay; or

e. Overhead: General and administrative overhead in an amount to be agreed upon, but not to exceed 3% of the Contract Award Amount divided by the originally specified Contract Time for each Day of the delay.

PART 8 – CLAIMS AND DISPUTE RESOLUTION

8.01 CLAIMS PROCEDURE

A. Claim is Contractor's remedy: If the parties fail to reach agreement on the terms of any Change Order for Ecology directed Work as provided in Section 7.01, or on the resolution of any request for an equitable adjustment in the Contract Sum as provided in Section 7.02 or the Contract Time as provided in Section 7.03, Contractor's only remedy shall be to file a Claim with Ecology as provided in this section.

B. Claim filing deadline for Contractor: Contractor shall file its Claim within 120 days from Ecology's final offer made in accordance with paragraph 7.01 E, or by the date of Final Acceptance, whichever occurs first.

C. Claim must cover all costs and be documented: The Claim shall be deemed to cover all changes in cost and time (including direct, indirect, impact, and consequential) to which Contractor may be entitled. It shall be fully substantiated and documented. At a minimum, the Claim will contain the following information:

1. Factual statement of Claim: A detailed factual statement of the Claim for additional compensation and time, if any, providing all necessary dates, locations, and items of Work affected by the Claim;

2. Dates: The date on which facts arose that gave rise to the Claim;

3. Ecology and A/E employee's knowledgeable about Claim: The name of each employee of Ecology or A/E knowledgeable about the Claim;
4. Support from Contract Documents: The specific provisions of the Contract Documents which support the Claim;
5. Identification of other supporting information: The identification of any documents and the substance of any oral communications that support the Claim;
6. Copies of supporting information: Copies of any identified documents, other than the Contract Documents, that support the Claim;
7. Details on Claim for Contract Time: If an adjustment in the Contract Time is sought, the specific days and dates for which it is sought; the specific reasons Contractor believes an extension in the Contract Time should be granted; and Contractor's analysis of its Progress Schedule to demonstrate the reason for the extension in Contract Time;
8. Details on Claim for adjustment of Contract Sum: If an adjustment in the Contract Sum is sought, the exact amount sought and a breakdown of that amount into the categories set forth in, and in the detail as required by Section 7.02; and
9. Statement certifying Claim: A statement certifying, under penalty of perjury, that the Claim is made in good faith, that the supporting cost and pricing data are true and accurate to the best of Contractor's knowledge and belief, that the Claim is fully supported by the accompanying data, and that the amount requested accurately reflects the adjustment in the Contract Sum or Contract Time for which Contractor believes Ecology is liable.

D. Ecology's response to Claim filed: After Contractor has submitted a fully documented Claim that complies with all applicable provisions of Parts 7 and 8, Ecology shall respond, in writing, to Contractor as follows:

1. Response time for Claim less than $50,000: If the Claim amount is less than $50,000, with a decision within 60 days from the date the Claim is received; or
2. Response time for Claim of $50,000 or more: If the Claim amount is $50,000 or more, with a decision within 60 days from the date the Claim is received or, with notice to Contractor, of the date by which it will render its decision. Ecology will then respond with a written decision in such additional time.

E. Ecology's review of Claim and finality of decision: To assist in the review of Contractor's Claim, Ecology may visit the Project site or request additional information in order to fully evaluate the issues raised by the Claim. Contractor shall proceed with performance of the Work pending final resolution of any Claim. Ecology's written decision, as set forth above, will be final and conclusive as to all matters set forth in the Claim unless Contractor follows the procedure set forth in Section 8.02.

F. Waiver of Contractor's rights for failure to comply with this Section: Any Claim of the Contractor against Ecology for damages, additional compensation, or additional time will be conclusively deemed to have been waived by the Contractor unless made in accordance with the requirements of this section.

8.02 ARBITRATION

A. Timing of Contractor's demand for arbitration: If Contractor disagrees with Ecology's decision rendered in accordance with paragraph 8.01 D, Contractor shall provide Ecology with a written demand for arbitration. No demand for arbitration of any such Claim will be made later than 30 days after the date of Ecology's decision on such Claim. Failure to demand arbitration within said 30-day period shall result in Ecology's decision being final and binding upon Contractor and its Subcontractors.

B. Filing of Notice for arbitration: Notice of the demand for arbitration shall be filed with the American Arbitration Association (AAA), with a copy provided to Ecology. The parties shall negotiate or mediate under the Voluntary Construction Mediation Rules of the AAA or mutually acceptable service before seeking arbitration in accordance with the Construction Industry Arbitration Rules of AAA as follows:

1. Claims less than $30,000: Disputes involving $30,000 or less shall be conducted in accordance with the Northwest Region Expedited Commercial Arbitration Rules; or

2. Claims greater than $30,000: Disputes over $30,000 shall be conducted in accordance with the Construction Industry Arbitration Rules of the AAA, unless the parties agree to use the expedited rules.

C. Arbitration is forum for resolving Claims: All Claims arising out of the Work shall be resolved by arbitration. The judgment upon the arbitration award may be entered, or review of the award may occur, in the superior court having jurisdiction thereof. No independent legal action relating to or arising from the Work will be maintained.

D. Ecology may combine Claims into same arbitration: Claims between Ecology and Contractor, Contractor and its Subcontractors, Contractor and A/E, and Ecology and A/E shall, upon demand by Ecology, be submitted in the same arbitration or mediation.

E. Settlement outside of arbitration to be documented in Change Order: If the parties resolve the Claim prior to arbitration judgment, the terms of the resolution shall be incorporated in a Change Order. The Change Order shall constitute full payment and final settlement of the Claim, including all claims for time and for direct, indirect, or consequential costs including costs of delays, inconvenience, disruption of schedule, or loss of efficiency or productivity.

8.03 CLAIMS AUDITS

A. Ecology may audit Claims: All Claims filed against Ecology shall be subject to audit at any time following the filing of the Claim. Failure of Contractor, or Subcontractors of any tier, to maintain and retain sufficient records to allow Ecology to verify all or a portion of the Claim or to permit Ecology access to the books and records of Contractor, or Subcontractors of any tier, shall constitute a waiver of the Claim and shall bar any recovery.

B. Contractor to make documents available: In support of Ecology audit of any Claim, Contractor shall, upon request, promptly make available to Ecology the following documents:

1. Daily time sheets and supervisor's daily reports;
2. Collective bargaining agreements;
3. Insurance, welfare, and benefits records;
4. Payroll registers;
5. Earnings records;
6. Payroll tax forms;
7. Material invoices, requisitions, and delivery confirmations;
8. Material cost distribution worksheet;
9. Equipment records (list of company equipment, rates, etc.);
10. Vendors', rental agencies', Subcontractors', and agents' invoices;
11. Contracts between Contractor and each of its Subcontractors, and all lower-tier Subcontractor contracts and supplier contracts;
12. Subcontractors' and agents' payment certificates;
13. Canceled checks (payroll and vendors);
14. Job cost report, including monthly totals;

15. Job payroll ledger;
16. Planned resource loading schedules and summaries;
17. General ledger;
18. Cash disbursements journal;
19. Financial statements for all years reflecting the operations on the Work. In addition, Ecology may require, if it deems it appropriate, additional financial statements for 3 years preceding execution of the Work;
20. Depreciation records on all company equipment, whether these records are maintained by the company involved, its accountant, or others;
21. If a source other than depreciation records is used to develop costs for Contractor's internal purposes in establishing the actual cost of owning and operating equipment, all such other source documents;
22. All non-privileged documents which relate to each and every Claim together with all documents which support the amount of any adjustment in Contract Sum or Contract Time sought by each Claim;
23. Worksheets or software used to prepare the Claim establishing the cost components for items of the Claim including but not limited to labor, benefits and insurance, materials, equipment, Subcontractors, all documents which establish the time periods, individuals involved, the hours for the individuals, and the rates for individuals; and
24. Worksheets, software, and all other documents used by Contractor to prepare its bid.

C. Contractor shall provide facilities for audit and shall cooperate: The audit may be performed by employees of Ecology or a representative of Ecology. Contractor and its Subcontractors will provide adequate facilities acceptable to Ecology for the audit during normal business hours. Contractor and all Subcontractors will make a good-faith effort to cooperate with Ecology's auditors.

PART 9 – TERMINATION OF THE WORK

9.01 TERMINATION BY ECOLOGY FOR CAUSE

A. 7-Day Notice to Terminate for Cause: Ecology may, upon 7-days written notice to Contractor and to its surety, terminate (without prejudice to any right or remedy of Ecology) the Work or any part of it for cause upon the occurrence of any one or more of the following events:

1. Contractor fails to prosecute the Work: Contractor fails to prosecute the Work or any portion thereof with sufficient diligence to ensure Substantial Completion of the Work within the Contract Time;

2. Contractor bankrupt: Contractor is adjudged bankrupt, makes a general assignment for the benefit of its creditors, or a receiver is appointed on account of its insolvency;

3. Contractor fails to correct Work: Contractor fails in a material way to replace or correct Work not in conformance with the Contract Documents;

4. Contractor fails to supply workers or materials: Contractor repeatedly fails to supply skilled workers or proper materials or equipment;

5. Contractor failure to pay Subcontractors or labor: Contractor repeatedly fails to make prompt payment due to Subcontractors or for labor;

6. Contractor violates laws: Contractor materially disregards or fails to comply with laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction; or

7. Contractor in material breach of Contract: Contractor is otherwise in material breach of any provision of the Contract Documents.

B. Ecology's actions upon termination: Upon termination, Ecology may at its option:

1. Take possession of Project site: Take possession of the Project site and take possession of or use all materials, equipment, tools, and construction equipment and machinery thereon owned by Contractor to maintain the orderly progress of, and to finish, the Work;

2. Accept assignment of Subcontracts: Accept assignment of subcontracts pursuant to Section 5.21;

3. Finish the Work: Finish the Work by whatever other reasonable method it deems expedient.

C. Surety's role: Ecology's rights and duties upon termination are subject to the prior rights and duties of the surety, if any, obligated under any bond provided in accordance with the Contract Documents.

D. Contractor's required actions: When Ecology terminates the Work in accordance with this section, Contractor shall take the actions set forth in paragraph 9.02 B, and shall not be entitled to receive further payment until the Work is accepted.

E. Contracts to pay for unfinished Work: If the unpaid balance of the Contract Sum exceeds the cost of finishing the Work, including compensation for A/E's services and expenses made necessary thereby and any other extra costs or damages incurred by Ecology in completing the Work, or as a result of Contractor's actions, such excess shall be paid to Contractor. If such costs exceed the unpaid balance, Contractor will pay the difference to Ecology. These obligations for payment will survive termination.

F. Contractor and surety still responsible for Work performed: Termination of the Work in accordance with this section shall not relieve Contractor or its surety of any responsibilities for Work performed.

G. Conversion of "Termination for Cause" to "Termination for Convenience": If Ecology terminates Contractor for cause, and it is later determined that none of the circumstances set forth in paragraph 9.01 A exist, then such termination will be deemed a termination for convenience pursuant to Section 9.02.

9.02 TERMINATION BY ECOLOGY FOR CONVENIENCE

A. Ecology Notice of Termination for Convenience: Ecology may, upon written notice, terminate (without prejudice to any right or remedy of Ecology) the Work or any part of it for the convenience of Ecology.

B. Contractor response to termination Notice: Unless Ecology directs otherwise, after receipt of a written notice of termination for either cause or convenience, Contractor shall promptly:

1. Cease Work: Stop performing Work on the date and as specified in the notice of termination;
2. No further orders or Subcontracts: Place no further orders or subcontracts for materials, equipment, services, or facilities, except as may be necessary for completion of such portion of the Work as is not terminated;
3. Cancel orders and Subcontracts: Cancel all orders and subcontracts, upon terms acceptable to Ecology, to the extent that they relate to the performance of Work terminated;
4. Assign orders and Subcontracts to Ecology: Assign to Ecology all of the right, title, and interest of Contractor in all orders and subcontracts;

5. Take action to protect the Work: Take such action as may be necessary or as directed by Ecology to preserve and protect the work, Project site, and any other property related to this Project in the possession of Contractor in which Ecology has an interest; and

6. Continue performance not terminated: Continue performance only to the extent not terminated.

C. Terms of adjustment in Contract Sum if Contract terminated: If Ecology terminates the Work or any portion thereof for convenience, Contractor shall be entitled to make a request for an equitable adjustment for its reasonable direct costs incurred prior to the effective date of the termination plus a reasonable allowance for overhead and profit on Work performed prior to termination, plus the reasonable administrative costs of the termination, but shall not be entitled to any other costs or damages whatsoever, provided however, the total sum payable upon termination shall not exceed the Contract Sum reduced by prior payments. Contractor shall be required to make its request in accordance with the provisions of Part 7.

D. Ecology to determine whether to adjust Contract Time: If Ecology terminates the Work or any portion thereof for convenience, the Contract Time shall be adjusted as determined by Ecology.

PART 10 – MISCELLANEOUS PROVISIONS

10.01 GOVERNING LAW

A. Applicable law and venue: The Contract Documents and the rights of the parties herein will be governed by the laws of the State of Washington. Venue will be in Thurston County, Ecology's principal place of business, unless otherwise specified by Ecology.

10.02 SUCCESSORS AND ASSIGNS

A. Bounds to successors, Assignment of Contract: Ecology and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to the other party hereto and to partners, successors, assigns, and legal representatives of such other party in respect to covenants, agreements, and obligations contained in the Contract Documents. Neither party shall assign the Work without written consent of the other, except that Contractor may assign the Work for security purposes, to a bank or lending institution authorized to do business in the State of Washington. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations set forth in the Contract Documents.

10.03 MEANING OF WORDS

A. Meaning of words used in Specifications: Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings. Reference to standard specifications, manuals, or codes of any technical society, organization, or association, or the code of any governmental authority, whether such reference be specific or by implication, will be to the latest standard specification, manual, or code in effect on the date for submission of bids, except as may be otherwise specifically stated. Wherever in these Drawings and Specifications an article, device, or piece of equipment is referred to in the singular manner, such reference will apply to as many such articles as are shown on the Drawings or are required to complete the installation.

10.04 RIGHTS AND REMEDIES

A. No waiver of rights: No action or failure to act by Ecology or A/E shall constitute a waiver of a right or duty afforded them under the Contract Documents, nor shall such action or failure to act constitute approval of an acquiescence in a breach therein, except as may be specifically agreed in writing.

10.05 CONTRACTOR REGISTRATION

A. Contractor to be registered or licensed: Pursuant to RCW 39.06, Contractor shall be registered or licensed as required by the laws of the State of Washington, including but not limited to RCW 18.27.

10.06 TIME COMPUTATIONS

A. Computing time: When computing any period of time, the day of the event from which the period of time begins will not be counted. The last day is counted unless it falls on a weekend or legal holiday, in which event the period runs until the end of the next day that is not a weekend or holiday. When the period of time allowed is less than 7 days, intermediate Saturdays, Sundays, and legal holidays are excluded from the computation unless stated otherwise.

10.07 RECORDS RETENTION

A. Six-year records retention period: The wage, payroll, and cost records of Contractor, and its Subcontractors, and all records subject to audit in accordance with Section 8.03, shall be retained for a period of not less than 6 years after the date of Final Acceptance.

10.08 THIRD-PARTY AGREEMENTS

A. No third party relationships created: The Contract Documents shall not be construed to create a contractual relationship of any kind between A/E and Contractor; Ecology and any Subcontractor; or any persons other than Ecology and Contractor.

10.09 ANTITRUST ASSIGNMENT

A. Contractor assigns overcharge accounts to Ecology: Ecology and Contractor recognize that in actual economic practice, overcharges resulting from antitrust violations are in fact usually borne by the purchaser. Therefore, Contractor hereby assigns to Ecology any and all claims for such overcharges as to goods, materials, and equipment purchased in connection with the Work performed in accordance with the Contract Documents, except as to overcharges that result from antitrust violations commencing after the Contract Sum is established and that are not passed on to Ecology under a Change Order. Contractor shall put a similar clause in its Subcontracts and require a similar clause in its Sub-subcontracts, such that all claims for such overcharges on the Work are passed to Ecology by Contractor.

10.10 HEADING AND CAPTIONS

A. Headings for convenience only: All headings and captions used in these General Conditions are only for convenience of reference, and shall not be used in any way in connection with the meaning, effect, interpretation, construction, or enforcement of the General Conditions, and do not define the limit or describe the scope or intent of any provision of these General Conditions.

END OF GENERAL CONDITIONS

1.01 GENERAL

Paragraphs shown are keyed to the Washington Department of Ecology General Conditions paragraphs that they supplement.

In accordance with the GENERAL CONDITIONS, SUPPLEMENTAL CONDITIONS take precedence over GENERAL CONDITIONS.

2.02 Replaces Section 2.02 – COVERAGE LIMITS

A. Insurance Coverage Certificates

The Contractor shall furnish acceptable proof of insurance coverage on the state of Washington Certificate of Insurance form SF500A, dated 07/02/92 or ACORD form.

B. Required Coverages

1. For a contract less than $100,000.00, the coverage required is:

a. Comprehensive General Liability Insurance – The Contractor shall at all times during the term of this contract, at its cost and expense, carry and maintain general public liability insurance, including contractual liability, against claims for bodily injury, personal injury, death, or property damage occurring or arising out of services provided under this contract. This insurance shall cover claims caused by any act, omission, or negligence of the Contractor or its officers, agents, representatives, assigns, or servants. The limits of liability insurance, which may be increased as deemed necessary by the contracting parties, shall be:

Each Occurrence	$1,000,000.00
General Aggregate Limits (other than products – commercial operations)	$1,000,000.00
Products – Commercial Operations Limit	$1,000,000.00
Personal and Advertising Injury Limit	$1,000,000.00
Fire Damage Limit (any one fire)	$50,000.00
Medical Expense Limit (any one person)	$5,000.00

b. If the contract is for underground utility work, then the Contractor shall provide proof of insurance for that above in the form of Explosion, Collapse, and Underground (XCU) coverage.

c. Employers

Liability on an occurrence basis in an amount not less than $1,000,000.00 per occurrence.

2. For contracts over $100,000.00 but less than $5,000,000.00, the Contractor shall obtain coverage limits as listed for contracts below $100,000.00 and General Aggregate and Products – Commercial Operations Limit of not less than $2,000,000.00.

3. Coverage for Comprehensive General Bodily Injury Liability Insurance for a contract over $5,000,000.00 is:

Each Occurrence	$2,000,000.00
General Aggregate Limits	$4,000,000.00
(other than products – commercial operations)	
Products – Commercial Operations limit	$4,000,000.00
Personal and Advertising Injury Limit	$2,000,000.00
Fire Damage Limit (any one fire)	$50,000.00
Medical Expense Limit (any one person)	$5,000.00

4. For all Contracts – Automobile Liability: In the event that services delivered pursuant to this contract involve the use of vehicles or the transportation of clients, automobile liability insurance shall be required. If Contractor-owned personal vehicles are used, a Business Automobile Policy covering at a minimum Code 2 “owned autos only” must be secured. If Contractor employees’ vehicles are used, the Contractor must also include under the Business Automobile Policy Code 9, coverage for non-owned autos. The minimum limits for automobile liability is $1,000,000.00 per occurrence, using a combined single limit for bodily injury and property damage.

5. For Contracts for Hazardous Substance Removal (Asbestos Abatement, PCB Abatement, UST abandonment, soil/sediment/groundwater contamination remediation that includes PCB contamination remediation, petroleum contamination remediation, heavy metals contamination remediation, etc.)

   a. In addition to providing insurance coverage for the project as outlined above, the Contractor shall provide Pollution Liability insurance for the hazardous substance removal as follows:

EACH OCCURRENCE	AGGREGATE
$500,000.00	$1,000,000.00

   or $1,000,000.00 each occurrence/aggregate bodily injury and property damage combined single limit.

1) Insurance certificate must state that the insurer is covering hazardous substance removal.

2) Should this insurance be secured on a "claims made" basis, the coverage must be continuously maintained for one year following the project's "final completion" through official completion of the project, plus one year following.

For Contracts where hazardous substance removal is a subcomponent of contracted work, the general Contractor shall provide to Ecology a certificate of insurance for coverage as defined in 5a. above. The State of Washington Department of Ecology must be listed as an additional insured. This certificate of insurance must be provided to Ecology prior to commencing work.

3.02 Replaces Section 3.02 B – <u>CONSTRUCTION SCHEDULE</u>

B. The Progress Schedule shall be in the form of a Critical Path Method (CPM) logic network or, with the approval of Ecology, a bar chart schedule may be submitted. The scheduling of construction is the responsibility of the Contractor and is included in the contract to assure adequate planning and execution of the work. The schedule will be used to evaluate progress of the work for payment based on the Schedule of Values. The schedule shall show the Contractor's planned order and interdependence of activities, and sequence of work. As a minimum, the schedule shall include:

a. Date of Notice to Proceed;

b. Activities (resources, durations, individual responsible for activity, early starts, late starts, early finishes, late finishes, etc.);

c. Utility shutdowns;

d. Interrelationships and dependence of activities;

e. Planned vs. actual status for each activity;

f. Substantial completion;

g. Punch list;

h. Final inspection;

i. Final completion; and

j. Float time.

The Schedule Duration shall be based on the Contract Time of

Completion listed on the Bid Proposal form. Ecology shall not be obligated to accept any Early Completion Schedule suggested by the Contractor. The Contract Time for Completion shall establish the Schedule Completion Date.

If the Contractor feels that the work can be completed in less than the Specified Contract Time, then the Surplus Time shall be considered Project Float. This Float time shall be shown on the Project Schedule. It shall be available to accommodate changes in the work and unforeseen conditions.

Neither the Contractor nor Ecology have exclusive right to this Float Time. It belongs to the project.

5.02 Replace Section 5.02 B – <u>PERMITS, FEES, AND NOTICES</u>

B. The actual cost of the general building permit (only) and the public utility hook-up fees will be a direct reimbursement to the Contractor or paid ***directly to the permitting agency*** *by Ecology.* ***Fees for these permits should not be included by the Contractor in his bid amount.***

Add New Section 5.02 D – <u>PERMITS, FEES, AND NOTICES</u>

D. The General Contractor shall submit copies of each valid permit required on the project to Ecology or Ecology's representative. Nothing in this part shall be construed as imposing a duty upon Ecology or the A/E to secure permits.

5.07 Replaces 5.07 A – <u>SAFETY PRECAUTIONS</u>

A. In performing this contract, the Contractor shall provide for protecting the lives and health of employees and other persons; preventing damage to property, materials, supplies, and equipment; and avoiding work interruptions. For these purposes, the Contractor shall:

1. Follow Washington Industrial Safety and Health Act (WISHA) regional directives and provide a site-specific safety program that will require an accident prevention and hazard analysis plan for the Contractor and each Subcontractor on the work site. The Contractor shall submit a site-specific safety plan to Ecology or Ecology's representative within 14 days after Notice to Proceed and prior to commencement of the Work.

2. Provide adequate safety devices and measures including, but not limited to, the appropriate safety literature, notice, training, permits, placement and use of barricades, signs, signal lights,

ladders, scaffolding, staging, runways, hoist, construction elevators, shoring, temporary lighting, grounded outlets, wiring, hazardous materials, vehicles, construction processes, and equipment required by Chapter 19.27 RCW, State Building Code (International Building, Electrical, Mechanical, Fire, and Plumbing Codes); Chapter 212-12 WAC, Fire Marshal Standards; Chapter 49.17 RCW, WISHA; Chapter 296-155 WAC, Safety Standards for Construction Work; Chapter 296-65 WAC, WISHA Asbestos Standard; Chapter 296-842 WAC, Respirator Standard; Chapter 296-62 WAC, General Occupation Health Standards; Chapter 296-24 WAC, General Safety and Health Standards; and Chapter 49.70 RCW, Right to Know Act.

3. Comply with the State Environmental Policy Act (SEPA), Clean Air Act, Shoreline Management Act, and other applicable federal, state, and local statutes and regulations dealing with the prevention of environmental pollution and the preservation of public natural resources.

4. Post all permits, notices, and/or approvals in a conspicuous location at the construction site.

5. Provide any additional measures that Ecology determines to be reasonable and necessary for ensuring a safe environment in areas open to the public.

6. Nothing in this part shall be construed as imposing a duty upon Ecology or the A/E to prescribe safety conditions relating to employees, public, or agents of the Contractors.

5.20 Replace Paragraph B – <u>SUBCONTRACTORS AND SUPPLIERS</u>

B. Prior to submitting the first Application for Payment, Contractor shall furnish in writing to Ecology on Ecology-provided form(s) the names, addresses, telephone numbers, and Tax Identification Numbers (TIN) of all Subcontractors, as well as suppliers providing materials in excess of $2,500.00. ***The Contractor shall designate all Subcontractor and supplier participants that they believe to be MBE or WBE owned businesses, or have identified themselves to the Contractor as MBE or WBE, or are Washington State OMWBE certified. The Contractor shall indicate the anticipated dollar value of each MWBE subcontract.*** Contractor shall utilize Subcontractors and suppliers that are experienced and qualified and meet the requirements of the Contract Documents, if any. Contractor shall not utilize any Subcontractor or supplier to whom Ecology has a reasonable objection, and shall obtain Ecology's written consent before making any substitutions or additions.

10.11 Add Part 10.11 – MINORITY AND WOMEN'S BUSINESS ENTERPRISES (MWBE) PARTICIPATION

In Accordance with the legislative findings and policies set forth in Chapter 39.19 RCW, the state of Washington encourages participation in all of its contracts by MWBE firms certified by the Office of Minority and Women's Business Enterprises (OMWBE). Participation may be either on a direct basis in response to this solicitation or as a Subcontractor to a Bidder. Any affirmative action requirements set forth in federal regulations or statutes included or referenced in the contract documents will apply. Bidders may contact OMWBE to obtain information on certified firms for potential Subcontractors/suppliers.

A. When referred to in this Contract, the terms Minority Business Enterprise (MBE) and Women's Business Enterprise (WBE) will be as defined by OMWBE, WAC 326-02-030.

B. OMWBE has compiled a directory of certified firms. Copies of this directory may be obtained through OMWBE. For information regarding the certification process or the certification status of a particular firm, contact:

OMWBE

Office Location:
210 11th Avenue SW, Suite 401
Olympia, WA 98501

Mailing Address:
P.O. Box 41160
Olympia, WA 98504-1160
Telephone (866) 208-1064 Toll Free

C. Eligible MWBEs or M/W firms

MWBE firms utilized for this project for voluntary MWBE goals may be certified by Washington State OMWBE or self-identified as minority- or women-owned (M/W firm).

D. MWBE Voluntary Goals

Ecology has established voluntary goals for MWBE participation for this project. The voluntary goals are set forth in the Invitation for Bids/Advertisement for Bids.

E. If any part of the contract, including the supply of materials and equipment, is anticipated to be subcontracted, then prior to receipt of the first payment, Contractor shall submit, pursuant to Section 5.20 A, a list of all Subcontractors/suppliers it intends to use, designate whether any of the Subcontractors/suppliers are MWBE firms, indicate the anticipated dollar value of each MWBE subcontract, and provide Tax Identification Number (TIN).

F. If any part of the contract, including the supply of materials and equipment, is actually subcontracted during completion of the work, then prior to final acceptance or completion of the contract or as otherwise indicated in the contract documents, the Contractor shall submit a statement of participation indicating what MWBEs were used and the dollar value of their subcontracts.

G. The provisions of this section are not intended to replace or otherwise change the requirements of RCW 39.30.060. If said statute is applicable to this contract, then the failure to comply with RCW 39.30.060 will still render a bid non-responsive.

H. The Contractor shall maintain, for at least three years after completion of this contract, relevant records and information necessary to document the level of utilization of MWBEs and other businesses as Subcontractors and suppliers in this contract, as well as any efforts the Contractor makes to increase the participation of MWBEs as listed in Section I below. The Contractor shall also maintain, for at least three years after completion of this contract, a record of all quotes, bids, estimates, or proposals submitted to the Contractor by all businesses seeking to participate as Subcontractors or suppliers in this contract. The state shall have the right to inspect and copy such records. If this contract involves federal funds, Contractor shall comply with all recordkeeping requirements set forth in any federal rules, regulations, or statutes included or referenced in the contract documents.

I. Bidders shall advertise opportunities for Subcontractors or suppliers in a manner reasonably designed to provide MWBEs capable of performing the work with timely notice of such opportunities, and all advertisements shall include a provision encouraging participation by MWBE firms. Advertising may be done through general advertisements (e.g. newspapers, journals, etc.) or by soliciting bids directly from MWBEs. Bidders shall provide MWBEs that express interest with adequate and timely information about plans, specifications, and requirements of the contract.

J. Contractors shall not create barriers to open and fair opportunities for all businesses including MWBEs to participate in all State contracts and to obtain or compete for contracts and subcontracts as sources of supplies, equipment, construction, and services. In considering offers from and doing business with Subcontractors and suppliers, the Contractor shall not discriminate on the basis of race, color, creed, religion, sex, age, nationality, marital status, or the presence of any mental or physical disability in an otherwise qualified disabled person.

K. Any violation of the mandatory requirements of this part of the contract shall be a material breach of contract for which the Contractor may be subject to a requirement of specific performance, or damages and sanctions provided by contract, by RCW 39.19.090, or by other applicable laws.

10.12 Add Part 10.12 – <u>MINIMUM LEVELS OF APPRENTICESHIP PARTICIPATION</u>

In accordance with RCW 39.04.320, the State of Washington requires 15% apprenticeship participation for projects estimated to cost one million dollars or more.

A. Apprentice participation, under this contract, may be counted towards the required percentage (%) only if the apprentices are from an apprenticeship program registered and approved by the Washington State Apprenticeship and Training Council (RCW 49.04 and WAC 296-04).

B. Bidders may contact the Department of Labor and Industries, Specialty Compliance Services Division, Apprenticeship Section, P.O. Box 44530, Olympia, WA 98504-4530 by phone at (360) 902-5320, and e-mail at thum235@lni.wa.gov, to obtain information on available apprenticeship programs.

C. For each project that has apprentice requirements, the Contractor shall submit a **"Statement of Apprentice/Journeyman Participation"** on forms provided by Ecology with every request for progress payment. The Contractor shall submit consolidated and cumulative data collected by the Contractor and collected from all Subcontractors by the Contractor. The data to be collected and submitted includes the following:

1. Contractor name and address
2. Contract number
3. Project name
4. Contract value
5. Reporting period "Notice to Proceed" through "Invoicing Date"

6. Name and registration number of each apprentice
7. Total number of apprentices and labor hours worked by them, categorized by trade or craft.
8. Total number of journeymen and labor hours worked by them, categorized by trade or craft.
9. Cumulative combined total of apprentice and journeymen labor hours.
10. Total percentage of apprentice hours worked

D. No changes to the required percentage (%) of apprentice participation shall be allowed without written approval of Ecology. In any request for the change, the Contractor shall clearly demonstrate a good faith effort to comply with the requirements for apprentice participation.

E. Any substantive violation of the mandatory requirements of this part of the contract may be a material breach of the contract by the Contractor. Ecology may withhold payment pursuant to Part 6.05, stop the work for cause pursuant to Part 3.04, and terminate the contract for cause pursuant to Part 9.01.

END OF SUPPLEMENTAL CONDITIONS

PART 1 – GENERAL

1.01 GENERAL

A. Site-Specific Hazards: The Project Site contains soil and groundwater contaminated with polychlorinated biphenyls (PCBs); tri-, di-, and chlorobenzenes; chlorinated ethenes (tetrachloroethene [PCE], trichloroethene [TCE], cis-1,2-dichloroethene [cis-DCE], and vinyl chloride);and scattered occurrences of metals (arsenic, cadmium, and lead), petroleum hydrocarbons, and dioxins/furans. The Work will involve contact with this soil and groundwater. The Contractor shall meet HAZWOPER rules and L&I rules, including necessary worker training requirements.

B. Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Work.

C. In carrying out its responsibilities according to the Contract Documents, Contractor shall protect the lives and health of employees performing the Work and other persons who may be affected by the Work; prevent damage to property, materials, supplies, and equipment, whether on site or stored off site; and prevent damage to other property at the site or adjacent thereto. Contractor shall comply with all applicable laws, ordinances, rules, regulations, and orders of any public body having jurisdiction for the safety of persons or property, or to protect them from damage, injury, or loss; shall erect and maintain all necessary safeguards for such safety and protection; and shall notify owners of adjacent property and utilities when prosecution of the Work may affect them.

   1. Contractor shall fulfill the health and safety requirements specified in **SECTION 02 61 13 – EXCAVATION AND HANDLING OF CONTAMINATED SOIL**.

D. Nothing provided in this section shall be construed as imposing any duty upon Ecology or A/E related to, or as constituting any express or implied assumption of, control or responsibility over Project Site safety, or over any other safety conditions relating to employees or agents of Contractor or any of its Subcontractors, or the public.

1.02 RELATED SECTIONS

A. **SECTION 01 35 29 – HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES**

1.03 SUBMITTALS

A. Project and Work Site-Specific Health and Safety Plan (HASP): The Contractor shall submit a Project and Work Site-Specific HASP to Ecology within 14 days after Notice to Proceed and prior to commencement of the Work.

1. This HASP will be prepared and signed by an Industrial Hygienist licensed in the State of Washington. The Appendix to the HASP shall include copies of each site worker's HAZWOPER training certificate meeting OSHA 29 CFR 1910.120 and a certificate of a refresher course taken within the prior calendar year.
2. This HASP must be followed by the Contractor, and a minimum of one (1) copy shall be available and accessible at the Project Site at all times.
3. Where Work is being performed in different areas of the overall Project Site, multiple copies of the HASP shall be available and accessible to Contractor personnel in each of those areas.
4. Contractor's Project and Work Site HASP shall contain all information as required by law, and, at a minimum, the information identified in "Personnel Disclosure and Training" Section herein.

B. PERSONNEL DUST EXPOSURE CONTROL PLAN

1. Personnel Dust Exposure Control Plan, including personnel air monitoring, shall be prepared by an Industrial Hygienist licensed in the State of Washington. Submit a minimum of two (2) weeks prior to commencing excavation Work at the Project Site.

C. MONITORING RESULTS

1. Hard and electronic copies of monitoring results shall be submitted to Ecology at the end of the project. Ecology will provide an electronic file example depicting the format for electronic delivery of data, and the Contractor shall format all data into the required format. Erroneously formatted data shall be reformatted and resubmitted.

1.04 PERSONNEL DISCLOSURE AND TRAINING

A. Contractor shall provide all persons working on the Project Site with information and training on hazardous chemicals in their work at the time of their initial assignment, and whenever a new hazard is introduced into their work area.

1. Information: At a minimum, Contractor shall inform persons working on the Project Site of:
   a. The requirements of *Chapter 296-62 WAC, General Occupational Health Standards.*
   b. Any operations in their work area where hazardous chemicals are present.
   c. The location and availability of written hazard communication programs, including the required list(s) of hazardous chemicals and Material Safety Data Sheets (MSDS) required by *Chapter 296-62 WAC*.
2. Training: At a minimum, Contractor shall provide training for persons working on the Project Site, which includes:
   a. Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.).
   b. The physical and health hazards of the chemicals in the work area.
   c. The measures such persons can take to protect themselves from these hazards, including specific procedures Contractor, or its Subcontractors, or others have implemented to protect those on the Project Site from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used.
3. The details of the hazard communication program developed by Contractor or its Subcontractors, including an explanation of the labeling system and the MSDS, and how employees can obtain and use the appropriate hazard information.

1.05 EXPOSURE AND SAFETY MANAGEMENT

A. Contractor shall implement a safety program as required by law and as stated in the Contractor’s Project and Work Site HASP.

B. Contractor's responsibility for hazardous, toxic, or harmful substances shall include the following duties:

1. Contractor shall not keep, use, dispose, transport, generate, or sell on or about the Project Site any substances now or

hereafter designated as, or which are subject to regulation as, hazardous, toxic, dangerous, or harmful by any federal, state, or local law, regulation, statute, or ordinance (hereinafter collectively referred to as hazardous substances), in violation of any such law, regulation, statute, or ordinance, but in no case shall any such hazardous substance be stored more than 90 days on the Project Site.

2. Contractor shall promptly notify Ecology of all spills or releases of any hazardous substances that are otherwise required to be reported to any regulatory agency and pay the cost of cleanup. Contractor shall promptly notify Ecology of all failures to comply with any federal, state, or local law, regulation, or ordinance; all inspections of the Project Site by any regulatory entity concerning the same; all regulatory orders or fines; and all responses or interim cleanup actions taken by or proposed to be taken by any government entity or private party on the Project Site.

C. All Work shall be performed with due regard for the safety of the public. Contractor shall perform the Work so as to cause a minimum of interruption of vehicular traffic or inconvenience to pedestrians. All arrangements to care for such traffic shall be the Contractor's responsibility. All expenses involved in the maintenance of traffic by way of detours shall be borne by Contractor.

D. The Contractor shall furnish, erect, and maintain such fences, barriers, lights, and signs and provide such flagging and guards as are necessary in the opinion of Ecology to give adequate warning to the public of the construction and of any dangerous condition which may be encountered as a result thereof.

E. The Contractor shall meet all safety requirements of *WAC 296-155-650 Part N, Excavation, Trenching, and Shoring,* when excavating over four feet in depth.

1.06 EMERGENCIES

A. In an emergency affecting the safety of life or the Work or of adjoining property, Contractor is permitted to act, at its discretion, to prevent such threatened loss or injury, and Contractor shall so act if so authorized or instructed.

B. Contractor shall maintain an accurate record of exposure data on all incidents relating to the Work resulting in death, traumatic injury, occupational disease, or damage to property, Property Owner(s), Tenant(s), pets owned by Property Owner(s) and/or Tenant(s), materials, supplies, or equipment. Contractor shall immediately report any such incident to Ecology. Ecology shall, at all times, have a right of access to all records of exposure.

C. Report incidents to Washington Department of Labor & Industries as required.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 IMPLEMENTATION

A. Implement the accepted HASP as written, and notify Ecology promptly regarding deviations from the plan. Update plan as required during the project and promptly notify Ecology of revisions.

B. The project industrial hygienist shall visit the site within 1 week after mobilization (during initial excavation of contaminated soil) and two additional times during the project excavation work and provide a report to Ecology (with 3 days of each visit) on compliance with the Health and Safety plan, and recommendations for improvements. The Contractor shall implement the recommendations immediately.

C. Maintain a boot wash facility at personnel exit areas from the work zone. Change water daily and maintain a clean wash station.

1. All Contractor personnel exiting the work area shall use the boot wash.
2. The Contractor's boot wash shall be maintained in good condition and shall be made available for use to all site visitors, Ecology staff and representatives, regulatory agency stall, cultural resources observer, and other project personnel.

END OF SECTION

PART 1 – GENERAL

1.01 SUMMARY OF PROJECT

A. The Project is located at the Jacobson Terminals Property (Property), owned by A&B Jacobson, LLC, in Seattle, King County, Washington.

B. The Project's objective is to remove and dispose of soil contaminated with PCBs and chlorinated benzenes from the area of concern at the north end of the property. According to the results of monitoring performed at the Property, the soil designated for excavation and removal has elevated PCB and chlorinated benzene concentrations, in addition to chlorinated ethenes and metals, as indicated in **SECTION 02 61 13 – EXCAVATION AND HANDLING OF CONTAMINATED SOIL**. Soil excavated and removed will be disposed of at a RCRA Subtitle C landfill and/or at an EPA-approved incineration facility, and will be replaced with clean imported backfill to restore the grade to pre-construction elevations. The Project also includes restoration of paving and utility features damaged or removed during construction.

C. The Project work limits for contaminated soil removal is as indicated on the Drawings. Work limits shall be established by the Contractor according to the Drawings and approved by Ecology.

1.02 WORK INCLUDED IN THE CONTRACT

A. The Total Base Bid work includes but is not limited to:

1. Surveying, mapping, and documenting all existing property features in accordance with the Project Manual, as a basis for restoring the property to its previous condition and/or as specified in the Contract Documents. This includes but is not limited to determining pre-construction topography and identifying and locating existing structures and site features, including private and public utilities.
2. Demolition of pavement over the designated excavation area, as specified in the Contract Documents.
3. Selective temporary removal of existing structures to provide accessibility for the Work.
4. Proper removal and disposal of debris generated by demolition and/or excavation.
5. Temporary bypassing/rerouting of underground utilities located within the planned excavation area.
6. Excavation of soil with elevated levels of PCBs and chlorinated benzenes in the area and to the depths indicated on the Drawings.

Excavated soil shall be removed from the Project Site and disposed of at a RCRA Subtitle C landfill and/or at an EPA-approved incineration facility. Excavation shall be performed to avoid buildings, structures, and paved areas designated to remain in place.

7. Maintaining access to the Jacobson Terminals facility by terminal staff, clients, contractors, and guests.
8. Maintaining all utility services to the Project Site. Underground utilities located within the planned excavation area shall be temporarily bypassed/rerouted during the Work. Promptly restore utility service in the event that the Work damages or shuts down utility service. Restore bypassed/rerouted underground utilities following completion of the excavation work, as specified in the Project Manual.
9. Repairing or replacing in kind all utilities damaged during the Work, except as otherwise specified in the Project Manual.
10. Maintaining safe and reasonable access to neighboring properties.
11. Maintaining safe and secure work areas to prevent intrusion of the public or animals while the Work is being performed (including but not limited to installing and maintaining fencing).
12. Importing sufficient clean backfill material to return site grades to pre-excavation elevation and conditions, except as otherwise specified in the Project Manual. This shall include surveyed verification that the backfilled excavation is in accordance with the Project Manual.
13. Placing and compacting backfill.
14. Restoring paving and site features that were removed or damaged during the Work.

1.03 TIME FOR COMPLETION OF PROJECT

A. Substantial Completion: The project shall be Substantially Complete within 120 calendar days from the date of the Notice to Proceed. See **SECTION 01 77 00 – CLOSEOUT PROCEDURES** for requirements for Substantial Completion.

B. Final Completion: The project shall achieve Final Completion within 45 calendar days from the date of Substantial Completion. See **SECTION 01 77 00 – CLOSEOUT PROCEDURES** for requirements for Final Completion.

1.04 LIQUIDATED DAMAGES AND ACTUAL DAMAGES

A. If the Contractor fails to achieve Substantial Completion in the required contract time, the Contractor authorizes Ecology to deduct liquidated damages from project progress payments in the amount of $1,500 per calendar day until Contractor achieves Substantial Completion.

B. If the Contractor fails to achieve Final Completion within the time stipulated after Substantial Completion, the Contractor shall be subject to actual damages suffered by Ecology until Contractor achieves Final Completion.

1.05 PROJECT WORK DATES, HOURS, SITE CONDITIONS, AND NOISE

A. Work days for this project are Monday through Friday, and work hours are from 7:00 a.m. to 5:00 p.m. Equipment and heavy vehicle operations during a work day shall be limited to 8:00 a.m. to 5:00 p.m.

B. Except in emergency circumstances, or as authorized by Ecology, Contractor shall not perform the Work during weekends (Saturday and Sunday) or Legal Holidays as defined and designated by the State of Washington.

   1. Weekends and legal holidays work restrictions are accounted for in the allowed contract time for this project.

C. Contractor shall be responsible for maintaining a safe and stable Project area during all periods of time when the Work is not permitted.

1.06 CULTURAL RESOURCES

A. No cultural resources are known to exist within the Work area. However, there is always the potential for unanticipated discoveries during excavation work.

B. Contractors, workers, and Engineer must be aware of clues that signify a potential discovery and what actions must be taken to protect the discovery.

C. Clues that may signal the presence of cultural resources are:

   1. Artifacts: Artifacts may be found exposed in open excavations or back dirt piles. These may range from finished tools such as stone pestles, arrowheads, or polished bone tools to small pieces of exotic stone such as chert, jasper, or obsidian. Historic artifacts include bottles, cans, bricks, window glass, square nails, or other objects in excess of 50 years in age. Do not remove items.

2. Buried features/middens: During excavation, exposed sides of excavations may contain buried features such as campfire hearths or shell middens. In cross-section, hearths look like evidence of shallow lenses (saucer-shaped) or rock, charcoal, and blackened sediment. Middens are buried prehistoric ground surfaces. These are usually thin lenses of dark greasy sediments running horizontally for many feet in different directions. Near coastal shorelines, these middens are characterized by accumulations of broken and burned shellfish remains. Occasionally they may also contain artifacts and/or broken bone fragments.

D. Unanticipated Discovery Procedures:

1. If artifacts or evidence of buried features/middens are discovered during construction, cease work and contact Ecology immediately according to Inadvertent Discovery Plan in Appendix D.

E. Discovery of Human Remains During Construction:

1. If human remains are discovered, work must cease in the area of discovery. Immediately notify Ecology, local law enforcement, and the coroner (Reference: RCW 27.44.055).

F. Special Conditions: No special conditions have been identified for this contract.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

PART 1 – GENERAL

1.01 OVERALL SITE ACCESS CONDITIONS

A. Contractor shall confine all operations, including storage of materials, to Ecology-approved areas.

B. Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be provided by Contractor only with the consent of Ecology and without additional expense to Ecology. The temporary buildings and utilities shall remain the property of Contractor and shall be removed by Contractor at its expense upon completion of the Work.

Ecology does not own property within or in close vicinity to the Project area. In the event that property or access rights must be obtained for the location of temporary buildings and utilities, the responsibility to secure all access rights and permissions shall be the Contractor's at no additional cost to Ecology. This includes right-of-way permits and fees for the location of temporary buildings and other facilities within the public right-of way.

C. Contractor shall use only established roadways or temporary roadways authorized by Ecology. When materials are transported in prosecuting the Work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by federal, state, or local law or regulation, or beyond the posted load capacity of any roads surrounding the Project Site.

D. Ownership and control of all materials or facility components to be demolished or removed from the Project Site by Contractor, and not identified as salvage to Ecology, are the responsibility of the Contractor. Contractor shall comply with laws governing their storage and ultimate disposal. Contractor shall provide Ecology with a copy of all manifests and receipts evidencing proper disposal of all materials removed from the Project Site.

1.02 CONTRACTOR'S USE OF SITE AND PREMISES

A. Contractor's Use of the Premises: During the construction period, Contractor shall have full use of the work areas shown on the plans.

B. Access is not permitted into the interiors of buildings or enclosed structures on the property, unless authorized by Ecology in advance.

Contractor's use of the tenant space shall be limited by the conditions set forth in the Project Manual and Ecology's right to perform construction operations with its own personnel or to employ separate contractors on portions of the Project.

Contractor's use of *surrounding areas* shall be subject to approval and direction of Ecology, including but not limited to traffic of Contractor equipment and vehicles, dust and debris control, and noise control.

C. Emergency Access/Egress: Contractor shall maintain all pathways, drives, gates, directional signage and provide other provisions as required by authorities having jurisdiction, for emergency access/egress to and from Project area(s).

1.03 ECOLOGY'S USE OF SITE AND PREMISES

A. Ecology reserves the right to occupy (Prior Occupancy) and to place and install equipment and furnishings in tenant space prior to Substantial Completion, provided that such occupancy does not interfere with completion of the Work within the Contract Time. Such Prior Occupancy (see **SECTION 00 72 00 – GENERAL CONDITIONS**) by Ecology shall not constitute acceptance of the total Work.

B. Contractor shall provide Ecology, Ecology's consultants, and others as designated to the Contractor, access to the Work in progress.

C. Ecology field representatives shall be authorized to enter the Project Site to observe and document the Work activities and coordinate communications and activities involving Contractor, Ecology, Ecology's consultant, and the Property Owner.

Contractor shall provide Ecology field representatives all reasonable access to the Work to photograph, document, measure, sample, or other activities as required by Ecology.

1.03 SITE ACCESS FOR TERMINAL BUSINESS OPERATIONS

A. Jacobson Terminals business operations will remain active during the Work. During construction, the Contractor shall maintain access to terminal facilities that are outside the active work area, as defined on the Drawings and identified and confirmed at the pre-bid meeting.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 PROTECTION OF ON-SITE PROPERTY, EQUIPMENT, AND MATERIALS

A. Contractor shall be responsible for the proper care and protection of its materials and equipment delivered to the Project Site. Materials and equipment may be stored on the premises subject to approval of Ecology. When Contractor uses any portion of the Project Site as a shop, Contractor shall be responsible for any repairs, patching, or cleaning arising from such use.

END OF SECTION

PART 1 – GENERAL

1.01 ELECTRICAL AND WATER

A. Contractor shall confirm if it is acceptable to use existing electrical and water utilities with the Seattle Public Utilities and Seattle City Light, and if so, coordinate utility use and payment with Ecology.

B. Contractor is permitted by Ecology to install temporary connections and distribution lines to public utilities independent of utilities provided to the existing Property Owner, as negotiated between Contractor and the utility service provider.

C. Where such temporary connections can be made, the utility service consumed shall be charged to and paid for by the Contractor.

D. Contractor shall, at its expense and in a manner satisfactory to Ecology, install and maintain the temporary connections and distribution lines, together with appropriate protective devices and all meters required to measure the amount of each utility used.

E. Prior to the date of Final Completion unless otherwise authorized by Ecology in writing, Contractor shall remove all temporary connections, distribution lines, meters, and associated equipment and materials, and restore any disturbed areas back to pre-construction conditions.

1.02 COMBINED SEWER

A. Access points into the combined sewer system for stormwater disposal purposes are found in the adjacent City streets.

B. Contractor shall obtain all required permissions from the City of Seattle for stormwater disposal from the Project Site during the Work, in accordance with City of Seattle Standard Specifications for Road, Bridge, and Municipal Construction (most current edition).

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

PART 1 – GENERAL

1.01 RELATED WORK DESCRIBED ELSEWHERE

A. The provisions and intent of the Contract, including the **SECTION 00 72 00 – GENERAL CONDITIONS –** and **SECTION 00 73 00 – SUPPLEMENTAL CONDITIONS –** apply to this Work as if specified in this section. Work related to this section is described throughout the sections of the Project Manual.

1.02 PAYMENT PROCEDURES

A. "Pencil copies" of the monthly pay estimates shall be presented to Ecology not more than three (3) days prior to the anticipated submittal of the "formal" pay estimate. The Contractor shall hold a meeting with Ecology to discuss the quantities to be included in the pay estimate for the respective month, based upon the submitted Schedule of Values. Upon agreement of the quantities performed, the Contractor shall complete the pay estimate for submittal.

B. Monthly pay estimates shall clearly identify the Work performed for the given time period based on a percentage of work completed for lump sum bid items and actual quantities installed/used for unit price items.

C. Prior to submitting pay estimates to Ecology, the Contractor and Ecology will review the Work accomplished to agree upon the percentage of Work completed.

D. Following review, the Contractor shall prepare an original pay estimate with complete supporting documentation attached and submit electronically (preferred method in support of Ecology's "Green" contracting practices) to the attention of Joe Ward, Ecology Contracts Officer. The pay estimate may be emailed to:

Email: joe.ward@ecy.wa.gov

Mailing address:
Attn: Joseph Ward, P.E.
Washington State Department of Ecology
Toxics Cleanup Program, PO Box 47600
Olympia, WA 98504

E. The Ecology Contracts Officer shall review the amount invoiced to verify costs are in accordance with the Project Manager's recommendations, authorized scope of work, proposed rates, and the terms and conditions of the Contract. No payments will be processed to the Contractor and its

Subcontractors that have performed work covered in the pay estimate until all Intents to Pay Prevailing Wages are on file with the Department of Labor and Industries. Once the above items are verified, the Ecology Contracts Officer shall approve the pay estimate for payment and forward to Ecology's finance department for processing. Payments for approved pay estimates shall be made within thirty (30) days of receipt by the Ecology Contracts Officer, unless the pay estimate has been returned for revision(s) and requires resubmittal. Pay estimates requiring revision(s) shall be returned to the Contractor per Article 6.04, Progress Payments, of **SECTION 00 72 00 – GENERAL CONDITIONS**.

1.03 PAYMENT PRICING

A. Pricing for the various lump sum or unit prices in the Bid Form, as further specified herein, shall include all compensation, including overhead and profit, to be received by the Contractor for furnishing all tools, equipment, supplies, and manufactured articles, and for all labor, operations, and incidentals appurtenant to the items of work being described, as necessary to complete the various items of the work in accordance with the requirements of the Contract Documents.

B. Pricing also includes all costs of compliance with the regulations of public agencies having jurisdiction, including safety and health requirements of the Occupational Safety and Health Administration of the U.S. Department of Labor (OSHA) and Washington Department of Labor and Industries.

C. No separate payment will be made for any item that is not specifically set forth in the Bid Form, and all costs therefore shall be included in the prices named in the Bid Form for the various appurtenant items of work.

D. All other work not specifically mentioned in the measurement and payment sections identified below shall be considered incidental to the work performed and merged into the various unit and lump sum prices bid. Payment for work under one item will not be paid for under any other item.

E. Ecology reserves the right to make changes should unforeseen conditions necessitate such changes. Where work is on a unit price basis, the actual quantities occasioned by such changes will govern the compensation.

1.04 MEASUREMENT FOR PAYMENT

A. Measurement for payment shall be in accordance with the agreed-upon percentage completion of Work, organized in accordance with the Schedule of Values submitted by the Contractor to Ecology before the first application for payment is submitted.

B. Payment will be considered full compensation for furnishing all labor, materials, and equipment to complete the Work specified, to include all direct, indirect and overhead costs, and profit.

C. **Trench Excavation Safety Provisions**: If any of Lump Sum or Unit Price Bid Item contains any work that requires trenching exceeding a depth of four feet, all costs for trench safety shall be included in the appropriate Bid Items for adequate trench safety systems as necessary, in compliance with Chapter 39.04 RCW, 49.17 RCW, and WAC 296-155-650.

D. In measuring all acceptably completed items of work, Ecology's Representative will:

1. Use United States standard measure;
2. Make all measurements as described in this section, unless individual specifications require otherwise;
3. Follow methods generally recognized as conforming to good engineering practice;
4. Conform to the usual practice of carrying measurements and computations to the proper significant figure or fraction of units for each item; and
5. Measure horizontally or vertically (unless otherwise specified).

E. The terms listed below shall be defined as follows in all measurements under this section:

1. "Lump Sum" (when used as an item of payment): Complete payment for the work described for that item in the contract. Lump sum payments also may be made based on percentage of completion. Unless otherwise specified, lump sum for an activity (e.g., health and safety) shall apply to the entire project, for all properties and duration of work. Minor adjustments to the work shall be assumed to be incidental with regard to global lump sum work items such as health and safety, survey, mobilization, and other similar items.
2. "Ton": 2,000 pounds of weight.
3. "Gallon": Measurement shall be in U.S. gallons, as measured by the licensed disposal facility at the time of disposal.
4. "Linear Foot": Measured parallel to the structure's base or foundation, unless the Plans require otherwise.
5. "Hour": Hourly rate for equipment and personnel, including fees, taxes, and any other incidentals. Prevailing wage rates shall apply for the work in this Contract.

F. For each item listed below, Ecology's Representative will use the method of measurement described.

1. Standard Manufactured Items: Measured by the manufacturer's identification gage, unit weight, section dimension, etc. Ecology's Representative will accept manufacturing tolerances set by each industry unless cited specifications require more stringent tolerances.

G. No measurement will be made for:

1. Work performed or materials placed outside lines shown in the Plans or set by Ecology's Representative;
2. Materials wasted, used, or disposed of in a manner contrary to the contract;
3. Rejected materials (including those rejected after placement if the rejection resulted in the Contractor's failure to comply with the contract);
4. Hauling and disposing of rejected materials;
5. Material remaining on hand after the work is completed; or
6. Any other work or material contrary to any contract provision.

H. Lump Sum/Known Quantity bid items, any alternate bid items, and any Unit Price Bid items are identified in **SECTION 00 41 43 – SUMMARY OF PAY ITEMS AND QUANTITIES**.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

PART 1 – GENERAL

1.01 GENERAL

A. All Work shown in the Contract Documents shall be paid on a lump sum/known quantity basis. Unit Prices shall be used to adjust the contract sum in the event of an increase or decrease in the quantity and associated price of work affected by a unit price.

1.02 DEFINITIONS

A. Unit Price, as stated on the Bid Form, is a price per unit of measurement for materials, labor, and all other aspects of the specific element of Work that adjusts the contract amount as a result of an increase or decrease in quantities from those provided in the contract documents. The associated adjustment in the contract amount will be incorporated into the contract through a change order.

B. Unit Prices shall include all labor, material, cost for delivery, equipment, installation, temporary facilities, and coordination/supervision to complete the Work described for the Unit Price, and include overhead and profit.

1.03 UNIT PRICE REFERENCES

A. Refer to sections of the specifications referenced in this section for Work that requires establishment of Unit Prices. Methods of measurement and payment for Unit Prices are specified in those referenced sections. If not specifically noted in other sections, measurements taken for the purpose of quantities for calculation are always to be measured as units in place.

B. Ecology has the right to validate Contractor measurements using an independent surveyor, when applicable, to verify quantities.

1.04 PROJECT UNIT PRICES

A. Loading, Transport, and Off-Site Disposal of Contaminated Material (designated UB1 in the Contract Documents): See **SECTION 02 61 13 – EXCAVATION AND HANDLING OF CONTAMINATED SOIL**.

B. Excavation (designated UB2 in the Contract Documents): See **SECTION 31 23 16 – EXCAVATION**.

C. Imported Clean Fill Material (designated UB3, to include backfilling and compaction, in the Contract Documents): See **SECTION 31 23 23 – FILL**.

D. Construction Dewatering Effluent Treatment (designated UB4 in the Contract Documents): See **SECTION 31 23 19 – CONSTRUCTION DEWATERING**.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

PART 1 – GENERAL

1.01 GENERAL

A. Request for Interpretation: A document submitted by the Contractor requesting clarification of a portion of the Contract Documents, hereinafter referred to as an RFI.

B. Should the Contractor be unable to determine from the Contract Documents the exact material, process, or system to be installed, or when the elements of construction are required to occupy the same space (interference), or when an item of the Work is described differently at more than one place in the Contract Documents, the Contractor shall request that Ecology make an interpretation of the requirements of the Contract Documents to resolve such matters. The Contractor shall comply with procedures specified in this section to make Requests for Interpretation.

C. The Contractor shall prepare and maintain a log of RFIs. At any time requested by Ecology, the Contractor shall furnish copies of the log showing all outstanding RFIs.

1.02 SUBMISSION

A. RFIs shall be prepared and submitted in accordance with the following:

1. RFIs shall be provided in writing to Ecology by the Contractor using a standardized form. Each RFI shall be given a discrete, consecutive number.
2. Each page of the RFI and each attachment to the RFI shall bear the Project name, date, RFI number, and a descriptive title.
3. Each RFI should contain a clear and legible statement of the Work element where interpretation is requested, including specific reference(s) to the pertinent sections and paragraphs of the Project Documents.
4. The RFI statement shall clearly state the reasons why the RFI is being submitted by the Contractor.
5. Contractor shall sign all RFIs attesting to good faith effort to determine from the Contract Documents the information requested for interpretation.
6. Contractor shall be responsible for delays resulting from the necessity to resubmit an RFI due to insufficient or incorrect information presented in the RFI.

B. Contractor shall carefully study the Contract Documents to ensure that information sufficient for interpretation of requirements of the Contract Documents is not included.

1. RFIs that request interpretation of requirements clearly indicated in the Contract Documents will be returned without interpretation.

2. Frivolous RFIs shall be subject to reimbursement from Contractor to Ecology for costs incurred in review of the frivolous RFIs by Ecology, the A/E, or other consultants and design professionals engaged by Ecology.

C. Subcontractor-Initiated and Supplier-Initiated RFIs: RFIs from Subcontractors and material suppliers shall be submitted through, be reviewed by, and be attached to an RFI prepared, signed, and submitted by the Contractor. RFIs submitted directly by Subcontractors or material suppliers will be returned unanswered to the Contractor.

1. Contractor shall review all Subcontractor- and Supplier-Initiated RFIs and take actions to resolve issues of coordination, sequencing, and layout of the Work.

2. RFIs submitted to request clarification of issues related to means, methods, techniques, and sequences of construction or for establishing trade jurisdictions and scopes of subcontracts will be returned without interpretation. Such issues are solely the Contractor's responsibility.

3. Contractor shall be responsible for delays resulting from the necessity to resubmit an RFI due to insufficient or incorrect information presented in the RFI.

D. In all cases in which RFIs are issued to request clarification of issues related to means, methods, techniques, and sequences of construction, the Contractor shall furnish all information required for Ecology or A/E to analyze and/or understand the circumstances causing the RFI and prepare a clarification or direction as to how the Contractor shall proceed.

1. If information included with this type of RFI by the Contractor is insufficient, the RFI will be returned unanswered.

E. Ecology shall review RFIs and respond to the Contractor within 10 working days of receipt. RFIs received after 12:00 noon shall be considered received on the next regular working day for the purpose of establishing the start of the 10-day response period.

F. RFIs shall not be used for the following purposes:

1. To request approval of submittals.

2. To request approval of substitutions.

3. To request changes that only involve change in Contract Time and/or Contract Sum.

4. To request different methods of performing Work than those indicated in the Contract Documents.

G. In the event that the Contractor believes a response to an RFI by Ecology will result in additional cost or time, the Contractor shall not proceed with the Work indicated by the RFI until authorized to proceed by Ecology.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. Contractor shall schedule and conduct meetings and conferences at the Project Site or another convenient location approved by Ecology, except for public meetings. The following requirements for the Contractor are specified for Project meetings:

1. Inform participants and others involved, and individuals whose presence at the meeting is required, of the date, time, and location of each meeting. Ecology shall always be notified of scheduled meetings dates, times, and locations.
2. Prepare a meeting agenda and distribute to all invited attendees.
3. Prepare minutes for each meeting. These minutes shall record significant discussions and agreements achieved. The meeting minutes shall be distributed to everyone concerned, including Ecology, within two (2) working days of the meeting, unless otherwise specified in the Project Documents.

B. Contractor shall participate in public meetings and conferences scheduled and conducted by Ecology. Ecology will coordinate with the Contractor for all these meetings to determine appropriate representation, discuss the meeting agenda, and minimize impacts and consequences on the Work.

1. Public meetings are anticipated on or near the beginning of the Contract Time.
2. A public meeting is possible at or near the end of the Contract Time, at the discretion of Ecology.
3. Contractor is not responsible for preparing and distributing either agenda or minutes for public meetings and conferences scheduled and conducted by Ecology.

1.02 PRE-CONSTRUCTION MEETING

A. The Contractor shall schedule a pre-construction meeting before starting construction, at a time convenient to Ecology and the Property Owner; but not later than fifteen (15) business days after written Notice to Proceed unless otherwise approved by Ecology.

1. The pre-construction meeting will be held at the site.
2. The purpose of the meeting will be to review responsibilities and assignments.

a. Attendees shall be familiar with the Project and authorized to conclude matters relating to the Work. Attendees shall include but are not limited to the following:

   1. Authorized representatives of Ecology, A/E, and their consultants;
   2. Contractor and its superintendent;
   3. Major Subcontractors, manufacturers, and suppliers as determined by the Contractor; and
   4. Representatives of the Property Owner and other representatives as determined by Ecology.

b. The agenda for the meeting shall be prepared in advance by the Contractor and should include the following elements:

   1. Preliminary construction schedule;
   2. Phasing;
   3. Critical sequencing of Work under the Contract;
   4. Designation of responsible personnel;
   5. Procedures for processing field decisions and Change Orders with Ecology;
   6. Brief discussion of procedures for processing Applications for Payment;
   7. Distribution of the Contract Documents;
   8. Submittal procedures;
   9. Preparation of Record Documents;
   10. Use of the premises in the Project area;
   11. Responsibility for temporary facilities, controls, and erosion best management practices;
   12. Parking availability;
   13. Work and temporary storage areas;
   14. Security;
   15. Progress cleaning;
   16. Working hours; and
   17. Topics requested by the Property Owner, Contractor, or Ecology.

1.03 PROGRESS MEETINGS

A. The Contractor shall conduct progress meetings at weekly intervals, at a time and place convenient for Ecology.

1. To coordinate the content of this meeting with Ecology's concurrent public involvement policies and program, Contractor shall schedule this weekly meeting on an agreed-upon day each week at an agreed-upon time between the hours of 9:00 a.m. and 4:00 p.m.

B. These meetings shall be held at the Project Site or another convenient location. The purpose of the meeting will be to review weekly progress and discuss current issues relating to the Work.

1. Attendees shall be familiar with the Project and authorized to conclude matters relating to the Work. Attendees shall include, but are not limited to, the following:

a. Authorized representatives of Ecology, A/E, and their consultants, as determined by Ecology.

b. Contractor on-site superintendent, managing foreman, or an appropriate alternate designated by the Contractor and approved by Ecology. This Contractor representative shall be the superintendent or managing foreman that has daily management responsibility for the Work being performed at the time of the meeting and can address questions and concerns regarding the performance of that Work.

c. Each Subcontractor, manufacturer, supplier, or other entity concerned with current progress of the Work or involved in planning, coordination, or performance of future activities of the Work, as determined by Ecology.

d. Representatives of the Property Owner shall be invited to these meetings, but their attendance according to their discretion.

2. The agenda for this meeting shall be prepared in advance by the Contractor and include, but not be limited to, the following elements:

a. Review and correct or approve minutes of the previous progress meeting.

b. Review site safety and health issues identified since the last meeting by Contractor, Ecology, Ecology's field representatives, Property Owners and/or Tenants, and the public.

c. Review items of significance that could affect progress of the Work.

d. Topics for discussion as appropriate to the status of the Work.

e. Contractor's Construction Progress Schedule:

   1. Progress since last meeting;
   2. Determination whether each activity is on time, ahead of schedule, or behind schedule in relation to the Contractor's Construction Progress Schedule;
   3. Determine how construction behind schedule will be expedited and secure commitments from parties involved to do so; and
   4. Discuss schedule revisions to ensure that current and subsequent Work activities will be completed within the Contract Time.

f. Review status of Submittals, Substitutions, RFIs, Work Change Directives, Change Orders, Schedule Modification Requests, and other documents under preparation or review by either Contractor or Ecology.

g. Review present and future needs of each entity present, including the following:

   1. Interface requirements;
   2. Sequence of operations;
   3. Status of submittals;
   4. Deliveries;
   5. Off-site fabrication;
   6. Access;
   7. Site utilization;
   8. Temporary facilities and controls;
   9. Work hours;
   10. Progress cleaning;
   11. Quality and work standards;
   12. Change Orders and RFIs; and
   13. Documentation of information for payment requests.

3. The Contractor shall distribute the minutes of the progress meeting to each party present within two (2) working days after the meeting.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. This section specifies administrative general and procedural requirements for submittals required for performance of the Work.

1. Additional requirements for administrative submittals are provided in other sections of the Contract Documents. Such submittals include but are not limited to:

a. Permits;

b. Applications for Payment;

c. Contractor's Construction Progress Schedule and Progress Schedule updates;

d. Guarantees;

e. Representative product samples; and

f. Substitutions.

1.02 RELATED WORK DESCRIBED ELSEWHERE

A. The provisions and intent of the Contract, including the General and Supplemental Conditions, apply to this work as if specified in this section. Work related to this section is described throughout these Specifications.

B. Individual submittals required in accordance with the pertinent sections of these Specifications. Other submittals may be required during the course of the project and are considered part of the normal work to be completed under the Contract.

C. The list below is incomplete and is not to be used as an all-inclusive list. It is the Contractor's responsibility to ensure that the Contractor has met all conditions of the contract requirements, including all required submittals.

1.03 RELATED SECTIONS

A. **SECTION 01 35 43.10 – GREEN CONSTRUCTION PRACTICES**

1.04 PRE-CONSTRUCTION SUBMITTALS

A. The following documents shall be submitted to Ecology within 14 days after Notice to Proceed and prior to commencement of the Work unless stated otherwise.

The following is a list of required pre-construction submittals, applicable reference section, and/or minimum requirements for each. This is not the complete listing of submittals required on this project.

1. Construction Quality Assurance Plan (CQAP)

   The Contractor will provide a comprehensive Construction Quality Assurance Plan (CQAP) in writing before commencing the work. The CQAP will include sketches as applicable. Ecology may request additional information if deemed necessary based on review of the Contractor's proposed activities. The CQAP will be submitted to Ecology within 14 days after Notice to Proceed and prior to commencement of the Work. The CQAP will include detailed construction plans for each of the primary elements of the Work.

   The CQAP shall, at a minimum, include and address the following:

   a. General requirements;
   b. Quality control organization;
   c. A comprehensive summary of the inspection and testing requirements;
   d. A comprehensive list of inspection and test methods, schedules, and procedures;
   e. Documentation methods and procedures;
   f. Requirements for corrective action when quality control and/or acceptance criteria are not met;
   g. Procedures to be followed to comply with the Record Document requirements (**SECTION 00 72 00 – GENERAL CONDITONS**, **Article 4.02**, **Project Record**, and **SECTION 01 77 00 – CLOSEOUT PROCEDURES**); and
   h. Any additional elements that the Contractor deems necessary to adequately control all construction processes required by this contract.

2. Project Schedule

   a. The Contractor will submit a Preliminary Project Schedule as indicated in **SECTION 00 72 00 – GENERAL CONDITIONS –** and **SECTION 00 73 00 – SUPPLEMENTAL CONDITIONS, Article 3.02, Construction Schedule**. The schedule will be a Critical Path Method (CPM) schedule developed by the Precedence Diagramming Method (PDM).

The Project Schedule will display the following information, at a minimum:

i. Construction Start Date;

ii. Critical Path;

iii. Identification and sequencing of contract work by Work Area;

iv. Listing of Each Contract Bid Item/Activity;

v. Activity Description;

vi. Activity Duration;

vii. Predecessor Activities;

viii. Successor Activities;

ix. Interruptions to utility service;

x. Roadway closures;

xi. Parking lot closures;

xii. Substantial Completion Date; and

xiii. Final Completion Date.

b. The Contractor will update the Project Schedule on a weekly basis and bring the required number of copies to the weekly Progress Meeting. At a minimum, schedule updates will reflect the following information:

i. The actual duration and sequence of as-constructed Work activities, including changed Work.

ii. Approved time extensions.

iii. Unresolved requests for time extensions will be reflected in the Schedule Update by assuming no time extension will be granted, and by showing the effects to follow-on activities necessary to physically complete the project within the currently authorized time for completion.

iv. Any construction delays or other conditions that affect the progress of the Work.

v. Any modifications to the as-planned sequence or duration of remaining activities.

vi. Any modifications to the Critical Path.

vii. The Physical Completion of all remaining Work in the remaining Contract time.

3. Site-Specific Health and Safety Plan (**SECTION 01 35 29 – HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES**)

   a. Assess the potential safety risks to on-site personnel and the environment and develop a Site-Specific Health and Safety Plan to safely execute the Work under this Contract. The Contractor is responsible for independently evaluating the physical and chemical hazards associated, or potentially associated, with the Project Site and the Work under this Contract and developing a plan that adequately addresses these hazards in compliance with applicable local, state, and federal regulations. The Contractor will submit the Site-Specific Health and Safety Plan to Ecology or Ecology's Representative for review and general concurrence. A copy of the approved Site-Specific Health and Safety Plan will be maintained on site at all times.

4. Temporary Facilities and Control Plan

   a. The Contractor shall develop and implement a Temporary Facilities and Control Plan that defines temporary traffic controls, utilities, site maintenance, air pollution control, noise abatement, and decontamination facility requirements. These measures will be planned and implemented by the Contractor including, but not limited to, the components shown on the Drawings and described in **SECTION 01 50 00 – TEMPORARY FACILITIES AND CONTROLS**.

5. Stormwater Pollution Prevention Plan

   a. The Contractor will prepare a Stormwater Pollution Prevention Plan (SWPPP) that includes a modified site plan that shows the work areas and Contractor's proposed staging and storage area, and indicates Contractor's planned means and methods for management of stormwater runoff in accordance with project permit requirements, containment of potentially contaminated surface water, and prevention of erosion during the work as described in **SECTION 01 57 13 – TEMPORARY EROSION AND SEDIMENTATION CONTROL**. The modified site plan will indicate the points where stormwater runoff potentially leaves the site, is collected in a surface water conveyance system (e.g., storm sewer, ditch, etc.), and enters receiving waters of the state.

6. Traffic Control Plan in accordance with **SECTION 01 50 00 – TEMPORARY FACILITIES AND CONTROLS**.

7. Green Construction Work Plan in accordance with **SECTION 01 35 43.10 – GREEN CONSTRUCTION PRACTICES**.

8. Submittal List as described in Paragraph 1.07.

1.05 PERIODIC SUBMITTALS

A. The Contractor will provide the following submittals to Ecology or Ecology's Representative at specified intervals.

1. Contractor Weekly Construction Report

   a. The Contractor Weekly Construction Report will contain a summary description of all work performed during that week, including Daily Field Reports/Logs, names of Contractor employees, equipment, hours worked, and a seven-day look ahead for anticipated project activities. In addition, the Contractor Weekly Construction Report will include quantities of work accomplished for all Pay Items identified in the Bid Form and a projection for work activities to be completed over the following week. The Contractor Weekly Construction Report will be submitted to Ecology or Ecology's Representative at the end of each workweek or one day prior to the weekly progress meeting, whichever is sooner.

2. Final Completion Report and As-Built Drawings as defined in **SECTION 01 77 00 – CLOSEOUT PROCEDURES –** and **SECTION 01 71 23 – FIELD ENGINEERING**.

1.06 PROJECT RECORD

A. The Contractor shall submit the PROJECT RECORD as described in **SECTION 00 72 00 – GENERAL CONDITIONS, Article 4.02**.

1.07 SUBMITTAL LIST

A. Check each Specification section for the complete submittal requirements.

1. The Submittal List (Table 1 at the end of this section) identifies in broad terms the general nature of the submittals that are required from the Contractor.

2. The information contained in this Submittals List is provided for the convenience of the Contractor.

3. This list may not be complete.

B. The Contractor shall notify Ecology of any apparent conflict between the Submittals List and individual specification sections.

PART 2 – PRODUCTS

2.01 SHOP DRAWINGS

A. Ecology will not accept shop drawings that prohibit Ecology from making copies for its own use.

1. Quality: Shop drawings shall be prepared accurately to scale sufficiently large to indicate all pertinent features of the products and the method of fabrication, connection, erection, or assembly with respect to the Work.

2. All drawings submitted to Ecology or Ecology's Representative for approval shall be drawn on full-size (ANSI D) copy or half-scale sets on 11 inches by 17 inches, bond paper only. Electronic versions of the drawings will also be submitted in the following formats on CD-ROM:

- DWG
- TIF
- PDF – Formatted to print to half-scale set on 11-inch x 17-inch paper.

3. Type of Prints Required:

a. The Contractor shall submit six (6) paper copies of all shop drawings or supplemental working drawings in accordance with the General Conditions. A copy shall also be submitted electronically in Adobe portable document format (PDF).

2.02 MANUFACTURERS' LITERATURE

A. The Contractor shall submit six (6) paper copies of manufacturers' literature for approval. A copy shall also be submitted electronically in Adobe portable document format (PDF). The manufacturers' original electronic issue is preferred.

B. Catalog cuts or brochures shall show the type, size, ratings, style, color, manufacturer, and catalog number of each item and be complete enough to provide for positive and rapid identification in the field. Catalog data shall be submitted in an orderly bound form. General catalogs or partial lists will not be accepted.

2.03 SAMPLES

A. The sample submitted shall be the exact or precise article proposed to be furnished.

B. Samples, color chips, finish styles, etc. shall be submitted in sufficient number as to provide Ecology or Ecology's Representative with alternate choices.

2.04 SUBSTITUTIONS

A. Refer to **SECTION 00 72 00 – GENERAL CONDITIONS**.

B. Catalog data for equipment approved by Ecology or Ecology's Representative does not in any case supersede the Contract Documents. The approval by Ecology or Ecology's Representative shall not relieve the Contractor from responsibility for deviations from the Drawings or specifications, unless Contractor has in writing called Ecology's or Ecology's Representative's attention to such deviations at the time of the submission, nor shall it relieve it from responsibility for errors of any sort in the items submitted. The Contractor shall check the work described by the catalog data with the Contract Documents for deviations and errors.

PART 3 – EXECUTION

3.01 SUBMITTAL PROCEDURES

A. Contractor shall coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal to Ecology sufficiently in advance of performance of related construction activities to avoid delay.

1. Contractor shall coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

2. Contractor shall coordinate transmittal of different types of submittals for related elements of the Work so processing shall not be delayed by the need to review submittals concurrently for coordination.

    a. Ecology reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

3. Contractor shall allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for resubmits.
   a. Allow two (2) weeks for initial Ecology review.
      i. Allow additional time if processing must be delayed to permit coordination with subsequent submittals.
      ii. Ecology shall promptly advise the Contractor when a submittal being processed must be delayed for coordination.
   b. If an intermediate submittal is necessary, the process shall be the same as the initial submittal.
   c. Allow two (2) weeks for reprocessing each submittal.
   d. No extension of Contract Time will be authorized because of failure to transmit submittals to Ecology sufficiently in advance of the Work to permit processing.

B. During submittal preparation, place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
   1. Include the following information on the label for processing and recording action taken:
      a. Project name;
      b. Date;
      c. Name and address of Ecology as the Project Owner;
      d. Name and address of Contractor;
      f. Name and address of Subcontractor(s), if appropriate;
      g. Name and address of supplier(s), if appropriate;
      h. Name of manufacturer(s), if appropriate;
      i. Section number(s) and title(s) of appropriate specification(s); and
      j. References, as appropriate, to other shop drawings, submittals, or other documentation previously provided by Contractor to Ecology.

C. Package each submittal appropriately for transmittal and handling. Each submittal shall be transmitted directly by Contractor to Ecology. Submittals received from sources other than the Contractor shall be returned without action.

1. Contractor shall review all submittals transmitted to Ecology, and mark in submittal the Contractor's review and approval.
2. Contractor shall record all deviations from Contract Document requirements, including minor variations and limitations. All submittals shall include Contractor's certification that information complies with Contract Document requirements.
3. Submittals received without the Contractor's review and approval markings shall be returned without comment and must be properly reviewed, marked, and resubmitted.

3.02 ECOLOGY'S MARKS OF ACTION FOR SUBMITTALS

A. Except submittals for information, record, or similar purposes, where action and return is required or requested, Ecology shall review each submittal, mark to indicate action taken, and return promptly.

   1. Compliance with specified characteristics described herein is the Contractor's responsibility.

B. Ecology shall mark each submittal with a uniform, self-explanatory notation describing, as follows, the action indicated for that submittal.

   1. Where submittals are marked "Approved," that part of the Work covered by the submittal may proceed, provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.
   2. Where submittals are marked "Approved as Noted," that part of the Work covered by the submittal may proceed, provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.
   3. When submittal is marked "Not Approved, Revise and Resubmit," the Contractor shall not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different mark of action.

      Do not permit submittals marked "Not Approved, Revise and Resubmit" to be used at the Project site, or elsewhere where Work is in progress.
   4. Where a submittal is primarily for information or record purposes, special processing, or other activity, the submittal shall be returned, marked "Action Not Required."

END OF SECTION

Table 1. Partial List of Submittals Provided for the Contractor's Convenience

Specification Section	Submittal	Latest Acceptance Date
00 72 00 3.02 00 73 00 3.02 01 31 19 1.03B 01 33 00 1.04A 2	Progress and Project Schedule (including a Critical Path Method [CPM] schedule)	14 days after NTP, update weekly.
00 72 00 4.02 01 77 00 01 33 00 1.06A	Project Record and Record documents (including Final Survey Documentation)	Within 30 days of Substantial Completion (Final Completion).
00 72 00 4.03	Shop Drawings	As necessary to allow for review and approval period by Ecology and any procurement lead times.
00 72 00 5.04B	Statement of Intent to Pay Prevailing Wage	First Pay Request (before payment is made by Ecology)
00 72 00 5.04C	Affidavit of Wages Paid	Submit with Final Invoice (prior to release of retainage)
00 72 00 5.04E	Statement That Prevailing Wages Were Paid	Each Pay Request.
00 72 00 5.04G	Certified Copy of Payroll	Upon Request.
00 72 00 5.20 00 73 00 5.20B	Subcontractors and Supplier List	First Pay Request (before submitting the first Application for Payment)
00 72 00 6.02	Schedule of Values	Pre-construction meeting (before submitting the first Application for Payment).
00 72 00 6.03	Application for Payment	Monthly.
00 72 00 6.09B	Notice of Disputes or Claims with Subconsultants	Prior to Final Acceptance.
00 72 00 7.01B	Change order proposal - Ecology may request COP from Contractor	Within 14 days of request from Ecology
00 73 00 5.02D	Permits	When obtained. Prior to work covered by permit.
00 73 00 5.07 01 33 00 1.04A 3	Site-Specific Safety Plan	Prior to the initial scheduled construction meeting.
00 73 00 5.20 00 73 00 10.11	MWBE Subcontractors and Supplier List	Prior to First Pay Request.
00 73 00 10.11	MWBE Utilization Summary	Submit with Final Invoice.
00 73 00 10.12	Apprenticeship Participation	Each Pay Request if applicable to the project.
00 73 19 1.03A 01 33 00 1.04A 3	Health and Safety Plan	Prior to the initial scheduled construction meeting.
00 73 19 1.03B	Personnel Dust Exposure Control Plan	2 weeks prior to commencing excavation work.
00 73 19 1.03C	Monitoring Results	Monthly, Final Completion.
01 20 00 1.02	Monthly pay estimates	Monthly

Specification Section	Submittal	Latest Acceptance Date
01 26 13 1.02	Requests for Interpretation (RFI)	As necessary by Contractor
01 33 00 1.04A 1	Construction Quality Assurance Plan (CQAP)	Within 14 days of NTP.
01 33 00 1.04A 4 01 50 00 1.03	Temporary Facilities and Control Plan	Prior to commencement of construction activities.
01 33 00 1.04A 5 01 57 13 1.03	Stormwater Pollution Prevention Plan	In accordance with project permit requirements
01 33 00 1.05A 1	Contractor Weekly Construction Report	Weekly
01 33 00 1.05A 2 01 77 00 01 71 23	Final Completion Report and As-Built Drawings	As-builts on monthly basis and before final completion is issued
01 10 00	Permits, licenses, certifications, inspection reports, etc.	As necessary throughout duration of Project
01 35 43.10 3.01 01 33 00 1.04A 7	Green Cleanup Project Work Plan	Mobilization to site
01 35 43.10 3.04	Construction Materials Handling and Disposal	The contractor shall submit receipts, scale tickets, and/or waybills to Ecology documenting disposal and/or recycling
01 41 00	License and Permit Applications and related documentation	As necessary throughout duration of Project.
01 41 00	Variations for Discrepancies between Contract Documents and governing codes and regulations	As necessary throughout duration of Project.
01 33 00 1.04A 6 01 50 00 3.01	Temporary Traffic Control Plan	Mobilization to site.
01 57 13 1.03	SWPPP and SWPPP Revisions	Initial Plan Prior to Mobilization to site. Submit accumulated revisions weekly.
01 57 13 1.03 01 57 13 1.04	Discharge Monitoring Reports	Monthly discharge reports
01 60 00 1.03	Product and Material Submittals, Test Data	Prior to delivery on site.
01 60 00 1.07	Requests for Substitutions	15 days prior to submittal.
01 71 23 3.02	Survey Work Plan	Submitted as part of the Quality Control Plan
01 73 23 3.05	Survey Documentation	As required throughout duration of Project
02 22 43 1.03B	Site Restoration Quality Control Plan	Within 15 days of NTP
02 41 13 1.05	Schedule of selective demolition activities compatible with the Construction Progress Schedule	If requested by Ecology
02 61 13 1.05	Disposal Facilities	Mobilization to site
31 23 16 1.04	Earthwork Plan	As part of CQAP
31 23 19 1.04A	Dewatering Plan	As part of CQAP

Specification Section	Submittal	Latest Acceptance Date
31 23 19 1.04B	Dewatering discharge records	Upon request; Final Completion
31 23 23 1.04	Fill Material Samples Test Reports Certificates	10 days prior to use Prior to use Prior to use
32 12 00 1.03A	Paving Subcontractor	First pay request (before submitting the first Application for Payment)
32 12 00 1.03B	Hot-Mix Asphalt Submittal	10 days prior to use
32 12 00 1.03C	Paint Striping Submittal	10 days prior to use

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Work in accordance with all applicable federal, state, and local codes. The Contractor shall furnish, erect, and maintain such fences, barriers, lights, and signs and provide such flagging and guards as are necessary in the opinion of Ecology or Ecology's Representative to give adequate warning to the public of the construction and of any dangerous condition that may be encountered as a result thereof. The Contractor shall also maintain a suitable number of operable fire extinguishers on site during the entirety of construction operations and notify all staff of its location and use.

1. In carrying out its responsibilities according to the Contract Documents, Contractor shall protect the lives and health of employees performing the Work, Property Owners and Tenants in the vicinity of the Work area, and other persons who may be affected by the Work; prevent damage to property, pets, materials, supplies, and equipment, whether on site or stored off site; and prevent damage to other property at the site or adjacent thereto. Contractor shall comply with all applicable laws, ordinances, rules, regulations, and orders of any public body having jurisdiction for the safety of persons or property, or to protect them from damage, injury, or loss; shall erect and maintain all necessary safeguards for such safety and protection; and shall notify owners of adjacent property and utilities when prosecution of the Work may affect them.
2. Contractor shall fulfill the health and safety requirements specified in **SECTION 02 61 13 – EXCAVATION AND HANDLING OF CONTAMINATED SOIL**.
3. Nothing provided in this section shall be construed as imposing any duty upon Ecology, A/E, Property Owner(s), and/or Tenant(s) with regard to, or as constituting any express or implied assumption of control or responsibility over, Project Site safety, or over any other safety conditions relating to employees or agents of Contractor or any of its Subcontractors or the public.

4. The Contractor shall meet all safety requirements of **WAC 296-155-650 Part N, EXCAVATION, TRENCHING, AND SHORING**, when excavating over four feet in depth.

5. The Contractor shall also be familiar with and meet the requirements of the following Washington Administrative Codes (WAC) and recommended industry standards.

   a. WAC 173-303 Dangerous Waste Regulations

   b. 40-Hour Health & Safety Training for all on-site workers

1.02 RELATED SECTIONS

A. **SECTION 00 73 19 – HEALTH AND SAFETY REQUIREMENTS**

1.03 SUBMITTAL

A. The Contractor shall submit a Project and Work Site-Specific Health and Safety Plan to Ecology within 14 days after Notice to Proceed and prior to commencement of the Work, as specified in **SECTION 00 73 19 – HEALTH AND SAFETY REQUIREMENTS –** and **SECTION 01 33 00 – SUBMITTAL PROCEDURES**.

1. This Health and Safety Plan must be followed by the Contractor and a minimum of one (1) copy shall be available and accessible at the Project Site at all times.

2. Where Work is being performed in different areas of the overall Project Site, multiple copies of the Health and Safety Plan shall be available and accessible to Contractor personnel in each of those areas.

3. Site-Specific Health and Safety Plan shall address the close proximity of Property Owners and/or Tenants to Work activities and how the Contractor shall maintain safety under those conditions.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 PERSONNEL DISCLOSURE AND TRAINING

A. Contractor shall provide all persons working on the Project Site with information and training on hazardous chemicals in their work at the time of their initial assignment, and whenever a new hazard is introduced into their work area.

1. Information: At a minimum, Contractor shall inform persons working on the Project Site of:
   a. The requirements of Chapter 296-62 WAC, General Occupational Health Standards.
   b. Any operations in their work area where hazardous chemicals are present.
   c. The location and availability of written hazard communication programs, including the required list(s) of hazardous chemicals and Material Safety Data Sheets (MSDS) required by Chapter 296-62 WAC.
2. Training: At a minimum, Contractor shall provide training for persons working on the Project Site, that includes:
   a. Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.).
   b. The physical and health hazards of the chemicals in the work area.
   c. The measures such persons can take to protect themselves from these hazards, including specific procedures Contractor, or its Subcontractors, or others have implemented to protect those on the Project Site from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used.
3. The details of the hazard communication program developed by Contractor or its Subcontractors, including an explanation of the labeling system and the MSDS, and how employees can obtain and use the appropriate hazard information.

3.02 EXPOSURE AND SAFETY MANAGEMENT

A. Contractor shall notify Ecology in writing a minimum of twenty-one (21) calendar days in advance if there is a risk of exposure of Property Owners, Tenants, pets/animals, or the public to hazardous chemicals used during the Work. This written notification shall include all the information specified in this paragraph and a discussion of the potential risks and control methods to be used by the Contractor to minimize the exposure of non-construction personnel and the public in close proximity to the Work.

1. Contractor shall provide all assistance and guidance promptly to Ecology, Property Owner, and Tenant(s) necessary to achieving and maintaining a safe work site.
2. Contractor's responsibility for hazardous, toxic, or harmful substances shall include the following duties:
   a. Contractor shall not keep, use, dispose, transport, generate, or sell on or about the Project Site any substances now or hereafter designated as, or which are subject to regulation as, hazardous, toxic, dangerous, or harmful by any federal, state, or local law, regulation, statute, or ordinance (hereinafter collectively referred to as hazardous substances), in violation of any such law, regulation, statute, or ordinance, but in no case shall any such hazardous substance be stored more than 90 days on the Project Site.
   b. Contractor shall promptly notify Ecology of all spills or releases of any hazardous substances that are otherwise required to be reported to any regulatory agency and pay the cost of cleanup. Contractor shall promptly notify Ecology of all failures to comply with any federal, state, or local law, regulation, or ordinance; all inspections of the Project Site by any regulatory entity concerning the same; all regulatory orders or fines; and all responses or interim cleanup actions taken by or proposed to be taken by any government entity or private party on the Project Site.
3. All Work shall be performed with due regard for the safety of the Property Owners, Tenants, animals/pets on the property, and the public. Contractor shall perform the Work so as to cause a minimum of interruption of vehicular traffic or inconvenience to pedestrians.
   a. All arrangements to care for such traffic shall be the Contractor's responsibility.
   b. All expenses involved in the maintenance of traffic by way of detours shall be borne by Contractor.
4. Contractor shall maintain an accurate record of exposure data on all incidents relating to the Work resulting in death, traumatic injury, occupational disease, or damage to property, materials, supplies, or equipment. Contractor shall immediately report any such

incident to Ecology. Ecology shall, at all times, have a right of access to all records of exposure.

5. The Contractor shall furnish, erect, and maintain such fences, barriers, lights, and signs and provide such flagging and guards as are necessary in the opinion of Ecology to give adequate warning to the public of the construction and of any dangerous condition which may be encountered as a result thereof.

6. The Contractor shall meet all safety requirements of **WAC 296-155-650 Part N, EXCAVATION, TRENCHING, AND SHORING**, when excavating over four feet in depth.

3.03 EMERGENCIES

A. In an emergency affecting the safety of life or the Work or of adjoining property, Contractor is permitted to act, at its discretion, to prevent such threatened loss or injury, and Contractor shall so act if so authorized or instructed.

1. Contractor shall maintain an accurate record of exposure data on all incidents relating to the Work resulting in death, traumatic injury, occupational disease, or damage to property, Property Owner(s), Tenant(s), pets owned by Property Owner(s) and/or Tenant(s), materials, supplies, or equipment. Contractor shall immediately report any such incident to Ecology. Ecology shall, at all times, have a right of access to all records of exposure.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. The Work shall consist of completing notifications and other actions required for the Contractor as summarized in Table 1. Other notifications and actions will be performed by Ecology or Ecology's Representative as listed in the table. The notifications and actions listed constitute environmental procedures for the project.

1.02 RELATED SECTIONS

A. **SECTION 01 57 13 – TEMPORARY EROSION AND SEDIMENTATION CONTROL**

B. **SECTION 02 61 13 – EXCAVATION AND HANDLING OF CONTAMINATED SOIL**

C. **SECTION 31 23 16 – EXCAVATION**

D. **SECTION 31 23 19 – CONSTRUCTION DEWATERING**

E. **SECTION 31 23 23 – FILL**

1.03 REFERENCES AND STANDARDS

A. The rules, requirements, and regulations that apply to this work include but are not limited to the following:

1. Chapter 173-303 WAC, Washington State Dangerous Waste Regulations.
2. Chapter 173-340 WAC, Model Toxics Control Act Cleanup Regulations.
3. 40 CFR Part 761, TSCA Regulations.
4. 49 CFR Parts 171 through 180, Department of Transportation (DOT) Hazardous Materials Regulations.
5. City of Seattle Grading Permit.

1.04 SUBMITTALS

A. Applicable Contractor submittals include but are not limited to:

1. Construction Water sampling, testing, shipment, and disposal records shall be transmitted to Ecology or Ecology's Representative per **SECTION 01 57 13 – TEMPORARY EROSION AND SEDIMENTATION CONTROL –** and **SECTION 31 23 19 – CONSTRUCTION DEWATERING**.

2. Off-site shipment and disposal documentation for all excavated material shall be transmitted to Ecology or Ecology's Representative in accordance with **SECTION 02 61 13 – EXCAVATION AND HANDLING OF CONTAMINATED SOIL**.
3. Documentation of imported soil quality.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 CONTRACTOR ENVIRONMENTAL PROCEDURES

A. In addition to Contractor submittals listed above in this section, required environmental procedures by the Contractor include but are not limited to:

1. Observing excavation for unexpected waste material or Dangerous Waste as defined by Chapter 173-303 WAC and immediately reporting any discovered unexpected waste or Dangerous Waste to Ecology or Ecology's Representative. Management of discovered unexpected waste material or Dangerous Waste shall be determined by Ecology or Ecology's Representative.
2. Maintaining temporary stockpiles of excavated and other material in accordance with **SECTION 31 23 16 – EXCAVATION –** and **SECTION 31 23 19 – CONSTRUCTION DEWATERING**.
3. Managing Suspect Materials including:
   a. Unexpected waste material or Dangerous Waste as defined by Chapter 173-303 WAC and as determined by Ecology or Ecology's Representative, in accordance with **DIVISION 31 – EARTHWORK**.
   b. Construction Water collection and holding tank solids in accordance with **SECTION 01 57 13 – TEMPORARY EROSION AND SEDIMENTATION CONTROL –** and **SECTION 31 23 19 – CONSTRUCTION DEWATERING**.
4. Controlling and managing site Construction Water including:
   a. Stormwater, potential excavation seepage, and dewatering water in accordance with **SECTION 01 57 13 – TEMPORARY EROSION AND SEDIMENTATION CONTROL –** and **SECTION 31 23 19 – CONSTRUCTION DEWATERING**.
   b. Free-phase product recovered from Construction Water in accordance with **SECTION 01 57 13 – TEMPORARY**

EROSION AND SEDIMENTATION CONTROL – and **SECTION 31 23 19 – CONSTRUCTION DEWATERING**.

5. Sampling and testing Construction Water prior to discharge in accordance with **SECTION 01 57 13 – TEMPORARY EROSION AND SEDIMENTATION CONTROL –** and **SECTION 31 23 19 – CONSTRUCTION DEWATERING**.

6. Completing sampling and testing of imported soil used for backfill material.

7. Authorizing bills of lading and other shipment documentation other than Dangerous Waste.

8. Completing sampling, testing, and reporting to meet imported fill materials quality requirements prior to importing any material.

   a. Prior to delivery of any imported fill material, the Contractor shall submit documentation of the fill quality, as specified in **SECTION 31 23 23 – FILL**.

   b. The supplier must provide an environmental certification, signed by the owner or officer of the supplier, that the material is free of contamination.

   c. If the material is from a WSDOT-approved source, the certification and acceptance information must be submitted.

   d. If the material is from a non-WSDOT-approved borrow pit, the supplier must provide documentation of the source area land use and operational history and chemical composition sufficient to identify the site as free from environmental contamination.

   e. For purposes of these specifications, environmental contamination is defined as specified in **SECTION 31 23 23 – FILL –** or any other characteristics (e.g., unpleasant odor) making the material unsuitable for use.

   f. Acceptance of fill material quality is at Ecology's or Ecology's Representative's discretion.

   g. In the absence of adequate soil quality testing documentation, the Contractor or fill source owner will be required to submit the results of analytical testing from the fill source, at their sole expense, at a sampling frequency as follows: five (5) samples for the first 500 cubic yards of material and one (1) additional sample for every additional 200 cubic yards.

h. Necessary analytical test methods will be determined by Ecology or Ecology's Representative.

i. The Contractor shall allow five (5) working days for review by Ecology or Ecology's Representative. If the submitted documentation or test results are unsatisfactory, additional testing will be required.

3.02 ENVIRONMENTAL PROCEDURES

A. Applicable environmental procedures to be conducted by Ecology or Ecology's Representative include:

1. Observing the excavation for the presence of potential Suspect Material, including unexpected Dangerous Waste, as defined by Chapter 173-303 WAC, or TSCA waste, as defined by 40 CFR Part 761, and identifying and/or confirming appropriate management actions.

2. Completing excavation performance soil sampling and testing from the excavation surfaces for the presence of potential Suspect Material, and identifying and/or confirming need for Ecology-Directed Overexcavation as defined in **SECTION 31 23 16 – EXCAVATION**.

   a. Contractor shall assume that sample testing results will be available (along with resulting direction on any required or Ecology-Directed Overexcavation) between two (2) and four[1](4) business days following collection of the samples.

3. Completing performance sampling and testing of soil from the excavation surfaces as needed during Ecology-Directed Overexcavation, and identifying and/or confirming need for additional overexcavation.

   a. Contractor shall assume that sample testing results will be available (along with resulting direction on any additional required Ecology-Directed Overexcavation) between two (2) and four (4) [2] business days following collection of the overexcavation performance samples.

4. Completing additional sampling and testing of soil from the excavation surfaces and/or of the excavated material if required, in accordance with **SECTION 31 23 16 – EXCAVATION**.

[1] During the period of state and national holidays, period could be five (5) business days.
[2] During the period of state and national holidays, period could be five (5) business days.

B. The Contractor shall provide access as needed for Ecology or Ecology's Representative to collect the samples described above and any other observation or sampling needed.

C. Contractor will compile testing data, including data from existing environmental reports for off-site disposal materials (refer to IAWP documents identified in Appendices for necessary data), and forward to the appropriate agents for off-site disposal facilities as needed to obtain disposal acceptance. Contractor shall provide documentation to Ecology or Ecology's Representative regarding disposal acceptance and any related conditions.

D. The Property Owner will authorize Dangerous Waste manifests and related Dangerous Waste documentation as the generator.

3.03 SPILL REPORTING

A. Any person observing a spill of any material to the ground surface, to surface water, or to groundwater shall immediately report the condition as noted in Table 1.

Table 013543-1 – Actions, Notifications, and Responsible Parties

Action	Responsible Parties and Notifications	Specification Sections
1. Environmental Field Observation:		
a. Observe excavation for potential Suspect Material conditions, including unexpected DW, and provide recommendations for characterization and handling.	Ecology or Ecology's Representative – Notify Contractor Site Superintendent if Suspect Material noted.	01 35 43 – Environmental Procedures
b. Observe excavation for Suspect Material or potential unexpected DW.	Contractor – Notify Ecology or Ecology's Representative if potential unexpected DW noted.	01 35 43 – Environmental Procedures
2. Maintain temporary stockpiles of excavated material and Suspect Material (as needed) in protected manner.	Contractor	01 57 13 – Temporary Erosion and Sedimentation Control 02 41 43 – Selective Site Demolition 31 23 16 – Excavation
3. Control and manage site Construction Water per CSGP, SWPPP, TESC, and permit conditions.	Contractor	01 57 13 – Temporary Erosion and Sedimentation Control 31 23 19 – Construction Dewatering
4. Implement DW handling and disposal, including maintaining segregated storage of DW, as needed.	Contractor, based on direction from Ecology or Ecology's Representative.	01 35 43 – Environmental Procedures 31 23 16 – Excavation
5. Sampling and Testing:		
a. Additional excavated material characterization (if required).	Ecology or Ecology's Representative – Notify Contractor of testing results.	01 35 43 – Environmental Procedures
b. Contingency Suspect Material characterization.	Contractor – Notify Ecology or Ecology's Representative of testing results.	01 35 43 – Environmental Procedures
c. Construction Water prior to discharges to sanitary sewer.	Contractor – Notify Ecology or Ecology's Representative	01 57 13 – Temporary Erosion and Sedimentation

	of testing results.	Control 31 23 19 – Construction Dewatering
d. Storage tank holding system and holding tank solids.	Contractor – Notify Ecology or Ecology's Representative of testing results.	01 35 43 – Environmental Procedures
e. Excavation soil performance samples.	Ecology or Ecology's Representative – Provide testing results and overexcavation decisions to Contractor (two to four business day turnaround time).	01 35 43 – Environmental Procedures 31 23 16 – Excavation
f. Imported soil backfill material samples.	Contractor – Provide Ecology or Ecology's Representative with testing results.	31 23 16 – Excavation
g. Imported material quality samples.	Contractor – Provide Ecology or Ecology's Representative with testing results.	01 35 43 – Environmental Procedures 31 23 16 – Excavation
6. Compile laboratory testing data from the IAWP, transmit to disposal facilities for disposal authorization, and notify disposal facility agents as needed prior to disposal of excavated material.	Contractor – Notify Ecology or Ecology's Representative regarding disposal acceptance.	01 35 43 – Environmental Procedures
7. Coordinate disposal of waste materials: a. Load excavated material for shipment to Subtitle C landfill disposal facility or incineration facility.	 Contractor	 31 23 16 – Excavation
b. Construction Water discharges to sanitary sewer.	Contractor	01 57 13 – Temporary Erosion and Sedimentation Control 31 23 19 – Construction Dewatering
8. Obtain and complete off-site shipment and disposal documentation for all media and	Contractor	01 35 43 – Environmental Procedures

transmit to landfill, transporter, and Ecology or Ecology's Representative.		
9. Authorize shipment bills of lading for non-DW.	Contractor	01 35 43 – Environmental Procedures
10. Authorize manifests for DW.	Property or Site Owner as DW generator	01 35 43 – Environmental Procedures
11. Immediately report spills into water, spills onto land with potential for entry into waters, or other significant water quality impact to: a. Ecology or Ecology's Representative (contact information to be provided) b. Ecology Northwest Regional Office (425) 649-7000 (24-hour phone number) c. Washington Emergency Management Division (800) 258-5990 d. NRC (800) 424-8802	Any person observing spill or significant water quality impact	01 35 43 – Environmental Procedures
12. Immediately report all other spills of any nature to Ecology or Ecology's Representative.	Contractor	01 35 43 – Environmental Procedures

CSGP – Construction Stormwater General Permit
CESCL – Certified Erosion and Sediment Control Lead
DW – Dangerous Waste
IAWP – Interim Action Work Plan
NRC – National Response Center
SWPPP – Stormwater Pollution Prevention Plan
TESC – Temporary Erosion and Sediment Control

END OF SECTION

PART 1 – GENERAL

1.01 SUMMARY

A. Cleaning up contaminated sites involves the use of energy, water, and other natural resources. Site cleanup activities can create an environmental footprint beyond the site itself. Because the environmental footprint of a remediation activity may exceed the site physical boundary, Green Remediation best management practices can be used to minimize the footprint and maximize environmental outcomes.

B. Ecology desires to minimize its environmental impact in all phases of cleanup actions, including construction, and refers to this as Green Remediation. To meet this intent, to the extent practicable, the Contractor shall explore and implement green remediation strategies and applications in the performance of the requirements of this project to maximize use of sustainable construction practices, reduce energy and water usage, promote demolition and construction materials reuse and recycling and use of recycled content materials, and minimizing impacts from site cleanup activities through controls on construction activities to preserve and protect our land, air, and water resources.

C. These guiding principles are the foundation for developing and implementing green construction practices:

1. Minimize total energy use and increase the percentage of energy use from renewable resources.
2. Minimize air pollution and greenhouse gas emissions.
3. Reduce water use and negative impacts on water resources.
4. Improve materials management and reduce, reuse, and recycle material and waste.
5. Protect ecosystems during site cleanup.
6. Consider climate change

1.02 RELATED SECTIONS

A. **SECTION 01 33 00 – SUBMITTAL PROCEDURES**

B. **SECTION 01 50 00 – TEMPORARY FACILITIES AND CONTROLS**

C. **SECTION 01 57 13 – TEMPORARY EROSION AND SEDIMENT CONTROL**

D. **SECTION 01 60 00 – PRODUCT REQUIREMENTS**

E. **SECTION 01 74 00 – CLEANING AND WASTE MANAGEMENT**

F. Divisions 02 through 32: See **Part 2 – Products** for Material Requirements in each section.

1.03 REFERENCES AND STANDARDS

A. ASTM E2893-13 Standard Guide for Greener Cleanups

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 GREEN CLEANUP PROJECT WORK PLAN

A. Prior to start of work the Contractor shall submit a Green Cleanup Project Work Plan that shall identify and describe each green remediation practice it proposes to use and how it will be implemented, to include those practices that are required by the Contract Documents and those that are independently proposed by the Contractor. This plan will include, at a minimum, practices that:

1. Incorporate equipment emission reduction controls and describe procedures for equipment operations that identify measures to operate equipment to minimize emissions, including engine idling reduction procedures, use of biodiesel and/or very low sulfur fuels only, and use of clean technology equipment designed to reduce exhaust emissions.
2. Minimize transportation requirements on the Project by use of the least impacting transportation methods practical, combining trips, use of backhaul.
3. Maximize use of products containing recycled materials (i.e., compost materials, concrete, backfill material, erosion control materials) that satisfy the specified performance requirements for Project materials, and identify procedures for material recycling, reuse, and waste minimization.
4. Use material suppliers that are in close proximity of the Project Site.
5. Use, to the maximum extent possible, the Green and Sustainable Site Cleanup Best Management Practices from the list provided in Paragraph 3.05 of this section, and describe how they will be implemented.

B. The Plan shall include a format for reporting/documenting best practices used on the Project as part of Contractor's weekly project progress updates that includes the following measures:

1. Equipment inventory and emission reduction controls on each piece of equipment.
2. Equipment use based on hour meters.
3. Total quantity of fuel in gallons used each week and type of fuel used.
4. Disposal of construction wastes as identified in Part 3, Paragraph 3.04. The contractor shall include a section on materials reuse, recycling, waste stream reduction, and resource conservation measures employed as part of the weekly project progress reports. This section will document what measures are in place to keep uncontaminated wastes out of landfills or disposal facilities. These actions are intended to conserve energy or other natural resources, thereby reducing negative impacts of a cleanup action.

3.02 PROTECTION OF LAND, AIR, AND WATER RESOURCES

A. Contractor shall consider and incorporate both temporary and permanent site controls to minimize impacts from site clearing, excavation, backfilling, and grading operations that should include:

1. Minimizing noise created over ambient noise levels;
2. Use of dust control measures;
3. Retaining construction water runoff and developing a method for reuse of water on site or use of recycled water for equipment wash down and dust control;
4. Disposal of construction debris at recycling centers;
5. Following erosion and sediment control practices including silt curtains and other similar barriers to prevent silt-laden runoff from stormwater or other sources from leaving the Project Site without treatment;
6. Maintaining a responsive oil spills cleanup capability including materials on site;
7. No burning of any kind on the Project Site; and
8. Use of native landscape materials, plastic sheeting, and recycled wood waste mulches to stabilize construction sites and minimize erosion.

3.03 EQUIPMENT EMISSIONS CONTROLS

A. The Contractor shall include the following actions, as applicable, to reduce equipment exhaust emissions from the Project Site and which shall be included in its Plan:

1. Alternative Fuel Use and Clean Technologies: The Contractor is encouraged to use clean technologies and/or fuels on all diesel equipment to the extent practicable and/or feasible. The preference is for clean diesel technologies, but alternative fuels, such biodiesel, low sulfur or ultra-low sulfur (preferred) diesel fuel, or natural gas-powered vehicles are acceptable options. These alternative fuels will be used where they are available within a reasonable distance to the Project Site. For equipment retrofits, the Contractor will employ the Best Available Control Technology on non-road and on-road diesel-powered equipment used at a site. Examples of clean diesel technologies include diesel particulate filters (DPFs) and diesel oxidation catalysis (DOCs). For alternative fuel usage, the Contractor shall use commercially available biodiesel blends, with the goal to use at least a B20 blend (i.e., 20% biodiesel and 80% petro diesel) or low sulfur or ultra-low sulfur (preferred) diesel fuels in the equipment engines that are used at the Project Site.

2. No-Idle Practices: In addition to using alternative fuel, the Contractor shall use methods to control nuisance odors associated with diesel emissions from construction equipment, including the following:

   a. Turning off diesel combustion engines on construction equipment not in active use, and on trucks that are idling while waiting to load or unload material for five minutes or more; and

   b. Locating diesel equipment away from the general public and sensitive receptors.

   Idling of diesel-powered vehicles and equipment must not be permitted during periods of non-active vehicle use. Diesel-powered engines shall not be allowed to idle for more than five consecutive minutes in a 60-minute period when the equipment is not in use, occupied by an operator, or otherwise in motion, except as follows:

   c. When equipment is forced to remain motionless because of traffic conditions or mechanical difficulties over which the operator has no control;

d. When it is necessary to operate auxiliary systems installed on the equipment, only when such system operation is necessary to accomplish the intended use of the equipment;

e. To bring the equipment to the manufacturer's recommended operating temperature;

f. When the ambient temperature is below forty (40) degrees F or above eighty (80) degrees F; or

g. When equipment is being repaired.

3. Clean Air Technologies: In performance of all activities under this contract, the Contractor shall, where feasible, use cleaner engines, cleaner fuel, and cleaner diesel control technology on diesel-powered equipment with engines greater than 50 horsepower whether the equipment is owned or rented. Cleaner engines include non-road engines meeting Tier 1 or cleaner standards and on-road engines meeting 2004 On-Highway Heavy-Duty Engine Emission Standards or cleaner, whether the equipment is owned or rented. Cleaner fuels include biodiesel blends or ultra-low sulfur diesel. Cleaner diesel control technology includes EPA or California Air Resources Board (CARB) verified diesel particulate filters (DPFs) or diesel oxidation catalysts (DOCs).

4. Engine Maintenance: Contractors perform routine and scheduled engine inspections and conduct preventative maintenance, giving any problems identified immediate attention. Perform routine engine cleaning and use environmentally friendly lubricants (i.e., bio-based) where available and where specified as an approved lubricant by engine and equipment manufacturers.

5. Transportation Alternatives: The Contractor shall transport material to and from the Project Site by truck, rail, barge, or other method or a combination of methods as site requirements may dictate, and when feasible, to an Ecology-approved facility in accordance with local, state, and federal regulations.

3.04 CONSTRUCTION MATERIALS HANDLING AND DISPOSAL

A. Disposal of Construction Demolition Debris and Unsuitable Materials: To the greatest extent possible, the Contractor shall minimize the amount of waste disposal in landfills by seeking opportunities to reduce, reuse, or recycle demolition materials that are not contaminated by hazardous substances. The Contractor shall dispose of uncontaminated, recyclable, or salvable demolition materials by a combination of salvage, reuse, or recycling at a facility approved by the Department of Ecology. The

Contractor shall submit receipts, scale tickets, and/or waybills to Ecology documenting disposal and/or recycling. Recyclable materials may include building materials such as lumber and other wood products, metal, concrete, rebar, pipe materials, and asphalt, but shall not include materials impacted by contaminated soil.

3.05 GREEN REMEDIATION AND SUSTAINABLE BEST MANAGEMENT PRACTICES

A. Table 1 identifies the Best Management Practices that the Contractor shall incorporate, where practical, into the project requirements.

Table 1. Green Remediation and Sustainable Best Management Practices

Action	Potentially Applicable to Site?	Potential Benefits			
		Air	Energy	Water	Land
Use alternate fuels such as biodiesel and E85.	Yes	Reduces air emissions from on-site construction equipment and from trucking waste materials.	Reduces use of petroleum products in on-site construction equipment and in trucking waste materials.		Less toxic to the environment should a leak occur.
Require vehicles and construction equipment to use idle reduction technologies	Yes	Reduces direct and indirect greenhouse gas and other emissions, e.g., CO, CO_{2}, VOC_{S}, NO_{X}, SO_{X}.	Reduces fuel use in on-site construction equipment and vehicles.		Reduces noise.
Sequence work to minimize double-handling of materials.	Yes	Reduces air emissions from on-site construction equipment. Reduces nuisance dust.	Reduces fuel use in on-site construction equipment.	Reduces water quality impacts from erosion.	Restores land sooner.
Use on-site renewable energy to power elements of the remedy, e.g., wind and solar power for treatment system.	Yes		Reduces purchased energy.		May be an asset to redevelopment if left on site after cleanup.
Purchase green energy to power elements of the remedy	No	Reduces air impacts of cleanup.			
Use permeable surface soil barriers, e.g., vegetated top soil or gravel	No			Reduces stormwater runoff	Increases post cleanup marketability of developable sites.

Action	Potentially Applicable to Site?	Potential Benefits			
		Air	Energy	Water	Land
Reclaim grey water for reuse.	Yes			Reduces water use.	
Use engineered surface soil barriers, e.g., pavement, cover system.	Yes	Reduces air emissions from on-site construction equipment and from trucking.	Reduces fuel use in on-site construction equipment and in trucking waste materials.		Reduces waste material requiring off-site disposal.
Use in-situ remediation technologies (e.g., monitored natural attenuation; chemical oxidation).	No	May reduce air emissions by reducing excavation and materials handling.	Reduces fuel use in on-site construction equipment and in trucking waste materials.		Less intrusive, especially if structures present like roads, utilities, and valuable buildings.
Use cleanup technologies that permanently destroy contaminants (incineration, treatment).	Yes		May be more energy intensive.		Reduces future contaminant migration concerns; eliminates need for long-term maintenance and monitoring.
Use treated soil to backfill excavation.	No	Reduces emissions from trucking in clean fill.			Reduces clean fill material requirements.
Retain existing structures on site.	Yes	Reduces air emissions from demolition activities.	Reduces fuel used for demolition and in trucking wastes off site.		Preserves structures for future redevelopment. provides link to the past.
Recycle waste materials generated during cleanup.	Yes				Reduces material requiring off-site disposal.
Collect rain water for on-site use, e.g., dust control.	Yes			Reduces water use; stormwater impacts.	
Install temporary dewatering systems to lower	Yes			Reduces potential ground and surface water impacts.	Better control of limits of excavation.

groundwater.					

END OF SECTION

PART 1 – GENERAL

1.01 AUTHORITY OF CODES, ORDINANCES, AND STANDARDS

A. All codes, ordinances, and standards referenced in the Project Manual shall have the full force and effect as though printed in their entirety in the Project Manual.

1.02 PRECEDENCE OF CODES, ORDINANCES, AND STANDARDS

A. Where specified requirements differ from the requirements of applicable codes, ordinances, and standards, the more stringent requirements shall take precedence.

B. Where the Project Manual requires or describes products or execution of better quality, higher standard, or greater size than required by applicable codes, ordinances, and standards, the Project Manual shall take precedence so long as such increase is legal.

C. Where no requirements are identified in the Project Manual, comply with all requirements of applicable codes, ordinances, and standards of authorities having jurisdiction.

1.03 APPLICABLE CODES, LAWS, ORDINANCES, AND PERMITS

A. Performance of the Work shall be governed by all applicable laws, ordinances, rules, and regulations of federal, state, and local governmental agencies and jurisdictions having authority over the Project.

B. Performance of the Work shall meet or exceed the minimum requirements of the series of Codes published by the International Code Council (ICC) and the National Electrical Code (NEC), as adopted and interpreted by local authorities having jurisdiction.

C. Performance of the Work shall be accomplished in conformance with all rules and regulations of public utilities, utility districts, and other agencies serving the facility.

D. Where such laws, ordinances, rules, and regulations require more care or greater time to accomplish the Work, or require better quality, higher standards, or greater size of products, the Work shall be accomplished in conformance to such requirements with no change to the Contract Time and Contract Sum, except where changes in laws, ordinances, rules, and regulations occur subsequent to the execution date of the Contract Documents.

E. Permits and approvals that Ecology knows or anticipates the Contractor will need to satisfy and/or obtain include but are not limited to the following:

1. The Contractor will need to create a Stormwater Pollution Prevention Plan (SWPPP) and satisfy existing general National Pollutant Discharge Elimination System (NPDES) permit requirements as described in **SECTION 01 57 13 – TEMPORARY EROSION AND SEDIMENTATION CONTROL**.

2. The Contractor will need to obtain City of Seattle permits and approvals including but not limited to the following:

   a. Grading permit with drainage review.

   b. Shoreline substantial development permit.

   c. Construction permits pertaining to underground utility temporary bypassing and restoration.

   d. Side sewer permit for temporary construction dewatering.

   e. Street use permit for right-of-way work (if any).

3. King County Industrial Waste Program approval for treated dewatering effluent discharges to sanitary sewer.

4. Well abandonment permits from Ecology for abandonment of existing on-site groundwater monitoring wells.

1.04 DATE OF CODES, LAWS, AND ORDINANCES

A. The applicable edition of all codes shall be that adopted at the time of issuance of permits by authorities having jurisdiction or the execution of the Contract Documents, whichever is applicable, and shall include all modifications and additions adopted by that jurisdiction and Ecology. The applicable date of laws and ordinances shall be that of the date of performance of the Work.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

PART 1 – GENERAL

1.01 USE OF REFERENCES

A. The Project Manual contains references to various standards, standard specifications, codes, practices, and requirements for products, execution, tests, and inspections. These reference standards are published and issued by the agencies, associations, organizations, and societies listed in this section or identified in individual sections.

1. Wherever the term “Agency” occurs in standard specifications, it shall be understood to mean the term used for Ecology.

2. Wherever term “Engineer” occurs in standard specifications, it shall be understood to mean Ecology, unless otherwise specified by Ecology.

3. Standard specifications shall be as amended and adopted by the jurisdiction in which the Project is located.

4. Where reference is made to standard details, such reference shall be to the standard details accompanying the standard specifications, as amended and adopted by the jurisdiction in which the Project is located.

B. Specifications and Standards of ASTM International (ASTM) and the American National Standards Institute (ANSI) are identified in the Project Manual by abbreviation and number only and may not be further identified by title, date, revision, or amendment.

C. Reference standards are not furnished with the Project Manual because it is presumed that Contractor, Subcontractors, manufacturers, suppliers, trades, and crafts are familiar with these generally recognized standards of the construction industry.

Copies of references standards may be obtained from publishing sources.

D. When an edition or effective date of a reference is not given, it shall be understood to be the current edition or latest revision published as of the date of the permit issued by authorities having jurisdiction or the execution of the Contract Documents, whichever is applicable.

All amendments, changes, errata, and supplements as of the effective date shall be included.

E. Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement.

Refer uncertainties and requirements that are different, but apparently equal, to Ecology for a decision before proceeding.

1. The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to Ecology for a decision before proceeding.

F. Contractor shall obtain and maintain at the Project Site copies of referenced codes and standards identified in the Project Manual in order to properly execute the Work.

1.02 DEFINITIONS OF TERMS

A. Additional words and terms may be used in the Project Manual and are defined as follows:

1. And/or: If used, shall mean that either or both of the items so joined are required.
2. Applicable: As appropriate for the particular condition, circumstance, or situation.
3. Approve(d): Approval action shall be limited to the duties and responsibilities of the party giving approval, as stated in the Contract Documents. Approvals shall be valid only if obtained in writing and shall not apply to matters regarding the means, methods, techniques, sequences, and procedures of construction. Approval shall not relieve the Contractor from responsibility to fulfill the Contract.
4. Directed: Limited to duties and responsibilities of Ecology or A/E as stated in the Contract Documents, meaning as instructed by Ecology or A/E, in writing, regarding matters other than the means, methods, techniques, sequences, and procedures of construction. Terms such as directed, requested, authorized, selected, approved, required, and permitted mean directed by Ecology, directed by the A/E, requested by Ecology, and similar phrases. No implied meaning shall be interpreted to extend the responsibility of Ecology, A/E, or other responsible design professional into the Contractor's supervision of construction.
5. Equal or equivalent: As determined by Ecology, A/E, or other responsible design professional as being equivalent, considering

such attributes as durability, finish, function, suitability, quality, utility, performance, and aesthetic features.

6. Furnish: Means supply and deliver to the Project Site, ready for unloading, unpacking, assembly, installation, and similar operation.

7. Indicated: The term indicated refers to graphic representations, notes, schedules, or paragraphs in the Project Manual, and similar requirements in the Contract Documents.

8. Install: Describes operations at the Project Site including the actual unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

9. Installer: Refers to the Contractor or an entity engaged by the Contractor, such as an employee, Subcontractor or Sub-subcontractor, for performance of a particular construction activity, including installation, erection, application, and similar operation. Installers are required to be experienced in the operations they are engaged to perform.

10. Experienced Installer: The term experienced, when used with installer, means having a minimum of 5 previous projects similar in size to this Project, knowing the precautions necessary to perform the Work, and being familiar with requirements of authorities having jurisdiction over the Work.

11. Job site: Same as Site, Project Site, Work Site.

12. Necessary: With due considerations of the conditions of the Project and as determined in the professional judgment of the responsible design professional as being necessary for performance of the Work in conformance with the requirements of the Contract Documents, but excluding matters regarding the means, methods, techniques, sequences, and procedures of construction.

14. Noted: Same as Indicated.

15. Per: Same as "in accordance with," "according to," or "in compliance with."

16. Product: Material, system, or equipment.

17. Project Site: Same as Site, Project Area, and Work Area.

18. Proper: As determined by Ecology, A/E, or other responsible design professional as being proper for the Work, excluding matters regarding the means, methods, techniques, sequences, and procedures of construction, which are solely the Contractor's responsibility to determine.

19. Provide: Means furnish and install, complete and ready for the intended use.

20. Regulation: Includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

21. Required: Necessary for the performance of the Work in conformance with the requirements of the Contract Documents, excluding matters regarding the means, methods, techniques, sequences, and procedures of construction, such as:

    a. Regulatory requirements of authorities having jurisdiction.

    b. Requirements of referenced standards.

    c. Requirements generally recognized as accepted construction practices of the locale.

    d. Notes, schedules, and graphic representations in the Project Manual

    e. Requirements specified or referenced in the Project Manual

    f. Duties and responsibilities stated in the Contract Documents

21. Scheduled: Same as Indicated.

22. Selected: As selected by Ecology, A/E, or other responsible design professional from the full selection of the manufacturer's products, unless specifically limited in the Contract Documents to a particular quality, color, texture, or price range.

23. Shown: Same as Indicated.

24. Site: Same as "Site of the Work," Job site, Work Area, Project Area, Project Site, the areas or spaces occupied by the Project, and including adjacent areas and other related areas occupied or used by the Contractor for construction activities, either exclusively or with others performing other construction on the Project. The extent of the Project Site is shown in the Project Manual and may or may not be identical with the description of the land upon which the Project is to be completed.

25. Supply: See Furnish.

26. Testing and Inspection Agency: An independent entity engaged to perform specific inspection or tests, at the Project Site or elsewhere, and to report on, and, if required, to interpret, results of those inspections or test.

27. Testing Laboratory: Same as Testing and Inspection Agency.

1.03 ABBREVIATIONS, ACRONYMS, NAMES AND TERMS

A. Where acronyms, abbreviations, names, and terms are used in the Project Manual or other Contract Documents, they shall mean the recognized name of the trade association, standards-generating organization, authority having jurisdiction, or other applicable entity.

B. The following acronyms or abbreviations, referenced in the Contract documents, are defined to mean the associated name. Applicable standards include but are not limited to the following:

1. ACI American Concrete Institute
2. ANSI American National Standards Institute
3. CCA Chromated Copper Arsenate
4. CESCL Certified Erosion and Sediment Control Lead
5. CPSC U.S. Consumer Product Safety Commission
6. CSWGP Construction Stormwater General Permit
7. Ecology Washington State Department of Ecology
8. EPA U.S. Environmental Protection Agency
9. ESC Erosion and Sediment Control
10. IBC International Building Code
11. L&I Washington State Department of Labor & Industries
12. MSDS Material Safety Data Sheet
13. MTCA Model Toxics Control Act
14. NPDES National Pollutant Discharge Elimination System
15. OSHA U.S. Occupational Safety & Health Administration
16. RCRA Resource Conservation and Recovery Act
17. RCW Revised Code of Washington
18. SEPA State Environmental Policy Act

19. SVOCs Semi-Volatile Organic Compounds
20. SWPPP Stormwater Pollution Prevention Plan
21. TESC Temporary Erosion and Sedimentation Control
22. TPH Total Petroleum Hydrocarbons
23. VOCs Volatile Organic Compounds
24. WAC Washington Administrative Code
25. WDA Waste Disposal Authorization
26. WSDOT Washington State Department of Transportation

C. The following are commonly used abbreviations that may be found in the Project Manual and/or the applicable standard specifications to the Project:

1. AC or ac alternating current or air conditioning (depending upon context)
2. amp ampere
3. C Celsius
4. CFM or cfm cubic feet per minute
5. CM or cm centimeter
6. CY or cy cubic yard
7. DC or dc direct current
8. DEG or deg degrees
9. F Fahrenheit
10. FPM or fpm feet per minute
11. FPS or fps feet per second
12. FT or ft foot or feet
13. Gal or gal gallons
14. GPM or gpm gallons per minute
15. IN or in inch or inches
16. Kip or kip thousand pounds
17. KSF or ksf thousand pounds per square foot
18. KSI or ksi thousand pounds per square inch

19. KV or kv kilovolt
20. KVA or kva kilovolt amperes
21. KW or kw kilowatt
22. KWH or kwh kilowatt hour
23. LBF or lbf pounds force
24. LF or lf lineal foot
25. M or m meter
26. MM or mm millimeter
27. MPH or mph miles per hour
28. PCF or pcf pounds per cubic foot
29. PPM or ppm parts per million (typically mg/kg for solid waste)
30. PSF or psf pounds per square foot
31. PSI or psi pounds per square inch
32. SF or sf square foot or feet
33. SY or sy square yard
34. V or v volts

D. Any reference to Washington State Department of Transportation (WSDOT) Standard Specifications is to that document's technical sections only (http://www.wsdot.wa.gov/publications/manuals/fulltext/M41-10/2014Amended1-5-2015.pdf).

E. When any reference is specified herein, it is the latest date/edition that exists at the time of project bid opening, unless otherwise noted.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. This section describes the Contractor's general quality control requirements, duties, and responsibilities during execution of the Contract Work. Detailed quality control requirements are presented in individual specification sections.

B. The Contractor shall establish, provide, and maintain an effective Quality Control Program that details the methods and procedures that will be taken to assure that all materials and completed construction conform to requirements of the Contract Documents and manufacturer recommendations. Although the guidelines are established and certain minimum requirements are specified herein and elsewhere in the Contract Documents, the Contractor shall assume full responsibility for accomplishing the stated purpose.

C. The Contractor shall be prepared to discuss and present, at the Pre-construction Meeting, its understanding of the quality control requirements for this project.

D. The Contractor shall not begin any construction or production of materials to be incorporated into the completed Work until the Quality Control Plan has been reviewed and approved by Ecology.

1.02 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship to produce work of specified quality.

B. Comply with manufacturers' instructions, including each step in the sequence.

C. Should manufacturers' instructions conflict with the Contract Documents, request clarification from Ecology before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform work by persons qualified to produce required and specified quality.

1.03 REFERENCES AND STANDARDS

A. For products or workmanship specified by association, trade, or other consensus standards, comply with the requirements of the standard, except where more rigid requirements are specified by applicable codes.

B. Conform to reference standard by date of issue current on date of contract documents, except where a specific date is established by code.

C. Obtain copies of standards where required by product specification sections.

1.04 TESTING SERVICES

A. Necessary materials testing shall be performed by an independent testing laboratory during the execution of the Work and paid for by Contractor, unless otherwise specified. Access to the area necessary to perform the testing and/or to secure the material for testing shall be provided by the Contractor.

B. Testing does not relieve the Contractor from performing the Work to Contract requirements.

C. Retesting required because of non-performance to specified requirements shall be performed by the same independent firm at the Contractor's expense.

D. Subsequent sampling and testing, required as the work progresses to assure continued control of materials and compliance with all requirements of Contract Documents, shall be the responsibility of the Contractor, except as required by other sections of these specifications.

E. See **SECTION – FILL 31 23 23, Paragraph 1.02B.4**, for testing requirements to confirm that imported fill does not contain concentrations of contaminants that are above cleanup levels.

1.05 SUBMITTALS

A. The Contractor shall provide the Construction Quality Assurance Plan to Ecology in accordance with **SECTION 01 33 00 – SUBMITTAL PROCEDURES**.

PART 2 – PRODUCTS

2.01 CONTRACTOR'S DAILY REPORT REQUIREMENTS

A. Date the report is issued.

B. Project name and Ecology number.

C. Work performed each day.

D. Name of workers and Subcontractors performing work each day including hours worked by each person.

E. Type of equipment and hours used each day.

F. Identification of bid item quantities used each day, or percent complete for lump sum items.

G. Identification of potential items that may result in schedule overruns or added costs.

PART 3 – EXECUTION

3.01 CONTRACTOR QUALITY CONTROL

A. Quality Control Plan

The Contractor shall prepare a Quality Control Plan as a component of the comprehensive CQAP described in **SECTION 01 33 00 – SUBMITTAL PROCEDURES, Part 1.04**.

B. Documentation

The Contractor shall maintain current quality control records of all inspections and tests performed. These records shall include factual evidence that the required inspections or tests have been performed, including type and number of inspections or tests involved; results of inspections or tests; nature of defects, deviations, causes for rejection, proposed corrective action; and corrective actions taken.

C. Non-compliance

1. Ecology may notify the Contractor of any non-compliance with project quality control requirements. The Contractor shall, after receipt of such notice, immediately take corrective action.

2. In cases where quality control activities do not comply with either the Contractor's Quality Control Plan or the contract provisions, or where the Contractor fails to properly operate and maintain an effective Quality Control Program, as determined by Ecology, Ecology may:

   a. Direct the Contractor to replace ineffective or unqualified quality control personnel or Subcontractors.

   b. Carry out the functions and operations of the Contractor's Quality Control Plan. Costs incurred by Ecology to operate the Quality Control Program plan or to otherwise remedy the Contractor's non-compliance with quality-related provisions of the Contract shall be deducted from the total amount due the Contractor.

c. Order the Contractor to stop operations until appropriate corrective actions are taken.

3. Any failure by Ecology to notify the Contractor of any non-compliance with any of the foregoing requirements shall not be deemed as a waiver of its enforcement rights hereunder and that the Contractor is still bound by the terms and conditions of said requirement.

3.02 CONTRACTOR'S DAILY REPORT

A. Contractor shall provide Ecology with a written daily report at the end of each day's work. The Contractor's Daily Report shall describe the work accomplished that day and address each item listed in Part 2.01 of this section. The Contractor's Daily Reports will be one of the agenda items discussed at the weekly project meeting described in **SECTION 01 31 19 – PROJECT MEETINGS**.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. This section describes the requirements to provide the temporary facilities required by both the Contractor and Ecology until final completion of the Work. The Work includes compliance with all controls and ordinances with respect to safety, noise, security, traffic, temporary utilities, site maintenance, and air pollution control.

1. The Contractor shall be responsible for cordoning off the work area with temporary fencing and erecting temporary traffic controls as shown on the Drawings and described herein.
2. These facilities and controls shall be in place to Ecology's satisfaction prior to commencement of construction activities.
3. During the construction, the Contractor shall pre-plan and coordinate with Ecology to minimize interference with area traffic and properties adjacent to the Project Site.
4. The Contractor shall be responsible for traffic control and coordination as described herein during the entire period of activities under this Contract.
5. The Contractor will provide temporary utilities, site maintenance, air pollution control, noise control; and operate a decontamination facility as discussed below.

1.02 RELATED SECTIONS

A. **SECTION 01 35 43.10 – GREEN CONSTRUCTION PRACTICES**

B. **SECTION 01 57 13 – TEMPORARY EROSION AND SEDIMENTATION CONTROL**

C**.** **SECTION 02 61 13 – EXCAVATION AND HANDLING OF CONTAMINATED SOIL**

1.03 SUBMITTALS

A. In addition to the Traffic Control Plan, the Contractor shall provide a Temporary Facilities and Controls Work Plan that details management of environmental conditions present during the performance of the Work and provides methods for how the work will be performed. This plan can be combined with the SPCC and other plans identified in **SECTION 01 33 00 – SUBMITTAL PROCEDURES**.

B. The Plan shall be submitted to Ecology for approval prior to beginning

Work. The Temporary Facilities and Control Plan shall include at a minimum:

1. A general description of the construction work to be performed, discussing anticipated chemical and physical hazards associated with the Work.
2. Hazardous Waste Contingency Plan.
3. Description of anticipated waste streams and procedures for site management, transportation, and off-site disposal/recycling.
4. Methods for managing, accumulating/stockpiling soil, sediment, ground asphalt, crushed concrete, and suspect materials on site.
5. Document control, including the documentation of all waste transportation and disposal, and including submission of a complete and final report to Ecology.
6. Methods for site maintenance and security.
7. Description of air pollution control procedures.
8. Methods for management of noise.
9. Hazardous Waste Management Plan to address on-site conditions.
10. Methods to protect groundwater and other critical areas from contamination and methods to decommission monitoring wells.
11. Runoff Management Plan detailing controls to be used during dust control, and any other use of water during the project that may impact the stormwater system.
12. Oil Spill Response and Prevention Procedures.

PART 2 – PRODUCTS

A. The Contractor is responsible for identifying and procuring all materials, products, equipment, etc. necessary to complete all of the Work described herein.

PART 3 – EXECUTION

3.01 TEMPORARY TRAFFIC CONTROLS

A. Temporary Traffic Control Plan

1. The Contractor must maintain traffic flow along NW 54th St., 30th Ave. NW, 28th Ave. NW, and NW Market St. in both directions at all times and may not block access to neighboring properties.

2. The Contractor shall not block the Ballard Terminal Railroad rail line located along the northern property boundary, and must not impede the movement of rail traffic.

3. The Temporary Traffic Control plan shall conform to the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD) and the current City of Seattle Standard Specifications for Road, Bridge, and Municipal Construction. The plan shall detail measures to be implemented to ensure access to the property via its existing entrances/exits for its owners, customers, and tenants, in addition to access to the public parking area located along the entry drive to the west of the property.

4. The Contractor shall be responsible for maintaining a safe flow of car and pedestrian traffic around work area at all times. The Contractor shall provide temporary flagging, signs, and/or barricades around construction areas, in accordance with the aforementioned standards, at all times to prevent accidental public access into active work areas. The Contractor shall obtain all necessary traffic control permits from King County and City of Seattle.

5. Flaggers, flagging equipment, and flagging procedures shall conform to Chapter 6 of the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD) and the current City of Seattle Standard Specifications for Road, Bridge, and Municipal Construction.

3.02 CONSTRUCTION TRAFFIC

A. The Contractor shall minimize interference with the activities of adjacent property owners as described below, and by other means identified and agreed upon during the course of the project.

B. The Contractor shall minimize vehicular traffic into and out of the Project Site.

C. Construction vehicles shall enter and exit the Project Site from 30th Ave. NW and follow the haul path shown on the Drawings.

D. A Contractor’s employee shall oversee any vehicle’s entrance to or exit from the Project Site, and direct the construction vehicle and any non-construction traffic as needed to prevent accidents and ensure smooth traffic flow around the Project Site.

E. If an open traffic lane needs to be temporarily blocked for the purpose of placing or removing equipment, coordinate such activities in advance with adjacent property owners to minimize disruption to their activities. The duration of the blocking activity shall be kept to a minimum, and the estimated duration is to be communicated to the adjacent property owners prior to commencement. The Contractor shall be responsible for directing both the construction and non-construction traffic during such times that the through-lane is blocked.

3.03 PEDESTRIAN TRAFFIC

A. The Contractor shall not restrict pedestrian traffic in areas of the property not being worked on. When ongoing material delivery or export activities require closure of pedestrian sidewalk or walkway entrances to the site, a Contractor's employee shall oversee the closure and ensure that alternative pedestrian routing is established to prevent accidents and ensure smooth pedestrian and vehicular traffic flow around the site.

3.04 TEMPORARY UTILITIES

A. The Contractor will provide adequate facilities for Contractor's operation at Contractor's expense including:

1. Water

   a. Fresh drinking water for employees shall be provided in sanitary containers by the Contractor. The Contractor shall arrange with the City of Seattle to supply construction water for the duration of the contract.

   b. All connections to the water supply shall be furnished and installed by the Contractor and be removed at the completion of the Work to the satisfaction of Ecology.

2. Construction Electricity

   a. The Contractor will be responsible for providing all necessary power connections required for site work, either by installing a temporary power drop or generator(s).

3. Toilet Room Facilities

   a. Contractor shall install and maintain temporary sanitary toilet facilities during the term of this contract. Toilets shall be of the chemical type and removed at the completion of the Work.

4. Communications

   a. Contractor shall install and maintain the appropriate equipment to allow for the efficient communication via voice, fax, and the internet with Ecology and with outside parties at all times during the term of this Contract. Remove at the completion of work. All accounts to be registered in the name of the Contractor.

5. Fences and Enclosures

   a. Temporary fences shall be in accordance with **SECTION 01 56 26 – TEMPORARY FENCING**.

   b. Contractor shall furnish its own fence to further protect its materials and equipment.

6. Contractor Field Office

   a. Contractor shall install and maintain or otherwise arrange with Ecology necessary field office space during the Work and remove at Substantial Completion of Work, to the satisfaction of Ecology.

   b. Contractor's office space shall include a meeting area/room of sufficient size to hold weekly construction meetings. The Contractor shall assume that up to two (2) Ecology representatives shall attend the meeting.

   c. Contractor's office space shall include dedicated work spaces for one (1) Ecology staff member, if needed. The work spaces shall be equipped with a desk and chair and high-speed internet service.

3.05 SITE MAINTENANCE

A. Contractor shall keep the work site, staging areas, and Contractor's facilities clean and free from dirt, rubbish, and debris at all times. Materials and equipment shall be removed from the site when they are no longer necessary. Before Final Completion of Work, the work site shall be cleared of equipment, unused materials, and dirt and rubbish to present a clean and neat appearance. Disturbed areas shall be restored per Ecology's or Ecology's Representative's direction.

B. Waste material of any kind shall not be permitted to accumulate, remain at the site of the Work, nor on adjacent streets.

C. In the event that waste material, refuse, debris, or rubbish is not removed from the work area or on adjacent streets by the Contractor, Ecology reserves the right to have such material removed and the cost of the removal and disposal charged to the Contractor.

3.06 AIR POLLUTION CONTROL

A. Contractor shall not discharge smoke, dust, or other contaminants into the air that violate local, state, or federal regulations. Internal combustion engines shall not be allowed to idle for prolonged periods of time. Exhaust emissions that are determined to be excessive by Ecology shall be repaired or the equipment replaced at the Contractor's expense.

B. Contractor shall minimize nuisance dust by cleaning, sweeping, vacuum sweeping, sprinkling with water, or other means. The use of water in amounts that result in mud on public streets or runoff to on-site or off-site drain catchments is not acceptable as a substitute for sweeping or other methods.

C. Contractor shall control dust in accordance with **SECTION 02 61 13 – EXCAVATION AND HANDLING OF CONTAMINATED SOIL, Paragraph 3.01C**.

3.07 NOISE CONTROL

A. Construction involving noisy operations, including starting and warming up of equipment, shall be in compliance with local noise ordinances.

B. Contractor shall comply with all local controls and noise level rules, regulations, and ordinances that apply to any work pursuant to the Contract (City of Seattle Municipal Code Chapter 25.08 [Noise Control]).

C. Workers shall not be exposed to noise levels from scrapers, pavers, graders, and trucks that exceed 90 dBA, as measured under the noisiest operating conditions. For all other equipment, workers shall not be exposed to noise levels exceeding 85 dBA. Equipment that cannot meet these levels shall be quieted by use of improved exhaust mufflers, portable acoustical screens, or other means. Equipment not modified to meet these requirements shall be removed from the project

3.08 SPILL RESPONSE

A. Implement the spill response plan. Maintain copies of all MSDS sheets at the site for chemicals on site including fuels, cleaners, fertilizers, and other chemical materials.

B. Comply with all applicable codes and ordinances for spill prevention and response.

C. Provide appropriate spill response materials including, but not limited to the following: containers, absorbents, shovels, and personal protective equipment. Spill response materials shall be available at all times when contaminated materials/wastes are being handled or transported. Spill response materials shall be compatible with the type of materials and contaminants being handled.

D. Emergency Spill Response Notification

1. Under state law, Ecology must be notified when any amount of regulated waste or hazardous material that poses an imminent threat to life, health, or the environment is released to the air, land, or water, or whenever oil is spilled on land or to waters of the state. The spiller is always responsible for reporting a spill. Failure to report a spill in a timely manner may result in enforcement actions. If you are not responsible for a spill, making the initial notification does not make you liable. However, please consult with Ecology's response team before attempting any type of response or cleanup. Also notify Property Owner and Engineer.

2. If oil or hazardous materials are spilled to state waters, the spiller must notify both federal and state spill response agencies. The federal agency is the National Response Center at 1-800-424-8802. For state notification, call the Washington Emergency Management Division (EMD) at 1-800-258-5990 or 1-800-OILS-911 AND the appropriate Ecology regional office for your county (see numbers below). An Ecology spill responder will normally call the reporting party back to gather more information. The agency will then determine its response action. Also notify Ecology, Property Owner, and Engineer.

   a. Ecology regional spill reporting numbers:

      i. **Southwest Regional Office – 1-360-407-6300** (Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Mason, Lewis, Pacific, Pierce, Skamania, Thurston, and Wahkiakum counties).

      ii. **Northwest Regional Office – 1-425-649-7000** (Island, King, Kitsap, San Juan, Skagit, Snohomish, and Whatcom counties).

      iii. **Central Regional Office – 1-509-575-2490** (Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, and Yakima counties).

      iv. **Eastern Regional Office – 1-509-329-3400** (Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, and Whitman counties).

3.09 DECONTAMINATION FACILITY AND CONTAMINATION EXCLUSION ZONE

A. The Contractor shall provide decontamination facilities for equipment and workers (including Ecology) based upon the requirements listed below:

1. Equipment shall be decontaminated to prevent tracking contaminated soil from trucks or other equipment leaving the Project Site. The Contractor shall collect decontamination water and incidental runoff and dispose of them appropriately.

2. The equipment decontamination area shall consist of a stabilized construction exit area.

3. The decontamination facility and the contamination exclusion zone shall conform to the Contractor Health and Safety Plan specified in **SECTION 01 35 29 – HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES.**

4. Because of the small footprint of the Project Site, the designated contamination zones are likely to change as work proceeds from one portion of the site to another. Contractor shall use signs or flagging to designate areas as needed. The Contractor shall arrange the following work areas at the Project Site:

   a. An Exclusion Zone to encompass areas where contaminated soil will be excavated, handled, and stockpiled.

   b. A Contamination Reduction Zone to provide a physical separation between the Exclusion Zone and Support Zone to enable decontamination of personnel and equipment prior to entering the Support Zone from the Exclusion Zone.

   c. A Support Zone for support facilities, clean equipment storage, and stockpiling clean materials. Workers may rest, eat, and drink in this area.

3.10 PROTECTION OF PROPERTY AND EXISTING FACILITIES

A. Provide protections necessary to prevent damage to property and facilities.

B. Only rubber-tired equipment is permitted to operate on paved surfaces, curbs, and sidewalks. Provide ground protection mats, or other means approved by Ecology, where equipment must cross pavement, curbs, and sidewalks. If existing facilities are damaged, the damaged portion shall be Replaced in Kind.

C. Do not paint facilities to remain. Instruct Contractor staff, utility locating firms, and surveyors that the facility and existing facilities to remain shall be protected and not defaced. Markings as needed shall be temporary and shall be removed at the completion of the project.

D. No additional site work not indicated in the Project Manual shall be completed without approval from Ecology.

3.11 DAMAGE TO FACILITIES, ROADS, VEGETATION, OR PROPERTY

A. The Contractor shall complete photo-documentation of site conditions prior to the start of work by the Contractor.

B. During the course of construction, the Contractor shall repair any damage to any part of the project property damaged by Contractor's actions, operations, or neglect. Contractor shall make repairs to the original condition, as acceptable to the Engineer, at no cost to Ecology.

C. Repair to "original condition" includes conforming with codes and regulatory requirements. Repairs shall conform to each of the following:

1. Meet applicable codes.
2. Meet relevant industry standards for the type of pipe, conduit, wire, etc., as published by a National Industry Association.
3. Meet applicable and relevant ASTM standards.
4. Replace the damaged item with an equivalent item. For pipe, conduit, wire, or similar item, replace the damaged item with the same size item of the same material of the same specification (e.g., schedule 40) based on inspection of the damaged item and concurrence of the Engineer. Replace a standard length of pipe or conduit or other item, and use joints or connectors specifically manufactured for the repair of the type of item/material damaged. Provide waterproof jacketing or other seals, coatings, or other ancillary items. Repair tracer wires and/or conductive warning tapes.
5. Complete all testing typically implemented for installation of the damaged item (e.g., pressure testing of water lines) and comply with regulatory procedures (e.g., disinfection of water lines).
6. Pipe wraps and similar patches shall not be used.

D. Repair, restore, or replace any curbs, parking lot pavement, utilities, vegetation, or property damaged by the Contractor to the original new condition. Repair or replace trees and vegetation indicated to remain (or not indicated for removal) that has been damaged by construction operations, in a manner acceptable to Ecology.

E. All repairs made within right-of-ways, including repair of sidewalks and curbs, shall meet current City of Seattle Standard Specifications for Road, Bridge, and Municipal Construction.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. Temporary fencing is to be provided as needed to sufficiently separate the construction activities from existing Property Owners and/or Tenants, children, pets, adjacent property owners and/or tenants and their families and pets, the public, and public amenities.

1. Temporary construction fencing required for the Work includes but is not limited to the following:
    a. Fencing of areas where the Work is being performed.
    b. Fencing of laydown or other construction operational areas.
2. Contractor shall comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including but not limited to:
    a. Building Code requirements, including local requirements, standards, and regulations where more restrictive.
    b. Health and safety regulations.
3. Contractor shall keep temporary facilities clean and neat in appearance.
    a. Operate in a safe and efficient manner.
    b. Take necessary fire prevention measures.
    c. Do not overload facilities or permit them to interfere with progress.
    d. Do not allow hazardous, dangerous, or unsanitary conditions or public nuisances to develop or persist on the Project Site.

PART 2 – PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. Provide new materials to be used or, if acceptable to Ecology, undamaged previously used materials in serviceable condition. Provide materials suitable for the use intended.

1. For open-mesh construction fencing, the Contractor shall provide 11-gage, galvanized 2-inch, chain link fabric fencing 6-feet high with galvanized steel pipe posts, 1-1/2 inch inner diameter for line posts and 2-1/2 inch inner diameter for corner posts.

2. A sufficient number of clamps to secure all fence sections used by the Contractor at the Project Site.

3. A sufficient number of movable fence bases to secure all fence sections used by the Contractor at the Project Site.

4. Contractor shall only be permitted to use orange rubberized fencing during the last 15 days of the maintenance and finishing period and to fence small areas of corrective work.

   a. When used, Contractor shall provide sufficient upright stakes and ties to securely hold orange fencing vertical at its full height.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Contractor shall use qualified personnel for installation of temporary fencing, and shall relocate and modify facilities during the course of construction as required.

1. Contractor shall provide temporary fencing ready for use when needed to avoid delay of the Work, and shall maintain and modify fencing as required.

   a. Do not remove until fencing is no longer needed.

2. Around each area where construction activity for the Work is being performed, the Contractor shall install open-mesh, chain link enclosure fences with posts property secured and a lockable entrance gate or similar means of entry. The fence shall be of sufficient length to accommodate construction operations, and as required for work/staging area safety and security.

   a. Install in a manner that will prevent people, dogs, and other animals from easily entering, except by the entrance gate when open.

   b. Where materials and equipment must be stored, and are of value or attractive for theft (including personal possessions of Property Owners and/or Tenants), the Contractor shall provide a secure lockup of the Work areas.

   c. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.

d. Contractor shall verify at the end of each day that all fence sections are secured and clamped to prevent collapse or unauthorized entry into Work areas.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. The Contractor shall be responsible for implementing, maintaining, monitoring, and supplementing silt control measures, stormwater runoff control measures, and additional Best Management Practices (BMPs) for the implementation and maintenance of a comprehensive erosion control plan. The Contractor shall meet City of Seattle requirements and the substantive requirements of the Construction Stormwater General Permit (CSWGP) under the National Pollutant Discharge Elimination System and State Waste Discharge Permit for Stormwater Discharges Associated with Construction Activity for site construction work (including applicable Construction Water).

1. The information provided in the Contract Documents shall be considered a minimum for the anticipated construction and conditions. The Contractor shall be responsible for adding additional BMPs as conditions change at no additional cost to Ecology.

2. The Contractor shall coordinate installation and inspections of the BMP's with City of Seattle and Ecology inspectors as necessary. Additional BMPs shall be stockpiled at the Project Site as requested by the City of Seattle and/or Ecology inspectors.

1.02 RELATED SECTIONS

A. **SECTION 01 35 43.10 – GREEN CONSTRUCTION PRACTICES**

B. **SECTION 01 50 00 – TEMPORARY FACILITIES AND CONTROLS**

C. **SECTION 02 61 13 – EXCAVATION AND HANDLING OF CONTAMINATED SOIL**

1.03 SUBMITTALS

A. The Contractor shall prepare, submit, and implement a Stormwater Pollution Prevention Plan (SWPPP) in accordance with requirements of the current CSWGP that became effective in January 2011. The SWPPP will describe the anticipated construction activities and Temporary Erosion and Sedimentation Control (TESC) measures, related pollution prevention measures, inspection/monitoring activities, and recordkeeping and reporting requirements. The Contractor is responsible for the implementation of the SWPPP and the TESC measures including monitoring, sampling, testing, and reporting required by the CSWGP.

1. If requested by Ecology, the Contractor shall submit to Ecology product catalog cuts for filter fabric fence and filter bag inserts to be used for the Work.

2. Contractor shall be responsible for submitting monthly discharge reports in accordance with the CSWGP.

   a. Contractor shall be responsible for all fines or penalties as a consequence of failure to submit monthly reports in a timely fashion.

1.04 REGULATORY REQUIREMENTS

A. The Contractor shall comply with all applicable Ecology and City of Seattle regulations and standards.

1. Contractor shall conform to all requirements of the CSWGP, including but not limited to the following:

   a. Prepare and maintain the SWPPP.

   b. Submit monthly discharge reports to Ecology.

   c. Have a Certified Erosion Control Lead on site and available.

   d. All water quality testing required by the City of Seattle to discharge construction stormwater into the City combined sewer.

1.05 SEQUENCING AND SCHEDULING

A. The facilities for the comprehensive erosion control plan for the Project must be coordinated by the Contractor with all clearing and grading activities, and in such a manner as to ensure that sediment-laden water does not enter the City of Seattle combined sewer, violate applicable water standards of the City of Seattle and the Washington State Department of Ecology, or adversely impact adjacent properties.

1. Contractor shall install and verify the working condition of all erosion control measures and other BMPs in Work areas at the Project Site prior to any clearing, grubbing, demolition, general site grading, or other construction.

B. Erosion control items shall be installed and removed at various times throughout the Contract Time of the Project.

C. Contractor shall locate existing catch basins and related stormwater drainage features that may be impacted by construction activities during the Project. Protection of these catch basins and related stormwater drainage features shall be coordinated with the Work by the Contractor.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Filter Fabric Fence (silt fence): This material shall be in accordance with WSDOT Standard Specifications (see link in **SECTION 01 42 00 – REFERENCES, Paragraph 1.03D**) Section 9-33, Temporary Silt Fence (Table 6).

B. Straw Mulching: This material shall be in accordance with WSDOT Standard Specifications Section 9-14.4(1).

C. Filter Fabric: Mirafi 140N or equal.

D. Filter Bag Inserts (siltsac inserts): Commercially manufactured filter bags specifically manufactured for silt filtering and which will provide filtering performance required. Contractor shall verify current standards for material and usage with the City of Seattle.

E. Polyethylene Sheeting: This material shall be in accordance with WSDOT Standard Specifications Section 9-14.5(3).

F. Sandbags for anchoring polyethylene sheeting.

PART 3 – EXECUTION

3.01 EROSION AND SEDIMENTATION PREVENTION MEASURES

A. Where possible, maintain natural vegetation for silt control.

1. Prevent silt-laden water from leaving Project Site or from entering off-site storm sewer systems.
2. All slopes, cut, or fill areas where Work has stopped for more than 30 days shall be stabilized by mulching, polyethylene sheeting, or other method to prevent erosion and sediment transport.
3. Keep all off-site parking areas and streets clean from construction activities.
    a. Where soil and other Work debris on paved surfaces is not contaminated soil from the Project Site, Contractor shall keep paved surfaces clean by the use of mechanical sweeping equipment, hand shovels and brooms, or other accepted methods suitable of removing dirt, rock, silt, and sand.

b. Where soil and other Work debris on paved surfaces is contaminated soil from the Project Site, Contractor shall keep paved surfaces clean by the use of mechanical vacuum sweeping equipment or other accepted methods suitable of removing dirt, rock, silt, and sand and permitting safe and legal disposal of swept-up material.

c. No street washing will be allowed.

3.02 MAINTENANCE OF EROSION AND SEDIMENTATION CONTROL MEASURES

A. The implementation of the comprehensive erosion control plan, and the maintenance, replacement, and upgrading of these facilities shall be the responsibility of the Contractor until Substantial Completion.

1. During the Contract Time, erosion control facilities installed by the Contractor may require maintenance, relocation, or upgrading (additional sumps, relocation of ditches and silt fences, etc.). This Work shall be performed by the Contractor as needed.

2. Contractor shall pay for all costs associated with the construction, maintenance, upgrading, and removal of the erosion control facilities throughout the Contract Time.

B. Contractor shall monitor and maintain erosion and silt control measures and other BMPs throughout the Contract Time of the Project.

1. Remove accumulations of sediment when more than 50 percent of silt storage capacity is filled.

C. Contractor shall provide continuous monitoring as required by the CSWGP.

D. Contractor shall inspect and repair temporary erosion control facilities as needed.

1. Inspections by the Contractor shall occur a minimum of once per week; during and after storms or other, similar weather events; and prior to weekends and holidays.

E. Adequate temporary and permanent control of surface water runoff and subsurface seepage will be required in order to allow site access, grading, and construction of underground utilities to proceed.

3.03 WET WEATHER GUIDELINES

A. Site preparation and initial construction activities should be planned to minimize disturbance to the existing ground surface during extended wet weather periods when the presence of excess moisture will render the site soil more prone to excessive disturbance.

B. During wet Project Site conditions:

1. Equipment traffic should not be allowed on exposed subgrade areas. Erosion of the soil will occur as exposed surfaces are disturbed due to construction activity and exposure to climatic conditions.

2. The Contractor shall be responsible for protecting disturbed or prepared surfaces by some form of weather cover if left exposed for more than two (2) days.

3. Contractor shall protect disturbed or prepared surfaces from surface ponding, stormwater runoff, and construction traffic.

4. The Contractor will be solely responsible for any repairs required to these surfaces at no additional cost to Ecology.

3.04 STREET AND PUBLIC SIDEWALK CLEANING

A. Contractor shall sweep truck exteriors before trucks leave the Project Site, and shall sweep truck loading areas and vehicle and equipment traffic areas in public right-of-way and on public sidewalks not closed to the public between truck loads and construction vehicle and equipment traffic, as necessary to prevent dirt from being carried onto and accumulating on public streets.

B. If streets or public sidewalks not closed to the public are fouled or when directed by Ecology, Contractor shall clean them with a vacuum sweeper truck or equal in conformance with City of Seattle and all governing requirements and regulations.

3.05 TURBIDITY MONITORING

A. The Contractor shall be responsible for meeting turbidity and pH requirements as required by the City of Seattle and the CSWGP.

1. Additional erosion and sedimentation control measures may be required to achieve discharge requirements. The Contractor shall be responsible for installing and maintaining additional measures as work progresses to meet turbidity requirements.

2. Turbidity monitoring and reporting will be required daily during construction in the rainy season (November 1st through April 30th) and weekly between May 1 and October 31.

3. Turbidity reports may not be necessary during extended periods of low flow or no-flow conditions.

   a. The Contractor shall coordinate arrangements with the City of Seattle during extended periods of low flow or no-flow conditions, and shall make available the monitoring reports to Ecology and the City of Seattle upon request.

   b. Due to the anticipated low flow or no-flow conditions during the drier summer months, stormwater flow may cease, causing an interruption in the turbidity monitoring and reporting.

4. The benchmark for turbidity is defined as 25 NTU (nephelometric turbidity units).

   a. The Contractor shall refer to the NPDES Permit for remedial measures when stormwater discharging from the Project Site has a turbidity measurement higher than 25 NTU.

5. If during the Contract Time the monitoring reports indicate that the threshold level of turbidity is exceeded, the monitor must report the condition to the City of Seattle immediately, or as soon as practical.

   a. The Contractor shall maintain a stockpile of materials to implement additional BMP measures as required during construction to bring the Project into compliance when the threshold level of turbidity has been exceeded.

3.06 SILT FENCE INSTALLATION

A. Before installing silt fence, Contractor shall lay out the limits of the Work area to install fence. Contractor shall field-adjust the alignment to the perimeter of Work areas.

   1. Perform clearing or other Work required to install erosion control.

B. Cast all trench excavation soil from fence installation to the Work side of fence.

C. Overlap filter fabric fence joints a minimum of 1 foot prior to backfilling the trench for the fence.

3.07 OTHER EROSION AND SEDIMENTATION CONTROLS INSTALLATION

A. For polyethylene sheeting, the Contractor shall overlap joints a minimum of 24 inches.

   1. Overlap in direction of drainage and prevent water from draining onto material being protected.

2. Secure sheeting in place to prevent movement and damage.
    a. Provide sandbags at 2.5-foot spacing.
    b. Tie the sand bags together with rope when used on slopes greater than 3:1 (horizontal:vertical).
    c. Minimize driving stakes through plastic.

B. Mulch exposed soil during Work in those areas if not protected by other means, unless otherwise specified in the Project Manual.

1. Provide continuous covering to a minimum depth of 3 inches if applied during Work. Apply mulch with tackifier to prevent blowing.
2. Remove mulch to continue Work in covered areas if not completed.

END OF SECTION

PART 1 – GENERAL

1.01 ECOLOGY FURNISHED ITEMS

A. Ecology furnishes no items for this project.

1.02 RELATED SECTIONS

A. **SECTION 01 35 43.10 – GREEN CONSTRUCTION PRACTICES**

1.03 SUBMITTALS

A. Submit manufacturers' product data for all materials incorporated into the Work, and such submittals shall be reviewed by Ecology prior to bringing material on site.

B. Submit supplemental test data where specified herein.

1.04 IMPLIED/INCIDENTAL MATERIALS

A. Minor materials required for proper Project completion although not specifically mentioned or shown in Contract Documents, are part of materials to be provided by Contractor as part of Contract and are considered incidental to the total cost of the Project. No additional compensation is due to the Contractor for providing such items.

1.05 QUALITY OF MATERIALS

A. Materials are to be new, free from defects, and of quality specified in the contract documents.

B. Select and provide materials to ensure satisfactory operation and rated life in prevailing environmental conditions where installed.

C. Same make and quality throughout the entire job, for each type. Furnish materials of lasted standard design products of manufacturers regularly engaged in their production.

1.06 SPECIFIED MATERIAL

A. Contract documents generally reference only one make and model for each item of material or equipment required. This is not intended to be restrictive but indicates the standard of quality, design, and features required. "Or equal" products are allowed if Contractor can demonstrate that they meet all conditions of the material or equipment named.

B. Specified product is the basis of design regarding physical size, strength, and performance. Products named indicate minimum acceptable product and are “or equal” unless noted otherwise.

1.07 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitutions immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Engineer will consider Contractor’s request for substitution when the following conditions are satisfied:

    a. Is consistent with Contract Documents and will produce indicated results.

    b. Requested substitution provides sustainable design characteristics that specified product provided.

    c. Requested substitution will not adversely affect Contractor’s construction schedule.

    d. Requested substitution received necessary approvals of authorities having jurisdiction.

    e. Requested substitution is compatible with other portions of the Work.

    f. Requested substitution has been coordinated with other portions of the Work.

    g. Requested substitution provides specified warranty.

    h. If requested substitution involves more than one Contractor, requested substitution has been coordinated with other portions of Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Engineer will consider requests for substitution if received within 20 days after the Notice of Proceed.

1. Conditions: Engineer will consider Contractor’s request for substitution when the following conditions are satisfied:

    a. Requested substitution offers Ecology a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Ecology must assume. Ecology’s additional responsibilities may include compensation to Engineer for redesign and evaluation services, increased cost of other construction by Ecology, and similar considerations.

b. Requested substitution does not require extensive revisions to the Contract Documents.

c. Requested substitution is consistent with Contract Documents and will produce indicated results.

d. Requested substitution provides sustainable design characteristics that specified product provided.

e. Requested substitution will not adversely affect Contractor's construction schedule.

f. Requested substitution has received necessary approvals of authorities having jurisdiction.

g. Requested substitution is compatible with other portions of the Work.

h. Requested substitution has been coordinated with other portions of the Work.

i. Requested substitution provides specified warranty.

j. If requested substitution involves more than one Contractor, requested substitution has been coordinated with other portions of Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

1.08 SUBSTITUTION OF MATERIALS (OR EQUAL)

A. Proposed equipment to be considered "or equal" will necessitate written approval by the Engineer prior to substitution.

1. On requests for substitution of materials clearly defined and describe proposed substitute.

2. Accompany requests by complete specifications, samples, records of performance, certified test reports, and such other information as the Engineer may request to evaluate the substitute product.

3. Contractor is responsible for a substitute item suiting the installation requirements and for additional costs incurred as a result of substitution.

B. Final decisions regarding quality and suitability of proposed substitutions rests solely with Engineer and will be based on information submitted.

1.09 TECHNICAL DATA

A. Technical data and information contained herein relies entirely on tests and ratings provided by manufacturers who are solely responsible for their accuracy. Engineer, by use of this information, in no way implies Engineer has tested or otherwise verified the results of published manufacturers' literature.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Transport products by methods to avoid product damage. Only deliver products to the Project Site that are undamaged and free from defects.

1. Provide proper equipment and personnel to handle and transport materials/products to the Project Site safely and undamaged.
2. Promptly inspect material to assure that products comply with Contract requirements, quantities are correct, and products are undamaged.
3. Store and/or stockpile materials and products only in areas designated and approved by Engineer prior to delivery.
4. Arrange storage to provide easy access for inspections. Original product labels, certifications, tags, stamps to be intact and readily visible for inspection purposes.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. This section describes the general requirements for site surveying and grade control including pre-construction and post-construction topographic surveys, utilities and record drawings, construction progress surveying for excavation limits and imported materials, final limits of excavations, recordkeeping, and submittals. In addition, establish and maintain design lines and grades shown on the Contract Documents.

1.02 RELATED SECTIONS

A. The provisions and intent of the Contract, including the General and Supplemental Conditions and Project Specific Requirements, apply to this work as if specified in this section. Coordinate related requirements in other sections of the specifications, including but not limited to the following:

1. **SECTION 01 33 00 – SUBMITTAL PROCEDURES**
2. **SECTION 01 77 00 – CLOSEOUT PROCEDURES**

1.03 QUALITY ASSURANCE

A. It is the responsibility of the Contractor to schedule Contractor's survey and to verify that it has met the Contract requirements prior to proceeding to the next sequence of work. Ecology or Ecology's Representative shall review and approve each survey or survey increment prior to the Contractor proceeding to the next phase of work in that specific area. The Contractor shall allow up to five (5) business days for Ecology's or Ecology's Representative's review. Surveys of the Project shall be surveyed using the same vertical (NAVD88) datum and horizontal (NAD83/1991) coordinate system as the Contract Drawings. Surveys may need to be completed in small increments to document work progress and sequential excavation and backfill. Minimum survey requirements are described in Part 3 of this section.

B. Pre-Construction Surveying: The Contractor shall conduct a pre-construction survey. The survey shall be approved by Ecology or Ecology's Representative prior to commencement of construction. This survey shall include the existing site topography and location of all site features within the work area. The Contractor shall establish local horizontal and vertical control on the Project Site. Local control shall be established using local survey markers. The Contractor shall ensure closure of all survey loops. The survey shall be of adequate resolution to allow subsequent accurate calculations of excavated volumes.

C. The surveys shall be performed and stamped by a Professional Land Surveyor registered in the State of Washington, independent of the Contractor, and acceptable to Ecology. The independent surveyor shall have actively engaged in land survey operations for the past ten (10) years, and shall have equipment and work force separate from the Contractor's.

D. The surveyor shall have insurance that has limits that meet or exceed the requirements of the General and Supplemental Conditions.

E. Ecology reserves the right to retain an independent surveyor to periodically check the Contractor's survey. Surveying performed by Ecology will be at no cost to the Contractor.

1.04 SUBMITTALS

A. General submittals required in accordance with this section include the following (as detailed in **Articles 3.02 – SURVEY WORK PLAN – and 3.05 – SURVEY DOCUMENTATION –** of this section):

1. Name, address, telephone number, and statement of qualifications of Professional Land Surveyor before starting survey work. This surveyor shall be responsible for stamping and signing all work as noted below.
2. On request, field notes and documentation verifying accuracy of survey work, to include cross section of interim surveys by the Contractor.
3. Project survey data shall be stored as electronic files on a compact disc formatted as (a) DWG, (b) TIF, (c) PDF and printed to a mylar sheet. At a minimum, data for each survey point shall include a sequential reference number, the elevation, and appropriate northing and easting coordinates.
4. Field notes, drawings, quantity computations, and point data for each survey shall be submitted to Ecology or Ecology's Representative.
5. Closure calculation for horizontal and vertical control. Submit prior to commencing survey work.
6. Pre-Finish Grading Surveys, as well as progress surveys to confirm as-built excavation limits.

B. As-Built Data Files:

1. Upon completion of all activities, the Contractor shall prepare As-Built drawings/data files for each survey described in this section. The post-construction As-Built drawing shall locate all features as constructed including but not limited to the limits of finished topography, prescribed boundaries, utilities surveyed as part of the Work, and all real estate/property boundaries and public land survey section corners and lines. The As-Built drawings shall be produced full size (ANSI D) on bond paper signed by the surveyor and Contractor. A paper copy of half-size As Builts shall also be created by the Contractor. Contractor to submit As-Built drawings in paper and electronic formats.
2. Contractor shall provide a single final As-Built drawing representing the extent of remedial excavation performed at the Project Site. This drawing shall include all interim progress surveys that were performed and be combined into a single CAD file.
3. Contractor electronic files for the As-Builts shall be fully editable and manipulatable so as to allow future changes by Ecology. The Contractor shall submit the electronic version of the As-Built drawings with hard copies as specified.

1.05 SURVEY VERTICAL DATUM

A. Project survey elevations shall reference the North American Vertical Datum of 1988 (NAVD88).

1.06 SURVEY HORIZONTAL DATUM

A. Project horizontal datum shall be based on the Washington State Plane Coordinate System, North American Datum of 1983 with 1991 adjustments (NAD 1983/1991).

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 GENERAL

A. The Contractor shall provide survey control and field surveying services during construction as specified herein to control the Work and document compliance with the Contract Documents.

3.02 SURVEY WORK PLAN

A. The Contractor shall prepare a Survey Work Plan that clearly describes surveying procedures, methods, and equipment to be employed for the Contractor's surveys. The Plan shall include methods to include redundancy in system equipment and work methods as well as laser instrument position locations and range-azimuth instrument control points. The work plan shall also identify the survey documentation to be furnished to Ecology or Ecology's Representative, and a submittal schedule. The Survey Work Plan shall be submitted as part of the Construction Quality Assurance Plan (see **SECTION 01 45 00 – CONTRACTOR QUALITY CONTROL –** and **SECTION 01 33 00 – SUBMITTAL PROCEDURES – Subparagraph 1.04 A1**) to Ecology for approval within the 2-week period following Notice to Proceed. Ecology will require a maximum of 2 weeks to review the submittal.

3.03 SURVEY CONTROL

A. The Contractor shall establish an accurate method of survey control before the Work begins. The proposed method and maintenance of the survey control system shall be described in the Survey Work Plan, and shall be subject to approval of Ecology or Ecology's Representative. If, at any time, the method fails to provide accurate information regarding the Contractor's operations, the Contractor may be required to suspend operations at no cost to Ecology or Ecology's Representative.

3.04 SURVEY SCHEDULE:

A. The Contractor shall perform surveys as specified below during this Contract. These surveys shall verify that the Work conforms to the Contract Documents.

1. Pre-Construction Survey: A survey of the existing site conditions shall be completed prior to the start of construction. Baseline control for the pre-construction survey shall be as specified herein. Construction shall not commence until pre-construction survey documentation has been submitted to and approved by Ecology or Ecology's Representative.

2. Progress Surveys: Topographic surveys shall be performed as required to control the Work, verify compliance with the Contract Documents, and to accompany Contractor payment requests. Interim surveys for progress payment requests will may be deemed invalid for any use other than progress payments, unless approved by Ecology or Ecology's Representative at the time of submission. At a minimum, progress surveys shall be completed, and survey

documentation submitted to Ecology or Ecology's Representative, for each stage of the Work described in the following paragraphs.

3. Final Acceptance Survey: Final surveys shall be performed to confirm that the Work conforms to the lines and grades shown on the Plans. Baseline control for the final acceptance survey shall be consistent with the pre-construction and progress surveys. The post-fill surveys will be used to determine compliance with the Contract Documents. Therefore, any errors in the interim progress surveys may require the Contractor to adjust areas out of compliance. At a minimum, surveys shall be completed, and survey documentation submitted to Ecology or Ecology's Representative, at the following stages of the work:

   a. Prior to construction to confirm baseline conditions.

   b. After completion of excavation, but prior to backfilling. This survey shall be used to confirm that specified excavation depths have been achieved to the satisfaction of Ecology or Ecology's Representative.

   c. After completion of backfilling. This survey shall be used to confirm that specified grades have been achieved.

3.05 SURVEY DOCUMENTATION

A. The following documentation shall be prepared and submitted to Ecology for each survey required herein:

1. General: The Contractor shall be responsible to coordinate the communication of progress survey data in order to minimize delay between excavation and backfill. Ecology or Ecology's Representative may take up to 24 hours, once provided with the necessary progress survey data, to determine compliance with the specifications.

   a. Field notes, drawings, quantity computations, and data point files shall be submitted to Ecology within 5 calendar days after completion of each survey specified herein. Survey documentation shall be submitted in accordance with **SECTION 01 33 00 – SUBMITTAL PROCEDURES.**

   b. Final survey documentation shall be submitted to Ecology at least 1 week prior to the pre-final inspection as specified in this section.

2. Field Notes: A bound copy of all field notes taken during the survey(s) shall be included in the documentation submitted for each survey.

3. Electronic Storage of Data: All survey data collected by an electronic data acquisition system shall be submitted as an electronic file on a compact disk in AutoCAD Release 2013 software format. At a minimum, data for each survey point shall include a sequential reference number, description, the elevation, description text, and appropriate coordinates. Survey data submitted shall include point files in PNEZD format, XML file, and a survey map (AutoCAD Release 2013).

4. Cross-Section Drawings: Drawings of each cross section, including one transparency that has been signed and sealed by the independent Surveyor, shall be included in the documentation for each survey.

5. Contour Maps: For all surveys using complete coverage techniques, the Contractor shall submit a contour map with 1-foot intervals of the area surveyed. The Contractor's firm name shall be printed on each sheet along with Contract name, number, and date of survey. The Contractor’s project manager or chief of survey party shall sign each sheet.

6. Quantity Calculations: For interim surveys, quantities shall be computed to the nearest cubic yard using the average-end-area method based on the lines surveyed and the section indicated on the Contract Plans. Tabular summaries shall be submitted to show all quantities. One copy of quantity calculations shall be included with the related survey documentation.

7. Certification of Compliance: A certificate signed and sealed by the Surveyor, certifying that the work as constructed conforms to the lines and grades shown on the Plans, shall be submitted with other documentation for the final acceptance survey.

3.06 PROJECT AS-BUILT DRAWINGS

A. Project As-Built Drawings shall be compiled by the Contractor and submitted to Ecology or Ecology’s Representative for translation to the Record Drawings on a monthly basis.

B. The Project As-Built Drawings will be submitted on paper full-sized (ANSI D) copy and PDF format.

C. Drawings shall be kept current and shall be done at the time the material and equipment is installed. Annotations to the record documents shall be made with an erasable colored pencil conforming to the following color code:

1. Additions – Red

2. Deletions – Green
3. Comments – Blue
4. Dimensions – Graphite

D. Project As-Built Drawings must be complete and accepted by Ecology or Ecology's Representative before Final Completion is issued.

E. As-Built Drawings shall be in accordance with horizontal and vertical control as shown on the Drawings.

END OF SECTION

PART 1 – GENERAL

1.01 MTCA REGULATED WASTE AND DEBRIS DISPOSAL

A. Refer to **SECTION 02 61 13 – EXCAVATION AND HANDLING OF CONTAMINATED SOIL.**

1.02 NON MTCA REGULATED DEBRIS DISPOSAL

A. No disposal site has been provided by the state for any debris or waste generated by or resulting from the specified Work.

B. All waste and debris removed from the worksite and not specified for reuse becomes the responsibility of the Contractor to be disposed of off the project property in areas authorized by the applicable local, county, and/or state agencies and in accordance with current rules and regulations governing the disposal of solid waste. All disposal fees and sundry charges are paid by the Contractor and are incidental to the contract. Excavated soil shall not be disposed of under this provision.

C. Burning shall not be permitted on this Project.

1.03 RELATED SECTIONS

A. **SECTION 01 35 43.10 – GREEN CONSTRUCTION PRACTICES**

1.04 DESCRIPTION OF WORK

A. Contractor shall conduct cleaning and waste disposal operations in full compliance with local laws and ordinances, and with federal and local environmental and anti-pollution regulations.

1. Comply with governing regulations and safety standards for cleaning operations.
2. Remove waste materials from the Project Site and dispose of in a lawful manner.
3. Where extra materials of value remain after completion of associated construction, dispose of these materials as directed by Ecology.
4. Cleaning activities shall include hauling routes and other areas located outside the Project Site that are used as part of the Work.

B. The Contractor shall not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in combined sewer drains.

1.05 SUBMITTALS

A. Submit material safety data sheets and maintain a MSDS file at the Project Site during the Work.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 CLEANING AND PROTECTION DURING CONSTRUCTION

A. During handling and installation, Contractor shall clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration before Substantial Completion.

B. Use cleaning materials and agents recommended by the manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property, or that might damage finished surfaces. Submit material safety data sheets and maintain a MSDS file at the Project Site during the Work.

C. Contractor shall clean and maintain completed Work as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

D. Contractor shall supervise construction activities to ensure that no part of the Work, completed or in progress, shall be subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include but are not limited to the following:

1. Excessive static or dynamic loading
2. Excessively high or low temperatures
3. Thermal shock
4. Excessive high or low humidity
5. Water or ice
6. Solvents
7. Chemicals
8. Asphalt roofing tar
9. Puncture
10. Abrasion

11. Heavy traffic
12. Soiling, staining, and corrosion
13. Rodent and insect infestation
14. Combustion
15. Electrical current
16. Unusual wear or other misuse
17. Misalignment
18. Contact between incompatible materials
19. Excessive weathering
20. Unprotected storage
21. Improper shipping or handling
22. Theft
23. Vandalism
24. Overspray from painting and fireproofing

3.02 COLLECTION AND DISPOSAL OF WASTE

A. Collect waste from construction areas and vicinity of the Project Site daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than seven (7) days during normal weather or three (3) days when the temperature is expected to rise above 80 degrees F (27 degrees C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material in a lawful manner.

B. All dumpsters are to be maintained within Work areas and shall not be open or accessible to the public or be located in a public right of way.

3.03 FINAL CLEANING

A. Before Final Completion, final cleaning of the Project Site shall be performed by the Contractor. Contractor shall leave the Project Site, including all properties in the Project Site, all adjacent properties, and all adjacent City rights of way in a clean, neat, and orderly condition satisfactory to Ecology.

1. Employ experienced workers or professional cleaners for final cleaning.

2. Clean the Project Site, yard, and grounds in areas disturbed by construction activities, including landscape development areas, of rubbish, waste materials, litter, and foreign substances. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
3. Remove tools, construction equipment, machinery, and surplus material from the Project Site.
4. Touch up and otherwise repair and restore marred exposed finishes and surfaces resulting from the Work. Replace finishes and surfaces that cannot be satisfactorily repaired or restored, or that show evidence of repair or restoration.
5. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances.
6. Clean exterior building walls, walkways, and overhangs.
7. Timing: Schedule final cleaning as approved by Ecology or Ecology's Representative to enable Ecology or the Property Owner to occupy the property after the project.

B. If Contractor fails to clean up the Project Site to the satisfaction of Ecology, after reasonable notice is provided by Ecology, Ecology may have the site cleaned at the Contractor's expense.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION

A. Contractor shall refer to **SECTION 00 72 00 – GENERAL CONDITIONS** for the definition, guidance, and requirements for Substantial Completion, Final Completion, and Final Acceptance.

B. These requirements include, but are not limited to, Contractor's notification requirements to Ecology, specified inspections, and submittal of Project Record documents and Final Cleanup.

1.02 SUBSTANTIAL COMPLETION

A. For this project, Substantial Completion is achieved when the major items of the Work are completed and only minimal landscaping work remains to be completed. At substantial completion, 90 percent of the value of the Work is completed, as verified by Ecology.

B. Substantial Completion inspections shall be called when the following conditions are met:

1. All remediation of contaminated soil work is complete.
2. Site grades are restored to pre-construction elevations.
3. Hardscape work (concrete, gravel surfacing, and asphalt) is completed.
4. Surface paint striping is completed.
5. Project site is generally safe for public use.

1.03 SUBSTANTIAL COMPLETION INSPECTION

A. Contractor shall give Ecology a minimum of seven (7) days' notice to schedule a Substantial Completion inspection.

B. Before requesting inspection for Substantial Completion by Ecology, the Contractor shall complete the following activities.

C. Unless required for continuing maintenance and finishing work on the property and/or permitted work as specified in this section, Contractor shall discontinue use and remove temporary facilities and utilities from the Project Site. Contractor shall also remove all construction tools, mock-ups, and similar elements.

D. Unless required for continuing maintenance and finishing work on the property and/or permitted work as specified in this section, Contractor shall remove all temporary protection and facilities installed for protection of the Work and vegetation, buildings, structures, and other site features and improvements that were protected during the Work.

E. On receipt of a request for an inspection for Substantial Completion by Ecology, Ecology shall proceed with the inspection with the Contractor. This inspection shall include the development of a punch list of items that either require the Contractor's attention and correction in order to achieve Substantial Completion, or to identify work remaining to be accomplished in order for the Contractor to achieve Final Completion of the Project.

F. If the Project is not deemed Substantially Complete, Ecology shall conduct a repeat inspection when requested by the Contractor, provided that the Contractor assures Ecology that the Work is Substantially Completed.

G. Ecology shall issue a written notice of Substantial Completion following this inspection or shall advise Contractor of Work that must be corrected or completed before the notice will be issued.

H. Results of the completed Substantial Completion inspection shall form the basis of identifying any outstanding requirements for achieving Final Completion.

1.04 PROJECT RECORD REVIEW

A. As part of the inspection for Substantial Completion, Contractor shall provide Ecology a draft of the Project Record file for review, including the record of as-built construction, warranties, approved permits, material and equipment submittals, in a binder that includes a table of contents and contents easily identifiable by the use of dividers.

B. The Contractor shall incorporate any comments received from Ecology into the final Record Document file and deliver to Ecology prior to Final Completion.

1.05 FINAL COMPLETION INSPECTION

A. Upon completion of all punch list items identified during the Substantial Completion inspection and the completion of all remaining Work items identified by Ecology, Contractor and Ecology shall perform an inspection to verify that Contract requirements, including corrective actions on punch list items, have been completed.

B. Contractor shall provide Ecology a minimum of seven (7) days' notice to schedule a Final Completion inspection.

C. On verification that all project work has been completed, including final cleanup, and upon receipt of the completed Project Record file, Ecology shall issue a Notice of Final Completion to the Contractor.

1.06 FINAL ACCEPTANCE

A. Ecology shall issue the Notice of Final Acceptance when all Contract-related documents have been presented to Ecology, including reconciliation of any outstanding Change Orders, written notification by the Contractor identifying any and all claims or disputes associated with the Project, and the submission of the final invoice for payment from the Contractor.

1.07 WARRANTY INSPECTION

A. An inspection visit of the Work shall be performed by Contractor and Ecology at approximately 4 weeks prior to the end of the 12-month warranty period that begins at Substantial Completion.

B. Contractor is responsible for scheduling this inspection with reasonable notice to Ecology.

C. During this inspection visit, Contractor and Ecology shall view the condition of Work since Substantial Completion, verify whether the Work still meets the requirements and specifications of the Contract Documents, and identify deficiencies in the Work that do not conform to the Contract Documents.

D. Work under warranty that does not meet the requirements and specifications of the Contract Documents shall be considered Remedy Work and scheduled for repair or replacement, as appropriate.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 REMEDY WORK

A. After the warranty inspection, the Contractor will schedule with Ecology any required remedy work. All Remedy Work shall be performed and completed no later than thirty (30) calendar days after the inspection visit, unless otherwise directed by Ecology.

B. Work to be remedied shall be replaced or rebuilt to an acceptable condition complying with the requirements of the Contract Documents. The Contractor is responsible for all costs associated with the Remedy Work.

C. In the event of equipment failure, during such time or in such a location that immediate repairs are mandatory, the Contractor shall respond promptly. If the Contractor is not available, Ecology will effect repairs. The Contractor shall reimburse Ecology for parts and labor necessary to correct deficiencies as defined within the warranty clause and time.

3.02 RECORD DOCUMENTS

A. Record Documents shall be in accordance with **SECTION 00 72 00 – GENERAL CONDITIONS**, **Part 4.02**; **SECTION 01 71 23 – FIELD ENGINEERING**; **SECTION 01 33 00 – SUBMITTAL PROCEDURES**, and other portions of the Contract Documents.

B. Final Survey Documentation: See **SECTION 01 71 23 – FIELD ENGINEERING** for Final Survey requirements. The Final Survey shall be completed and submitted to Ecology or Ecology's Representative within 30 days of Substantial Completion. Final Survey must be complete and accepted by Ecology before Final Completion is issued.

C. Documents shall be submitted by the Contractor to Ecology prior to Final Completion**.**

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. This section describes the Contractor's archeological monitoring requirements, duties, and responsibilities during execution of the Work.

B. Archaeological monitoring shall be performed during any excavation or other earthwork activities to address any unanticipated discoveries of archaeological resources or human remains, in compliance with applicable laws and regulations, particularly 36 CFR Part 800 "Protection of Historic Properties," which implements Section 106 of the National Historic Preservation Act of 1966, as amended, and Title 27 RCW, Chapter 27.44 "Indian Graves and Records," and Chapter 27.53 "Archaeological Sites and Resources."

1.02 REFERENCES AND STANDARDS

A. Archaeological Monitoring Plan for the Jacobson Terminals Interim Remedial Action dated [DATE].

1.03 SUBMITTALS AND NOTIFICATIONS

A. The Contractor shall provide the submittals and notifications required by the Archaeological Monitoring Plan for the Jacobson Terminals Interim Remedial Action dated [DATE].

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 ARCHAEOLOGICAL MONITORING

A. Archaeological monitoring must be directed by an approved archaeologist. The archaeologist is to train the Contractor's Project Environmental Inspector and Construction Supervisor(s) about identification of and the appropriate procedures to follow in the event of encountering archaeological deposits or human remains. The training will be completed before any ground-disturbing activity commences. In each Construction Progress Meeting during ground-disturbing activities, the Environmental Inspector or Construction Supervisor will emphasize the need for vigilance regarding the unanticipated discovery of archaeological deposits and human remains, and the procedures for treating such discoveries. Refer to the Archaeological Monitoring Plan for the Jacobson Terminals Interim Remedial Action dated [DATE], for further procedural details and requirements.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. Prior to commencing excavation or disturbing the Project Site, Contractor shall perform all necessary existing conditions assessments as to facilitate and permit the Contractor to return and restore the Project Site to match or exceed its original condition as specified in the Project Manual.

B. Existing conditions assessments shall include but are not limited to topographical surveying of existing surface grades and elevations to the degree and accuracy necessary to restore the Project Site to its previous grade and topography and as specified in **SECTION 01 71 23 – FIELD ENGINEERING**.

C. Existing conditions assessments shall include the location of underground utilities within the Project Site. Underground utilities that exist in the planned excavation area will require temporary rerouting/bypassing to facilitate complete removal of soil from the planned excavation, and will be restored to pre-construction condition following completion of excavation and backfilling work, as specified in **DIVISION 33 – UTILITIES**. Contractor will coordinate with all utility companies regarding utility location, temporary rerouting/bypassing, and subsequent restoration.

D. Contractor shall provide photographs or videotape, sufficiently detailed, depicting existing conditions of any adjoining buildings, structures, construction, or site improvements that have alterations or marring that might be misconstrued as damage caused by selective demolition operations.

E. All areas found to be damaged, if not identified in Contractor's documentation, shall be repaired and/or replaced at the expense of the Contractor.

F. Contractor shall verify with Ecology the limits of site improvement and development prior to commencing the Work. Prior to beginning the Work, Contractor shall meet with a field representative of Ecology and review all proposed utility layouts on site. Contractor shall indicate all existing site features and improvements that will be affected by construction.

1.02 RELATED SECTIONS

A. **SECTION 01 71 23 – FIELD ENGINEERING**

B. **SECTION 33 00 00 – EXISTING UNDERGROUND UTILITIES**

C. **SECTION 33 70 00 – OVERHEAD ELECTRICAL UTILITIES**

1.03 SUBMITTALS

A. Contractor shall include an existing conditions assessment schedule with the Preliminary Progress Schedule submittal.

1. Existing conditions assessments for all areas of work in the Project Site shall be completed before selective demolition or earthwork is begun on any area of work in the Project Site, unless otherwise directed by Ecology in writing.

B. Within fifteen (15) business days after the date of the Notice to Proceed and before proceeding with Contractor's existing conditions assessment, Contractor shall submit to Ecology a plan (Site Restoration Quality Control Plan) for maintaining quality control for the surface restoration of the Project Site and for conforming with all specifications in this Project Manual.

1. This plan shall incorporate but not be limited to the following elements:

a. Description of methods for comprehensive documentation of existing conditions.

b. Description of methods for surveying all required elevation benchmarks, references, and control points as specified in **SECTION 01 71 23 – FIELD ENGINEERING**. This shall include establishment of initial points, frequency of verification of elevation control during the Work, final confirmation and documentation at each significant stage of Work, and removal as necessary of marks on existing site features and buildings.

c. Identification of sources for replacement materials for where Contractor removes pre-construction materials of site features during the Work.

d. Plans for removing, handling, cleaning, storing, and reinstalling site feature materials specified to be removed and reinstalled. This shall include procedures for making requests of Ecology to use new materials as replacements in and for site features specified to be removed and reinstalled during the Work.

e. Plan for the temporary rerouting/bypassing of underground utilities affected by the Work and the subsequent restoration of the rerouted/bypassed underground utilities to full working condition, as specified in **DIVISION 33 – UTILITIES**.

f. Determination of location and orientation of original site features to be restored, including all utilities as specified in **DIVISION 33 – UTILITIES**.

g. Communication and coordination of all existing site assessment materials, data, and restoration information with field personnel crews and Subcontractors.

h. Procedures for identification and protection of buildings and site features specified to remain in place during the Work.

i. Communication of questions to Ecology relating to site restoration. Sufficient time shall be included in this for Ecology communications with Property Owner.

j. Contractor's verification of accuracy of site restoration.

k. All other quality control procedures determined by the Contractor to be necessary to meet the specifications in this Project Manual.

C. Contractor shall provide existing conditions assessment information prior to the start of work and during the contract time for all areas where the Work has been performed or is in the process of being performed, as requested by Ecology. Contractor shall include all existing feature inventories with the Project Record for submission to Ecology before Final Acceptance.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 UTILITY LOCATION

A. Contractor shall locate all existing utilities so as to avoid damage or disturbance and to confirm locations of utilities within Project Site to be rerouted/bypassed, as specified in **DIVISION 33 – UTILITIES**.

3.02 COORDINATION WITH UTILITY COMPANIES

A. The Contractor shall coordinate with utility companies regarding requirements and procedures for temporary rerouting/bypassing of existing underground utilities, execution of the rerouting/bypassing work, and subsequent restoration of rerouted/bypassed underground utilities, as specified in **DIVISION 33 – UTILITIES**.

3.03 UNFORESEEN PHYSICAL CONDITIONS

A. If Contractor encounters conditions at the Project Site that are subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Project Manual, or unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Project Manual, then Contractor shall immediately notify Ecology and give written notice to Ecology no later than five (5) calendar days after the first observance of the conditions, before conditions are disturbed.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. Select site features and improvements in the Project Site will need to be demolished by Contractor. Demolished site features are either to be restored to their original location, configuration, and alignment after completion of earthwork or are to be removed from the Project Site for proper disposal.

B. The work includes but is not limited to the requirements for the removal, wholly or in part, and satisfactory disposal of asphalt pavements, concrete slabs, underground utilities, groundwater monitoring wells, injection points, miscellaneous site debris, and other obstructions that are designated to be demolished on the Drawings or within these specifications.

1.02 RELATED SECTIONS

A. **SECTION 01 35 43.10 – GREEN CONSTRUCTION PRACTICES**

B. **SECTION 01 57 13 – TEMPORARY EROSION AND SEDIMENTATION CONTROL**

C. **SECTION 02 61 13 – EXCAVATION AND HANDLING OF CONTAMINATED SOIL**

1.03 DEFINITIONS

A. Remove: Remove and legally dispose of these items off site except those indicated to be Reinstalled, Salvaged, Remain in Place, or to otherwise remain the property of Ecology or Property Owner.

B. Remove and Reinstall: Unless identified in one of the other categories by the Project Manual or by Ecology, Contractor shall assume that all movable items and site features in the Project Site shall be Remove and Reinstall. Contractor shall carefully remove items; clean, service, and otherwise prepare them for reuse; store and protect them against damage; and reinstall items in the same locations and configurations as their pre-excavation condition or in the locations indicated.

C. Remain in Place (also Existing to Remain): Protect in place and leave undisturbed items designated Remain in Place during construction against damage and soiling, including during selective demolition and earthwork activities.

1. If authorized by Ecology in writing, items to Remain in Place may be moved or removed by Contractor to a suitable, protected storage location during selective demolition and then cleaned and reinstalled in their original locations and configurations.

a. This shall be done at no additional cost to Ecology and with Contractor assuming all risks associated with loss or damage.

2. All buildings and other large, permanent structures/features shall be considered Remain in Place by Contractor, unless otherwise indicated in the Project Manual.

D. Remove and Replace in Kind: Definition applies only to underground utilities and other features noted on the Drawings to remove and replace at the Project Site. Contractor shall remove existing underground utilities within the excavation area prior to commencing excavation activities. During fill placement, Contractor shall install utilities per **DIVISION 33 – UTILITIES**.

1.04 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain the property of Ecology or Property Owner, demolished materials shall become the Contractor's property and shall be removed from the site. Disposal shall be at the Contractor's option (provided that disposal is legal) unless otherwise specified herein.

1. Contractor shall dispose of all decommissioned groundwater monitoring well and injection point materials as specified in Article 3.04 of this section.

B. Contractor shall promptly dispose of demolished materials, unless otherwise indicated. Contractor shall obtain all permits for transport and disposal of demolition debris and materials as required.

1. Comply with hauling and disposal regulations of authorities having jurisdiction.

2. Do not allow demolished materials to accumulate at the Project Site.

1.05 SUBMITTALS

A. If requested by Ecology, Contractor shall submit a schedule of selective demolition activities compatible with the Construction Progress Schedule indicating the following:

1. Detailed sequence of selective demolition and removal work at the Project Site, with starting and ending dates for each activity.

2. Interruption of utility services.

3. Coordination for shutoff, capping, and continuation of utility services.

4. Detailed sequence of selective demolition and removal work to ensure uninterrupted progress of Contractor's on-site operations.

B. Where appropriate, Contractor shall submit landfill records indicating receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 PREPARATION PROCEDURES

A. Verify that utilities have been disconnected and capped.

B. Survey and assess existing conditions and correlate with requirements indicated to determine extents of selective demolition, removal, disposal, cleaning, and/or storage required.

C. Verify the inventory, locations, and configurations, and record the conditions of items to be removed and reinstalled and items to be removed and salvaged.

D. If unanticipated mechanical, electrical, or structural elements that conflict with the intended function or design are encountered, then investigate and measure the nature and extent of the conflict. Promptly submit a written report to Ecology.

E. Survey the condition of buildings and other structures at the Project Site to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during selective demolition.

F. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.02 UTILITY SERVICES

A. Maintain existing private utilities indicated to remain in service and protect them against damage during selective demolition and excavation operations. Maintain existing public utilities in service during the Work, unless otherwise authorized by Ecology.

B. Do not interrupt existing public utilities serving occupied or operating buildings and facilities, except when authorized in writing by Ecology and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Ecology and to governing authorities.

C. Locate, identify, disconnect, and seal or cap off indicated utilities serving areas to be selectively demolished or excavated, if appropriate.

1. Arrange to shut off indicated utilities with utility companies.
2. Where utility services are required to be removed, relocated, or abandoned, provide bypass connections to maintain continuity of service to other parts of buildings or other facilities before proceeding with selective demolition and excavation.

3.03 SELECTIVE DEMOLITION GENERAL PROCEDURES

A. Conduct demolition operations and remove debris and materials to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used buildings and facilities.

B. Do not close or obstruct streets, driveways, walks, parking lot areas, or other adjacent occupied or used facilities, except as specified on the Drawings, without permission from Ecology and authorities having jurisdiction.

1. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

C. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities that are to remain in place. Ensure safe passage of people around selective demolition area.

1. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways where required by authorities having jurisdiction.
2. Protect existing site improvements, appurtenances, and landscaping to remain in place.
3. Provide temporary weather protection on exterior surfaces and new construction to ensure that no water leakage or damage occurs to structures or interior areas.

D. Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of buildings or other structures during the Work.

1. Strengthen or add new supports when required during the Work, including but not limited to during the period of selective demolition and excavation.

E. Demolish and remove existing construction only to the extent required for the Work as indicated in the Project Manual. Use methods required to complete Work within limitations of governing regulations and as follows:

1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain in place or adjoining construction. To minimize disturbance of adjacent surfaces, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings until permanent fixtures are in place.
2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire suppression devices during flame-cutting operations.
4. Maintain adequate ventilation when using cutting torches.
5. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly, but legally, dispose of off site.
6. Dispose of demolished items and materials promptly. On-site sale of removed items is prohibited.

F. Demolish concrete and masonry in small sections. At junctures with construction, structures, or site developments that are to remain in place, cut concrete and masonry using power-driven masonry saw or hand tools; do not use power-driven impact tools.

G. Upon completion of earthwork and the restoration of the Project Site, return all elements of site improvements, features, and construction surfaces identified to remain or be restored to condition existing before start of selective demolition operations.

3.04 GROUNDWATER MONITORING WELL AND INJECTION POINT DECOMMISSIONING AND REMOVAL

A. The Contractor shall provide all labor, materials, and equipment for the complete and satisfactory decommissioning of groundwater monitoring wells and injection points identified on the Drawings. Groundwater monitoring well and injection point installation logs are presented in Appendix A of the Project Manual. The Contractor shall complete all work relating to well decommissioning in accordance with regulations under Chapter 176-160 WAC (Minimum Standards for Construction and Maintenance of Wells).

B. Contractor requirements for decommissioning of wells include but are not limited to the following:

1. Notifying the Washington State Department of Ecology of the intent to decommission wells at least 72 hours before starting the work. The Contractor shall follow notification procedures listed in WAC 173-160-151 and -420. The Contractor is responsible for applicable well decommissioning fees at the time of notification.
2. Submitting a well decommissioning report to the Washington State Department of Ecology within 30 days after equipment for decommissioning has left the site. The Contractor shall follow reporting and related documentation procedures listed in WAC 173-160-141 and -420.
3. Obtaining a Washington State licensed well construction operator to perform well decommissioning activities.
4. Decommissioning wells in accordance with standards and procedures listed in WAC 173-160-381 and -420 and -460.
5. Use of well sealants and procedures listed in WAC 173-160-221 and -450.
6. Providing copies of all notifications, decommissioning reports, and other correspondence with the Washington State Department of Ecology concurrently to Ecology's Representative.
7. Performing decommissioning activities prior to any other work that would impair the integrity or proper function of the wells.
8. The Contractor is advised that the bottoms of the existing site monitoring wells and injection points may be either above or below the final excavation grade. Remove decommissioned wells during excavation as follows:
    a. If the bottom of a well installation is below final grade of the excavation, the Contractor shall cut the well casing or screen at the final grade elevation after decommissioning, and not remove or otherwise disturb the remaining well length below the final elevation grade.
    b. If the bottom of a well installation is above final grade of the excavation, the Contractor shall remove the decommissioned well during the excavation process. Alternatively, the Contractor may propose and apply for a variance in lieu of sealing the wells during decommissioning. The Contractor shall submit variance applications to the Washington State Department of Ecology in accordance with WAC 173-160-106 and -406.
9. All removed decommissioned well materials shall be loaded and disposed of off site with excavated contaminated soil, as specified

in **SECTION 02 61 13 – EXCAVATION AND HANDLING OF CONTAMINATED SOIL**.

3.05 POLLUTION CONTROL

A. Contractor shall provide services for effective air, noise, and water pollution controls as required by local authorities having jurisdiction and in accordance with **SECTION 01 57 13 – TEMPORARY EROSION AND SEDIMENTATION CONTROL –** and **SECTION 02 61 13 – EXCAVATION AND HANDLING OF CONTAMINATED SOIL**.

B. Use water mist, temporary enclosures, and other suitable methods to limit the spread of dust and soil.

1. Comply with governing environmental protection regulations.
2. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, or pollution.

C. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

D. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition and excavation operations.

1. Return adjacent areas to condition existing before start of selective demolition as soon as practicable.

3.06 REPAIR OF DAMAGE FROM SELECTIVE DEMOLITION

A. Contractor shall remove, replace, patch, and repair existing materials and surfaces cut, marred, or damaged during selective demolition. Such materials and surface shall be repaired or restored to their condition prior to the damage. This repair or restoration work shall be done at no additional cost to Ecology, and by methods and with materials so as not to void existing warranties.

1. Repair materials shall be identical to existing materials unless otherwise authorized by Ecology.
2. Where identical materials are unavailable or cannot be used for exposed surfaces, and with Ecology approval, use materials that visually match existing adjacent surfaces to the fullest extent possible.
3. Use materials that will perform equally well or better than existing materials.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. Work includes providing all materials, equipment, and labor necessary to excavate, handle, transport, and dispose of contaminated soil from the planned excavation area. Excavated soil shall be managed in accordance with the requirements of the state dangerous waste regulations (Chapter 173-303 WAC) and the federal TSCA regulations (40 CFR Part 761). Excavated soil will require disposal at a RCRA Subtitle C landfill and/or incineration in an EPA-approved incinerator if free PCB product or sludge is present in the soil.

1.02 SUMMARY OF CONTAMINATION

A. The soil to be removed from the Project Site is contaminated with elevated levels of polychlorinated biphenyls (PCBs). Additional soil contaminants of concern include tri-, di-, and mono-chlorobenzene; chlorinated solvents (tetrachloroethene [PCE], trichloroethene [TCE], cis-1,2-dichloroethene [cis-DCE], and vinyl chloride); and scattered metal (arsenic, cadmium, and lead) occurrences.

B. A historical release of transformer oil containing PCBs and trichlorobenzene on the northern portion of the Jacobson Terminals property created a plume of PCBs and several chlorinated benzene compounds in groundwater. Elevated concentrations of PCBs and chlorinated benzenes above applicable cleanup levels were identified in soil samples up to 30 feet below ground surface downgradient of where the presumed transformer oil release occurred.

C. Excavation depths specified in the Project Manual were developed based on sampling performed previously by Ecology. The specified depths represent the depths of existing soil to be removed in order to remediate the Project Site as defined in this Project Manual.

D. Total PCB concentrations demonstrated substantial variation. The concentrations in samples tested for this Project ranged from 0.0021 to 30,000 milligrams per kilogram (mg/kg). The average total PCB concentration in soil tested for this Project is approximately 345 mg/kg.

E. Soil chemical laboratory results for the Project Site will be made available to the Contractor after Notice to Proceed.

F. Contractor shall promptly contact Ecology if evidence of additional contamination is encountered during the Work.

1.03 RELATED SECTIONS

A. **SECTION 01 35 43 – ENVIRONMENTAL PROCEDURES**

B. **SECTION 01 35 43.10 – GREEN CONSTRUCTION PRACTICES**

C. **SECTION 31 23 16 – EXCAVATION**

1.04 REFERENCES AND STANDARDS

A. Washington State Dangerous Waste Regulations (Chapter 173-303 WAC).

B. TSCA regulations (40 CFR Part 761).

C. Department of Transportation (DOT) Hazardous Materials Regulations (49 CFR Parts 171 through 180).

1.05 SUBMITTALS

A. Before commencing excavation activities for the Work, Contractor shall submit to Ecology the name of one (1) or more disposal facilities appropriate and legal for receiving and disposing of the contaminated soil exported as part of the Work.

1. Ecology must approve of all disposal facilities used by Contractor in advance of use by the Contractor.

2. Disposal facilities identified by the Contractor shall be capable of receiving contaminated soil from the Project Site at the rate it is generated by the Work. No adjustments to Contract Time or Contract Sum will be considered by Ecology based on delays caused by limits to received volumes by disposal facilities.

3. Contractor will compile testing data, including data from existing environmental reports for soil to be disposed off site (refer to IAWP documents identified in Appendices for necessary data), and forward to the appropriate agents for off-site disposal facilities as needed to obtain disposal acceptance, as specified in **SECTION 01 35 43 – ENVIRONMENTAL PROCEDURES**. Contractor shall provide documentation to Ecology or Ecology's Representative regarding disposal acceptance and any related conditions.

4. The Property Owner will authorize Dangerous Waste manifests and related Dangerous Waste documentation as the generator.

B. After commencing excavation, the Contractor may submit substitutions or additional options for disposal facilities.

1. The Contractor will obtain Ecology's written consent before making any substitutions or additions.

2. No adjustments to Contract Sum or Time will be permitted by Ecology for substitutions or additional options for disposal facilities.

C. A Project and Work Site-Specific Health and Safety Plan shall be submitted to Ecology for review and approval, as specified in **SECTION 01 35 29 – HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES –** of the Project Manual.

D. Disposal facility weigh tickets will be used to verify the quantities associated with the transportation of contaminated soil and disposal of contaminated soil pay items.

1.06 QUALIFICATIONS

A. Personnel engaged in hazardous materials work shall be Hazmat, OSHA, and WISHA trained and certified. Conduct earthwork associated with known or potentially contaminated materials in accordance with Contractor's Site-Specific Health and Safety Plan prepared in accordance with **SECTION 01 35 29 – HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES**.

B. Transport of known or potentially contaminated materials shall be performed by properly licensed, insured, and registered waste haulers that are acceptable to Ecology and in accordance with applicable local, state, and federal regulations for transportation. Transportation contractor(s) shall submit documentation that demonstrates it is properly licensed and in compliance with applicable DOT regulations, as well as a copy of its contingency and spill control plans describing measures to be implemented in the event of spills or discharges during material handling and transporting.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 EXCAVATION PROCEDURES AND REQUIREMENTS

A. General specifications and requirements for excavation at the Project Site are provided in **SECTION 31 23 16 – EXCAVATION**. This section provides additional procedures and requirements specific to the excavation and handling of contaminated soil.

B. Contractor shall conform to all applicable requirements for excavation and soil handling in Chapter 296-848 WAC and **SECTION 01 35 29 – HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES –** of the Project Manual.

C. Pursuant to Chapter 296-848 WAC, Contractor shall perform all excavation and contaminated soil handling and transportation so as to minimize physical and chemical hazards to Contractor personnel, representatives of Ecology, Property Owner(s), and the public. This shall include but not be limited to:

1. Contractor shall perform the Work to prevent the airborne dust health risk to Contractor personnel, representatives of Ecology, Property Owner(s), and the public. This shall include all air monitoring necessary to demonstrate to Ecology that the health risk has been completely controlled and prevented.
2. Contractor shall not permit airborne dust to rise to a level where respirators are required by Contractor personnel, representatives of Ecology, Property Owner(s), or the public.
3. Contractor shall provide all appropriate health and safety training to Contractor personnel regarding the presence of soil contamination, including procedures for decontaminating both themselves and their clothing and equipment during and after the Work.
4. The Contractor's Site-Specific Health and Safety Plan shall include reference to the presence of contamination in the soil in the Project Site as described in this Project Manual, including procedures for minimizing exposure and first aid methods.

D. Contractor shall maintain a clean Project Site and areas surrounding the Project Site in accordance with **SECTION 01 50 00 – TEMPORARY FACILITIES AND CONTROLS –** Article 3.05. Erosion and sedimentation control measures shall be implemented by the Contractor in accordance with **SECTION 01 57 13 – TEMPORARY EROSION AND SEDIMENTATION CONTROL** and the SWPPP.

E. Until removed from the Project Site for safe and legal disposal, excavated contaminated soil shall be confined to fenced areas of the Work. Fencing shall be secured to prevent public access to exposed contaminated soil.

F. Until removed from the Project Site for safe and legal disposal, stockpiles of contaminated soil shall be contained to prevent cross contamination with clean soil and be covered when the Work is not being performed to prevent erosion.

G. Contractor shall include all costs for excavation, containment, and handling contaminated soil in the Contract Amount. Contract Amount shall also include all costs for containment of contaminated soil, protecting stockpiles, and cleaning activities during loading and transportation of contaminated soil.

3.02 TRANSPORTATION AND DISPOSAL OF CONTAMINATED SOIL

A. Contractor shall transport and dispose of contaminated soil safely and legally, obeying all local, state, and federal laws and regulations having jurisdiction for all phases of this work activity.

B. Contractor is responsible for identifying disposal facility(ies) appropriate for the contaminated soil, which will be, at a minimum, a Subtitle C facility and/or an EPA-approved incineration facility.

C. All costs for transportation and disposal at the receiving disposal facility, including trucking cost, fuel, fees, taxes, etc., shall be included in the Contract Amount.

D. No adjustments to Contract Amount based on changes in costs for transportation and disposal at the receiving disposal facility will be permitted by Ecology during Contract Time.

E. Contractor shall cover all loads prior to transporting off site.

F. Contractor shall maintain weight tickets from the disposal site for all contaminated soil and material disposal.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. Work includes all materials, equipment, and labor necessary to excavate soil to the grades specified in the Drawings. The Work described in this Section shall incorporate and conform to the requirements in **SECTION 02 61 13 – EXCAVATION AND HANDLING OF CONTAMINATED SOIL**.

1.02 RELATED SECTIONS

A. **SECTION 01 35 43.10 – GREEN CONSTRUCTION PRACTICES**

B. **SECTION 01 80 00 – ARCHAEOLOGICAL MONITORING DURING EXCAVATION**

C. **SECTION 02 61 13 – EXCAVATION AND HANDLING OF CONTAMINATED SOIL**

D. **SECTION 33 00 00 – EXISTING UNDERGROUND UTILITIES**

E. **SECTION 33 70 00 – OVERHEAD ELECTRICAL UTILITIES**

1.03 REFERENCES AND STANDARDS

A. Washington State Department of Transportation 2014 Standard Specifications for Road, Bridge, and Municipal Construction (WSDOT Standard Specifications).

B. City of Seattle Standard Specifications for Road, Bridge, and Municipal Construction (most current edition).

1.04 SUBMITTALS

A. Prepare and submit for Ecology or Ecology's Representative approval an Earthwork Plan as a component of the CQAP described in **SECTION 01 33 00 – SUBMITTAL PROCEDURES** that includes details of Contractor's methods and equipment to accomplish the work under this section, including equipment to be used, coordination of loading/scheduling of trucks, sequencing of excavation and backfilling activities, and schedule.

B. Refer to **SECTION 02 61 13 – EXCAVATION AND HANDLING OF CONTAMINATED SOIL** for coordination and recordkeeping associated with transportation and weigh tickets from soil disposal activities.

C. See **SECTION 01 35 43 – ENVIRONMENTAL PROCEDURES** for sampling and laboratory testing to be performed by Ecology or Ecology's Representative during the Work.

1.05 QUANTITY MEASUREMENTS AND ADJUSTMENTS

A. Contractor shall include in its Bids the cost of achieving and documenting all excavated grades during the Work at the Project Site, as specified in **SECTION 01 71 23 – FIELD ENGINEERING**.

B. All excavation to specified depths as indicated in the Project Manual shall be included in the Contractor's Bids.

1. If the Contractor's sequencing of the Work requires stockpiling and double handling of soil and materials, this shall be accomplished within the Bid amount at no additional cost to Ecology.

C. Unit bid price for UB2 (Excavation) in the Contract represents the price that will be used to adjust the contract amount when there is an increase or decrease in the basis of bid quantities in the Total Base Bid for excavation, as defined in **SECTION 00 41 43 – SUMMARY OF PAY ITEMS AND QUANTITIES**.

D. Contractor shall be responsible for all unauthorized excavation of additional soil. The Unit Prices shall not be applied to unauthorized excavation. There will be no adjustment to either the Contract Sum or Contract Time for all such unauthorized Work.

1.06 MATERIAL DELIVERY, STORAGE, AND HANDLING

A. Stockpile materials on site within clearing limits and at locations approved by Ecology. Contractor shall be responsible for protecting the stockpiled material as indicated on the Drawings.

B. Contractor shall prevent unprotected physical contact between contaminated soil and uncontaminated materials, equipment, and surfaces in accordance with **SECTION 02 61 13 – EXCAVATION AND HANDLING OF CONTAMINATED SOIL** and the Drawings. This shall include excavated contaminated soil and clean imported fill materials.

C. Direct surface water away from stockpile site so as to prevent erosion or deterioration of materials.

D. When removing stockpiles, leave area in a clean and neat condition as specified in the Contract Documents.

E. Comply with WSDOT Standard Specifications Section 3-02.2(6). Contractor shall provide survey stakes for stockpiles.

F. Soil integrity will be influenced by the weather conditions and the Contractor's handling and protection of the soil as it is removed and placed. It is the sole responsibility of Contractor to protect soil from the elements. Soil that is deemed unsuitable due to lack of protection will be rejected by Ecology. Contractor will be responsible for removing such soil and replacing with acceptable soil at no additional cost to Ecology.

G. Maintain toe of stockpiled material at least 6 feet from edges of trenches and excavations. Pile so surface water is prevented from flowing into excavations. Provide free access to fire hydrants, water valves, meters, and private driveways, and leave clearance to enable the free flow of storm water into gutters, conduits, and natural water courses.

1.07 DIMENSIONS AND LAYOUTS

A. Contractor will be responsible for furnishing, setting, and marking all line and location stakes, including offsets and general construction staking. When work requiring control is being performed, all necessary related equipment, supplies, and instruments shall be on site and used by Contractor. An experienced layout engineer, surveyor, or technical specialist shall be used by the Contractor for this Work. Both the equipment and personnel must be available, at no additional cost to Ecology, for the purpose of verifying layout and conformance of grading, and certifying the accuracy of the Work on the Project Site.

B. Contractor is responsible for preserving all benchmarks and stakes and replacing any that are displaced or missing.

C. Contractor is responsible for review of all utility purveyor, and City, County, or State records relative to the existing underground utilities. Contractor is responsible for avoiding damage to these facilities and shall restore all utilities at Contractor's own expense, as specified in **SECTION 33 00 00 – EXISTING UNDERGROUND UTILITIES**.

D. Contractor is to notify Ecology immediately if underground utilities not shown on the Drawings are encountered, for resolution on how to proceed.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 CONTRACTOR PREPARATION AND VERIFICATION OF CONDITIONS

A. Before commencing excavation, Contractor shall:

1. Verify that survey benchmark and intended elevations for the Work are as indicated.
2. Verify that erosion and sedimentation control measures are in place and operating properly.

3. Verify that buildings, site features, and improvements specified to remain in place are protected and prominently marked.

4. Identify pre-construction survey required grid lines, elevation point locations, levels, contours, and datum, and resolve all conflicts with the Drawings with Ecology.

5. Confirm that all pre-construction elevation points needed for backfilling to restore existing grades can be collected as specified in the Project Manual.

B. Contractor shall locate underground utilities and shall be prepared to protect, reroute/bypass, repair, and restore site underground utilities in accordance with **SECTION 02 22 43 – EXISTING CONDITIONS ASSESSMENTS** and **SECTION 33 00 00 – EXISTING UNDERGROUND UTILITIES**.

C. Contractor shall be prepared to fulfill the requirements for working near overhead electrical distribution and transmission systems in accordance with **SECTION 33 70 00 – OVERHEAD ELECTRICAL UTILITIES**.

D. Contractor shall remove asphalt pavement from designated excavation area, as shown on the Drawings, in accordance with **SECTION 02 41 13 – SELECTIVE SITE DEMOLITION**.

E. Before commencing excavation, Contractor shall verify that all site features that are specified to remain in place or that have been removed and reinstalled or removed and replaced in kind as part of the Work are protected and prominently marked.

3.02 GENERAL EXCAVATION REQUIREMENTS

A. Excavation shall be completed to the depths indicated on the Drawings and in the Project Manual with an allowable vertical tolerance of 0.25 feet, unless otherwise restricted by the preservation of buildings, structures, or improvements designated to remain in place.

B. Excavation soil and material shall be moved with the use of mechanical equipment, but shall not require drilling and blasting or drilling and line breaking. Excavation by sluicing method will not be permitted. Contractor shall make every effort to coordinate excavation activities such that excavation spoils are handled as little as possible.

C. Excavations shall be sloped away from the base of all building and structure foundations, the edge of all sidewalks, concrete slabs-on-grade, concrete or asphalt driveways, the toe of rock slopes and rockeries to be left in place, and all other structures and site features that may otherwise be disturbed by excavation activities. Slope configurations shall be as shown on the Drawings.

1. Contractor shall protect and monitor all excavation slopes for erosion or instability and correct deficiencies promptly at no additional cost to Ecology.

2. The northern extent of the planned excavation area is near the toe of the railroad ballast of the Ballard Terminal Railway line. Contractor shall protect and monitor the excavation slope and railroad ballast for erosion or instability. Contractor shall stop work immediately and promptly notify Ecology or Ecology's Representative if erosion or instability is observed to determine further course of action.

D. Brace and shore sides of excavation as necessary to meet Contractor or regulatory needs. Comply with all federal, state, and local regulations regarding shoring, bracing, and other protection requirements.

1. Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of buildings or other structures during the Work.

a. Strengthen or add new supports when required during the Work, including but not limited to during the period of selective demolition and excavation.

E. Excavation shall be performed in such a fashion as to avoid damage to buried utilities designated to remain in place (if any), including using hand-tools when over or in the close vicinity of buried utilities.

1. Damage to utility lines shall be repaired promptly and service shall be restored at no additional cost to Ecology as specified in Paragraph 3.01 B of this section.

F. Excavation shall be performed in a manner that avoids the destabilization and deflection of any aboveground utility pole or anchor foundation for an aboveground utility pole, as specified in **SECTION 33 70 00 – OVERHEAD ELECTRICAL UTILITIES**.

G. Excavated soil is to be stockpiled and removed from the Project Site for legal disposal off site. See stockpile requirements in Article 3.04 below.

H. Contractor shall control moisture content so that excavated soil for off-site disposal passes Paint Filter Test (SW-846 Method 9095A) at point of loading of trucks.

I. Contractor shall employ all appropriate measures to control dust both within the Project Site and in the surrounding properties and areas.

3.03 REMEDIAL EXCAVATION

A. Maintain open excavation during analytical testing periods specified herein for excavation extending to and beyond the planned excavation limits shown on the Drawings, unless directed otherwise by Ecology or Ecology's Representative.

B. Soil samples will be obtained from excavation walls and bottom and from Ecology-Directed Overexcavation as described in Paragraphs 3.03 C and D below.

C. Excavation Sampling Procedures and Ecology-Directed Overexcavation: If potential Suspect Material is observed, further overexcavation may be directed by Ecology or Ecology's Representative based on laboratory analytical results of soil sample tests and/or other factors. Sequencing/timing requirements for sampling, Ecology-Directed Overexcavation, and backfilling are described below:

1. Ecology or Ecology's Representative will collect soil samples for laboratory testing from the walls and bottom of the cut per **SECTION 01 35 43 – ENVIRONMENTAL PROCEDURES**. Contractor shall provide labor and equipment as necessary to facilitate the collection of soil samples.

2. If sample analytical results are acceptable to Ecology or Ecology's Representative, confirmational post-excavation survey of the finished Remedial Excavation shall be performed prior to backfilling, as specified in **SECTION 01 71 23 – FIELD ENGINEERING**.

3. If sample analytical test results detect unacceptable concentrations of contamination, then Contractor shall perform overexcavation as directed by Ecology or Ecology's Representative.

4. Contractor shall not backfill the excavation until directed by Ecology or Ecology's Representative that overexcavation is complete and subsequent final as-built survey of the excavation is performed.

D. Ecology-Directed Overexcavation beyond the excavation limits shown on the Drawings shall be as described below:

1. Overexcavation to a maximum depth of 6 feet below the proposed excavation finish grade as directed by Ecology or Ecology's Representative.

2. Chase contamination laterally beyond the proposed excavation limits as directed by Ecology or Ecology's Representative.

3.04 GENERAL STOCKPILE REQUIREMENTS

A. The Contractor may elect to temporarily stockpile remedial excavation material for dewatering and other imported materials on the Project Site.

B. The Contractor shall locate stockpiles as necessary within the Project Site to complete the Work. No stockpiles may be located in such a manner as to impair access to adjacent sites or facilities or be detrimental to work progress or the completed work in any way. Stockpile locations and configurations must be approved by Ecology or Ecology's Representative.

C. All stockpile areas shall be sized to accommodate anticipated volumes and rates of excavation and import.

D. All stockpiles shall be covered, lined, and bermed as shown on the Drawings. Weather-resistant sheeting or other suitable means shall be used to protect stockpiles when stockpiles are not in use, and to prevent precipitation and other materials from contacting the stockpiles. The stockpile covers shall be anchored to prevent them from being removed by wind as shown on the Drawings. Stockpile berms or enclosures shall be maintained in good condition and constructed of materials that are compatible with the material to be stored. Vehicle access points to the stockpiles shall also be bermed. Alternatively, ecology blocks may be placed around stockpiles to serve as berms, except at vehicle access points. The Contractor shall repair or replace torn covers immediately.

E. The Contractor shall minimize potential contact of stormwater runoff and precipitation with stockpiles through best management practices, including diverting precipitation falling on the stockpile covers to outside the stockpile areas. See **SECTION 01 57 13 – TEMPORARY EROSION AND SEDIMENTATION CONTROL** for additional requirements.

F. Stockpile underliners shall be constructed as shown on the Drawings:

1. Adjacent underliner sections shall be continuously overlapped by a minimum of 3 feet. It is not necessary to seam adjacent underliner sections below the stockpiles.

2. The Contractor shall place a layer of geotextile or plywood to fully underlie and protect the underliner for remedial excavation stockpiles in any locations containing rocks or debris that are greater than 0.5 inch in diameter, on the ground surface, or under any areas through which vehicular traffic will travel. Geotextile or plywood protection shall also be used to protect the underliner for remedial excavation stockpiles, if created by the Contractor. The geotextile shall be woven sheet of polymeric material, which is chemically resistant to the conditions to which it will be exposed.

Geotextile shall be Mirafi 500X or approved equivalent. The plywood shall have a minimum thickness of 0.5 inch.

G. Stockpiles of remedial excavation material may be established without underliners over areas containing the same material to be subsequently excavated. Such stockpiles shall be bermed and covered as shown on the Drawings and as described herein.

H. The Contractor shall not stockpile remedial excavation material or any suspect material on exposed soil following completion of remedial excavation in that area.

I. Stockpiles of imported material may be established without underliners if located on clean soil or clean underlying surface, but shall be bermed and covered as shown on the Drawings and as described herein.

J. The Contractor shall maintain a written log for stockpiles containing excavated materials from the Project Site.

K. The Contractor shall inspect all stockpile areas daily and after rain events, and shall maintain a written inspection log. The inspection log shall be available at the request of Ecology or Ecology's Representative and also submitted with the Contractor's Weekly Report. Inspection logs shall contain date and time of inspection, name of individual conducting the inspection, observations, problems noted, and corrective actions taken. For each stockpile, the log shall note the material present; dates that the stockpile was established or modified; daily volumes based on visual or other estimates; condition of the stockpile covers, berms, and liners where visible; presence and estimated volumes of stockpile drainage water; and sump condition as applicable. The log shall also note dates that stockpiles are shipped for off-site disposal, or relocated on site. The log shall establish a sequential numbering system for each stockpile.

3.05 SOIL PROTECTION

A. If subgrade or fill soils become loosened or disturbed, then Contractor shall excavate to expose undisturbed soil. Replacement with properly compacted fill will be required.

B. Contractor shall repair and provide the additional excavation, disposal, and import of replacement material at no additional cost to Ecology.

C. Contractor shall cover stockpiles during periods of wet weather to prevent the imported fill from becoming too wet to properly place and compact.

D. If earthwork is to be performed or fill is to be placed in wet weather or under wet conditions when control of soil moisture content is not possible, the following recommendations shall be followed:

1. Earthwork should be performed in small areas to minimize exposure to wet weather.
2. The size and type of construction equipment used may have to be limited to prevent soil disturbance.
3. The ground surface within the construction area should be graded to promote runoff of surface water and to prevent the ponding of water.
4. Excavation and placement of fill should be observed by a field representative of Ecology to verify that all unsuitable materials are removed and that suitable compaction and site drainage is achieved.
5. Erosion control measures shall be strategically located as necessary to control surface water, including during storm events, and prevent erosion.

3.06 SITE CLEANING

A. Dispose of waste, surplus, and unsuitable materials off site according to laws, regulations, and ordinances at no additional cost to Ecology.

B. Contractor shall minimize contact between contaminated soil and uncontaminated areas, materials, and equipment. Areas of contact shall be promptly cleaned and all contaminated soil shall be removed.

C. Contractor shall be responsible for preventing the uncontrolled off-site movement of all waste materials, spills, etc. resulting from the Work under this Contract, and shall be responsible for any consequences of any such offsite movement of material.

D. Contractor shall maintain hauling routes clean and free of debris at no additional cost to Ecology.

E. Contractor shall clean up soil tracked from the Project Site onto public roadways on a daily basis or more frequently, as directed by Ecology or Ecology's Representative.

F. Contractor shall return stockpile areas to original conditions on completion of use.

G. Contractor shall maintain dewatering systems during use to prevent leakage or loss of effluent.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. Construction dewatering may be necessary at the Project Site to excavate below the water table and to prevent surface water from flowing into the excavation. This section specifies requirements for the management of water associated with excavation, stockpiling, and backfilling at the Project Site, and the handling, storage, treatment, testing, and disposal of such water during implementation of the Work under this Contract.

B. Dewatering of the remedial excavation will likely have to be incorporated into the Contractor's plans at various occasions to facilitate contaminated soil removal and excavation backfilling activities. Water generated by construction dewatering activities from within excavations shall be conveyed to an aboveground storage tank prior to treatment and discharge according to the requirements of **SECTION 01 57 13 – TEMPORARY EROSION AND SEDIMENTATION CONTROL**.

C. Construction water shall be collected, stored, and treated as required to demonstrate that the effluent meets King County Industrial Waste Program and City of Seattle standards for discharge to the sanitary sewer system, according to the requirements of **SECTION 01 57 13 – TEMPORARY EROSION AND SEDIMENTATION CONTROL**.

1.02 RELATED SECTIONS

A. **SECTION 01 57 13 – TEMPORARY EROSION AND SEDIMENTATION CONTROL**

1.03 REFERENCES AND STANDARDS

A. All construction dewatering shall conform to the requirements of the City of Seattle Standard Specifications (most recent edition) and Title 22.802 of the City of Seattle Stormwater, Grading, and Drainage Control Code (most recent edition).

B. King County Industrial Waste Program standards for discharge to the sanitary sewer system.

C. Disposal of water containing PCBs shall comply with the TSCA regulations (40 CFR Part 761).

D. Transport of water containing PCBs shall comply with the Department of Transportation (DOT) Hazardous Materials Regulations (49 CFR Parts 171 through 180).

1.04 SUBMITTALS

A. Submit a Dewatering Plan as a component of the Contractor Quality Assurance Plan (CQAP) described in **SECTION 01 33 00 – SUBMITTAL PROCEDURES** for Ecology or Ecology's Representative approval that includes:

1. Design drawings and description of the methods and equipment that will be used for construction dewatering, water storage, treatment, and disposal.

2. Estimated dewatering rates assumed by Contractor in sizing the various components of the dewatering and water storage and treatment systems and assumptions regarding additional quantities of stormwater that may be collected/removed from the excavations during storm events.

3. Description of the number, types, sizes, capacity, and other relevant information for the various components of the dewatering and water storage and treatment systems (e.g., vacuum wellpoints, pumps, discharge hoses, storage and treatment tanks, etc.).

4. Estimated storage capacity to be provided for temporary containment/settling of water between extraction and final disposal, and plans for promptly increasing water storage capacity as needed during the Work.

B. Contractor shall keep a daily record of the volume of construction dewatering effluent disposed/discharged, which shall be included in the Project Record to be submitted to Ecology upon completion of the Work. During execution of the Work, Contractor shall provide water discharge records to Ecology or Ecology's Representative upon request.

1.05 SITE CONDITIONS

A. The following site information is intended to provide a brief overview of pertinent site conditions. Contractor shall be solely responsible for reviewing available project documents to verify site conditions critical to the execution of the Work under this section, and modifying construction dewatering and water storage, treatment, and disposal operations as required to adequately address actual site conditions encountered during the Work.

1. Soil: Property soil generally consists of approximately 10 feet of fill overlying native estuarine sediment. The fill is a diverse mixture of silty sand, silt, wood waste, and occasional debris. A layer of wood waste approximately 6 to 10 feet deep has been identified over much of the northern portion of the property. Below the fill layer is

native sand or silty sand to 16 to 18 feet deep. Beneath the sand layer is a layer of discontinuous silt and clay, typically 1 to 4 feet thick. Below this layer are discontinuous layers of sand and silt of increasing density.

2. Groundwater: Shallow groundwater in the area flows generally toward the south-southeast before discharging into the Lake Washington Ship Canal. Groundwater elevations on the Property are typically 7 to 8 feet relative to the City of Seattle elevation datum. Groundwater has been typically encountered 4 to 7 feet below ground surface. The groundwater elevation fluctuates approximately 2 feet seasonally and depends largely on the elevation of the Ship Canal, which is adjusted seasonally by the Corps of Engineers. The rate of groundwater seepage into the excavation will vary with depth and time.

3. Water Quality: Contaminant constituents in pumped water may include PCBs; tri-, di-, and chlorobenzene; chlorinated solvents; and metals. Free-phase PCB product has been historically observed in shallow monitoring wells IP-9 and JT-8. It is possible that small amounts of residual product may be encountered during dewatering and excavation activities.

1.06 QUALITY ASSURANCE/QUALITY CONTROL

A. Performance Operation and Maintenance Monitoring: Monitor dewatering and water handling, treatment, and disposal operations and notify Ecology or Ecology's Representative immediately if any portions of the systems are not operating as intended. Operational problems may include but are not limited to insufficient capture of groundwater and stormwater within the work area, lack of containment of decontamination and construction water, plugging or breakage of pipes or hoses used for water conveyance, leaking of water containment vessels, and malfunction of pumps used to transfer water.

B. Sampling and Analysis: Contractor will perform sampling and analysis of representative samples of the treated water as required to demonstrate that the effluent meets King County Industrial Waste Program water quality discharge limits before discharge into the sanitary sewer system according to the requirements of **SECTION 01 57 13 – TEMPORARY EROSION AND SEDIMENTATION CONTROL**.

PART 2 – PRODUCTS

2.01 SYSTEM COMPONENTS

A. The Contractor shall provide equipment/product specifications, as proposed to meet these performance specifications, including make, model, and manufacturer in the Dewatering Plan.

B. All dewatering and water handling, storage, and treatment equipment and accessories shall be properly sized and suitable for its intended use.

C. Water storage tanks shall be weir type tanks with internal baffles designed to aid in the retention of floating oil and settleable solids.

D. Provide suitable water storage tanks, water treatment equipment, and all ancillary materials and equipment needed to treat extracted water to meet City of Seattle water quality discharge limits prior to discharge to the sanitary sewer system. Contractor shall be prepared to remove, contain, and properly dispose of free-phase PCB product, if encountered during the Work.

E. If discharge effluent sample analysis indicates that activated carbon treatment is required to meet the City's water quality discharge limits, Contractor shall be prepared to supply a granular activated carbon (carbon) filtration system consisting of at least two carbon vessels piped in series. Ecology or Ecology's Representative will evaluate the need for a carbon filtration system by conducting chemical testing of pumped water.

F. To prevent plugging of the carbon vessels with solids, Contractor shall be prepared to provide and maintain a particle filter to be installed upstream of the carbon vessels. The filter can be a bag-style filter, sand filter, or cartridge filter that is rated for at least the maximum flow rate of the carbon vessels. If a bag or cartridge style filter is used, the bags or cartridges shall be 50-micron nominal particle size retention or smaller. A particle filter may be needed to achieve the settleable solids discharge standard even if a carbon filtration system is not used.

G. Contractor shall provide a transfer pump to convey water from the storage tanks to the particle filter and/or the carbon vessels.

H. Contractor shall provide a totalizing flow meter to measure and record the volume of water discharged to the sanitary sewer.

PART 3 – EXECUTION

3.01 DEWATERING

A. Contractor shall provide labor, equipment, and materials to design, construct, operate, maintain, and modify as needed, effective excavation dewatering and water treatment systems. Continue operation of the systems as required to complete the Work and to protect the completed Work and adjacent property, until such time that protection is no longer required.

B. Modify excavation dewatering and water storage methods and equipment if permit conditions are not being met or if Ecology or Ecology's Representative determines that Contractor's methods and equipment are not adequate for site conditions encountered during the Work. Do not cease excavation dewatering activities until excavations are satisfactorily confirmed and backfilled, unless otherwise approved by Ecology or Ecology's Representative.

C. Contractor shall control runoff of stormwater into the excavation to limit the amount of water requiring removal, treatment, and disposal. Establish and maintain temporary diversions outside the excavation limits to convey stormwater and water removed from excavations to collection or runoff areas.

3.02 WATER TREATMENT

A. Store pumped excavation water on site until treated to adequately settle suspended solids and meet King County Industrial Waste Program discharge criteria prior to discharge to the sanitary sewer system.

B. Contractor shall abide by any other requirements or limitations contained in the County's and City's wastewater discharge authorizations. Contractor will perform periodic sampling and analysis of treated discharge to ensure that effluent complies with King County Industrial Waste Program discharge criteria.

1. Contractor shall temporarily store water on site pending results of sampling and analysis. After sampling and before results are available, Contractor shall not add new water to a particular storage tank or remove water. Contractor shall dispose of water only as directed by Ecology after results from chemical analysis become available.

C. If activated carbon treatment is necessary, to meet discharge requirements, the effluent from the lead (first in series) carbon vessel shall be periodically sampled and analyzed by the Contractor to ensure that the carbon in the lead vessel is replaced when it has become spent (i.e., fully saturated with the contaminants of concern). During periodic carbon replacement activities, the former downstream (second in series) vessel will be moved into the lead position and the vessel with the new carbon shall be placed in the downstream (second in series) position.

D. Discharge treated effluent to an approved location of the sanitary sewer system, and provide effluent flow meter monitoring to document the volume of water discharged to the sanitary sewer system.

E. Remove accumulated solids from the storage tank as necessary to ensure that the maximum thickness of settled solids at the bottom of the storage tank is less than 6 inches.

3.03 INSPECTIONS

A. Contractor shall perform daily visual inspections during dewatering, water treatment, and water discharge activities. At a minimum, examine piping and hoses for leaks or excessive wear, inspect the storage tanks for any accumulated oil, check pressure drops across the particle filter unit and each carbon vessel, replace filter bags or cartridges as necessary, and examine the discharge connection point to the sanitary sewer.

B. On a daily basis, record totalizer readings from the discharge flow meter, provide readings to Ecology or Ecology's Representative, and prepare discharge monitoring reports to the City as required. Also examine the quantity of solids accumulated in the storage tank on a daily basis and record the total quantity of removed solids.

3.04 HEALTH AND SAFETY

A. Contractor shall include within its site-specific health and safety plan a description of the hazards associated with the contaminants expected in the water removed from the excavation. The plan shall include site-specific conditions of potential exposure associated with confined spaces (e.g., accessing or opening hatches on the top of the storage tank and accessing or opening lids of sewer manholes).

3.05 REMOVAL

A. Properly contain used filter bags/cartridges, spent activated carbon, and sediment removed from the storage tank. Dispose of these materials in accordance with all applicable regulations.

B. Disassemble, clean, and remove materials and equipment when no longer required for dewatering, water collection, storage, treatment, handling, and disposal operations.

C. Decommission all wells and/or vacuum wellpoints in accordance with Chapter 173-160 WAC after dewatering is completed.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. Work includes all materials, equipment, and labor necessary for the following:

1. Placement and compaction of imported backfill and surfacing materials to restore the existing, pre-excavation property elevations and topography surveyed by Contractor, and as specified in the Project Manual.
2. Placement of materials to return surface to pre-excavation elevations next to permanent site features previously surveyed by Contractor.
3. Placement and compaction of imported backfill in areas to receive pavement surfacing.
4. Repair and/or installation of any public and private utilities rerouted/bypassed, removed, destroyed, or damaged during the Work.
5. Removal and disposal of imported backfill that was allowed to become too wet to place or compact as specified, or that has otherwise become unsuitable.

1.02 RELATED SECTIONS

A. **SECTION 01 35 43 – ENVIRONMENTAL PROCEDURES**

B. **SECTION 01 35 43.10 – GREEN CONSTRUCTION PRACTICES**

C. **SECTION 31 23 16 – EXCAVATION**

D. **SECTION 33 00 00 – EXISTING UNDERGROUND UTILITIES**

1.03 REFERENCES AND STANDARDS

A. Washington State Department of Transportation 2014 Standard Specifications for Road, Bridge, and Municipal Construction (WSDOT Standard Specifications).

B. City of Seattle Standard Specifications for Road, Bridge, and Municipal Construction (most current edition).

C. ASTM C-136 Standard Method for Sieve Analysis of Fine and Coarse Aggregate.

D. ASTM D-422 Method for Particle Size Analysis of Soils.

E. ASTM D-4318 Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

F. AASHTO T176 Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test.

1.04 SUBMITTALS

A. Samples: Submit a minimum 50-pound sample for each imported soil material a minimum of ten (10) business days prior to the use of material, unless otherwise indicated.

1. If multiple sources for fill materials are to be used for the Work, then one sample shall be submitted for each source.

B. Test Reports:

1. Sieve analysis for each material.
2. Plasticity Index for Common Fill.
3. Documentation demonstrating that all clean soil materials shall have no concentrations of any contaminating and/or hazardous substance exceeding MTCA Method A Cleanup Levels for Unrestricted Land Use. Substances include but are not limited to:
   a. SVOCs (per EPA 8270C)
   b. VOCs (per 8260B)
   c. PCBs (per EPA 8082)
   d. Chlorinated Pesticides (per EPA 8081A)
   e. Metals per EPA 6020 (antimony, arsenic, beryllium, cadmium, chromium, copper, lead, nickel, selenium, silver, thallium, zinc)
   f. Cyanide (per EPA 9012)
   g. Mercury (per EPA 7471)
4. If multiple sources for fill materials are to be used for the Work, then a complete set of test reports shall be submitted for each source.

C. Certificates: Provide WSDOT pit certification for each pit source of fill material.

1.05 QUALITY ASSURANCE

A. Contractor shall retain a third-party geotechnical/materials testing and inspection service to confirm that compaction is performed in conformance with contract requirements to the satisfaction of Ecology or Ecology's Representative. Sampling and testing for compliance with the Contract provisions shall be in accordance with **SECTION 01 45 00 – CONTRACTOR QUALITY CONTROL** and as described herein.

B. See **SECTION 01 35 43 – ENVIRONMENTAL PROCEDURES** for sampling and laboratory testing to be performed by Ecology and the Contractor during the Work.

1.06 QUANTITY MEASUREMENT AND CONTRACT SUM

A. Contractor shall document all restored final grades and topography present at the Project Site, as specified in **SECTION 01 71 23 – FIELD ENGINEERING**.

B. All imported soil, including placement and compaction required to achieve the final grades and completed structures as specified in the Project Manual, shall be included in the Contractor's Bid.

   1. If Contractor's sequencing of the Work requires stockpiling and double handling of materials, this shall be accomplished within its Bid amount at no additional cost to Ecology.

C. Unit bid price for UB3 (Imported Clean Fill Material) in the Contract represents the price that will be used to adjust the contract amount when there is an increase or decrease in the basis of bid quantities in the Total Base Bid for clean imported fill material, including backfilling and compaction, as defined in **SECTION 00 41 43 – SUMMARY OF PAY ITEMS AND QUANTITIES**.

D. Contractor shall be responsible for all unauthorized excavation of additional soil and/or placement of additional fill. The unit prices shall not be applied to unauthorized excavation. There will be no adjustment to either the Contract Sum or Contract Time for all such unauthorized work.

1.07 MATERIAL DELIVERY, STORAGE, AND HANDLING

A. Delivery, storage, stockpiling, and handling of materials shall be in accordance with the Project Manual, including **SECTION 31 23 16 – EXCAVATION**, **SECTION 01 57 13 – TEMPORARY EROSION AND SEDIMENTATION CONTROL**, and **SECTION 02 61 13 – EXCAVATION AND HANDLING OF CONTAMINATED SOIL**.

1.08 WET WEATHER CONDITIONS

A. Maintain appropriate drainage in areas of the Project Site where placement and compaction of fill is being performed. Excavations shall be free of standing water before placing and compacting fill.

B. When reconstructing site grades, slope grades away from existing buildings and other structures to the extent practicable while achieving specified grades.

1.09 DIMENSIONS AND LAYOUTS

A. This work shall be in accordance with **SECTION 31 23 16 – EXCAVATION**.

PART 2 – PRODUCTS

2.01 GENERAL IMPORT MATERIAL QUALITY REQUIREMENTS

A. Imported materials shall be tested and certified to be free of contaminants as approved by Ecology or Ecology's Representative. See **SECTION 01 35 43 – ENVIRONMENTAL PROCEDURES** for the details of the required testing, submittals, and approval.

B. Ecology or Ecology's Representative maintains the right to reject any materials that have been determined to be substandard for any reason. In the event of rejection, it shall be the responsibility of the Contractor to remove all rejected material from the site at its sole expense.

C. Visually inspect each load of imported material upon delivery. Material shall be inspected for presence of foreign, recycled, or reprocessed material. Ecology or Ecology's Representative may at any time perform an independent inspection. Material may be rejected due to identification of any such material or as a result of substandard test results.

2.02 SELECT BORROW

A. Select Borrow or Engineer-approved equal shall be used for backfilling excavations (both below and above groundwater) as shown on the Drawings or as directed by Ecology or Ecology's Representative. Select Borrow shall consist of soil that can be compacted as specified herein. Select Borrow shall conform to Section 9-03.14(1) of the 2014 WSDOT Standard Specifications for imported gravel borrow with the following modifications:

1. Imported soil shall contain at least 30 percent material coarser than a 3/4-inch sieve.
2. Imported soil shall contain less than 5 percent passing a U.S. No. 200 sieve based on the minus 3/4 fraction, and shall be used where necessary to facilitate compaction.
3. The maximum particle size shall be less than half the specified loose lift thickness.

2.03 BASE COURSE

A. Base Course shall be used as underlying base material for paving (see **SECTION 32 12 00 – PAVING**). Base Course shall meet the requirements of Crushed Surfacing as described in Section 9-03.9(3) of the 2014 WSDOT Standard Specifications.

2.04 QUALITY CONTROL

A. Where specified in the Project Manual and when requested by Ecology, Contractor shall submit test reports to Ecology demonstrating that materials meet the specifications in the Project Manual. If tests indicate that materials do not meet specified requirements, then Contractor shall change materials and retest at no additional cost to Ecology.

PART 3 – EXECUTION

3.01 CONTRACTOR PREPARATION AND VERIFICATION OF CONDITIONS

A. Before commencing backfilling, grading, and compaction, Contractor shall obtain approval from Ecology. Approval is based upon the Contractor satisfying the following:

1. Verify that survey benchmark and intended elevations for the Work are as indicated and are available to field personnel and surveyors performing the Work.
2. Verify that erosion and sedimentation control measures are in place and functioning properly.
3. Verify that the excavation and removal of contaminated soil has been completed to the depths indicated in the Project Manual, unless otherwise indicated.
4. Identify required lines, elevation survey locations, elevation control points, final elevation marks, levels, contours, and datum and resolve all conflicts with Ecology.

5. Verify that all information required to meet grading tolerance specifications has been provided to field personnel and that appropriate surveying equipment and trained personnel are present to direct the Work to achieve the specified tolerances.

6. Verify that all pre-construction elevations are matched as specified in the Project Manual, including all elevation control points and final elevation control marks.

7. Verify the horizontal locations of all pre-construction elevations, including all elevation control points and final elevation control marks.

8. Verify that all field personnel have all elevation data, pre-construction condition information, and other data necessary to restore the pre-construction site elevations and topography.

9. Verify that surveying resources to conduct surveying will be used as specified in **SECTION 01 71 23 – FIELD ENGINEERING** in order to achieve the tolerances specified in this section.

B. No backfilling shall occur until after post-excavation survey and laboratory analysis of soil samples of the finished excavation surface is completed and approved by Ecology or Ecology's Representative, as described in **SECTION 31 23 16 – EXCAVATION**.

C. Before commencing backfilling, grading, and compaction, Contractor shall verify that all site features that have previously been removed and replaced in kind or removed and reinstalled as part of the Work are protected and prominently marked.

3.02 GENERAL PROCEDURES FOR FILL PLACEMENT

A. Do not fill over ponded surface water or existing subgrade surfaces which are yielding, disturbed, unstable under foot traffic or heavier loads, or softened.

B. Suspend placing fill when the weather conditions will not allow proper placement and fill compaction and when surface water cannot otherwise be controlled by Contractor.

C. Fill placement shall be performed in such a fashion as to avoid damage to buried utilities, including by using light compaction equipment adjacent to and over utilities. Damage to utility lines shall be repaired promptly and service shall be restored at no additional cost to Ecology.

D. To the extent where buried utility lines are exposed during the Work, Contractor shall install tracer tape of the appropriate type aligned over the utility in accordance with all codes and requirements applicable, as specified in **SECTION 33 00 00 – EXISTING UNDERGROUND UTILITIES**.

E. After placement of fill and before surfacing is placed, Contractor shall verify by surveying that all elevation control points and final elevation control marks surveyed as specified in **SECTION 01 71 23 – FIELD ENGINEERING** achieve the tolerances specified in this section. Contractor shall verify the grade transition between each point and accurately represents the pre-construction topography.

F. Unless otherwise indicated by the pre-construction topography and/or site features, Contractor shall make grade changes gradual. Blend slope into level areas. Construct uniform grades between spot elevations or contours.

G. Grade areas adjacent to buildings, structures, and hardscape edges in a manner that provides positive drainage away from foundations and slabs-on-grade and prevents ponding at the building or structure itself.

H. Grade slopes as follows:

   1. Lifts of backfill for restoring existing slopes shall be placed level and compacted evenly. No void spaces between lifts of fill and vertical bench cuts will be permitted.

I. Contractor shall employ all appropriate measures to control dust both within the Project Site and in the surrounding properties and areas.

   1. Spray/mist backfill material and exposed subsurfaces as necessary to limit dust to lowest practicable level. Do not use excess water that would cause flooding, contaminated runoff, or icing.

J. Protect fill from erosion at all times during transport, stockpiling, and placement. Imported fill shall not be delivered in muddy or frozen condition.

K. Remove and dispose of excess fill materials to an approved waste disposal site at no additional expense to Ecology.

3.03 SITE ELEVATION AND LOCATION TOLERANCES

A. Tolerance for Select Borrow shall be **±1 inch**.

B. Tolerance for finished grades shall be **-0.0 inches to +0.5 inches** at surveyed elevation control points., and **±1/4 inch** at final elevation control marks on permanent and/or Remain-In-Place buildings, structures, and other site features.

D. Tolerance for restoration of all fences, buildings, and other site and landscape structures and features, unless otherwise specified in the Project Manual: **±1.0 inches in any direction**.

3.04 SOIL PROTECTION

A. This work shall be in accordance with **SECTION 31 23 16 – EXCAVATION**.

3.05 GENERAL COMPACTION REQUIREMENTS

A. Compaction shall be performed with compaction equipment suitable for the soil and the area being compacted. Each lift of material placed shall be uniformly compacted to the density indicated for the specific material and use set forth in these specifications. The compaction equipment may be of any type, provided it is capable of compacting each lift of the material to the specified density. Ecology or Ecology's Representative may require that the use of particular compaction equipment be discontinued if it is not capable of compacting the material to the required density within a reasonable time, or if the equipment may damage underlying or adjacent soil.

B. Lab-determined optimum moisture content and maximum dry density of different soils shall be determined by the Contractor's testing laboratory in accordance with ASTM D1557 and as described in Article 3.07 of this section.

C. The Contractor shall moisten or aerate material as necessary to achieve the required specified percent compaction and/or moisture content.

D. Contractor shall place fill in 12-inch maximum loose lift thickness, unless specified otherwise.

E. All soil materials shall be compacted and tested to the requirements of this specification. If the specified densities with the maximum lift thicknesses specified cannot be attained, the lift thickness shall be reduced and/or heavier compaction equipment shall be provided. Adjustments to achieve compaction shall be at no additional cost to Ecology.

F. Concrete and rocks greater than half the loose lift thickness in any dimension shall be removed prior to compaction, unless specified elsewhere. Garbage, debris, pieces of wood larger than 4 inches in any dimension, and other deleterious material shall be removed and disposed of appropriately prior to compaction.

G. Lifts shall be uniform thickness, sloped to drain, and even across the entire width of the fill surface. Shape the surfaces to uniform cross sections and eliminate ruts and holes.

H. Specific compaction requirements for the specific different types of fill materials are described in the following paragraphs of this section.

3.06 SELECT BORROW PLACEMENT AND COMPACTION

A. Unless noted otherwise, Select Borrow or an Engineer-approved equal shall be used to backfill the excavation area (both above and below groundwater) to achieve compaction specified on the Drawings.

B. Select Borrow placed below groundwater shall be placed in loose lift thicknesses of less than 2 feet and compacted by tamping/compressing with a trackhoe bucket to a firm condition.

C. Select Borrow or Engineer-approved equal placed above water levels in the excavation, and up to 3 feet below final grades, shall be compacted to at least 90% of the maximum dry density (per Article 3.08) as determined by compaction control tests. The upper 3 feet of fill below final grades shall consist of base course placed and compacted per Article 3.07 below and **SECTION 32 12 00 – PAVING**.

D. For Select Borrow placed and compacted within 1.5 feet above water levels, it may be difficult to achieve required compaction. Percent compaction may be modified by Ecology or Ecology's Representative or Geotechnical Engineer based on field conditions.

E. Contractor shall control moisture content of Select Borrow to within +/- 2% of the optimum water content (per Article 3.05) to aid in achieving specified compaction.

3.07 BASE COURSE PLACEMENT AND COMPACTION

A. Base Course shall be used as underlying base material for paving (see **SECTION 32 12 00 – PAVING**). Base Course shall be placed and compacted in conformance with Section 4-04.3 of the WSDOT

Standard Specifications. Base Course shall be compacted in 4-inch lifts, maximum.

3.08 QUALITY CONTROL TESTING FOR COMPACTION

A. The Contractor shall provide the testing laboratory with soil samples for soils requiring compaction testing to perform grain size (ASTM D 422), natural moisture content (ASTM D 2216), and moisture density tests (ASTM D 1557). Results shall be provided to Ecology or Ecology's Representative at least one week prior to use of this material on site. If the material type changes sufficiently such that it is not the same as the original moisture density as determined by Ecology or Ecology's Representative, additional samples shall be tested by the Contractor and results submitted.

B. The Contractor shall be responsible to obtain density testing in accordance with ASTM D 2922 at the frequency specified below, unless specified otherwise:

   1. Select Borrow: Contractor shall obtain a representative number of density tests to demonstrate required compaction from Contractor's methods to Ecology's or Ecology's Representative's satisfaction. Ecology or Ecology's Representative may request additional tests based on field conditions and/or departures from the agreed upon methods.

C. See **SECTION 01 35 43 – ENVIRONMENTAL PROCEDURES** for additional requirements for environmental sampling and quality control.

3.09 SITE CLEANING

A. This work shall be in accordance with **SECTION 31 23 16 – EXCAVATION,** Article 3.07.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. The work described in this section includes paving and pavement marking (striping) to restore the Project Site to pre-construction condition.

1.02 REFERENCES AND STANDARDS

A. All paving and pavement marking work shall conform to the requirements of the City of Seattle Standard Specifications for Road, Bridge, and Municipal Construction (most current edition).

1.03 SUBMITTALS

A. Paving Subcontractor: The Contractor shall submit the name and experience of the paving subcontractor (if any) to Ecology. The paving subcontractor shall demonstrate a minimum of 5 years of experience on paving projects of similar nature to the Work described in this Project Manual.

B. Hot-Mix Asphalt Mix Submittal: The Contractor shall submit the hot-mix asphalt (HMA) mix, including but not limited to mix plant name and contact information, aggregate gradation, percent of aggregate in mix, asphalt binder type, percent of asphalt binder in mix, mix plant recommended placement/compaction temperature, emulsified liquid asphalt (tack coat) type, and manufacturer recommended application rate.

C. Paint Striping: The Contractor shall submit the paint striping type, manufacturer, and supplier to confirm conformance with specifications.

PART 2 – PRODUCTS

2.01 HOT-MIX ASPHALT

A. HMA shall match existing material type at the Project Site and shall meet the requirements of Section 5-04 of the current City of Seattle Standard Specifications for Road, Bridge, and Municipal Construction.

2.02 PAVEMENT MARKINGS

A. Pavement markings on the Property define vehicular and pedestrian travel paths and delineate specific usage areas (e.g., parking). Pavement markings within the work area shall be restored to pre-construction condition. Pavement markings damaged during execution of the Work shall be restored to pre-construction condition.

PART 3 – EXECUTION

3.01 PAVEMENT PLACEMENT, CONTROL, AND ACCEPTANCE

A. HMA shall be placed, compacted, and inspected per the current City of Seattle Standard Specifications Section 5-04. HMA shall also be in accordance with but not limited to the following:

1. The Contractor shall make a vertical saw cut for any pavement that abuts new paving where existing pavement was removed. All saw cut lines shall be straight, or curvilinear, with no more than a 1-inch deviation from a straight line or smooth curve. Damage to adjacent pavement to remain shall be repaired at the Contractor's expense.
2. All pavement joints shall receive an application of emulsified liquid asphalt (tack coat) immediately prior to paving. All joints not overlaid within 10 days, and all joints within the asphalt wearing course, shall be sealed using rubberized asphalt crack sealer in accordance with Section 5-04 of the current City of Seattle Standard Specifications.
3. HMA shall be placed and compacted at temperatures recommended by the asphalt manufacturer and as specified in Section 5-04 of the current City of Seattle Standard Specifications.
4. Surface smoothness for all new paving shall meet the requirements of Section 5-04 of the current City of Seattle Standard Specifications.
5. Asphalt concrete pavement not meeting the prescribed minimum density standard shall be removed and replaced with satisfactory material at no additional cost to Ecology.
6. Ecology reserves the right to require the Contractor to test any area that appears defective and to require the further compaction of areas that fall below acceptable density requirements. Recompaction of areas not meeting specifications shall be completed at no additional cost to Ecology.

3.02 INSPECTION

A. The City of Seattle shall inspect and approve final finish grades prior to paving. Failure to have a City inspection may result in removal and replacement of the pavement at no extra cost to Ecology.

B. The City shall be notified prior to any paving with asphalt concrete pavement or Portland cement concrete pavement per the requirements of the current City of Seattle Standard Specifications.

3.03 PAVEMENT MARKINGS

A. Pavement markings shall be replaced with and match the existing markings (e.g., same number and type of striping).

B. Pavement markings shall be installed in accordance with the current City of Seattle Standard Specification requirements.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. Several underground utilities are known to exist within the Project Site and planned excavation area. These include but are not limited to a municipal sewer line; private sewer connections to the municipal line from the on-site business; water supply lines, water utility vault, and fire hydrant; and storm drainage lines and catch basins. Existing underground utilities that impede or interfere with accessibility of the planned excavation area will require temporary rerouting/bypassing to facilitate complete removal of soil from the planned excavation.

B. The work shall consist of identifying and delineating underground utilities within the Project Site and adjacent rights of way; acquiring necessary permits and approvals from applicable utility agencies; temporary rerouting/bypassing affected underground utilities; removal of underground utility lines and appurtenances from the excavation area as needed to allow for complete soil removal; and restoring the rerouted/bypassed underground utilities following completion of the excavation and backfilling work specified in **DIVISION 31 – EARTHWORK**.

C. The Contractor shall be responsible for coordinating and complying with all applicable utility agencies regarding utility location, requirements and procedures for temporary rerouting/bypassing/protection of affected utilities, and subsequent restoration of rerouted/bypassed utilities. The Contractor shall furnish all materials, labor, tools, equipment, and incidentals, and perform all operations and testing, necessary for rerouting/bypassing affected underground utilities to maintain continuity of service at all times, and for the subsequent restoration of rerouted/bypassed utilities to their original (or better) pre-construction, fully functional condition, in accordance with City of Seattle Standard Specifications and applicable industry standards, or as directed in writing by Ecology.

1.02 RELATED SECTIONS

A. **SECTION 02 22 43 – EXISTING CONDITIONS ASSESSMENTS**

B. **SECTION 33 70 00 – OVERHEAD ELECTRICAL UTILITIES**

1.03 REFERENCES AND STANDARDS

A. City of Seattle Standard Specifications for Road, Bridge, and Municipal Construction (most current edition) and all applicable industry standards referenced therein.

B. King County Wastewater Treatment Division Engineering Design Standards and all applicable industry standards referenced therein.

1.04 SUBMITTALS

A. The Contractor shall provide a complete and detailed plan describing the temporary rerouting/bypassing of underground utilities to be implemented and the subsequent restoration of the rerouted/bypassed underground utilities to full working condition. This plan shall be submitted as a part of the Site Restoration Quality Control Plan, as specified in **SECTION 02 22 43 – EXISTING CONDITIONS ASSESSMENTS, Paragraph 1.03B**.

B. Contractor shall provide a surveyed as-built plan (record drawing) to Ecology of the installed locations of the restored underground utility lines and appurtenances. The plan shall include the location and invert elevation of the pipe, valves, and service connections/taps. The as-built plan shall be performed by a professional surveyor regularly engaged in surveying and licensed in the state of Washington. The as-built locations shall be to an accuracy of plus or minus 0.10 feet in plan and elevation.

1.05 QUALITY ASSURANCE

A. Qualification of Workers: Contractor shall employ the services of a qualified utility contractor, who will be thoroughly familiar with the type of materials being installed and the best methods for their installation, and who shall direct all work performed under this section.

B. Codes and Standards: The Contractor shall comply with the applicable provisions of all pertinent codes and regulations. References made herein for manufactured materials, such as pipe, fittings, valves, hydrants, and specialties, refer to designations for American Water Works Association (AWWA) or to American National Standards Institute (ANSI).

C. City of Seattle: The Contractor shall comply with the applicable provisions of all pertinent codes and regulations from Seattle Public Utilities, the Department of Planning and Development, and King County concerning testing, installation, inspection, and materials used.

1.06 COORDINATION WITH UTILITY AGENCIES

A. The Contractor shall coordinate and comply with all applicable utility agencies regarding underground utility location; requirements and procedures for temporarily rerouting/bypassing of existing underground utilities to maintain continuous service; execution of the rerouting/bypassing work; and subsequent restoration of rerouted/bypassed underground utilities. Applicable utility agencies may include the following:

1. Water Service: Seattle Public Utilities, Water Operations
2. Local Sanitary Sewer, Storm Drainage: Seattle Public Utilities
3. Regional Sanitary Sewer, Storm Drainage: King County Wastewater Treatment Division
4. Side Sewer: City of Seattle Department of Planning and Development
5. Discharges to Sanitary Sewer: King County Industrial Waste Program

B. The Contractor shall coordinate with utility agencies regarding temporary service, timing and notification of any anticipated service outages, and utility protection requirements.

C. The Contractor shall coordinate with, obtain necessary permits for, perform associated work for, and be responsible to pay for all other utility-related work that may be required.

PART 2 – PRODUCTS

2.01 PRODUCT AND MATERIAL REQUIREMENTS

A. Water Mains and Appurtenances. All products and materials shall conform to the latest appropriate section of AWWA and ANSI Standards and as otherwise specified herein.

B. Sanitary Sewer, Storm Drainage. All products and materials shall conform to the latest ASTM, ANSI, or other appropriate standards and as otherwise specified herein.

PART 3 – EXECUTION

3.01 UTILITY LOCATION, PROTECTION, AND REPAIR

A. Contractor shall locate all existing utilities within the Project Site to avoid damage or disturbance and to confirm locations of underground utilities to be rerouted/bypassed to allow unhindered access for complete removal of soil from the planned excavation area. Contractor shall contact utility location service and have all underground utilities within the Project Site and adjacent rights of way clearly marked. For aid in utility location, Contractor shall call "Dial Dig" at 1-800-424-5555 or (www.callbeforeyoudig.org) a minimum of two working days prior to beginning the Work.

B. Contractor shall provide and pay for a private utility locating service(s) to locate private and auxiliary utilities within the Project Site and adjacent rights of way as required.

C. Contractor is responsible for review of all utility purveyor, City, County, or State records relevant to the existing underground utilities within the Project Site and adjacent rights of way. Contractor is responsible for avoiding damage to these facilities and shall restore all damaged utilities at Contractor's own expense unless otherwise specified herein or directed in writing from Ecology.

D. Contractor shall verify the presence and approximate alignments of private utilities based upon information provided in this Project Manual, information provided by the Property Owner, and visible site features (i.e., conduits, control boxes, drains, etc.).

1. Contractor shall document private utilities both prior to and during the Work in order to restore these utilities to operation during completion of the Work.

2. Utility information on the Drawings is based on available site information, but may be neither current, nor complete, nor appropriately surveyed, and so shall be field verified by the Contractor as specified.

E. Repair and restoration of all utilities, both public and private, made inoperable by the Work or during the Work shall be the responsibility of the Contractor at no additional cost to Ecology, unless otherwise specified herein or directed in writing by Ecology.

F. Contractor shall identify all utilities damaged or destroyed during demolition, excavation, and all other Work performed for the Project. Identification should include the materials and the alignment of those utilities. Contractor shall be prepared to replace in kind all utilities damaged or destroyed during the Work unless otherwise specified herein or directed in writing by Ecology.

G. Contractor shall identify all utilities encountered during demolition, excavation, and all other work performed for the Project.

1. Document utility conditions, layout, and configuration, identifying any damage prior to and/or during the Work.

2. Identification should include the materials, dimensions, location, and alignment of those utilities.

3. The Contractor shall notify Ecology's Representative immediately if underground utilities not shown in the Project Manual are encountered.

3.02 HANDLING UTILITY MATERIALS

A. Pipe and fittings shall be handled with care to ensure that the pipe and fittings are in sound, undamaged condition. Particular care shall be taken to prevent damage to pipe coating and/or lining (if any).

B. The Contractor shall furnish slings, straps, and/or other approved devices to support the pipe when it is lifted. Pipe and fittings shall not be dropped from trucks onto the ground or into the trench. Transporting pipe and fittings from storage areas shall be restricted to operations that shall not cause damage to the pipe or lining (if any).

C. All pipe and fittings shall be examined before laying, and no pipe or fittings shall be installed that are found to be defective. All pipe and fittings shall be thoroughly cleaned before laying, and shall be kept clean until installed. Damaged pipe coatings and/or lining (if any) shall be repaired as approved or directed by Ecology or Ecology's Representative at no additional cost to Ecology.

D. If any defective pipe is discovered after it has been laid, the Contractor shall remove the defective pipe and replace it with sound pipe as approved or directed by Ecology or Ecology's Representative at no additional cost to Ecology.

E. Pipe that has become damaged or contaminated shall be removed from the trench, cleaned, repaired as required, and relaid, as approved or directed by Ecology or Ecology's Representative at no additional cost to Ecology.

3.03 TRENCH EXCAVATION

A. Contractor shall perform utility trench excavation per the requirements of the City of Seattle Standard Specifications (most current edition).

B. Trench excavation, dewatering, sheeting, and bracing shall be carried out in such a manner as to eliminate any possibility of undermining or disturbing the foundations of any existing structure, utilities, or any work previously completed under this Contract.

3.04 INSPECTION

A. Contractor shall coordinate and comply with the respective utility agencies to arrange for inspection of the installed utility lines and appurtenances, as required.

B. Any section of utility line or related appurtenance that does not comply with the inspection criteria, as determined by the utility agency's inspector, shall be promptly corrected, replaced, or repaired by the Contractor at no cost to Ecology. Such methods as are employed for the correction shall be approved by Ecology or Ecology's Representative.

3.05 FIELD TESTING

A. The Contractor shall furnish all necessary equipment and labor for, and perform, testing of all installed underground pipe and appurtenances in accordance with the requirements of the City of Seattle Standard Specifications (most current edition) and the applicable utility agencies. The Contractor shall at all times protect the new and existing utility lines and appurtenances against the entrance of polluting material.

3.06 DISINFECTION OF WATER PIPE

A. Before being placed in service, Contractor shall disinfect all new, repaired portions, or extensions of potable water lines in accordance with the requirements of the City of Seattle Standard Specifications (most current edition). Contractor shall dispose of test water in accordance with applicable regulations.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. Overhead high- and low-voltage electrical utility lines, communication lines, and utility poles exist within the Project Site near the planned excavation area. Overhead utilities and associated utility poles shall remain in place during the Work. Rerouting of overhead utility lines to accommodate the Work will not be allowed. Utility poles shall be protected in place during the Work.

B. Contractor shall comply with all requirements of Seattle City Light and the City of Seattle Standard Specifications (most current edition) for working near electrical distribution and transmission systems. Requirements to be observed shall include but are not limited to:

1. Maintaining safe working distance from electrified transmission lines.
2. Maintaining appropriate clearances from aboveground utility poles, or anchor foundations for aboveground utility poles, during excavation work to prevent any degree of destabilization and deflection of the utility pole.

C. Contractor shall comply with the provisions of Article 3.01 of **SECTION 33 00 00 – EXISTING UNDERGROUND UTILITIES** in fulfilling the requirements of this section as they apply to aboveground utilities.

1.02 RELATED SECTIONS

A. **SECTION 02 22 43 – EXISTING CONDITIONS ASSESSMENTS**

B. **SECTION 31 23 16 – EXCAVATION**

C. **SECTION 33 00 00 – EXISTING UNDERGROUND UTILITIES**

1.03 REFERENCES AND STANDARDS

A. City of Seattle Standard Specifications (most current edition).

B. Seattle City Light requirements and standards for work conducted near electrical distribution and transmission systems.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

APPENDIX A
Regulatory Information and Project Documents

IFB XXXX TCP
JACOBSON TERMINALS PROPERTY
INTERIM REMEDIAL ACTION
[MONTH] 20XX

A01
Draft State Environmental Policy Act (SEPA) Checklist

DRAFT

IFB XXXX TCP
JACOBSON TERMINALS PROPERTY
INTERIM REMEDIAL ACTION
[MONTH] 20XX

SEPA ENVIRONMENTAL CHECKLIST

Purpose of checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

Instructions for applicants**:** [help]

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for Lead Agencies:
Please adjust the format of this template as needed. Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of checklist for nonproject proposals: [help]

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (part D). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Part B - Environmental Elements –that do not contribute meaningfully to the analysis of the proposal.

A. Background [help]

1. Name of proposed project, if applicable: [help]

Jacobson Terminals Interim Remedial Action

2. Name of applicant: [help]

Washington State Department of Ecology, Toxics Cleanup Program

3. Address and phone number of applicant and contact person: [help]

Applicant
Mr. Eugene Freeman
Washington State Department of Ecology
3190 160th Ave. SE
Bellevue, WA 98008
(425) 649-7191

Landowner
Mr. Scott Jacobson
Jacobson Terminals, Inc.
5350 30th Avenue NW
Seattle, WA 98107
(206) 783-1038

4. Date checklist prepared: [help]

June 2015

5. Agency requesting checklist: [help]

Washington State Department of Ecology

6. Proposed timing or schedule (including phasing, if applicable): [help]

Specific timing and schedule for the proposed work has not yet been determined. Implementation is tentatively scheduled to occur from November 2016 through February 2017.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain. [help]

No. Future remedial actions may be performed at the site but they have not yet been determined. Any such actions would be subject to a separate permitting process.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal. [help]

Numerous environmental investigations have taken place at the Jacobson Terminals Site ("site") and surrounding properties since the 1980's. Historic soil and groundwater data collected from the site and surrounding wells are described in the 2013 Data Gaps Report (Hart Crowser 2013). Previous remedial actions performed at the site are also discussed in this report. More recent soil, groundwater, and sediment investigations are presented in the 2014 Interim Action Work Plan (Hart Crowser 2014) and Remedial Investigation and Feasibility Study (RI/FS) (Hart Crowser 2015). References for these reports are provided below:

- Hart Crowser 2013. Data Gaps Report, Jacobson Terminals, Seattle, Washington. Prepared for Washington State Department of Ecology. December 20, 2013.
- Hart Crowser 2014. Draft Interim Action Work Plan, Jacobson Terminals, Seattle, Washington. Prepared for Washington State Department of Ecology. July 1, 2014.
- Hart Crowser 2015. Remedial Investigation and Feasibility Study, Jacobson Terminals, Seattle, Washington. Prepared for Washington State Department of Ecology. April 25, 2015.

The Jacobson Terminals facility has been enrolled in Ecology's Voluntary Cleanup Program (VCP) since 2001 under VCP number NW0611. Additional reports and studies are available on Ecology's project website at: https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=4498

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain. [help]

There are no other known proposals that directly affect the property covered by this proposal.

10. List any government approvals or permits that will be needed for your proposal, if known. [help]

Potential government approvals or permits that may apply include the following:

State

- 05-05 Compliance (WA Dept. of Archaeology & Historic Preservation)
- Laboratory Accreditation (WA Dept. of Ecology)
- Model Toxics Control Act (MTCA) - Reporting Requirements (WA Dept. of Ecology)
- State Wastewater Discharge Permit (WA Dept. of Ecology)
- Shoreline Management Act- Substantive Requirements (WA Dept. of Ecology)
- Well Abandonment/Construction Permits (WA Dept. of Ecology)
- Well Construction and Operator's License (WA Dept. of Ecology)

Local

- Construction Permits (Seattle PUD and King County)
- Grading Permit (City of Seattle)
- Industrial Waste Permit (King County)
- Stormwater Control Permit (City of Seattle)

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.) [help]

The proposed project involves the excavation of contaminated soil at the Jacobson Terminals site and backfill of clean material in its place. The project will remove polychlorinated biphenyls (PCBs) and other contaminants from the Interim Action (IA) area at the site, which will reduce the risk of contaminant migration to the Lake Washington Ship Canal. Contaminated soil will be transported to an off-site facility approved for disposal of PCB-contaminated waste. The IA area encompasses approximately 0.1 acres. The project is expected to achieve cleanup standards per Washington Administrative Code (WAC) 173-340-430(2). As proposed, the interim remedial action includes the following components:

- Removing site obstructions such as pavement, existing wells, and buried utilities.
- Dewatering the site before excavation and/or dewatering of excavated material.
- Treating contaminated water generated by dewatering activities prior to discharge to the sanitary sewer system. This will likely involve a storage/flow-equalization tank followed by solids filtration and granular activated carbon filtration.
- Mobilizing, operating, and subsequent demobilizing of soil excavation and supporting materials and equipment (e.g., decontamination equipment, temporary fencing, continuous trencher or similar low-clearance equipment, loading facilities, dump trucks, backfill materials).
- Temporarily rerouting subsurface utilities around the excavated area.
- Permanently replacing underground utilities following excavation and backfill.
- Transporting excavated contaminated soil to an off-site facility approved for disposal of PCB-contaminated material.
- Backfilling the excavation area with clean, imported fill material.
- Restoring the site and disposing of project waste materials.

Project construction is expected to occur from November 2016 through February 2017, but will not commence until all necessary permits and approvals are obtained. The project schedule assumes that site preparation activities can be completed in a month. The operation of the continuous trenching/backfilling activities is expected to proceed at a rate of approximately 100 to 200 cubic yards per day, which will require 14 to 27 construction days for the targeted 1 mg/kg cleanup level. The site will be restored immediately after completing the excavation and backfill activities; site restoration is expected to be completed within a week. The project will occur within upland areas at least 50 feet away from the Lake Washington Ship Canal. All work will be completed above the ordinary high water mark. No adverse effects to riparian or aquatic habitat in or adjacent to the ship canal are expected.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist. [help]

The Jacobson Terminals facility is located at 5350 30th Avenue NW, in the Ballard district of Seattle, Washington. The site is geographically located in Township 25 North, Range 3 East, and Section 11. Latitude and longitude coordinates are 47.6676 North and -122.3943 West, respectively. The Jacobson Terminals property boundaries include the Lake Washington Ship Canal to the east and south, Seaborn property to the east, US Army Corps of Engineers (Corps) property to the west, and City of Seattle (City) property to the north. A vicinity map and site plan are provided in Figures 1 and 2, respectively.

B. ENVIRONMENTAL ELEMENTS [help]

1. Earth

a. General description of the site [help]
(circle one): Flat, rolling, hilly, steep slopes, mountainous,
other _____________

The long axis of the IA area runs west to east and is generally flat.

b. What is the steepest slope on the site (approximate percent slope)? [help]

~ 10%. The northwest corner of the property, which is used for parking, is approximately 5 feet above the elevation of the rest of the property. This parking lot is at the approximate elevation of the adjacent City property and railroad tracks.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils. [help]

Below the impervious surface layer, soils at the project site consist of approximately 10 feet of fill overlying native estuarine sediment. The fill is a diverse mixture of silty sand, silt, wood waste, and occasional debris. A layer of wood waste approximately 6 to 10 feet deep has been identified over much of the northern portion of the property (Hart Crowser 2014). A geologic cross-section of the IA area indicates that surface soils within this area consist of slightly gravelly, silty Sand, with discontinuous layers of Silt (Hart Crowser 2015). No agricultural soils are present at the project site.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe. [help]

The project site has been developed and is covered by asphalt. Due to these factors and the flat slope at the project site, soil instability is not an issue.

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill. [help]

The proposed work includes excavating, backfilling, and grading. The purpose of this work is to remove PCB-contaminated soils from the IA area and then backfill the area with clean material. The remedial action has been designed to meet the Model Toxics Control Act (MTCA) unrestricted use cleanup level of 1 mg/kg for PCBs. As such, the approximate removal/fill area and volumes are as follows:

- Excavation, backfilling, and grading area – ~4,600 square feet
- Excavation/backfill volume – ~2800 cubic yards
- Depth – 0 to ~21 feet

Excavated areas will be backfilled to restore existing grades. Clean fill material will be used for backfilling from a local source to be determined by the contractor.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe. [help]

Appropriate best management practices (BMPs) will be applied to control the potential for erosion during excavation and after clean soils have been placed at the site.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)? [help]

The Terminals property is currently covered with asphalt. Following excavation and backfill, the remedial site will be recovered with asphalt, which will recreate a physical barrier between site soils and the terrestrial community. Asphalt resurfacing is also necessary as part of the Terrestrial Ecological Evaluation (TEE) exemption requirements (WAC 173-340-7491).

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any: [help]

Contractors will be required to implement BMPs for erosion control during construction consistent with the Washington State Department of Ecology Stormwater Management Manual for Western Washington. These may include covering stockpiles or using fabric filter fences, straw bales, and/or other similar measures. Silt fences or other erosion control measures will be used to protect sedimentation into the Lake Washington Ship Canal. Following construction, the IA area will be recovered with asphalt and restored to existing conditions.

2. Air

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known. [help]

Short-term air emissions are expected to be limited to diesel and gasoline engine emissions from work vehicles and other heavy equipment being used for excavating, backfilling, grading, and other construction work. The potential exists for dust to be generated during excavation, backfilling, and grading. Dust suppression BMPs will be employed during these activities and for stockpiled soil, including but not limited to, wetting and covering the soil. After the project is completed, air emissions at the project site are expected to be consistent with existing conditions.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe. [help]

No.

c. Proposed measures to reduce or control emissions or other impacts to air, if any: [help]

BMPs will be implemented by the contractor, as appropriate, to control or reduce emissions, including but not limited to, keeping areas wetted to reduce dust during earthwork activities and maintaining all internal combustion equipment to limit emissions.

3. Water

a. Surface Water: [help]

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into. [help]

The proposed project site is located adjacent to the Lake Washington Ship Canal, which connects Lake Washington with Puget Sound. There are no other streams or wetlands within the project area. Existing stormwater runoff from the project site is routed into the City's stormwater conveyance system.

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans. [help]

There will be no in- or over-water work. Work will be performed in upland areas within 100 feet of the Lake Washington Ship Canal; however, the work will not extend below or waterward of the ordinary high water mark (OHWM). The project site and Lake Washington Ship Canal are shown on the vicinity map and site plans (see Figures 1 and 2).

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material. [help]

None.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known. [help]

No.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan. [help]

No. According to the 1995 FEMA Flood Insurance Rate Map, the project site is within Zone X, which is outside of the 500-year floodplain.

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge. [help]

No. Any wastewater resulting from site or soil dewatering will be pretreated and then released to the City's sanitary sewer, consistent with all applicable state and local requirements. The contractor will implement BMPs to ensure that no wastewater or stormwater runoff from the excavation area is released into the Lake Washington Ship Canal. BMPs will also be implemented to reduce the potential for leakage of petroleum products (fuels, oil, grease, hydraulic fluids, lubricants), as well as minimize and control spills. These measures will be taken to reduce potential contaminant releases into surface waters through stormwater runoff.

b. Ground Water:

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known. [help]

Groundwater will not be withdrawn from a well for drinking water purposes. Water will not be discharged to groundwater.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve. [help]

Not applicable. The work does not involve discharge of waste material into the ground from septic tanks or other sources.

c. Water runoff (including stormwater):

1) Describe the source of runoff (including stormwater) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe. [help]

Some stormwater runoff is expected during construction activities due to the timing of the project (November through February). Currently, stormwater runoff at the site drains to the City's stormwater conveyance system, which provides treatment before release to surface waters. The contractor will implement BMPs to contain and treat stormwater that contacts the excavated sediments so that contaminants are not released into the Lake Washington Ship Canal. Since the site is less than one acre, an NPDES permit is not required. However, contract plans and specifications will require the contractor to develop a Stormwater Pollution Prevention Plan that is generally in accordance with the substantive requirements of the current Washington State Construction Stormwater General Permit.

2) Could waste materials enter ground or surface waters? If so, generally describe. [help]

Since BMPs will be implemented during project activities, there is very little potential for waste materials to enter ground or surface waters. Any discharges, if they occur, are planned to be managed on site, as appropriate. Contractors will be required to have spill response plans and appropriate materials necessary to contain and clean up an accidental spill at the site.

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.

No. The site grade will be restored back to original condition following remediation activities.

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:

Impervious surface sweeping will be implemented to limit materials that can be mobilized by storm events as well as other BMP measures including minimizing exposed soil during rainy periods using plastic covering or use of straw bales. Care will be taken to prevent petroleum products, chemicals, or other toxic materials from entering the water. Contractors will be required to have spill response plans and appropriate materials necessary to contain and clean up an accidental spill at the site. Construction BMPs will comply with the substantive requirements of the Construction Stormwater General Permit and Stormwater Management Manual for Western Washington.

4. **Plants** [help]

a. Check the types of vegetation found on the site: [help] None. The IA area is completely covered by asphalt.

___deciduous tree: alder, maple, aspen, other: deciduous larch conifers
___evergreen tree: fir, cedar, pine, other:
___shrubs
___grass
___pasture
____crop or grain
____orchards, vineyards or other permanent crops.
____wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
____water plants: water lily, eelgrass, milfoil, other
____other types of vegetation

b. What kind and amount of vegetation will be removed or altered? [help]

None.

c. List threatened and endangered species known to be on or near the site. [help]

None are known to occur within the IA area or project site. The nearby Lake Washington Ship Canal provides habitat for several federally-listed salmonids, as described below.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any: [help]

None. The site will be restored to existing conditions.

e. List all noxious weeds and invasive species known to be on or near the site.

None.

5. **Animals**

a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site. Examples include: [help]

- Birds: Urban birds, such as pigeons, gulls, crows, and starlings may utilize the project site. Waterfowl, eagles, osprey, great blue heron, and various songbirds have been observed at the adjacent Corps property and nearby Charles S. English Botanical Gardens.
- Mammals: Small mammals (e.g. shrews, moles, squirrels, and raccoons) may be found on the property, but are more likely to occur in nearby wooded areas. California sea lions and harbor seals are periodically observed at the locks to feed on salmon and steelhead. Steller sea lions are less frequently sighted at the locks.

- Fish: Six anadromous salmonid species are known to pass through the Locks and Ship Canal - Chinook salmon, coho salmon, sockeye salmon, coastal cutthroat, steelhead, and bull trout. Marine fish that may inhabit the canal include starry flounder, shiner surfperch, striped surfperch, and Pacific herring. The canal also supports a variety of shellfish species.

b. List any threatened and endangered species known to be on or near the site. [help]

No known threatened or endangered species are known to utilize the project site. The Lake Washington Ship Canal provides habitat for Puget Sound Chinook salmon, Puget Sound steelhead trout, and Coastal/Puget Sound bull trout, which are all federally threatened species. Coho salmon are not federally listed, but are protected under the Magnuson-Stevens Act.

c. Is the site part of a migration route? If so, explain. [help]

No, the project site is not part of a migration route.

d. Proposed measures to preserve or enhance wildlife, if any: [help]

The removal of PCB contaminated soil would reduce a source of groundwater contamination to the Lake Washington Ship Canal, which would improve water quality for fish and wildlife that use the canal.

e. List any invasive animal species known to be on or near the site.

None are known.

6. **Energy and natural resources**

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc. [help]

The completed project will not have any energy needs.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe. [help]

No.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any: [help]

None are proposed.

7. **Environmental health**

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe. [help]

Potential environmental health hazards during the cleanup work include accidental spills or leakage of petroleum products from construction equipment used during construction. Contractors will be required to have spill response plans and appropriate materials necessary to contain and clean up an accidental spill at the site. The Contractor will be required to prepare a health and safety plan for work in areas where it is expected that contaminated soil may be encountered.

1) Describe any known or possible contamination at the site from present or past uses.

Historical environmental investigations have identified several contaminants of concern in soil and/or groundwater at the project site including PCBs, metals, petroleum hydrocarbons, chlorinated benzenes, and chlorinated solvents. These contaminants are the result of past land use activities at and adjacent to the project site. The proposed interim action will remove priority contaminants within the IA area. Future remedial actions may address other soil and groundwater contaminants on the Jacobson Terminals property.

2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

None are anticipated.

3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.

Petroleum products will be used for the construction equipment during execution of the work.

4) Describe special emergency services that might be required.

None are anticipated.

5) Proposed measures to reduce or control environmental health hazards, if any:

- Health and Safety Plan;
- Spill Control Plan;
- BMPs;
- HAZWOPER training; and
- HAZMAT handling training and equipment.

b. Noise

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)? [help]

Existing noise will not affect the project.

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site. [help]

Short-term construction noise will occur associated with a variety of construction equipment and activities including truck engines, excavators, backhoes, and other heavy equipment. Construction work and noise will be limited to work days and daytime hours.

3) Proposed measures to reduce or control noise impacts, if any: [help]

Construction activities will be implemented in a manner consistent with the City of Seattle municipal code and state environmental noise standards.

8. Land and shoreline use

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe. [help]

Currently, the Jacobson Terminals property is used as a marine support facility, which provides boat storage, maintenance, and repair services. The IA area is used for parking and boat storage. The project is not anticipated to impact surrounding properties.

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use? [help]

The project site has not been used as working farmlands or working forest lands. No agricultural or forest land of long-term commercial significance will be converted to other uses.

1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:

No.

c. Describe any structures on the site. [help]

Several small marina offices and warehouses are located on the western part of the property. Large boat storage racks are located along the Lake Washington Ship Canal and adjacent to the IA area.

d. Will any structures be demolished? If so, what? [help]

No.

e. What is the current zoning classification of the site? [help]

Industrial (IGIU/45).

f. What is the current comprehensive plan designation of the site? [help]

Industrial.

g. If applicable, what is the current shoreline master program designation of the site? [help]

Not applicable.

h. Has any part of the site been classified as a critical area by the city or county? If so, specify. [help]

No.

i. Approximately how many people would reside or work in the completed project? [help]

Current use of the site is expected to remain unchanged following project completion.

j. Approximately how many people would the completed project displace? [help]

None.

k. Proposed measures to avoid or reduce displacement impacts, if any: [help]

Not applicable.

L. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any: [help]

The project site will be cleaned up and restored to pre-existing conditions; land uses will not change.

m. Proposed measures to ensure the proposal is compatible with nearby agricultural and forest lands of long-term commercial significance, if any:

Not applicable. There are no agricultural or forest lands of long-term significance nearby.

9. **Housing**

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing. [help]

Not applicable. The proposed project does not involve housing construction.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing. [help]

Not applicable.

c. Proposed measures to reduce or control housing impacts, if any: [help]

Not applicable.

10. **Aesthetics**

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed? [help]

No structures are proposed.

b. What views in the immediate vicinity would be altered or obstructed? [help]

Not applicable.

c. Proposed measures to reduce or control aesthetic impacts, if any: [help]

Not applicable.

11. **Light and glare**

a. What type of light or glare will the proposal produce? What time of day would it mainly occur? [help]

The proposal will not produce light or glare.

b. Could light or glare from the finished project be a safety hazard or interfere with views? [help]

Not applicable.

c. What existing off-site sources of light or glare may affect your proposal? [help]

None.

d. Proposed measures to reduce or control light and glare impacts, if any: [help]

Not applicable.

12. **Recreation**

a. What designated and informal recreational opportunities are in the immediate vicinity? [help]

The project site is a commercial marine facility and does not support recreation. However, adjacent areas, such as the Lake Washington Ship Canal, Ballard Locks, and the Charles S. English Botanical Gardens provide recreational boating, hiking, and sightseeing opportunities.

b. Would the proposed project displace any existing recreational uses? If so, describe. [help]

No.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any: [help]

Not applicable.

13. **Historic and cultural preservation**

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers located on or near the site? If so, specifically describe. [help]

The Washington Information System for Architectural and Archaeological Records Data (WISAARD) was reviewed to determine whether cultural and historic resources have been previously identified at or near the Jacobson Terminals property (http://www.dahp.wa.gov/, accessed 6/11/15). The database indicates that the Jacobson Terminals site is within the geographical extent of the Chittenden Locks and Lake Washington Ship Canal Historic Register Property. However, no known historic buildings or structures are present within the IA area or project site.

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources. [help]

There are no known landmarks, features, or evidence of Indian or historic use or occupation within the IA area or project site. The project site encompasses a former estuarine tideflat that has been subject to significant disturbance over the years. In the 1920s, the area was filled with sand dredged from the Lake Washington Ship Canal, as well as wood waste and construction debris. The property was formerly the site of a lumber mill and surrounding properties were used for industrial manufacturing. Based on this disturbance history, it is unlikely that the project site supports any culturally significant resources.

c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc. [help]

Further investigations will be needed to determine potential impacts to cultural and historic resources on or near the project site. We anticipate that this will involve consultation between the Washington Department of Ecology and Department of Archaeology and Historic Preservation (DAHP). These results of these investigations will determine what measures will be needed (if any) to avoid, minimize, or compensate for disturbance to these resources.

d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.

A cultural and historic resources review will be performed to determine what measures are necessary to protect these resources. We expect that if any historical or archeological resources are found during project implementation, then the project will be stopped and the appropriate agencies (DAHP) will be notified. If needed, a plan that will satisfy DAHP requirements for dealing with these resources will be prepared. Work will resume once DAHP determines that the site is in compliance with its regulations.

14. **Transportation**

a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any. [help]

The Jacobson Terminals property is served by an access road that intersects 30th Avenue NW. The access road runs along the south side of the railroad tracks and leads to the Terminals property and other commercial facilities. This street will serve as the main access route during construction.

b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop? [help]

The nearest King County Metro transit stop is located at NW 54th Street and 30th Avenue NW, which is approximately 600 feet from the site.

c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate? [help]

Not applicable. Existing parking will remain unchanged following project completion.

d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private). [help]

No.

e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe. [help]

The project site is located in close proximity to rail tracks and the Lake Washington Ship Canal. However, the project is not expected to use these methods of transportation.

f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates? [help]

During construction of the project, excavated materials and backfill will be transported from and to the site in single or double dump trucks. It is estimated that during project construction, approximately 5 to 10 double dump truck (or 10 to 20 single dump truck) trips per day will be generated, which would occur over a few days. Truck travel may occur throughout the workday, as trucks become available and loads are prepared for transport to and from the site. Additionally, contracted worker travel to and from the site may generate approximately 3 to 5 passenger vehicular trips per day over 4 to 6 weeks. These are rough estimates and are based on similar project experience. The completed project will not generate daily vehicular trips. Following completion of construction, vehicular traffic for the site in general is expected to return to pre-existing conditions.

g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.

No.

h. Proposed measures to reduce or control transportation impacts, if any: [help]

None.

15. **Public services**

a. Would the project result in an increased need for public services (for example, fire protection, police protection, public transit, health care, schools, other)? If so, generally describe. [help]

No.

b. Proposed measures to reduce or control direct impacts on public services, if any. [help]

Not applicable.

16. **Utilities**

a. Circle utilities currently available at the site: [help]
electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other ___________

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed. [help]

No new utility services are proposed for the project. The project will temporarily relocate buried utilities that are present within the IA area and place them back underground following construction activities.

C. Signature [HELP]

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: ____

Name of signee: __Eugene Freeman__________________________________

Position and Agency/Organization: _Site Manager

____Washington State Department of Ecology, Toxics Cleanup Program______

Date Submitted:_June 2015_

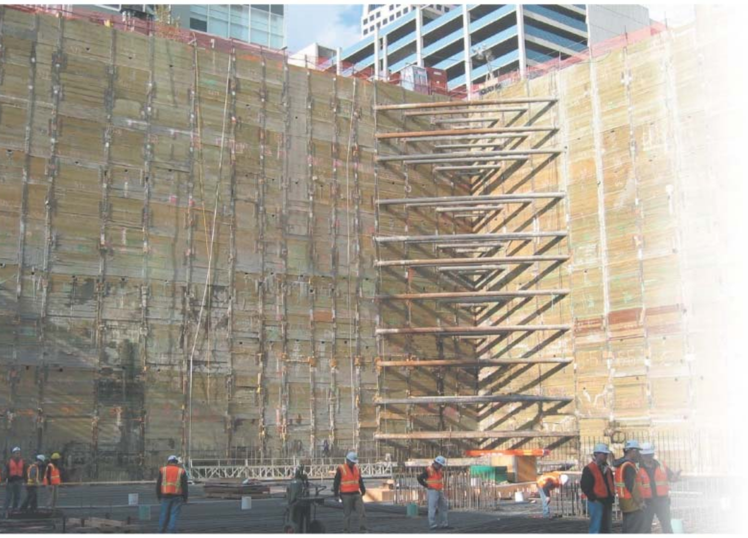
Attachments:

Figure 1 – Vicinity Map

Figure 2 – Site Overview Map

A02
Interim Action Work Plan

IFB XXXX TCP
JACOBSON TERMINALS PROPERTY
INTERIM REMEDIAL ACTION
[MONTH] 20XX



DRAFT

Interim Action Work Plan

Jacobson Terminals Property

Seattle, Washington

Prepared for

Washington State
Department of Ecology

June 9, 2016
17800-56

HARTCROWSER

www.hartcrowser.com

DRAFT

Interim Action Work Plan

Jacobson Terminals Property

5350 30th Avenue NW

Seattle, Washington

Prepared for

Washington State

Department of Ecology

June 9, 2016

17800-56

Prepared by

Hart Crowser, Inc.

State of Washington
2943
Licensed Geologist
Philip R. Cordell

Phil Cordell, LG
Senior Project Geologist
Phil.cordell@hartcrowser.com

Mike Ehlebracht
Principal Geochemist
mike.ehlebracht@hartcrowser.com

3131 Elliott Avenue, Suite 600
Seattle, Washington 98121
Fax 206.328.5581
Tel 206.324.9530

Contents

1.0 INTRODUCTION	1
1.1 Purpose	**1**
2.0 SITE DESCRIPTION AND BACKGROUND	3
2.1 Location and Site Description	**3**
2.1.1 Current Conditions at Surrounding Properties	3
2.1.2 Historical Site Use	3
2.2 Summary of Previous Environmental Characterization and Remediation Activities	**4**
2.2.1 Contaminants of Concern	4
2.2.2 Historical Environmental Characterization	4
2.2.2 Historical Remediation Activities	5
2.3 Environmental Setting	**5**
2.3.1 Geology	6
2.3.2 Hydrogeology	6
2.3.3 Ship Canal Surface Water Hydrology	7
3.0 CLEANUP OBJECTIVES	7
3.1 Remedial Action Objectives	**7**
3.2 Cleanup Standards	**7**
3.2.1 Soil	8
3.2.2 Groundwater	8
3.2.3 Sediment	8
3.3 Area of Concern	**8**
3.4 ARARs and Applicable Regulations	**9**
4.0 REMEDIAL INVESTIGATION	10
4.1 Remedial Investigation Activities	**10**
4.1.1 Push Probes	10
4.1.2 Monitoring Well Installation	11
4.1.3 Groundwater Sampling	11
4.1.4 Sediment Sampling	12
4.2 Remedial Investigation Results	**12**
4.2.1 Soil Investigation Results	13
4.2.2 Groundwater Investigation Results	17
4.3.3 Sediment Investigation Results	19
4.3.4 Data Gaps	21

5.0 CONCEPTUAL SITE MODEL 21

6.0 DEVELOPMENT OF REMEDIATION ALTERNATIVES 23

6.1 Remediation Technology Screening 23

6.1.1 In Situ Solidification/Stabilization 23

6.1.2 Excavation and Off-Site Disposal 27

6.2 Remediation Alternative Descriptions 28

6.2.1 Alternative 1 – In Situ Stabilization 28

6.2.2 Alternative 2 – Excavation and Off-Site Disposal 30

7.0 REMEDIATION ALTERNATIVE SELECTION 31

7.1 Selection Criteria 31

7.2 Alternative Evaluation and Selection 32

8.0 SCHEDULE 34

9.0 REFERENCES 34

TABLES

1 Soil Sample Analytical Results
2 Analytical Results for Dioxins and Furans in Soil Samples
3 Water Sample Analytical Results
4 Sediment Sample Analytical Results
5 Potential Applicable or Relevant and Appropriate Requirements
6 Alternative 1 Cost Summary 30
7 Alternative 2 Cost Summary 31
8 Disproportionate Cost Analysis

ILLUSTRATIONS

1 Examples of soil mixing equipment and techniques 25
2 Continuous trenching 26

FIGURES

1 Vicinity Map
2 Exploration Location Plan
3 Generalized Geologic Cross Section A–A’
4 Generalized Geologic Cross Section B–B’
5 Groundwater Elevation Contours April 2005
6 2014 PCB Occurrences in Soil
6a 2014 PCB Concentrations in Soil 0 to 10 Feet
6b 2014 PCB Concentrations in Soil 10 to 18 Feet
6c 2014 PCB Concentrations in Soil below 18 Feet
7 2014 Chlorinated Benzene Occurrences in Soil
8 2014 Chlorinated Ethene Occurrences in Soil

9 2013–2014 Groundwater COC Concentrations
10 2014 PCB Occurrences in Sediment
11 Conceptual Site Model
12 Interim Action Remediation Area Greater than 10 mg/kg
13 Interim Action Remediation Area Greater than 1 mg/kg
14 Comparison of Costs for Each Proposed Cleanup Level 33

APPENDIX A
Field Exploration Methods and Analysis with Boring, Monitoring Well, and Vibracore Logs

APPENDIX B
Chemical Data Quality Review and Laboratory Reports

APPENDIX C
Benthic Survey

APPENDIX D
Cost Summary Backup

APPENDIX E
Data Gaps Report

Jacobson Terminals Property

Seattle, Washington

1.0 INTRODUCTION

This report presents the results of a remedial investigation (RI) and remedial alternatives evaluation performed for the Washington State Department of Ecology (Ecology) for the Jacobson Terminals Site (site) in Seattle, Washington (Figure 1). The interim action work plan (IAWP) focuses on soil remediation at the north end of the site, which contains polychlorinated biphenyls (PCBs), chlorinated benzenes, and chlorinated solvents in exceedance of regulatory criteria. The IAWP is limited to this area of concern (AOC) and does not include adjacent properties, other areas of the site, or the aquatic environment (Figure 2).

The Jacobson Terminals facility has been enrolled in Ecology's Voluntary Cleanup Program (VCP) since 2001 under VCP number NW0611. Aspect Consulting (Aspect) has been the owner's environmental consultant since 2003. The work for this report follows previous investigations and remedial actions conducted by Aspect and Hart Crowser at the site beginning in 1996. Hart Crowser's work for this Interim Action (IA) was conducted under contract to Ecology.

1.1 Purpose

The purpose of this IA is to develop and evaluate remedial alternatives for the AOC and to recommend the most appropriate alternative based on chemical and physical conditions in this area. This IA is intended to achieve cleanup standards per Washington Administrative Code (WAC) 173-340-430(2). The focus of this interim action is to remove or stabilize elevated PCB concentrations in soil within the AOC to reduce the risk of contaminant migration to the Lake Washington Ship Canal. This IA does not directly address other COCs at the site and will result in partial remediation of PCB-impacted media.

1.2 Interim Action Approach and Report Organization

The preparation of this IAWP involved completing a Remedial Investigation (RI) and developing, evaluating, and recommending an appropriate remedial action for the AOC that would meet MTCA requirements specified in WAC 173-340-430. Specific tasks for this IAWP included:

- Completing an RI in accordance with WAC 173-340-430(7)(b);
- Identifying the AOC for remediation;
- Reviewing existing site information to assess soil conditions in the AOC, previous remediation activities completed at the site, and potential exposure pathways;

- Developing remedial action objectives and remediation goals based on the cleanup levels established for the AOC;
- Developing remediation alternatives for the AOC from applicable technologies;
- Evaluating alternatives following the evaluation criteria specified in WAC 173-340-360; and
- Recommending a cleanup alternative for the AOC.

This IAWP is organized into the following sections:

- **Section 2.0 – Site Description and Background.** This section provides the general description of the site, its location, historical and current activities, and previous investigations.
- **Section 3.0 – Cleanup Objectives.** This section details the remedial action objectives, cleanup standards to be used, identifies the AOC, and outlines the applicable or relevant and appropriate requirements (ARARS). This section provides the framework for evaluating remediation alternatives described later in this IAWP, and for selecting a preferred alternative.
- **Section 4.0 – Remedial Investigation**. This section details the findings of the soil, groundwater, and sediment investigation.
- **Section 5.0 – Conceptual Site Model.** This section provides a conceptual understanding of the site derived primarily from the results of the historical research, RI, and previous remedial activities at the site. Included is a discussion of the constituents and media of concern, the fate and transport characteristics of the constituents of concern, potential exposure pathways, and potential receptors at the site.
- **Section 6.0 – Development of Remediation Alternatives.** This section describes the details of each remediation alternative. Candidate remedial technologies were identified to develop potential cleanup alternatives for further evaluation in this IAWP.
- **Section 7.0 – Remediation Alternatives Selection.** Remediation alternatives are evaluated in this section by comparative analysis. A disproportionate cost analysis is used to determine whether the cleanup action uses cost-effective solutions to the maximum practicable extent. Finally, a recommendation is provided based on the results of the evaluation and disproportionate cost analysis.

Supporting information is provided in the tables, figures, and appendices at the end of the IAWP text.

2.0 SITE DESCRIPTION AND BACKGROUND

2.1 Location and Site Description

The Jacobson Terminals facility is located at 5350 30th Avenue NW in the Ballard district of Seattle (Figure 1). The property boundaries are the Lake Washington Ship Canal (Ship Canal) to the east and south, Seaborn property to the east, Army Corps of Engineers (Corps) property to the west, and City of Seattle (City) property to the north.

The site is generally flat. The northwest corner, which is used for parking, is approximately 5 feet above the elevation of the rest of the property, at the approximate elevation of the City property and railroad tracks.

Large boat storage racks are located along the Lake Washington Ship Canal. Offices and small warehouses border the US Army Corps of Engineers (Corps) property to the west.

Numerous utilities run through the site and the AOC. A municipal sewer line located approximately 10 feet below ground surface (bgs) runs west to east within the AOC. A private sewer connects to the municipal line from the on-site business. Other utilities include a fire hydrant, two underground water lines, high- and low-voltage overhead power, and communication lines that are located in the AOC.

Fencing and gates control access to the site. (A site map is provided on Figure 2.) The Terminals property is zoned industrial (IGIU/45).

2.1.1 Current Conditions at Surrounding Properties

The Corps property contains offices, maintenance buildings, and a tourist facility for the Ship Canal Locks. The Seaborn property is used for boat moorage and office space. The City property consists of a former Burlington Northern Railroad right of way and contains active railroad tracks. North of the City property and railroad tracks, at 2801 NW Market Street, is the Market Street property, which consists of a climbing gym and other commercial businesses.

2.1.2 Historical Site Use

Terminals Property

The property is located on a former estuarine tideflat. In the 1920s, the area was filled with sand dredged from the Lake Washington Ship Canal, wood waste, and construction debris. The property was the site of a lumber mill from approximately 1890 to the 1930s. Starting around 1940, the property was used for loading and unloading boats and for storage. Alan and Brian Jacobson (partners in A&B Jacobson, LLC) purchased the property in 1975 and the property has been used as a marine support facility since that date.

Market Street Property

Approximately 14 interconnected buildings were constructed on the Market Street property from 1946 to 1955. Fuel tanks and shell casings were reportedly manufactured at the property before the factory switched to steel window frame manufacturing in the late 1940s. In 1955, the factory stopped producing steel frames and began producing aluminum window frames. This manufacturing process used extrusion presses, an anodizing circuit of 21 aboveground steel or concrete tanks, a paint room, ten underground storage tanks (USTs), and an interior drainage system that included 24 floor drains, trench drains, and sumps.

Wastewater from the Market Street property was discharged to the Lake Washington Ship Canal from approximately 1948 to 1978; in later years, the wastewater was treated on the property and discharged to the King County Metro wastewater collection system. Violations of the Metro permit for pH and metal discharge exceedances are documented in the project file. A video inspection of the sewer lines was conducted in the late 1970s and severe deterioration and disintegration of the lines was observed. The former owner of the property reportedly replaced the lines. Window manufacturing operations ceased at the Market Street property in 1989 (Hart Crowser 2000).

2.2 Summary of Previous Environmental Characterization and Remediation Activities

A number of environmental investigations and remedial actions have been completed at the site and the adjacent Corps, City, and Market Street properties. A summary of contaminants of concern and remedial activities are provided below.

2.2.1 Contaminants of Concern

Based on the results of historical environmental investigations and this RI, the major contaminants of concern (COCs) include:

- PCBs in soil at the Terminals property;
- Tri-, di-, and chlorobenzene in soil and groundwater at the Terminals property;
- Petroleum hydrocarbons in soil at the Terminals property;
- Chlorinated solvents (PCE, TCE, cis-DCE, and vinyl chloride) in soil and groundwater on the Market Street, City, Corps, and Terminals properties; and
- Metals in soil and groundwater on the Terminals, Market Street, and City properties.

PCBs are the focus of this IAWP, and their nature and extent is the sole basis for evaluation of the remediation alternatives.

2.2.2 Historical Environmental Characterization

Groundwater monitoring was first conducted to delineate a vinyl chloride plume identified at the upgradient Market Street property. Historical releases of metals, low- and high-pH solutions, and solvents occurred on the Market Street and City properties during operations by Fentron Industries (Fentron). The releases created localized exceedances of metals in soil and groundwater and an extensive groundwater plume of tetrachloroethene (PCE) and associated degradation products (primarily trichloroethene [TCE], cis-1,2-dichloroethene [cis-DCE], and vinyl chloride). Prior to installation of a treatment wall in 1999, the plume extended from the Market Street and City properties onto the Corps and Terminals properties.

A separate area of chlorinated solvents, located on the City property downgradient of the Market Street treatment wall, was identified as the likely source of chlorinated solvent impacts on the Terminals property, although elevated chlorinated solvent concentrations observed during this RI in the northeast corner of the site suggest that there are still soil impacts downgradient of the Market Street treatment wall.

A historical release of transformer oil containing PCBs and trichlorobenzene on the northern portion of the Terminals property created a plume of PCBs and several chlorinated benzene compounds in groundwater (Figure 2). Elevated concentrations of PCBs and chlorinated benzenes above applicable cleanup levels (see section 3.2) have been identified in soil samples up to 30 feet bgs downgradient of where the presumed transformer oil release occurred.

During construction activities in the early 1990s, a separate area of PCB- and petroleum-impacted soil was discovered at the Terminals property in an alley that borders the Corps property (Figure 2).

2.2.2 Historical Remediation Activities

A number of remedial actions have been completed at the site to address potential human and ecological exposure to the COCs described above. These cleanup actions were conducted under the Voluntary Cleanup Program (VCP) by the Jacobsons.

In 1996, PCB- and petroleum-contaminated soil was removed from between two buildings bordering the Corps property. Much of the source material was removed, but confirmation sampling showed that petroleum hydrocarbon concentrations remained above cleanup levels in sidewall and bottom samples (Hart Crowser 1997).

In 2001 and 2002, Fenton's Reagent (acidified hydrogen peroxide and ferrous iron) was injected in the AOC to provide source area treatment of the PCB/chlorinated benzene plume and to provide a more aggressive oxygen enhancement for degrading cis-DCE and vinyl chloride. In December 2003, a continuous permeable treatment wall containing granular activated carbon and zero-valent iron was installed along the Lake Washington Ship Canal to remove PCBs and chlorinated benzenes from groundwater (Aspect 2003).

2.3 Environmental Setting

This section describes the environmental setting of the property including geology, hydrogeology, and surface water hydrology.

2.3.1 Geology

Terminals property soil generally consists of approximately 10 feet of fill overlying native estuarine sediment. The fill is a diverse mixture of silty sand, silt, wood waste, and occasional debris. A layer of wood waste approximately 6 to 10 feet deep has been identified over much of the northern portion of the property. Below the fill layer is native sand or silty sand to 16 to 18 feet deep. Beneath the sand layer is a layer of discontinuous silt and clay, typically 1 to 4 feet thick. Below this layer are discontinuous layers of sand and silt of increasing density. Two generalized geologic cross sections are provided on Figures 3 and 4.

During the RI investigation, the silt and clay layer was not observed at MW-200 and JT-US-33. This suggests that the layer may not be continuous.

2.3.2 Hydrogeology

Groundwater Flow Patterns

Shallow groundwater in the area generally flows toward the south-southeast before discharging into the Lake Washington Ship Canal. Groundwater elevations on the Terminals property are typically 7 to 8 feet relative to the city of Seattle elevation datum. Groundwater is typically encountered 4 to 7 feet bgs on the site. The groundwater elevation fluctuates approximately 2 feet seasonally and depends largely on the elevation of the Ship Canal, which is adjusted seasonally by the Corps of Engineers. A map showing site groundwater elevation contours measured in 2005 is provided on Figure 5.

Groundwater elevations have typically been lower near the sewer line in the JT-9 area than the rest of the property. A sewer camera survey in April 2003 indicated that a connection to the side sewer was located in this area. The camera noted water flowing in at the side sewer connection with significant scale buildup. The sewer line is located below the water table (see Figure 3 and 4); therefore, leakage of shallow groundwater into the sewer could result in the observed groundwater depression (Aspect 2003).

Groundwater Flow Rates

An upward gradient has been reportedly identified between the deeper water-bearing zone (beneath the silty clay layer) and the shallower water-bearing zone, with the hydrostatic head typically 1 to 2 feet greater at wells JT-5, MW-8D, MW-100, and MW-00 than at adjacent shallower wells.

Saturated-zone soil at the site is reported to have generally low hydraulic conductivity. Slug tests performed in 2003 indicated that at five of six wells tested, the average hydraulic horizontal gradient was 0.02 foot per foot across the property, and assuming a porosity of 0.4, the estimated groundwater flow rate is 0.1 foot per day (40 feet per year). Using the maximum calculated hydraulic conductivity in the remaining well, the groundwater flow rate would be 0.7 foot per day (250 feet per year). Using vinyl chloride (a very mobile compound in groundwater) as a conservative tracer, groundwater velocity was calculated at approximately 0.4 foot per day, or 150 feet per year (Aspect 2003).

2.3.3 Ship Canal Surface Water Hydrology

In 1914, Lake Union was hydraulically connected to Lake Washington by construction of the Montlake Cut between Portage Bay and Union Bay. Lake Union was also connected to the then-marine waters of Salmon Bay by construction of the Fremont Cut. The connection to Shilshole Bay and Puget Sound, and a means to control water levels, was established by constructing the Hiram M. Chittenden Locks. The Fremont Cut and Montlake Cut make up the Lake Washington Ship Canal. The locks and dam maintain the Ship Canal water level.

These modifications increased inflow to Lake Union by diverting the outflow from Lake Washington into the Montlake Cut and, hence, Lake Union, which now drains west into Salmon Bay. During periods of high water flow, the north part of Lake Union can flush (completely exchange water) in about 7 days. However, the southern part of Lake Union does not completely flush and remains relatively stagnant. Opening the locks also allows a periodic influx of dense salt water from Puget Sound into the Ship Canal. Because the saltwater is heavier than freshwater, it sinks to the bottom of the canal and moves eastward following the density gradient into Lake Union. The balance between the saltwater intrusion and the flushing rate at a given time varies. During the rainy season and spring thaw, runoff from the Cascade foothills is high and the lake is flushed. In the summer, as the runoff flow decreases and lock openings increase, saltwater intrusion increases.

The Corps maintains the water level in Lake Washington and Lake Union by regulating flow through the locks on the western end of Salmon Bay. Lake Union water levels vary by roughly 2 feet during the year, from 20 feet during the winter months to 22 feet during the summer months.

The Lake Washington Ship Canal from the locks (river mile 1.0) to Lake Washington (river mile 8.6) is designated as “lake class” by Ecology, stipulating that water quality must meet the requirements for most, if not all of the following uses: wildlife habitat; general recreation; fish reproduction, rearing, and harvest; water supply; and stock watering. However, it should be noted that elevated salinity levels within the portion of the Ship Canal adjacent to the Terminals property would likely severely limit its potential use as a source for potable water.

3.0 CLEANUP OBJECTIVES

3.1 Remedial Action Objectives

The remedial action objectives (RAOs) of the interim remedial action is to remove PCB and chlorinated benzene source material. Following removal of the impacted soil, a reduction in PCB and chlorinated benzene concentrations in groundwater is expected. The long-term goal is to reduce COC concentrations in groundwater to levels protective of surface water, so the treatment wall is no longer necessary. Depending on the remediation alternative selected, follow-up cleanup activities may be necessary to achieve the cleanup standards described in section 3.2.

3.2 Cleanup Standards

Cleanup levels for soil, groundwater, and sediment are presented below.

3.2.1 Soil

Soil screening levels have historically been compared to MTCA Method A Industrial screening levels or MTCA Method C Direct Contact Levels for Industrial Sites (Hart Crowser 1999).

To evaluate whether COC concentrations in soil are protective of adjacent surface waters, screening levels were calculated using Ecology's Three-Phase Partitioning Model (WAC 173-340-747). This model provides a conservative estimate for establishing a soil concentration that will not cause groundwater contamination above an acceptable level. Surface water screening values presented in Table 3 were used to compute soil screening levels protective of the groundwater exposure pathway.

For chemicals with no freshwater screening values, the MTCA Method A or B cleanup level was used. For this IA, PCB concentrations were also compared to the MTCA Method A unrestricted cleanup level of 1 mg/kg and the MTCA Method A industrial cleanup level of 10 mg/kg for evaluation of remediation alternatives costs. Soil screening levels are shown in Tables 1 and 2.

3.2.2 Groundwater

Groundwater screening levels have historically been compared to surface water protection criteria. Depending on the COC, either MTCA Method B freshwater screening criteria or State freshwater screening criteria as defined in WAC 173-201A were used (Hart Crowser 1999).

Due to the proximity to the Lake Washington Ship Canal, as defined in WAC 173-430-720 and 173-430-730, screening levels were updated based on the most conservative freshwater screening levels for consumption of organisms: Federal Clean Water Act Section 304, National Toxics Rule 40 CFR 131, or MTCA Method B surface water criteria, whichever is lower. For chemicals with no freshwater screening values, MTCA Method A cleanup levels were used. Groundwater screening levels are shown in Table 3.

3.2.3 Sediment

Sediment data was compared to the Washington State Freshwater Sediment Cleanup Objective Criteria and Freshwater Sediment Cleanup Screening Levels as defined in WAC 173-204. Sediment screening levels are shown in Table 4.

3.3 Area of Concern

The area of concern for this IA is the PCB-impacted area shown on Figure 6. For the purpose of our remediation alternatives evaluation, three potential remediation areas have been delineated on Figure 6. The three areas of concern are:

- **Area exceeding the MTCA Method A industrial cleanup level (>10 mg/kg)**
  - Area – ~3,420 square feet
  - Depth – 0 to ~19 feet
  - Volume – ~2050 cubic yards

- **Greater than MTCA Method A Unrestricted (>1 mg/kg)**
  - Area – ~4,600 square feet
  - Depth – 0 to ~21 feet
  - Volume – ~2800 cubic yards

- **Area exceeding surface water protection criteria (>0.0000787 mg/kg)**
  - Area – Not delineated (>13,000 square feet)
  - Depth – Not delineated (0 to 30+ feet)
  - Volume – Unknown (>14,500 cubic yards)

Note that areas and volumes are based on potential excavation areas discussed in section 6. A detailed discussion of RI analytical results can be found in section 4.0.

3.4 ARARs and Applicable Regulations

This section identifies potential applicable or relevant and appropriate requirements (ARARs) to be used in assessing and implementing remedial actions at the site. The potential ARARs focus on federal or state statutes, regulations, criteria, and guidelines. The specific types of potential ARARs evaluated include contaminant-, location-, and action-specific ARARs. Each type of potential ARAR is evaluated for the site AOC and summarized in Table 5.

In general, only the substantive requirements of ARARs are applied to MTCA cleanup sites being conducted by Ecology (WAC 173-340-710[9][b]). Thus, cleanup actions under a formal agreement with Ecology are exempt from the administrative and procedural requirements specified in state and federal laws. This exemption also applies to permits or approvals required by local governments.

Contaminant-Specific ARARs

Contaminant-specific ARARs are usually health- or risk-based numerical values or methodologies that, when applied to site-specific conditions, result in the establishment of numerical contaminant values that are generally recognized by the regulatory agencies as allowable to protect human health and the environment. As noted in Section 3.2, Ecology has established MTCA cleanup levels and Sediment Management Standards for site COCs.

Action-Specific ARARs

Action-specific ARARs are pertinent to particular remediation methods and technologies, and to actions conducted to support cleanup. Action-specific ARARs are requirements that may need to be satisfied during the performance of specific remedial actions because they prescribe how certain activities (e.g., treatment and disposal practices, media monitoring programs) must occur. Typically, action-specific ARARs are not fully defined until a preferred response action has been selected and the corresponding remedial action can be more completely refined. However, preliminary consideration of the range of potential action-specific ARARs may help focus the process of selecting a preferred remedial action alternative.

Location-Specific ARARs

Location-specific ARARs are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they are in a specific location. Some examples of special locations include floodplains, wetlands, historic sites, and sensitive ecosystems or habitats.

4.0 REMEDIAL INVESTIGATION

In January 2013, in general accordance with the Soil, Groundwater, and Sediment Characterization Work Plan dated December 19, 2013, Hart Crowser conducted a soil, groundwater, and sediment investigation to characterize and delineate the PCB and chlorinated benzene impacted area at the site. Analytical data from this investigation indicated that impacted soil extended beyond the limits of the investigation.

To address these data gaps, a supplemental soil and groundwater investigation was completed in March 2013, in general accordance with the Supplemental Soil and Groundwater Characterization Work Plan dated March 6, 2013.

A detailed description of field activities including departures from the proposed SAP/QAPP are presented in Appendix A.

4.1 Remedial Investigation Activities

A summary of investigation activities is provided below. A detailed description of processes used to complete the RI is included in Appendix A. Exploration locations are shown on Figure 2.

4.1.1 Push Probes

Thirty-eight push-probe borings were completed to depths ranging from 10 to 30 feet bgs at locations shown on Figure 2. Push-probe borings were logged at 5-foot intervals and field-screened using headspace and water sheen tests to determine the appropriate interval for collecting discrete samples. Based on the field indications, and when sufficient soil recovery allowed, a single discrete soil sample was collected from most 5-foot samples. If there was no field indication of contamination, the soil at the groundwater interface was typically selected for analysis. Each sample was analyzed for:

- Volatile Organic Compounds (VOCs) by EPA Method 8260C; and
- Polychlorinated Biphenyls (PCBs) by EPA Method 8082A.

Selected samples were analyzed for:

- Metals by EPA Method 6020A/7471;
- Dioxin/furans by EPA Method 1613B;
- Diesel- and oil-range petroleum hydrocarbon analysis by Northwest Test Method NWTPH-Dx;
- Total solids by EPA Method 160.3M/SM 2540B; and
- TOC by Plumb (1981).

The first round of push probes were advanced on January 2, 3, and 6, 2014, the second round of push probes were advanced on March 11 and March 12. All samples were delivered to Analytical Resources, Inc., of Tukwila, Washington. Boring logs are presented in Appendix A.

4.1.2 Monitoring Well Installation

Two hollow-stem auger borings were completed as monitoring wells to 30 feet bgs at locations shown on Figure 2. Monitoring wells were screened from 25 to 30 feet bgs. Borings were generally logged at 1.5-foot intervals from samples collected every 5 feet. Samples were field-screened using headspace and water sheen tests. Samples selected for analysis were based on field screening and/or from below 18 feet bgs, beneath the silt/clay layer. Four soil samples were collected and analyzed for:

- Volatile Organic Compounds (VOCs) by EPA Method 8260C;
- Polychlorinated Biphenyls (PCBs) by EPA Method 8082A; and
- Total solids by EPA Method 160.3M/SM 2540B.

Hollow-stem auger and well installation was completed on March 13 and March 14, 2014. All samples were delivered to Analytical Resources, Inc. of Tukwila, Washington. Boring logs are presented in Appendix A.

4.1.3 Groundwater Sampling

On January 7, 8, 9, and 11, 2014, select existing monitoring wells were sampled to assess groundwater conditions. Groundwater samples were collected from within the source area (IP-9, IP-14, and JT-8), four downgradient wells (JT-3, JT-7, JT-11, and SRW-1), one upgradient well (MW-8D), and the two compliance wells (JT-6 and JT-12). Groundwater samples collected during the first investigation were analyzed for:

- VOCs by EPA Method 8260C;
- PCBs by EPA Method 8082A;
- Total Metals (including arsenic, cadmium, chromium, lead, and mercury) by EPA Methods 6010/6020/7470A;
- Dissolved Metals and Inorganics (including arsenic, calcium, cadmium, chromium, lead, magnesium, and mercury) by EPA Methods 6010/6020/7470A;
- TOC by SM5410;
- Alkalinity by SM2320B; and
- Nitrate, Sulfate, and Chloride by EPA Methods 353.2/375.2/325.2.

The two deep monitoring wells (MW-100 and MW-200) described in section 4.1.2, and the two other existing deep wells (JT-5 and MW-8D) were sampled on March 18, 2014. Groundwater samples collected during this investigation were analyzed for:

- VOCs by EPA Method 8260C;
- PCBs by EPA Method 8082A; and
- Total Suspended Solids by SM240D.

All samples were delivered to Analytical Resources, Inc. Well construction logs for the sampled wells are presented in Appendix A.

4.1.4 Sediment Sampling

On January 14, 2014, five vibracores (JT-SS-01 thru JT-SS-05) were advanced approximately 2 to 4 feet below the mud line. Cores were logged and select samples were analyzed for:

- VOCs by EPA Method 8260C;
- PCBs by EPA Method 8082;
- Metals (including arsenic, cadmium, chromium, lead, and mercury) by EPA Method 200.8/6010/7470; and
- TOC by Plumb (1981).

Select sediment samples were archived for possible PCB congener analysis by EPA Method 1668 and dioxins/furans analysis by EPA Method 1613B. All samples were delivered to Analytical Resources, Inc., of Tukwila, Washington.

On January 14, 2014, three surface samples were collected using power Van Veen sediment sampling equipment for a limited benthic survey. Samples were submitted to Rhithron Associates, Inc., in Missoula, Montana, for aquatic invertebrate analysis.

4.2 Remedial Investigation Results

Hart Crowser's investigation found PCB- and chlorinated benzene-impacted soil extending beyond the area previously identified in the 2013 Data Gaps Report (Hart Crowser 2013a). Concentrations of PCBs in soil were above screening levels protective of surface water in all 40 borings. PCB impacts above MTCA Method A Unrestricted and/or Industrial cleanup levels were found to extend north, east, and west of the previously identified source area. Dioxin concentrations in three samples collected from the source area were also above the surface water screening level, but below expected local urban background concentrations (Ecology, 2011).

Groundwater sampling found PCB concentrations above surface water screening levels in all monitoring wells. Free-phase PCB oil was also found in monitoring wells IP-9 and JT-8. PCB concentrations above surface water screening levels were also found in the four deep wells at the site, MW-8D, JT-5, MW-100, and MW-200.

Sediment adjacent to the site, collected from just below the mud line, contained PCB concentrations below the sediment cleanup screening level, but above the sediment cleanup objective level. Salinity and aquatic invertebrate sampling indicates that at the time of our investigation, the portion of the Lake Washington Ship Canal adjacent to the site appears to be a freshwater environment.

A detailed description of the remedial investigation results is presented in sections 4.2.1 thru 4.2.3.

4.2.1 Soil Investigation Results

Numerous volatile organic compounds (VOCs) and/or PCBs were detected in all 103 soil samples collected from the 38 push probes and two monitoring wells. PCBs were found above concentrations protective of surface water in all 40 explorations. The chlorinated benzenes 1,4-dichlorbenzene, 1,2,4-trichlorobenzene, and/or chlorobenzene were detected in 51, 54, and 37 samples, respectively. Chlorinated ethenes including tetrachloroethene, trichloroethene, and/or vinyl chloride were also detected in a number of soil samples. These compounds represent the primary COCs at the site. Other VOCs, metals, and dioxins/furans were also detected in soil samples.

A discussion of the RI soil analytical data is presented below. Soil analytical data can be found in Tables 1 and 2. A site plan showing exploration locations is presented on Figure 2. Analytical data for select COCs is displayed on Figures 6 thru 6c (PCBs), Figure 7 (chlorinated benzene), and Figure 8 (chlorinated ethene).

PCBs

All 40 explorations advanced during the RI contained PCB concentrations in soil above levels protective of surface water (0.0000787 mg/kg). The screening level protective of surface water is below the laboratory method detection limit. A total of 91 samples contained detectable concentrations of PCBs. Aroclor 1260 was the most frequently detected PCB; it was detected in 88 of the 91 samples. Only two other Aroclors were detected in site soil. Aroclor 1248 was detected in four borings and Aroclor 1254 were detected in three. The extent of PCB impacts is shown on Figure 6 and PCB occurrences are displayed by depth intervals on Figure 6a (0 to 10 feet bgs), Figure 6b (10 to 18 feet bgs), and Figure 6c (over 18 feet bgs)

PCB concentrations were compared to three screening levels for remediation budgeting purposes. The following cleanup levels were used to evaluate PCB impacts at the site:

- MTCA Method A Industrial cleanup level of 10 mg/kg PCBs
- MTCA Method A unrestricted use cleanup level of 1 mg/kg PCBs
- MTCA protection of surface water for PCBs of 0.0000787 mg/kg, discussed in section 3.2.1.

The MTCA Method A Industrial cleanup level was exceeded in ten borings (JT-US-01, JT-US-02, JT-US-05, JT-US-08, JT-US-11, JT-US-14, JT-US-18, JT-US-19, JT-US-20, and JT-US-27). PCB concentrations ranged from 22 mg/kg in JT-US-11-S2 to 30,000 mg/kg in JT-US-27-S2. These elevated concentrations were generally observed just below the groundwater table from 6 to 11 feet bgs and are likely associated with the reported past transformer oil release. Deeper exceedances were observed in JT-US-05-S3 (1,800 mg/kg), collected from 17.5 to 18.25 feet bgs and JT-US-08-S4 (1,400 mg/kg), collected from 15 to 16 feet bgs. One near-surface exceedance (340 mg/kg) was located 2.5 to 3 feet bgs in JT-US-18-S1.

In general, exceedances of the MTCA Method A Industrial cleanup level were shallower in the western and northern portions of the AOC. Deeper impacts were generally observed in the southern and eastern portions of the plume. The exceedance in sample JT-US-05-S3 was collected from within the silt/clay layer.

The MTCA Method A Unrestricted cleanup level was exceed in six additional samples from borings JT-US-03, JT-US-05, JT-US-12, JT-US-28, JT-US-31, and JT-US-34. Three of the exceedances were from borings located outside of the area with PCB concentrations above MTCA Method A industrial cleanup levels, including JT-US-12, JT-US-28, and JT-US-31. These three borings are located along the north and western edges of the main plume and generally located at or below the water table.

One exceedance was located below the silt/clay layer. Soil sample JT-US-34-S3, collected from 20 to 21 feet bgs contained PCBs at 1.6 mg/kg. And soil sample JT-US-03-S3, collected within the silt/clay layer from 17.5 to 18 feet bgs contained PCBs at 1.2 mg/kg.

The MTCA screening level protective of surface water was exceeded in all 40 borings. Exceedances extended from the near-surface to 30 feet bgs in MW-200-S6 where PCBs were measured at 0.277 mg/kg. PCB concentrations above this screening level likely extend beyond the areas shown on Figures 6 thru 6c. The widespread and relatively low PCB concentrations indicate that these detections may be related to historical regional sources and are likely ubiquitous within this industrial area of Seattle.

Chlorinated Benzenes

Chlorobenzene, 1,4-dichlorobenzene, and 1,2,4-trichlorobenzene were detected throughout the study area. Their presence is likely related to the transformer oil release and generally co-occur in areas with elevated PCB concentrations. Chlorobenzene was detected in 54 samples, 1,4-dichlorobenzene was detected in 51 samples, and 1,2,4-trichlorobenzene was detected in 37 samples. The frequency of detections and the elevated chlorobenzene concentrations may suggest some anaerobic degradation of 1,2,4-trichlorobenzene. A discussion of the RI chlorinated benzene occurrences is presented below.

1,2,4-trichlorobenzene was detected at concentrations ranging from 0.0063 mg/kg to 370 mg/kg. The calculated MTCA Method B screening level protective of surface water is 0.0056 mg/kg. Numerous other detections were reported, but at concentrations below the laboratory reporting limit; those values were flagged with a T in Table 1. All detections were below the MTCA Method B cleanup level of 800 mg/kg. Elevated detections were generally observed near or below the water table at depths ranging from 7 to 18.25 feet bgs.

1,4-dichlorobenzene was detected at concentrations ranging from 0.0013 mg/kg to 52 mg/kg. Thirty-three samples exceeded the calculated MTCA Method B screening level protective of surface water of 0.02 mg/kg. All detections were below the MTCA Method B cleanup level of 5,600 mg/kg. The elevated concentrations were generally located near or below the water table.

Chlorobenzene was detected at concentrations ranging from to 0.0024 mg/kg to 3,800 mg/kg. Twenty-five samples exceed the calculated MTCA Method B screening level protective of surface water of 0.84 mg/kg. Chlorobenzene concentrations exceeded the MTCA Method B cleanup level of

1,600 mg/kg in one sample, JT-US-27-S2 (3,800 mg/kg). The elevated concentrations were generally located near or below the water table.

Chlorinated Ethenes

Tetrachloroethene, trichloroethene, and vinyl chloride were detected throughout the study area. Their occurrence is likely related to chlorinated ethene impacts documented within the upgradient Market Street Property. A discussion of the RI chlorinated ethene occurrences is presented below.

Tetrachloroethene (PCE) was detected in 11 samples above laboratory reporting limits. Seven samples contained PCE concentrations above the calculated MTCA Method B screening level protective of surface water of 0.0018 mg/kg. Concentrations in the seven samples ranged from 0.0027 mg/kg to 2.7 mg/kg. The highest concentration was detected in JT-US-32-S2 at 5 to 6 feet bgs. The elevated PCE concentrations were primarily observed in the northern and western parts of the AOC.

Trichloroethene (TCE) was detected above the laboratory detection limit in 14 samples. Ten samples contained TCE concentrations above the calculated MTCA Method B screening level protective of surface water of 0.0042 mg/kg. TCE concentrations in these samples ranged from 0.0024 mg/kg to 4.6 mg/kg. The highest concentration was detected in JT-US-018-S2 at 11 to 11.5 feet bgs. The elevated TCE concentrations were primarily observed in the northern and western portions of the AOC and generally observed at or below the water table. TCE was measured in JT-US-30-S4 at 0.0012 mg/kg at 20 to 21 feet bgs, below the silt/clay layer.

Vinyl Chloride was detected above the laboratory detection limit in 23 samples. All of these samples contained concentrations above the calculated MTCA Method B screening level protective of surface water of 0.00076 mg/kg, which is below the laboratory method detection limit. Vinyl chloride was measured in sample JT-US-018-S2 at 23 mg/kg, at a depth of 11 to 11.5 feet bgs. The other 20 vinyl chloride detections ranged from 0.0021 mg/kg to 0.41 mg/kg. The detections were observed throughout the study area at or below the water table. Vinyl chloride was not detected below the silt/clay layer and elevated detections were generally concentrated in the northern part of the AOC.

Metals

Thirty-three soil samples were analyzed for arsenic, cadmium, chromium, lead, and mercury. Samples were collected for waste profiling. Elevated lead, mercury, arsenic, and cadmium were detected in fill material at concentrations above their respective screening levels. Screening levels for metals are based on concentrations protective of surface water as described in section 3.2.1. For metals with no surface water screening levels, MTCA Method A unrestricted cleanup levels were used.

Lead was detected in all 33 samples analyzed. Only two samples exceeded the MTCA Method A unrestricted cleanup level of 250 mg/kg. Samples JT-US-003-S2 and JT-US-018-S2 had concentrations of 422 mg/kg and 1,050 mg/kg, respectively.

Arsenic was detected in all 33 samples analyzed. Six samples contained arsenic concentrations above the Puget Sound regional background 90th percentile level of 7 mg/kg (Ecology 1994). Sample JT-US-

018-S2 contained arsenic at 196 mg/kg. Arsenic concentrations in the other 32 samples ranged from 1.3 to 17.8 mg/kg.

Mercury was detected in 22 of the 33 samples analyzed at concentrations generally within the Puget Sound regional background 90th percentile level of 0.07 mg/kg. One sample exceeded the calculated MTCA Method B screening level protective of surface water of 0.157 mg/kg. Sample JT-US-012-S1 contained mercury at a concentration of 0.39 mg/kg. Concentrations in the other 21 samples ranged from 0.02 mg/kg to 0.13 mg/kg.

Cadmium was detected in 14 of the 33 samples analyzed. One sample exceeded the concentration protective of surface water of 5.6 mg/kg. Sample JT-US-018-S2 contained cadmium at 26 mg/kg.

Chromium was detected in all 22 samples analyzed at concentrations well below the MTCA Method A unrestricted cleanup level of 2,000 mg/kg.

Petroleum hydrocarbons

Petroleum hydrocarbons were initially analyzed for evaluation of potential *in situ* polishing following the PCB remedial action, but additional petroleum hydrocarbon identification was performed to identify whether impacted soil identified during field screening was a result of a PCB or petroleum release. Petroleum hydrocarbons concentrations were compared to MTCA Method A unrestricted cleanup levels.

Diesel-range organics, electrical insulating oil, lube oil, and gasoline-range organics were detected in fill material throughout the study area. Only one sample, JT-US-003-S2, which contained lube oil at 3,500 mg/kg, exceeded the MTCA Method A unrestricted cleanup level for lube oil of 2,000 mg/kg.

Dioxins/Furans

Three samples, JT-US-003-S2, JT-US005-S2, and JT-US-005-S2 were analyzed for dioxins/furans. All exceeded the toxicity equivalency quotient protective of surface water of 0.049 pg/g, but do not exceed the local background concentration of 47 pg/g (Ecology 2011). The toxicity equivalency quotient ranged from 1.59 pg/g to 5.53 pg/g.

Soil Results Summary

Our investigation found PCB impacts extending beyond the area previously identified in the Data Gaps Report (Hart Crowser 2013). PCB concentrations above MTCA Method A unrestricted cleanup levels extend to 21 feet bgs and concentrations above surface water protection criteria extend to 31 feet bgs. The lateral extent of PCB soil concentrations above MTCA Method A unrestricted cleanup levels have not been completely delineated to the north and east, but impacts related to the historical transformer oil release are unlikely to extend significantly further in either direction. PCB soil concentrations exceeding MTCA Method A industrial levels appear to be delineated. PCB concentrations exceeding levels protective of surface water have not been delineated. As noted previously, these low-level concentrations may be related to historical industrial operations.

Chlorinated benzene concentrations exceed calculated MTCA Method B screening levels protective of surface water throughout the AOC and appear to be co-located with elevated PCB occurrences. Elevated chlorinated ethene concentrations appear to be concentrated in the northern portion of the PCB-impacted area and were not detected in deeper samples from below the silt/clay layer. Scattered areas of petroleum, metals, and solvent related contaminants were observed in fill material within the study area.

4.2.2 Groundwater Investigation Results

Shallow groundwater wells and one deep well were sampled in January 2013. Following a review of the soil and groundwater data, deep wells JT-5 and MW-8D and two additional newly installed deep wells (MW-100 and MW-200) were sampled in March 2013, to determine if groundwater COC impacts extend to the lower aquifer.

PCBs were detected above MTCA Method B freshwater surface water protection screening levels (0.000064 µg/L for Total PCBs which is below the PQL) in all 14 groundwater samples, including the compliance wells JT-6 and JT-12 and the four deep wells, JT-5, MW-8D, MW-100, and MW-200. PCB free-phase product was found in shallow wells IP-9 and JT-8.

Chlorinated benzenes were detected above MTCA Method B freshwater surface water protection screening levels in three shallow wells located within the AOC.

A discussion of the RI groundwater analytical data is presented below. Groundwater analytical data can be found in Table 3. A site plan showing select groundwater COC concentrations is presented on Figure 9.

PCBs

Aroclor 1260 was the only Aroclor detected and it was found in all groundwater samples at concentrations ranging from 0.018 µg/L to 280 µg/L. Monitoring wells IP-9 and JT-8 contained the highest concentrations of Aroclor 1260, 18 µg/L and 280 µg/L, respectively. A viscous product was observed at the bottom of both wells during development. A sample of the product was collected from JT-8 and analyzed for diesel- and oil-range organics. The results were quantified by the lab as diesel- and residual-range organics at concentrations of 3,600 mg/L and 1,400 mg/L, respectively. A review of the chromatogram indicated the detections were due to the presence of PCBs, not diesel- and oil-range organics.

Three shallow wells downgradient of the PCB-impacted soil area, JT-3, JT-7, and JT-11 contained Aroclor 1260 concentrations of 0.76 µg/L, 0.17 µg/L, and 0.91 µg/L. These wells are located upgradient of the wall. Aroclor 1260 was measured at 0.13 µg/L in SRW-1, located within the treatment wall. Downgradient compliance wells JT-12 and JT-6 contained Aroclor 1260 concentrations of 0.018 µg/L and 0.05 µg/L, respectively.

Deep wells JT-5, MW-100, and MW-200, screened from 25 to 30 feet bgs, contained Aroclor 1260 concentrations of 0.91 µg/L, 1.1 µg/L, and 0.057 µg/L, respectively. A slight sheen was noted on the groundwater during development and purging of well JT-6. Deep well MW-8 was sampled twice, in

January and March; Aroclor 1260 concentrations were 0.49 µg/L and 0.18 µg/L, respectively. Monitoring well MW-8D is located on the northern edge of the PCB AOC. Monitoring well MW-200 is located adjacent to monitoring well JT-8 where PCB product was observed in the upper aquifer. Wells MW-100 and JT-5 are located down gradient of the treatment wall.

Chlorinated Benzenes

The chlorinated benzenes 1,4-dichlorobenzene, and 1,2,4-trichlorobenzene were detected above MTCA Method B freshwater surface water protection screening levels in AOC monitoring wells. Chlorinated benzenes were detected at concentrations below surface water screening levels downgradient of the AOC and in both compliance wells.

1,4-dichlorobenzene was detected in AOC wells IP-9, IP-14, and, JT-8 at concentrations of 33 µg/L, 670 µg/L, and 730 µg/L, respectively, above the Method B freshwater protection screening level of 21 µg/L.

Compliance wells JT-12 and JT-6 contained 1,4-dichlorobenzene at 1.5 µg/L and 2.7 µg/L, respectively. Downgradient wells JT-3, JT-11, and JT-7 contained 1,4-dichlorobenzene concentrations of 1.7 µg/L, 1.8 µg/L, 2.3 µg/L, respectively. It was not detected above laboratory detection limits in SRW-1.

Deep well MW-200 contained 1,4-dichlorobenzene at 4 µg/L, and it was detected in well MW-100, but at concentrations below the laboratory reporting limit. Concentrations were below laboratory detection limits in MW-8D and JT-6.

1,2,4-trichlorobenzene was detected within the AOC in wells IP-14, IP-9, and JT-8 at concentrations of 960 µg/L, 130 µg/L, and 9,900 µg/L, respectively, above the Method B freshwater protection screening level of 2.03 µg/L. Deep well MW-200 contained 1,2,4-trichlorobenzene at a concentration (100 µg/L) exceeding the screening level.

Concentrations of 1,2,4-trichlorobenzene in downgradient wells JT-3 and JT-7 were measured at 0.86 µg/L and 0.58 µg/L, respectively, below the freshwater screening level. 1,2,4-trichlorobenzene was detected in deep wells MW-8D and JT-5, but at estimated concentrations below laboratory reporting limits.

Chlorobenzene was detected in 11 of the 13 wells sampled. Concentrations ranged from 0.28 µg/L to 1,200 µg/L, below the Method B freshwater protection screening level of 800 µg/L. Concentrations in wells located in the PCB impacted area (IP-14, IP-9, and JT-8) ranged from 150 µg/L to 1,200 µg/L. Downgradient and compliance wells exhibited chlorobenzene concentrations ranging from 42 µg/L to 300 µg/L. Deep wells MW-8D, MW-100, and MW-200 contained concentrations between 0.28 µg/L and 16 µg/L. Chlorobenzene was not detected in deep well JT-5.

Chlorinated Ethenes

No chlorinated ethenes were detected above Method B freshwater protection screening levels. Vinyl chloride was detected in eight wells, PCE and TCE were only detected in JT-8. Detected vinyl chloride concentrations ranged between 0.21 µg/L and 1.1 µg/L. PCE was measured at 0.29 µg/L in JT-8 and TCE was detected at estimated concentrations below the laboratory reporting limit.

Metals

Arsenic was the only metal detected above Method B freshwater protection screening levels. Dissolved arsenic was detected in nine of the ten wells sampled for metals at concentrations ranging from 4.8 µg/L to 25.1 µg/L. Total arsenic was detected in all wells tested at concentrations ranging from 0.2 µg/L to 21.8 µg/L.

No other metals were quantified above their respective screening levels. Metals were not analyzed for in wells JT-5, MW-100, and MW-200.

Total Petroleum Hydrocarbons

Diesel- and residual-range organics were detected in a sample of product collected from well JT-8. A review of the chromatogram showed the thick, viscous sample had a PCB signature, not petroleum.

Conventionals

Alkalinity, chloride, nitrate, sulfate, total organic carbon (TOC), and total suspended solids (TSS) were analyzed during the first round of sampling to assess whether soil and groundwater conditions were favorable for conducting supplemental *in situ* treatment following the IA. Analytical data suggest that conditions at the site are suitable for anaerobic bioremediation, including a mix of reductive and oxidative processes. A detailed analysis of potential post-interim action treatment options will be conducted following selection and implementation of the IA.

Groundwater Summary

Groundwater PCB concentrations exceeded the MTCA Method B freshwater surface water protection screening level in all wells sampled, including the four deep wells. The highest PCB concentrations were observed upgradient of the treatment wall near the PCB remediation area. Free-phase PCB product was observed in wells JT-8 and IP-9. Chlorinated benzenes only exceed surface water screening levels within the AOC.

Deep well MW-200 contained 1,2,4-trichlorobenzene concentrations approximately 50 times above the surface water screening level. No silt or clay was observed while drilling MW-200, suggesting that groundwater from the upper aquifer may be mixing with the lower aquifer at this location.

4.3.3 Sediment Investigation Results

The sediment investigation found PCB and arsenic impacts above Washington Sediment Management Standards (SMS) freshwater Sediment Cleanup Objective (SCO) levels but below Cleanup Screening Levels (CSL). There are no freshwater sediment management standards for chlorinated benzene and chlorinated ethene COCs.

Sediment analytical data can be found in Table 4 and sediment PCB analytical data is presented on Figure 10. The benthic survey is included in Appendix C.

Salinity

Salinity calculations from conductivity and temperature measurements were consistently 0.05 parts per thousand (ppt) at vibracore locations JT-SS-01, JT-SS03, and JT-SS-05. Measurements were collected within the water column at 3-foot intervals from just above the mud line to just below the water surface. The low salinity levels indicate that freshwater conditions were present at the time of the measurements.

A limited benthic survey was performed on three surface sediment samples collected from sediment sampling locations JT-SS-01, JT-SS-02, and JT-SS-03. The benthic community in the three samples was identified as a freshwater population. None of the organisms identified were characteristic of a marine environment. The results of the benthic survey are presented in Appendix C.

The results of these surveys support the conclusion that the Lake Washington Ship Canal adjacent to the site is a freshwater environment and state freshwater sediment management standards should be used to evaluate sediment COCs.

PCBs

Total PCBs were detected in all eight sediment samples at concentrations ranging from 0.0072 mg/kg to 0.405 mg/kg. The SCO and CSL for total PCBs is 0.11 mg/kg and 2.5 mg/kg, respectively. Surface samples collected from 0 to 1 foot below the mud line were above the PCB SCO in JT-SS-01 (0.283 mg/kg), JT-SS-02 (0.133 mg/kg), JT-SS-03 (0.346 mg/kg), and JT-SS-05 (0.292 mg/kg). The 1- to 2-foot sample at JT-SS-5 (0.405 mg/kg) also exceeded the SCO.

Unlike upland soil and groundwater samples, Aroclor 1254 was the most frequently detected Aroclor and generally had the highest concentrations. Aroclor 1248 and 1260 were also detected in most of samples, but at concentrations below Aroclor 1254. The varying distribution of Aroclors between the upland AOC soil and groundwater matrices versus the Ship Canal sediments may indicate differing sources.

Metals

Arsenic exceeded the SCO of 14 mg/kg in surface samples collected 0 to 1 foot below mud line at core locations JT-SS-03 (17.2 mg/kg), JT-SS-04 (71.8 mg/kg), and JT-SS-05 (23.5 mg/kg). Arsenic was detected in the other five sediment samples collected at concentrations ranging from 4.7 to 13 mg/kg. No other metals analyzed for were detected above their respective sediment screening levels

Chlorinated Benzenes

Chlorobenzene and 1,4-dichlorobenzene were the only chlorinated benzene COCs detected in the eight sediment samples. Freshwater sediment management standards have not been established for either chemical. 1,4-dichlorobenzene was measured at 1.4 mg/kg in JT-SS-03-S1, collected from 0 to 1 feet below the mud line, and it was detected below the reporting limit in JT-SS-04-S1. Chlorobenzene was detected below the reporting limit in samples JT-SS-03-S1, JT-SS-04-S1, and JT-SS-05-S1.

Chlorinated Solvents

Vinyl Chloride and TCE were not detected above laboratory detection limits. PCE was detected below the laboratory reporting limit in JT-SS-03-S2, collected from 1 to 2 feet bgs. PCE was not detected above laboratory detection limits in the other seven samples.

Summary

Sediment adjacent to the site are impacted with PCBs and arsenic above Washington State Department of Ecology freshwater sediment cleanup objective screening levels. In order to determine whether remediation is warranted, a sediment bioassay would likely be needed to determine the site-specific risk. Based on the distribution of PCB Aroclors detected in the sediment, it does not appear that discharges from the AOC are the primary source of PCBs to shallow sediment within the Lake Washington Ship Canal.

4.3.4 Data Gaps

The extent of impacted soil, groundwater, and sediment above screening levels has not been delineated. Additional investigations will be needed to assess the extent of the impacted media.

RI analytical data indicates that the PCB-impacted soil exceeding MTCA Method A Industrial cleanup levels has been delineated. The vertical and lateral extent of PCB soil concentrations exceeding the calculated MTCA Method B screening level protective of surface water have not been defined. Additional sampling may be needed to delineate PCB impacts exceeding surface water screening levels or assess whether these low-level PCB detections are characteristic of local background levels.

Additional sediment assessments, including a bioassay, may be needed to determine if the observed contaminants pose a risk to the aquatic environment.

Groundwater concentrations above surface water screening levels are present downgradient of the treatment wall and within the deeper aquifer. Additional characterization may be needed to assess the extent of the COC impacts and the effectiveness of the IA.

5.0 CONCEPTUAL SITE MODEL

A conceptual site model (CSM) presents the links between contaminant sources, release mechanisms, exposure pathways and routes, and receptors to summarize the current understanding of the risk to human health and the environment. Figure 11 graphically illustrates the preliminary CSM developed for the PCB/chlorinated benzene area.

A historical release of transformer oil resulted in introduction of PCBs and chlorinated benzenes to Terminals property soil, creating a secondary source. Secondary release mechanisms include fugitive dust, plant uptake, infiltration and leaching to groundwater, and volatilization. Groundwater discharge can also potentially impact surface water. Exposure routes potentially include inhalation, ingestion, and dermal contact.

Potential human receptors include workers inside the Terminals property buildings, potential workers during future development of the site, and utility workers. Terrestrial ecological receptors include plants and animals exposed to impacted media, as well as secondary food chain consumers such as birds and mammals.

A Terrestrial Ecological Evaluation (TEE) was not completed for the Terminals property because it qualifies for a TEE exemption. As detailed in WAC 173-340-7491, the property is covered by asphalt, creating a physical barrier between contaminated media and plants and wildlife, qualifying the property for exemption from TEE requirements. To formally qualify for this exemption, institutional controls to maintain the asphalt will need to be put in place, requiring a formal written agreement between the property owner and Ecology. Assuming these steps are taken, a TEE is not required for the Terminals property.

For a contaminant to present a risk to human health and/or the environment, the pathway from the contaminant to the receptor must be complete. The potential exposure pathways and whether they are considered complete are summarized below.

Soil. On-site soil may contain elevated concentrations of PCBs, metals, chlorinated benzenes, and chlorinated ethenes. The site is paved and, therefore, there is no exposure pathway unless the pavement is removed. Workers digging in the soil for future development or utility work may be exposed to contaminants without adequate personal protective equipment and safety procedures. Routes of exposure include incidental ingestion and direct contact. Available data indicate that soil contamination does not extend off-property.

Groundwater. Three potential exposure routes exist for groundwater: inhalation of vapors, incidental ingestion, and direct contact. Complete pathways for incidental ingestion and direct contact only exist if workers are digging in soil below the water table. Volatile aromatic compounds dissolved in Terminals property groundwater may volatilize out of the liquid phase and migrate upward into unsaturated soil pore spaces. Given that the nearest Terminal buildings are located over 80 feet upgradient of the PCB/chlorinated benzene plume, indoor air impacts are unlikely. There is a potential for on-site and off-site utility workers to be exposed to vapors.

Surface Water. Shallow groundwater beneath the property migrates to the Lake Washington Ship Canal. There is a potential for dissolved contaminants to impact the aquatic environment.

Sediment. Arsenic and PCBs in sediment can impact the aquatic environment. Additional data will need to be collected to see if concentrations truly pose a risk to the environment.

Soil Gas. Volatilization of chlorinated benzenes in the soil can lead to concentrations in soil gas that may migrate to the surface. Impacts to indoor air within existing Terminal buildings is unlikely given their distance from the plume. However, this pathway may exist for utility workers.

Fugitive Dust. The fugitive dust pathway does not exist while the site it paved. Fugitive dust could be a potential pathway if the pavement is removed and workers are digging in the soil.

Plant Uptake. The PCB/chlorinated benzene area and surrounding Terminals property are predominantly paved or covered by building foundations. Plants are not grown for human consumption within the impacted areas and, therefore, the pathway is incomplete.

The main exposure pathways that exist at the site that are not currently mediated are migration of dissolved contaminants to adjacent surface water beneath or around the existing treatment wall and inhalation risk to utility workers. Several pathways are potentially complete only if property or utility work includes digging in the soil or groundwater.

6.0 DEVELOPMENT OF REMEDIATION ALTERNATIVES

The remedial actions considered in this interim action work plan are intended to address residual contaminants in site soils that were not removed by the prior *in situ* chemical oxidation remedial actions. Remedial technologies potentially applicable for addressing the residual site contaminants are identified and screened to eliminate those that are not effective at achieving the RAOs (see Section 3.0 Cleanup Objectives) and to select process options that are the most implementable and/or cost effective. The retained technologies and preferred process options are then combined into remedial alternatives and descriptions of their conceptual designs and implementation details are developed for subsequent detailed evaluation.

6.1 Remediation Technology Screening

The remediation technologies considered for addressing the source area soils at this site are (1) *in situ* solidification/stabilization and (2) excavation with off-site disposal. *In situ* solidification/stabilization is intended to lock up contaminants within the soil matrix and prevent mobilization to the groundwater, while excavation with off-site disposal would physically remove the contaminated soil so further mobilization of contaminants to groundwater could not occur. These two remediation technologies and process options potentially applicable to site conditions are discussed below.

6.1.1 In Situ Solidification/Stabilization

In situ solidification/stabilization consists of mixing Portland cement, fly ash, or other pozzolonic agent with the contaminated soil to form a solid, cemented mass. Because the contaminants are incorporated within the cemented mass they are no longer in contact with percolating water or groundwater and, therefore, cannot migrate to potential human or ecological receptors.

Advantages of this remediation technology are that remedial activities are largely limited to the site, and:

- Site dewatering is not necessary, avoiding the trouble and expense of treating and disposing of this water;
- Off-site traffic to transport contaminated soil and import backfill is avoided; and
- The expense of off-site transport and disposal of contaminated soil and the import and backfilling of replacement is avoided.

Disadvantages of this remediation technology are:

- Site contaminants are not destroyed and remain in place, (although immobilized);
- Future site uses may be restricted by the cemented soil mass (e.g., excavation for future building foundations or the placement of subsurface utilities may be impractical);
- Groundwater flow patterns may be disturbed and may limit effectiveness of the zero-valent iron/granular activated carbon wall on impacts from upgradient sources outside of the treatment area;
- Treatability studies would be required to determine solidification mixture; and
- Institutional controls including a restrictive covenant would likely be required.

The equipment used for mixing the cement with site soil is typically a large-diameter (3 to 10 feet) auger. A cement and grout mixture is injected through the hollow stem of the auger while it is advanced to depth and then reversed to mix the soil and cement and to remove the auger. Sequential auger borings are overlapped to assure complete site coverage. An optional process is to use a bank of (usually three) counter-rotating, large-diameter augers to provide greater assurance of auger overlap and mixing than the single-auger process option provides. Single and triple augers and soil mixing techniques are shown in Illustration 1, below.

Single Auger Soil Mixer

Triple Auger Soil Mixer

Illustration 1. Examples of soil mixing equipment and techniques.

Site conditions that could affect implementation of this remediation technology include the presence of a high-voltage overhead power line through the remediation area. The drilling equipment typically used for the large-diameter augers is generally too tall to allow sufficient vertical clearance for safety reasons. Seattle City Light has stated that rerouting this power line or temporarily disrupting power through this line is not possible.

An optional process that could solve this dilemma is continuous trenching technology or specialized low-clearance drilling equipment. Continuous trenching equipment uses belt, chain, or auger mechanisms that are deployed at a low angle and brought to a vertical position in the subsurface. Illustration 2 shows an example of continuous trenching.

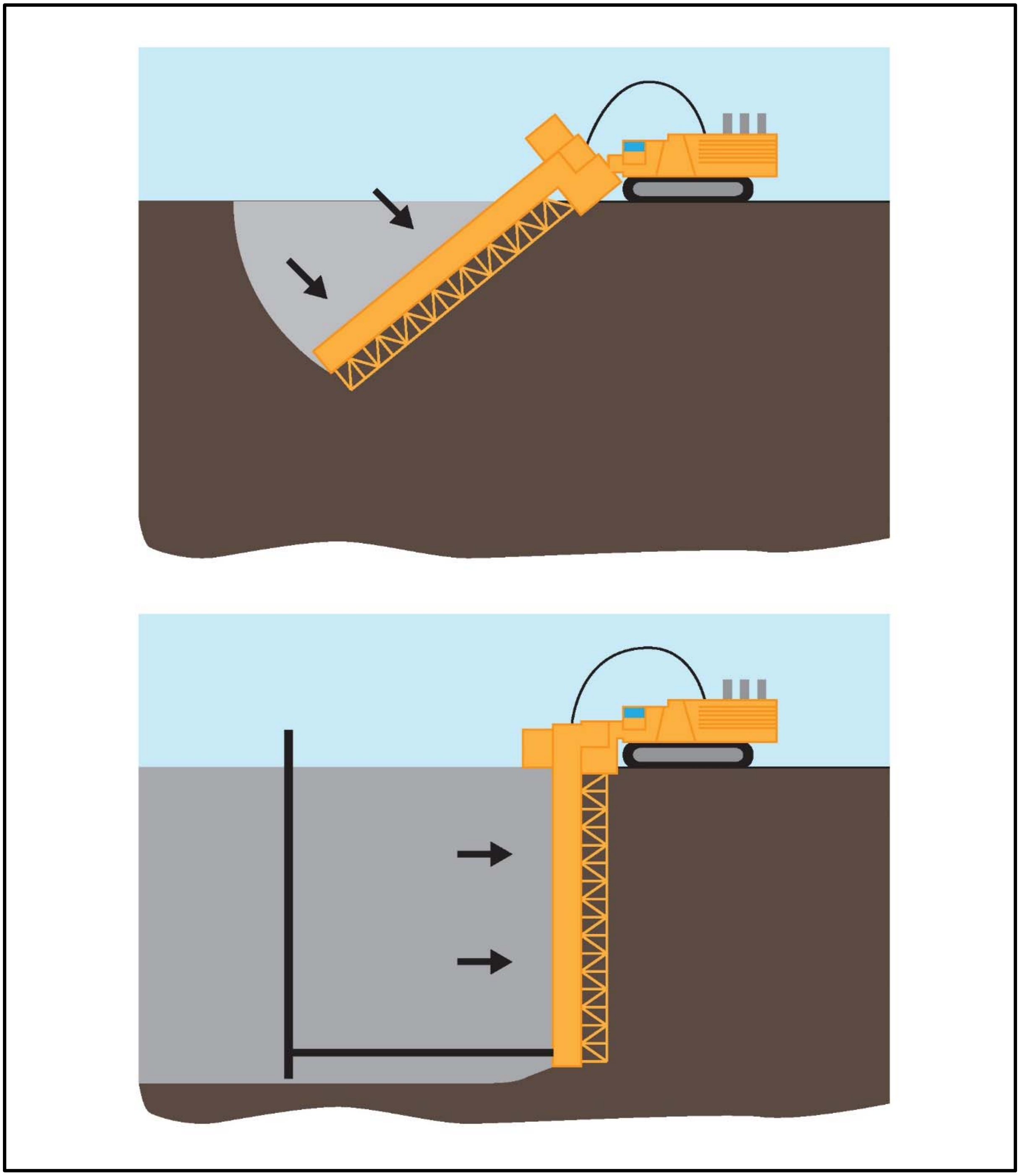


Illustration 2. Continuous trenching.

Continuous trenchers do not have a high vertical profile and would be able to meet the overhead power line clearance safety requirements. Because of the overhead power line safety concerns, the continuous trenching process option is retained for this remediation technology.

6.1.2 Excavation and Off-Site Disposal

Excavation and off-site disposal is a commonly used remediation technology that would permanently remove the source area contaminated soil for disposal in an appropriately designed and permitted off-site landfill. Soils containing PCBs that exceed 50 mg/kg would be disposed of at a TSCA landfill, and soil containing PCBs below 50 mg/kg would be disposed of at a RCRA hazardous waste landfill. It is possible that after waste profiling, some material may not be suitable for a landfill and may require incineration.

Conventional excavation at this site would require shoring to protect adjacent properties and ongoing site operations. Similar to the vertical clearance restrictions discussed for the *in situ* solidification technology, the overhead power line that traverses the site presents a dilemma for high-profile equipment commonly used to build excavation shoring (e.g., drill rigs and sheet pile drivers) and to perform the excavation (e.g., long-reach bucket excavators). Process options that were considered included:

- **Large-diameter augers.** Large-diameter augers (3 to 10 feet) would be advanced inside temporary casings, removing the contaminated soil as drill cuttings, and backfilling with clean fill as the casing is removed. These borings would be sequentially advanced in an overlapping manner until the entire site was addressed. Although potentially implementable, this alternative was eliminated because of uncertainties associated with the height requirements of the drill rig, the vertical clearance restrictions of the overhead power lines, and extra soil volume generated when overlapping the borings.

- **Sheet pile shoring and long-reach excavator.** This commonly used alternative was eliminated because of the height requirements of the sheet pile driving equipment and the vertical clearance restrictions of the overhead power lines. The vertical clearance of the long-reach excavator was also a significant safety concern but one that could potentially be addressed by careful attention to excavator placement during excavation.

- **Soil freezing for shoring and long reach excavator.** Soil freezing is achieved by installing closely spaced vertical pipes around the excavation perimeter that are connected by a manifold into a refrigerant circuit. This shoring option was identified as a possible way to avoid the height requirements of sheet piles. Low-clearance drilling rigs would be used to install the refrigerant piping. Although potentially implementable, this alternative was eliminated because of uncertainties associated with being able to achieve the power line clearance requirements with the long-reach excavator coupled with the high costs required to implement this technology.

- **Continuous trenching.** This technology was described for *in situ* solidification/stabilization, but instead of mixing site soil with an added cement, the soil would be removed and clean soil continuously backfilled as the trencher advances. Trenches 3 to 5 feet wide would be installed side by side until the entire area of interest is addressed. Costs for this technology are considered high, roughly equivalent to the soil freezing/long-reach excavator process option.

Because of safety concerns for the overhead power line, the continuous trenching process option is considered to be the most implementable of the excavation options and is retained for use in this remediation alternative. However, specialized equipment or procedures could be identified for the other process options that would address these concerns and allow them to be implemented.

6.2 Remediation Alternative Descriptions

The retained remedial technologies are *in situ* stabilization (Alternative 1) and excavation with off-site transport and disposal (Alternative 2). For this evaluation, both of these alternatives will use a continuous trenching process because of site constraints (high voltage power lines) that prevent the use of taller equipment. Additional variations of these alternatives are identified to address the following cleanup levels:

- MTCA industrial cleanup level of 10 mg/kg PCBs;
- MTCA unrestricted use cleanup level of 1 mg/kg PCBs; and
- MTCA protection of surface water to below detection level for PCBs (0.0000787 mg/kg).

Descriptions of these two primary remedial alternatives and their cleanup level variations (total of six remedial alternatives) are presented below. These include descriptions of conceptual designs, discussions of implementation procedures and schedules, and estimated costs. Costs have been estimated using RACER cost estimating software supplemented with vendor-supplied estimates and recent Hart Crowser experience for similar items on other projects. Because this is considered an interim action, long-term monitoring, and site closure activities are not included in the cost estimates prepared for these alternatives. Site monitoring is an ongoing site activity that is expected to continue after the interim action has been completed and site closure will be addressed as part of any final remedies implemented for the site.

The cleanup level variations for each of the alternatives involve increasing areal extent and volume with decreasing (stricter) cleanup levels. The estimated contaminant extent for these cleanup level variations are shown on Figure 6 and proposed excavation areas for the 10 mg/kg and 1 mg/kg remediation scenarios are presented on Figures 12 and 13, respectively. The resulting area and volume estimates are summarized in section 3.3.

6.2.1 Alternative 1 – In Situ Stabilization

Alternative 1 uses solidification techniques to encapsulate site contaminants in a solid soil matrix that will be left in place. Although site contaminants will not be destroyed, the intention is to permanently immobilize them, thus preventing migration to potential human and ecological receptors. The implementation of this alternative will require:

- Removal of site obstructions such as pavement, existing wells, and buried utilities;

- Temporary rerouting of subsurface utilities (e.g., water and sewer lines) around the treated area;
- Permanently replacing the underground utilities following treatment;
- Mobilization, operation, and subsequent demobilization of *in situ* soil mixing and supporting materials and equipment (e.g., decontamination equipment, temporary fencing, continuous trencher or other low clearance equipment, Portland cement mixture); and
- Site restoration and disposal of implementation-derived waste materials (e.g., decontamination water, disposable PPE, construction debris).

Permits (or associated substantive requirements) and approvals required prior to the implementation of Alternative 1 are expected to include:

- A stormwater control permit from the City of Seattle for construction activities;
- Construction permits from the Seattle Public Utilities Department and King County for water line and sewer rerouting and replacement;
- A grading permit from the City of Seattle for pavement replacement after completion of the remedial activities;
- A shoreline conditional use permit from King County for conducting construction activities within 200 feet of a shoreline; and
- Well abandonment and well construction permits from Ecology for abandonment of existing on-site monitoring wells and subsequent replacement.

Because site dewatering is not necessary for the implementation of Alternative 1, no dewatering treatment system (or associated sewer connection and discharge permit) is included. Wastes generated from decontamination operations will be containerized and transported to an off-site facility approved for disposal of PCB-contaminated materials.

The schedule for implementation of Alternative 1 assumes that site preparation activities including rerouting site utilities, removing site obstructions, erecting temporary fencing, mobilizing equipment and materials, and constructing decontamination facilities can be completed in a month. For the purpose of this IAWP, the operation of the continuous trenching/solidification activities is estimated to proceed at a rate of approximately 100 to 200 cubic yards per day, which will require 10 to 20 construction days for the 10 mg/kg cleanup level and 14 to 27 construction days for the 1 mg/kg cleanup level. The area exceeding MTCA Method B surface water protection criteria has not been delineated, so construction duration has not been estimated. The site will be restored immediately after completing the solidification activities and is expected to be completed within a week.

Cost estimates for the three cleanup levels are presented in Table 6. Details of these estimates are included in Appendix D.

Table 6 – Alternative 1 Cost Summary

Alternative	Cleanup Level	Total Estimated Cost
1A	MTCA Method A Industrial 10 mg/kg	$1.36 million
1B	MTCA Method A Unrestricted 1 mg/kg	$1.63 million
1C	Protection of Surface Water 0.0000787 mg/kg	>$5.8 million

Note: Detailed cost estimates are included in Appendix D.

6.2.2 Alternative 2 – Excavation and Off-Site Disposal

Alternative 2 excavates contaminated soil for transport to an off-site facility approved for disposal of PCB-contaminated materials. The excavation will be backfilled with clean imported fill. This alternative permanently removes PCB-contaminated soil at the site. Implementation of this alternative will require:

- Removing site obstructions such as pavement, existing wells, and buried utilities.
- Dewatering the site before excavation or dewatering of excavated material.
- Treating dewatering water prior to discharge to the sanitary sewer system. The conceptual design for the dewatering treatment system envisions a storage/flow-equalization tank followed by solids filtration and granular activated carbon filtration.
- Mobilizing, operating, and subsequent demobilizing of soil excavation and supporting materials and equipment (e.g., decontamination equipment, temporary fencing, continuous trencher or similar low-clearance equipment, loading facilities, dump trucks, backfill materials).
- Temporarily rerouting subsurface utilities around the excavated area.
- Permanently replacing underground utilities following excavation and backfill.
- Transporting and disposal of excavated contaminated soil.
- Restoring the site, and disposing of implementation-derived waste materials.

Permits and approvals required before implementation of Alternative 2 are expected to include the same as listed above for Alternative 1, plus permits from the King County Industrial Waste Program for the dewatering treatment system for sewer connection and discharge. Liquid waste generated from decontamination operations will be treated by the dewatering treatment system for discharge to the sanitary sewer. Solid waste generated during construction will be containerized and transported to an off-site facility approved for disposal of PCB-contaminated materials.

The schedule for implementation of Alternative 2 assumes that site preparation activities including site dewatering, rerouting site utilities, removing site obstructions, erecting temporary fencing, mobilizing equipment and materials, and constructing decontamination facilities can be completed in a month.

For the purpose of this IAWP, the operation of the continuous trenching/backfilling activities is expected to be similar to the trenching/solidification operations for Alternative 1 and is estimated to proceed at a similar rate of approximately 100 to 200 cubic yards per day. The estimated construction schedule for Alternative 2 is, therefore, the same as Alternative 1: excavation using continuous trenching will require 10 to 20 construction days for the 10 mg/kg cleanup level; 14 to 27 construction days for the 1 mg/kg cleanup level. The area exceeding MTCA Method B surface water protection criteria has not been delineated, so construction duration has not been estimated. The site will be restored immediately after completing the excavation and backfill activities and is expected to be completed within a week.

Cost estimates for the three cleanup level variations of Alternative 2 are shown in Table 7. Details of these estimates are included in Appendix D.

Table 7 – Alternative 2 Cost Summary

Alternative	Cleanup Level	Total Capital Costs
2A	MTCA Method A Industrial 10 mg/kg	2.9 million
2B	MTCA Method A Unrestricted 1 mg/kg	3.7 million
2C	Protection of Surface Water 0.0000787 mg/kg	>9.4 million

Note: Detailed cost estimates are included in Appendix D.

7.0 REMEDIATION ALTERNATIVE SELECTION

Alternative 2 was selected as the preferred interim cleanup action for the Site. The selection criteria and evaluation are described below.

7.1 Selection Criteria

The process for selecting a cleanup action is described in WAC 173-340-360. However, this cleanup is being completed as an Interim Action and none of the alternatives presented in Section 6.2 are expected to comply with cleanup standards as described in the MTCA Threshold Requirements presented in WAC 173-340-360(2)(a)(ii). However, in combination with the existing zero-valent iron/granular activated carbon wall and restrictive covenant, the alternatives are considered to be protective of human health and the environment.

In order to select an alternative, a disproportionate cost analysis (DCA) was completed on the two alternatives. MTCA provides a methodology to determine whether the costs associated with each cleanup alternative are disproportionate relative to the incremental benefit of a lower-cost alternative. The following criteria, listed in WAC 173-340-360(3)(f), are used to evaluate and compare cleanup action alternatives when conducting a disproportionate cost analysis:

- **Protectiveness.** Overall protectiveness of human health and the environment, including the degree to which existing risks are reduced, time required to reduce risk at the facility and attain cleanup standards, on-site and off-site risks resulting from implementing the alternative, and improvement of the overall environmental quality.

- **Permanence.** The degree to which the alternative permanently reduces the toxicity, mobility, or volume of hazardous substances, including the adequacy of the alternative in destroying the hazardous substances, the reduction or elimination of hazardous substance releases and sources of releases, the degree of irreversibility of waste treatment process, and the characteristics and quantity of treatment residuals generated.

- **Cost.** The cost to implement the alternative. Long-term costs including operation and maintenance costs, monitoring costs, and the cost of maintaining institutional controls were not included in this evaluation.

- **Effectiveness Over the Long Term.** Long-term effectiveness includes the degree of certainty that the alternative will be successful, the reliability of the alternative during the period of time hazardous substances are expected to remain on-site at concentrations that exceed cleanup levels, the magnitude of residual risk with the alternative in place, and the effectiveness of controls required to manage treatment residues or remaining wastes. The following cleanup action components may be used as a guide, in descending order, when assessing the relative degree of long-term effectiveness:

  - Reusing or recycling;
  - Destruction or detoxification;
  - Immobilization or solidification;
  - On-site or off-site disposal in an engineered, lined, and monitored facility;
  - On-site isolation or containment with attendant engineering controls; and
  - Institutional controls and monitoring.

- **Management of Short-Term Risks.** The risk to human health and the environment that is associated with the alternative during construction and implementation, and the effectiveness of measures that will be taken to manage such risks.

- **Technical and Administrative Implementability.** Ability to be implemented including consideration of whether the alternative is technically possible; availability of necessary off-site facilities, services and materials; administrative and regulatory requirements; scheduling; size; complexity; monitoring requirements; access for construction and monitoring; and integration with existing facility operations and other current or potential remedial actions.

- **Consideration of Public Concerns.** Consideration of public concerns is mandated under the MTCA cleanup regulation for an Ecology-led or potentially liable person-led cleanup action under an Agreed Order or Consent Decree. This criterion will be addressed during the public review and comment period and was not used to evaluate the proposed alternatives.

7.2 Alternative Evaluation and Selection

The site is currently protective of human health and the environment with the existing treatment wall and surface pavement. Both alternatives will eliminate the soil to groundwater pathway in the treatment area and eliminate the direct contact risk. Additional treatment will reduce the need for the treatment wall and potentially eliminate the need for future maintenance of the treatment wall.

Alternative 1 provides little additional benefit beyond the existing remedies that are currently in place at the site. In addition, Alternative 1 may reduce the effectiveness of the treatment wall by modifying the groundwater flow path and potentially causing impacted groundwater from areas outside the treatment area or upgradient areas to flow around or under instead of through the existing treatment wall.

Based on our evaluation, Alternative 2 was selected as the preferred interim remedial action. Table 8 presents the results of the DCA. Alternatives were compared assuming that the same area was being treated by both alternatives. Alternative 2 also provides greater protection, permanence, and long-term effectiveness. While there are slightly higher short-term risks associated with Alternative 2, it is considered easier to implement because it does not require treatability studies.

Figure 14 shows how the costs of Alternative 2 changes for each of the proposed cleanup levels.

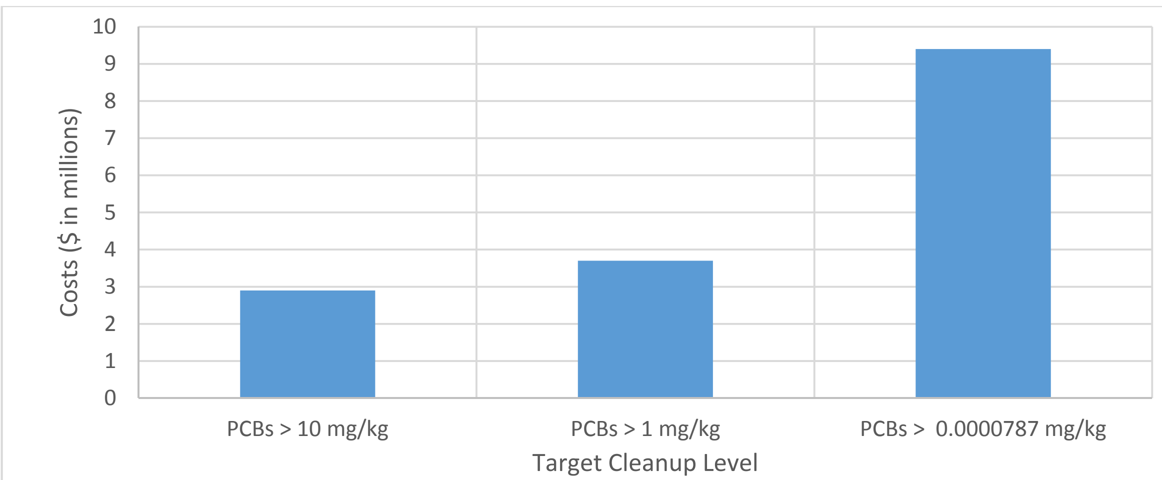


Figure 14. Comparison of Costs for Each Proposed Cleanup Level.

The recommended cleanup approach is Alternative 2B, excavation to the MTCA unrestricted use cleanup level of 1 mg/kg for PCBs. Based on the estimated average concentration of total PCBs in soil samples (approximately 500 mg/kg) and assuming 2,800 cubic yards of soil will be removed, roughly 4,500 pounds of PCB mass could be removed from the site. It should be noted that PCB concentrations measured in the proposed excavation area are highly variable so the total mass removed may vary by orders of magnitude.

The incremental costs from Alternative 2A ($2.9 million) to Alternative 2B ($3.7 million) is not considered disproportionate to the incremental benefit that it will provide. Alternative 2B would provide additional protection to groundwater quality. The incremental costs for Alternative 2C are considered disproportionate to the incremental benefits. The extent of impacts greater than the soil concentration considered protective of surface water have not been delineated and likely extend well beyond the property boundary and to areas where treatment or removal are not feasible. The existing treatment wall currently prevents PCBs from reaching the surface water at concentrations above the surface water criteria.

8.0 SCHEDULE

The project schedule is not known at this time.

9.0 REFERENCES

Aspect 2003. Draft Cleanup Action Plan, Jacobson Terminals. Prepared for A&B Jacobson, LLC, by Aspect, LLC. August 27, 2003.

Aspect 2004. Construction Report, Reactive/Sorptive Wall Groundwater Treatment System, Jacobson Terminals Site Memorandum. Prepared for A&B Jacobson, LLC, by Aspect Consulting. February 17, 2004.

Aspect 2010. Re: Comments on Periodic Review Draft Report Jacobson Terminals, Inc. Prepared for Ecology on behalf of Jacobson Terminals, Inc. by Aspect Consulting. April 9, 2010.

Aspect 2013. Analytical data and CAD files provided by Aspect. July and September 2013.

Ecology 1993. Natural Background Soil Metals Concentrations in Washington State Toxics Cleanup Program Department of Ecology. Publication #94-115. October 1994.

Ecology 2011. Urban Seattle Area Soil and Dioxin and PAH Concentrations Initial Summary Report. Publication #11-09-049. Prepared by the Washington State Department of Ecology. September 2011.

EMCON 1996. Interim Report on Independent Cleanup, 2801 Northwest Market Street, Seattle Washington. Prepared for Fentron Building Products, Inc., by EMCON. December 1996.

EPA 2000. A Guide to Developing and Documenting Cost Estimates During the Feasibility Study. US Environmental Protection Agency. EPA 540-R-00-002, OSWER 9355.0-75. July 2000.

Hart Crowser 1997. Petroleum-Contaminated Soil Removal, Lake Washington Ship Canal, Seattle, Washington. Prepared for Seattle District Army Corps of Engineers and Jacobson Terminals, Inc. March 1997.

Hart Crowser 1999. Cleanup Action Plan Market Street Property, Seattle, Washington. Prepared for A&B Jacobson, LLC, by Hart Crowser. June 22, 1999.

Hart Crowser 2000. Construction Report, Zero-Valent Iron Groundwater Treatment Wall, prepared by Hart Crowser. January 14, 2000.

Hart Crowser 2002. Jacobson Terminals Interim Cleanup Action Summary Report Seattle, Washington. Prepared for A&B Jacobson, LLC, by Hart Crowser. July 18, 2002.

Hart Crowser 2013a. Soil, Groundwater, and Sediment Characterization Work Plan Jacobson Terminals Property Seattle, Washington. Prepared for the Washington Department of Ecology. December 19, 2013.

Hart Crowser 2013b. Data Gaps Report Jacobson Terminals Seattle, Washington. Prepared for the Washington Department of Ecology. December 20, 2013.

Hart Crowser 2014. Soil, Supplemental Soil and Groundwater Characterization Work Plan Jacobson Terminals Property Seattle, Washington. Prepared for the Washington Department of Ecology. March 6, 2014.

L:\Notebooks\1780056_Jacobson Terminal Property RI-FS\Deliverables\Reports\Final IAWP\Final IAWP.docx

Table 1 – Soil Sample Analytical Results

Sample ID	MTCA	JT-US-001-S2	JT-US-001-S3	JT-US-002-S2	JT-US-003-S2	JT-US-003-S3	JT-US-004-S2	JT-US-004-S3	JT-US-004-S4	JT-US-005-S2	JT-US-005-S3	JT-US-006-S2	JT-US-006-S3	JT-US-007-S2	JT-US-007-S3	JT-US-007-S4
Sampling Date	Method B Soil	1/2/2014	1/2/2014	1/2/2014	1/2/2014	1/3/2014	1/3/2014	1/3/2014	1/3/2014	1/2/2014	1/2/2014	1/2/2014	1/2/2014	1/2/2014	1/2/2014	1/2/2014
Depth in feet	Screening Level[a]	11 to 11.5	15.5 to 16	6.5 to 7	7.5 to 8	17 to 17.5	17 to 17.5	17 to 17.5	17 to 17.5	10 to 10.5	17.5 to 18.25	6.5 to 7	15.5 to 16	7.5 to 8	11.5 to 12	16.5 to 17
Conventionals in %																
Total Organic Carbon															**1.16**	
Metals in mg/kg																
Arsenic	7[b]	**5.7**		**5.2**	**17.8**		**5.5**			**4.4**	**6**	**3.1**		**2.4**	**5.9**	
Cadmium	5.6	**0.5**		**0.1**	**1.1**		0.1 U			**0.2**	0.1 U	0.1 U		0.1 U	0.1 U	
Chromium	2000[c]	**26**		**35**	**35**		**24.4**			**26.1**	**26.6**	**29.6**		**23.1**	**26**	
Lead	250[c]	**49.5**		**40**	**422**		**9.4**			**60**	**1.9**	**3.1**		**2.1**	**1.9**	
Mercury	0.146	**0.09**		**0.04**	**0.13**		**0.07**			**0.03**	0.02 U	**0.03**		**0.02**	0.03 U	
TCLP Lead in mg/L	5[d]															
TPH in mg/kg																
Diesel Range Organics	2000[c]	960 U, C		71 U, C	**1200**		**18**			1600 U, C					6.2 U	
Lube Oil	2000[c]	710 U, C		54 U, C	**3500**		**29**			560 U, C					12 U	
Electrical Insulating Oil	2000[c]	980 U, C		74 U, C	**1700**		**20**			1600 U, C					12 U	
Gasoline Range Organics	30[c]															
PCBs in mg/kg																
Aroclor 1016		100 U	0.019 U	9.2 U	0.0038 U	0.078 U	0.0039 U	0.0037 U	0.0039 U	0.43 U	120 U	0.018 U	0.004 U	0.0038 U	0.0038 U	0.0038 U
Aroclor 1221		100 U	0.019 U	9.2 U	0.0038 U	0.078 U	0.0039 U	0.0037 U	0.0039 U	0.43 U	120 U	0.018 U	0.004 U	0.0038 U	0.0038 U	0.0038 U
Aroclor 1232		100 U	0.023 U	9.2 U	0.0038 U	0.078 U	0.0058 U	0.0056 U	0.0039 U	0.43 U	120 U	0.018 U	0.006 U	0.0038 U	0.0057 U	0.0038 U
Aroclor 1242		100 U	0.019 U	9.2 U	0.0038 U	0.078 U	0.0039 U	0.0037 U	0.0039 U	0.43 U	120 U	0.018 U	0.004 U	0.0038 U	0.0038 U	0.0038 U
Aroclor 1248		100 U	0.019 U	9.2 U	0.038 U	0.078 U	0.0039 U	0.0037 U	0.0039 U	0.43 U	120 U	0.018 U	0.004 U	0.0038 U	0.0038 U	0.0038 U
Aroclor 1254		300 U	0.023 U	28 U	0.038 U	0.48 U	0.0039 U	0.0037 U	0.0058 U	2.1 U	730 U	0.018 U	0.02 U	0.0038 U	0.0038 U	0.0038 U
Aroclor 1260		**870**	**0.051**	**74**	**0.068**	**1.2**	**0.0073**	0.0037 U	**0.015**	**5.1**	**1800**	0.018 U	**0.054**	**0.0046**	**0.0025** T	**0.0034** T
Aroclor 1262		100 U	0.019 U	9.2 U	0.0038 U	0.078 U	0.0039 U	0.0037 U	0.0039 U	0.43 U	120 U	0.018 U	0.004 U	0.0038 U	0.0038 U	0.0038 U
Aroclor 1268		100 U	0.019 U	9.2 U	0.0038 U	0.078 U	0.0039 U	0.0037 U	0.0039 U	0.43 U	120 U	0.018 U	0.004 U	0.0038 U	0.0038 U	0.0038 U
Total PCBs	0.0000787[e]	**870**	**0.051**	**74**	**0.068**	**1.2**	**0.0073**	0.0037 U	**0.015**	**5.1**	**1800**	0.018 U	**0.054**	**0.0046**	**0.0025** J	**0.0034** J
Select Detected Volatiles in mg/kg																
1,1-Dichloroethene	0.0011	4.4 U	0.001 U	0.063 U	0.0024 U		0.076 U	0.069 U	0.0007 U	0.0019 U	0.1 U	0.059 U	0.068 U	0.0009 U	0.001 U	
1,2,3-Trichlorobenzene		22 U	0.0048 U	0.31 U	0.012 U		0.38 U	0.34 U	0.0035 U	**0.0041** T	**1**	0.29 U	0.34 U	0.0047 U	0.0051 U	
1,2,4-Trichlorobenzene	0.0056	22 U	0.0048 U	**0.27** T	0.012 U		**1.1**	**0.12** T	**0.0011** T	**0.033**	**13**	**0.11** T	**0.086** T	0.0047 U	0.0051 U	
1,2,4-Trimethylbenzene		4.4 U	0.001 U	0.063 U	**0.0013** JT		0.076 U	0.069 U	0.0007 U	0.0019 U	0.1 U	0.059 U	0.068 U	0.0009 U	0.001 U	
1,2-Dichlorobenzene	2.33	4.4 U	0.001 U	0.063 U	0.0024 U		**1.8**	**0.089**	0.0007 U	**0.0011** T	**0.74**	0.059 U	**0.082**	0.0009 U	0.001 U	
1,3,5-Trimethylbenzene		4.4 U	0.001 U	0.063 U	0.0024 U		0.076 U	0.069 U	0.0007 U	0.0019 U	0.1 U	0.059 U	0.068 U	0.0009 U	0.001 U	
1,3-Dichlorobenzene	0.011	4.4 U	0.001 U	**0.17**	**0.0013** JT		**7**	**0.97**	0.0007 U	**0.0053**	**4.7**	**0.14**	**0.73**	0.0009 U	**0.0032**	
1,4-Dichlorobenzene	0.02	**5.1**	0.001 U	**0.33**	**0.0027**		**8.3**	**1.2**	0.0007 U	**0.0096**	**4.6**	**0.23**	**1.5**	0.0009 U	**0.0049**	
2-Butanone		22 U	0.0048 U	0.31 U	**0.011** T		0.38 U	0.34 U	0.0035 U	0.0097 U	0.51 U	0.29 U	0.34 U	0.0047 U	0.0051 U	
4-Isopropyltoluene		4.4 U	0.001 U	0.063 U	0.0024 U		**0.062** T	0.069 U	0.0007 U	0.0019 U	0.1 U	0.059 U	0.068 U	0.0009 U	0.001 U	
Acetone	24,100	22 U	**0.0076**	0.31 U	**0.03** J		0.38 U	0.34 U	**0.0072**	**0.047**	0.51 U	0.29 U	0.34 U	**0.025**	**0.026** J	
Benzene	0.0064	**2.7** T	0.001 U	**0.034** T	**0.0015** T		**0.42**	0.069 U	0.0007 U	**0.0026**	0.1 U	0.059 U	0.068 U	0.0009 U	**0.001** T	
Bromomethane	7.08	4.4 U	0.001 U	0.063 U	0.0024 U		0.076 U	**0.055** T	0.0007 U	0.0019 U	0.1 U	**0.06**	0.068 U	0.0009 U	0.001 U	
Carbon Disulfide	170	4.4 U	0.001 U	0.063 U	**0.0058**		0.076 U	0.069 U	**0.0008**	**0.0027**	0.1 U	0.059 U	0.068 U	**0.0016**	**0.014**	
Chlorobenzene	0.434	**170**	**0.0006** T	**2.8**	**0.036**		**14**	**0.36**	0.0007 U	**0.027**	**2.9**	**0.34**	**3.2**	0.0009 U	**0.085**	
cis-1,2-Dichloroethene		4.4 U	0.002	0.063 U	0.0024 U		7.8	0.069 U	0.0007 U	**0.0016** T	0.1 U	0.059 U	**0.15**	0.0009 U	0.001 U	
Ethylbenzene	0.056	4.4 U	0.001 U	0.063 U	0.0024 U		0.076 U	0.069 U	0.0007 U	0.0019 U	0.1 U	0.059 U	0.068 U	0.0009 U	0.001 U	
Iodomethane		4.4 U	0.001 U	0.063 U	0.0024 U		0.076 U	0.069 U	0.0007 U	0.0019 U	0.1 U	0.059 U	**0.043** T	0.0009 U	0.001 U	
Isopropylbenzene		4.4 U	0.001 U	0.063 U	0.0024 U		0.076 U	0.069 U	0.0007 U	0.0019 U	0.1 U	0.059 U	0.068 U	0.0009 U	0.001 U	
Methylene Chloride	4.46	8.8 U	**0.0013** T	0.13 U	0.0048 UJ		0.15 U	0.14 U	**0.0022**	0.0039 U	0.21 U	0.12 U	0.14 U	**0.0039**	**0.0034** J	
Naphthalene	6.56	*22 U*	0.0048 U	0.31 U	0.012 U		0.38 U	0.34 U	0.0035 U	0.0097 U	0.51 U	0.29 U	0.34 U	0.0047 U	0.0051 U	
sec-Butylbenzene		4.4 U	0.001 U	0.063 U	0.0024 U		0.076 U	0.069 U	0.0007 U	0.0019 U	0.1 U	0.059 U	0.068 U	0.0009 U	0.001 U	
Tetrachloroethene	0.015	4.4 U	0.001 U	0.063 U	0.0024 U		0.076 U	0.069 U	0.0007 U	0.0019 U	0.1 U	0.059 U	0.068 U	0.0009 U	0.001 U	
Toluene	0.189	4.4 U	0.001 U	0.063 U	0.0024 U		**0.11**	0.069 U	0.0007 U	**0.0012** T	0.1 U	0.059 U	0.068 U	0.0009 U	0.001 U	
trans-1,2-Dichloroethene	1.09	4.4 U	0.001 U	0.063 U	0.0024 U		**0.44**	0.069 U	0.0007 U	0.0019 U	0.1 U	0.059 U	0.068 U	0.0009 U	0.001 U	
Trichloroethene	0.0023	4.4 U	0.001 U	0.063 U	0.0024 U		**0.44**	0.069 U	0.0007 U	0.0019 U	0.1 U	0.059 U	0.068 U	0.0009 U	0.001 U	
Vinyl Chloride	0.0005[e]	4.4 U	**0.0082**	0.063 U	0.0024 U		**0.41**	0.069 U	0.0007 U	0.0019 U	0.1 U	0.059 U	0.068 U	0.0009 U	0.001 U	
Total Xylenes	9[c]	4.4 U	0.001 U	0.063 U	0.0024 U		**0.11**	0.069 U	0.0007 U	0.0019 U	0.1 U	0.059 U	0.068 U	0.0009 U	0.001 U	

Notes:

a. Value provided is the Three-Phase Partitioning Model screening level calculated with MTCA equation 747-1 using the lowest surface water level for protection of human health considering food ingestion only (WAC 173-340-474). The cleanup levels provided are based on potential for groundwater migration to surface water.
b. Value based on regional natural background for Puget Sound (Ecology 1994).
c. MTCA Method A Soil Unrestricted Land Use Table Value.
d. Washington State Maximum Concentration of Contaminants for the Toxicity Characteristic Dangerous Waste (WAC 173-303-100).
e. The screening level is lower than the method PQL; MTCA defaults the screening level up to the PQL.
f. MTCA Method B Soil Unrestricted Land Use Direct Contact Formula Value, Carcinogen.

C = The chromotogram indicates the presence of PCBs, not DRO or RRO. Laboratory-reported results were updated to non-detect (U) for DRO/RRO.
J = Estimated value.
T = Value is between the MDL and MRL.
U = Not detected at the reporting limit indicated.
Bold = Detected value.
Shaded = Value exceeds the screening level.

Table 1 – Soil Sample Analytical Results

Sample ID	MTCA	JT-US-008-S2	JT-US-008-S4	JT-US-008-S5	JT-US-009-S1	JT-US-009-S2	JT-US-009-S3	JT-US-009-S4	JT-US-010-S2	JT-US-010-S3	JT-US-011-S2	JT-US-011-S3	JT-US-011-S4	JT-US-012-S1	JT-US-012-S2	JT-US-012-S3
Sampling Date	Method B Soil	1/2/2014	1/2/2014	1/2/2014	1/3/2014	1/3/2014	1/3/2014	1/3/2014	1/3/2014	1/3/2014	1/3/2014	1/3/2014	1/3/2014	1/6/2014	1/6/2014	1/6/2014
Depth in feet	Screening Level[a]	6.5 to 7	15.5 to 16	18 to 18.5	1 to 2	6.5 to 7.5	12.75 to 13.5	18 to 18.75	10.5 to 11	16.5 to 17	7 to 7.5	11.5 to 12	15.5 to 16	0.5 to 2	5 to 7	10 to 11
Conventionals in %																
Total Organic Carbon			**0.09**													
Metals in mg/kg																
Arsenic	7[b]		**5.3**			**2.9**	**1.3**		**4.1**		**5.3**	**1.5**		**8.3**	**4.3**	
Cadmium	5.6		0.1 U			0.1 U	0.1 U		0.1 U		**0.1**	0.1 U		**2**	**0.4**	
Chromium	2000[c]		**25.2**			**43**	**22**		**20**		**47**	**22.2**		**41.9**	**24.9**	
Lead	250[c]		**1.7**			**2.4**	**1.3**		**60.1**		**9.4**	**1.4**		**167**	**12.3**	
Mercury	0.146		0.02 U			**0.03**	0.02 U		**0.12**		0.03 U	0.02 U		**0.39**	**0.03**	
TCLP Lead in mg/L	5[d]															
TPH in mg/kg																
Diesel Range Organics	2000[c]		660 U, C													
Lube Oil	2000[c]		250 U, C													
Electrical Insulating Oil	2000[c]		650 U, C													
Gasoline Range Organics	30[c]															
PCBs in mg/kg																
Aroclor 1016		0.0038 U	240 U	0.079 U	0.0037 U	0.0039 U	0.0038 U	0.0037 U	0.0038 U	0.004 U	1 U	0.0039 U	0.0038 U	0.01 U	0.0038 U	0.0038 U
Aroclor 1221		0.0038 U	240 U	0.079 U	0.0037 U	0.0039 U	0.0038 U	0.0037 U	0.0038 U	0.004 U	1 U	0.0039 U	0.0038 U	0.01 U	0.0038 U	0.0038 U
Aroclor 1232		0.0038 U	240 U	0.079 U	0.0037 U	0.0039 U	0.0038 U	0.0037 U	0.0038 U	0.004 U	1 U	0.0039 U	0.0038 U	0.01 U	0.0038 U	0.0095 U
Aroclor 1242		0.0038 U	240 U	0.079 U	0.0037 U	0.0039 U	0.0038 U	0.0037 U	0.0038 U	0.004 U	1 U	0.0039 U	0.0038 U	0.01 U	0.0038 U	0.0038 U
Aroclor 1248		0.0038 U	240 U	0.079 U	0.0074 U	0.0039 U	0.0038 U	0.0037 U	0.0038 U	0.004 U	1 U	0.077 U	0.0094 U	3.8 U	0.038 U	0.0038 U
Aroclor 1254		0.0038 U	610 U	0.36 U	0.037 U	0.0039 U	0.0038 U	0.0037 U	0.0038 U	0.004 U	15 U	0.097 U	0.0094 U	2.5 U	0.019 U	0.0095 U
Aroclor 1260		0.0038 U	**1400**	**0.81**	**0.12**	0.0039 U	0.0038 U	0.0037 U	**0.004**	**0.0042**	**22**	**0.11**	**0.017**	**1.5**	**0.023**	**0.016**
Aroclor 1262		0.0038 U	240 U	0.079 U	0.0037 U	0.0039 U	0.0038 U	0.0037 U	0.0038 U	0.004 U	1 U	0.0039 U	0.0038 U	0.01 U	0.0038 U	0.0038 U
Aroclor 1268		0.0038 U	240 U	0.079 U	0.0037 U	0.0039 U	0.0038 U	0.0037 U	0.0038 U	0.004 U	1 U	0.0039 U	0.0038 U	0.01 U	0.0038 U	0.0038 U
Total PCBs	0.0000787[e]	0.0038 U	**1400**	**0.81**	**0.12**	0.0039 U	0.0038 U	0.0037 U	**0.004**	**0.0042**	**22**	**0.11**	**0.017**	**1.5**	**0.023**	**0.016**
Select Detected Volatiles in mg/kg																
1,1-Dichloroethene	0.0011	0.056 U	0.0012 U	0.0007 U	0.0015 U	0.06 U	0.067 U		0.001 U	0.06 U	0.072 U	0.069 U	0.077 U	0.063 U	0.001 U	**0.0012**
1,2,3-Trichlorobenzene		0.28 U	**1.5** T	0.0035 U	0.0074 U	0.3 U	0.34 U		0.0052 U	0.3 U	0.36 U	0.34 U	0.39 U	0.32 U	0.0048 U	0.0053 U
1,2,4-Trichlorobenzene	0.0056	**0.22** T	**43**	0.0035 U	**0.002** T	**0.41**	**0.29** T		**0.0014** JT	0.3 U	**1.8**	0.34 U	0.39 U	0.32 U	0.0048 U	0.0053 U
1,2,4-Trimethylbenzene		0.056 U	0.0012 U	0.0007 U	**0.0013** T	0.06 U	0.067 U		0.001 U	0.06 U	0.072 U	0.069 U	0.077 U	0.063 U	0.001 U	0.0011 U
1,2-Dichlorobenzene	2.33	**0.046** T	**1.5**	0.0007 U	0.0015 U	**0.078**	**0.22**		0.001 U	0.06 U	**0.16**	0.069 U	**0.28**	**0.034** T	0.001 U	0.0011 U
1,3,5-Trimethylbenzene		0.056 U	0.0012 U	0.0007 U	0.0015 U	0.06 U	0.067 U		0.001 U	0.06 U	0.072 U	0.069 U	0.077 U	0.063 U	0.001 U	0.0011 U
1,3-Dichlorobenzene	0.011	**0.37**	**0.22**	0.0007 U	0.0015 U	**0.67**	**1.6**		0.001 U	**0.17**	**1.2**	**0.075**	**1.4**	**0.1**	0.001 U	0.0011 U
1,4-Dichlorobenzene	0.02	**0.59**	**5.6**	0.0007 U	0.0015 U	**1**	**1.7**		0.001 U	**3**	**3.6**	**0.19**	**1.9**	**0.3**	0.001 U	0.0011 U
2-Butanone		0.28 U	**0.0037** T	0.0035 U	0.0074 U	0.3 U	0.34 U		0.0052 U	0.3 U	0.36 U	0.34 U	0.39 U	0.32 U	0.0048 U	0.0053 U
4-Isopropyltoluene		0.056 U	0.0012 U	0.0007 U	0.0015 U	0.06 U	0.067 U		0.001 U	0.06 U	0.072 U	0.069 U	0.077 U	0.063 U	0.001 U	0.0011 U
Acetone	24,100	0.28 U	**0.035** J	**0.0089**	**0.028** J	0.3 U	0.34 U		**0.026** J	0.3 U	0.36 U	0.34 U	0.39 U	0.32 U	**0.021**	0.0053 U
Benzene	0.0064	0.056 U	**0.0009** T	0.0007 U	0.0015 U	0.06 U	0.067 U		**0.0006** T	0.06 U	**0.065** T	0.069 U	0.077 U	0.063 U	0.001 U	0.0011 U
Bromomethane	7.08	**0.062**	0.0012 U	0.0007 U	0.0015 U	**0.083**	**0.067**		0.001 U	**0.065**	**0.062** T	**0.07**	**0.081**	**0.062** T	0.001 U	0.0011 U
Carbon Disulfide	170	0.056 U	**0.015**	**0.0008**	**0.0026**	0.06 U	0.067 U		0.001 U	0.06 U	0.072 U	0.069 U	0.077 U	0.063 U	**0.0009** T	**0.0031**
Chlorobenzene	0.434	**0.8**	**0.031**	0.0007 U	**0.001** T	**0.79**	**0.39**		**0.0008** T	**2.4**	**12**	**0.75**	**0.47**	**0.14**	0.001 U	0.0011 U
cis-1,2-Dichloroethene		0.056 U	**0.0016**	0.0007 U	0.0015 U	0.06 U	0.067 U		**0.0085**	0.06 U	0.072 U	0.069 U	**0.14**	0.063 U	**0.001**	**0.16**
Ethylbenzene	0.056	0.056 U	0.0012 U	0.0007 U	0.0015 U	0.06 U	0.067 U		0.001 U	0.06 U	0.072 U	0.069 U	0.077 U	0.063 U	0.001 U	0.0011 U
Iodomethane		0.056 U	0.0012 U	0.0007 U	0.0015 U	**0.049** T	**0.036** T		0.001 U	**0.047** T	**0.044** T	**0.061** T	0.077 U	0.063 U	0.001 U	0.0011 U
Isopropylbenzene		0.056 U	0.0012 U	0.0007 U	0.0015 U	0.06 U	0.067 U		0.001 U	0.06 U	0.072 U	0.069 U	0.077 U	**0.37**	0.001 U	0.0011 U
Methylene Chloride	4.46	**0.1** T	**0.0035** J	**0.0019**	**0.0036**	0.12 U	0.13 U		0.0021 U	0.12 U	0.14 U	0.14 U	0.16 U	0.13 U	0.0019 U	**0.0022**
Naphthalene	6.56	0.28 U	0.0062 U	0.0035 U	**0.19**	0.3 U	0.34 U		0.0052 U	0.3 U	0.36 U	0.34 U	0.39 U	0.32 U	0.0048 U	0.0053 U
sec-Butylbenzene		0.056 U	0.0012 U	0.0007 U	0.0015 U	0.06 U	0.067 U		0.001 U	0.06 U	0.072 U	0.069 U	0.077 U	**0.7**	0.001 U	0.0011 U
Tetrachloroethene	0.015	0.056 U	0.0012 U	0.0007 U	0.0015 U	0.06 U	0.067 U		0.001 U	0.06 U	0.072 U	0.069 U	0.077 U	0.063 U	**0.0008** T	**0.0012**
Toluene	0.189	0.056 U	0.0012 U	0.0007 U	0.0015 U	0.06 U	0.067 U		0.001 U	0.06 U	0.072 U	0.069 U	0.077 U	0.063 U	0.001 U	0.0011 U
trans-1,2-Dichloroethene	1.09	0.056 U	0.0012 U	0.0007 U	0.0015 U	0.06 U	0.067 U		0.001 U	0.06 U	0.072 U	0.069 U	0.077 U	0.063 U	0.001 U	**0.0018**
Trichloroethene	0.0023	0.056 U	0.0012 U	0.0007 U	0.0015 U	0.06 U	0.067 U		0.001 U	0.06 U	0.072 U	0.069 U	0.077 U	0.063 U	**0.0006** T	**0.0037**
Vinyl Chloride	0.0005[e]	0.056 UJ	**0.0008** T	0.0007 U	0.0015 U	0.06 U	0.067 U		**0.058**	0.06 U	0.072 U	0.069 U	0.077 U	0.063 U	0.001 U	**0.038**
Total Xylenes	9[c]	0.056 U	0.0012 U	0.0007 U	0.0015 U	0.06 U	0.067 U		0.001 U	0.06 U	0.072 U	0.069 U	0.077 U	**0.036** J	0.001 U	0.0011 U

Notes:

a. Value provided is the Three-Phase Partitioning Model screening level calculated with MTCA equation 747-1 using the lowest surface water level for protection of human health considering food ingestion only (WAC 173-340-474). The cleanup levels provided are based on potential for groundwater migration to surface water.
b. Value based on regional natural background for Puget Sound (Ecology 1994).
c. MTCA Method A Soil Unrestricted Land Use Table Value.
d. Washington State Maximum Concentration of Contaminants for the Toxicity Characteristic Dangerous Waste (WAC 173-303-100).
e. The screening level is lower than the method PQL; MTCA defaults the screening level up to the PQL.
f. MTCA Method B Soil Unrestricted Land Use Direct Contact Formula Value, Carcinogen.

C = The chromotogram indicates the presence of PCBs, not DRO or RRO. Laboratory-reported results were updated to non-detect (U) for DRO/RRO.
J = Estimated value.
T = Value is between the MDL and MRL.
U = Not detected at the reporting limit indicated.
Bold = Detected value.
Shaded = Value exceeds the screening level.

Table 1 – Soil Sample Analytical Results

Sample ID	MTCA	JT-US-012-S5	JT-US-013-S2	JT-US-013-S3	JT-US-013-S4	JT-US-014-S2	JT-US-014-S3	JT-US-014-S4	JT-US-015-S1	JT-US-015-S2	JT-US-016-S2	JT-US-016-S3	JT-US-017-S4	JT-US-017-S5	JT-US-018-S1	JT-US-018-S2
Sampling Date	Method B Soil	1/6/2014	1/3/2014	1/3/2014	1/3/2014	1/3/2014	1/3/2014	1/3/2014	1/3/2014	1/3/2014	1/3/2014	1/3/2014	1/6/2014	1/6/2014	1/3/2014	1/3/2014
Depth in feet	Screening Level[a]	16.5 to 17.5	6 to 7	11 to 12	16 to 16.5	7 to 8	15 to 16	16 to 17	5.5 to 6	16 to 16.5	7.5 to 8.5	12 to 12.5	17.5 to 18.5	20.5 to 21.5	2.5 to 3	11 to 11.5
Conventionals in %																
Total Organic Carbon						**4.54**										
Metals in mg/kg																
Arsenic	7[b]		**8.1**	**5.8**						**6**		**6**	**4.1**			**196**
Cadmium	5.6		**0.2**	0.1 U						0.1 U		0.1 U	0.2 U			**26**
Chromium	2000[c]		**35**	**22**						**31**		**33**	**26**			32.4
Lead	250[c]		**22.1**	**1.5**						**2.3**		**1.7**	**33.1**			**1050**
Mercury	0.146		**0.05**	0.03 U						0.03 U		0.03 U	**0.18**			0.2
TCLP Lead in mg/L	5[d]															
TPH in mg/kg																
Diesel Range Organics	2000[c]					490 U, C										
Lube Oil	2000[c]					220 U, C										
Electrical Insulating Oil	2000[c]					460 U, C										
Gasoline Range Organics	30[c]															
PCBs in mg/kg																
Aroclor 1016		0.0039 U	0.0038 U	0.0038 U	0.0039 U	100 U	0.0039 U	0.004 U	0.0039 U	0.0038 U	0.0038 U	0.0039 U	0.0039 U	0.004 U	93 U	0.0039 U
Aroclor 1221		0.0039 U	0.0038 U	0.0038 U	0.0039 U	100 U	0.0039 U	0.004 U	0.0039 U	0.0038 U	0.0038 U	0.0039 U	0.0039 U	0.004 U	93 U	0.0039 U
Aroclor 1232		0.0039 U	0.0038 U	0.0038 U	0.0039 U	100 U	0.0039 U	0.005 U	0.0039 U	0.013 U	0.0038 U	0.0039 U	0.0058 U	0.006 U	93 U	0.0039 U
Aroclor 1242		0.0039 U	0.0038 U	0.0038 U	0.0039 U	100 U	0.0039 U	0.004 U	0.0039 U	0.0038 U	0.0038 U	0.0039 U	0.0039 U	0.004 U	93 U	0.0039 U
Aroclor 1248		0.0039 U	0.0096 U	0.0038 U	0.0039 U	100 U	0.0058 U	0.004 U	0.0077 U	0.0038 U	0.0038 U	0.0039 U	0.0039 U	0.004 U	93 U	0.097 U
Aroclor 1254		0.0039 U	0.012 U	0.038 U	0.0039 U	210 U	0.039 U	0.006 U	0.019 U	0.0095 U	0.077 U	0.0039 U	0.0039 U	0.004 U	140 U	0.039 U
Aroclor 1260		**0.0027** T	**0.014**	**0.11**	**0.005**	**400**	**0.12**	**0.013**	**0.051**	**0.026**	**0.14**	**0.0022** T	**0.0021** T	**0.0052**	**340**	**0.073**
Aroclor 1262		0.0039 U	0.0038 U	0.0038 U	0.0039 U	100 U	0.0039 U	0.004 U	0.0039 U	0.0038 U	0.0038 U	0.0039 U	0.0039 U	0.004 U	93 U	0.0039 U
Aroclor 1268		0.0039 U	0.0038 U	0.0038 U	0.0039 U	100 U	0.0039 U	0.004 U	0.0039 U	0.0038 U	0.0038 U	0.0039 U	0.0039 U	0.004 U	93 U	0.0039 U
Total PCBs	0.0000787[e]	**0.0027** J	**0.014**	**0.11**	**0.005**	**400**	**0.12**	**0.013**	**0.051**	**0.026**	**0.14**	**0.0022 J**	**0.0021 J**	**0.0052**	**340**	**0.073**
Select Detected Volatiles in mg/kg																
1,1-Dichloroethene	0.0011		0.0025 U	0.0011 U	0.0017 U	21 U	0.0011 U	0.0014 U	0.066 U	0.001 U	0.0018 U	0.0011 U	0.0021 U	0.001 U	0.061 U	**0.56**
1,2,3-Trichlorobenzene			0.012 U	0.0057 U	0.0086 U	100 U	0.0056 U	0.0071 U	0.33 U	0.0048 U	0.0088 U	0.0054 U	0.01 U	0.0051 U	**0.16** T	0.86 U
1,2,4-Trichlorobenzene	0.0056		0.012 U	**0.0019** T	0.0086 U	**370**	0.0056 U	0.0071 U	**0.28** T	0.0048 U	0.0088 U	0.0054 U	0.01 U	0.0051 U	**0.34**	0.86 U
1,2,4-Trimethylbenzene			0.0025 U	0.0011 U	0.0017 U	21 U	0.0011 U	0.0014 U	0.066 U	0.001 U	0.0018 U	0.0011 U	0.0021 U	0.001 U	0.061 U	0.17 U
1,2-Dichlorobenzene	2.33		0.0025 U	0.0011 U	0.0017 U	21 U	0.0011 U	0.0014 U	0.066 U	0.001 U	0.0018 U	0.0011 U	0.0021 U	0.001 U	**0.094**	0.17 U
1,3,5-Trimethylbenzene			0.0025 U	0.0011 U	0.0017 U	21 U	0.0011 U	0.0014 U	0.066 U	0.001 U	0.0018 U	0.0011 U	0.0021 U	0.001 U	0.061 U	0.17 U
1,3-Dichlorobenzene	0.011		0.0025 U	**0.0011** T	0.0017 U	**22**	0.0011 U	0.0014 U	0.066 U	0.001 U	0.0018 U	0.0011 U	0.0021 U	0.001 U	**1.1**	0.17 U
1,4-Dichlorobenzene	0.02		0.0025 U	**0.0013**	0.0017 U	**52**	0.0011 U	0.0014 U	0.066 U	**0.0009** T	0.0018 U	0.0011 U	0.0021 U	0.001 U	**8.5**	0.17 U
2-Butanone			**0.058**	0.0057 U	0.0086 U	100 U	0.0056 U	0.0071 U	0.33 U	0.0048 U	**0.018**	0.0054 U	0.01 U	0.0051 U	0.3 U	0.86 U
4-Isopropyltoluene			0.0025 U	0.0011 U	0.0017 U	21 U	0.0011 U	0.0014 U	0.066 U	0.001 U	0.0018 U	0.0011 U	0.0021 U	0.001 U	0.061 U	0.17 U
Acetone	24,100		**0.31** J	**0.016** J	0.0086 UJ	100 UJ	0.0056 UJ	0.017 J	0.33 UJ	0.0048 UJ	**0.13**	**0.049**	**0.036**	**0.011**	0.3 UJ	0.86 UJ
Benzene	0.0064		0.0025 U	0.0011 U	**0.0053**	21 U	0.0011 U	0.0014 U	0.066 U	0.001 U	0.0018 U	0.0011 U	0.0021 U	0.001 U	0.061 U	**0.3**
Bromomethane	7.08		0.0025 U	0.0011 U	0.0017 U	21 U	0.0011 U	0.0014 U	0.066 U	0.001 U	0.0018 U	0.0011 U	0.0021 U	0.001 U	**0.059** T	**0.16** T
Carbon Disulfide	170		**0.011**	**0.0053**	**0.001** T	21 U	0.0011 U	0.0014 U	0.066 U	**0.001**	**0.04**	**0.0073**	**0.013**	0.001 U	0.061 U	0.17 U
Chlorobenzene	0.434		0.0025 U	**0.0009** T	0.0017 U	21 U	0.0011 U	0.0014 U	0.066 U	**0.0005** T	0.0018 U	0.0011 U	0.0021 U	0.001 U	**0.98**	0.17 U
cis-1,2-Dichloroethene			0.0025 U	**0.0026**	**0.0046**	21 U	**0.0009** T	0.0014 U	**2.6**	**0.0056**	0.0018 U	**0.005**	**0.0019** T	**0.01**	0.061 U	**190**
Ethylbenzene	0.056		0.0025 U	0.0011 U	0.0017 U	21 U	0.0011 U	0.0014 U	0.066 U	0.001 U	0.0018 U	0.0011 U	0.0021 U	0.001 U	0.061 U	0.17 U
Iodomethane			0.0025 U	0.0011 U	0.0017 U	21 U	0.0011 U	0.0014 U	**0.056** T	0.001 U	0.0018 U	0.0011 U	0.0021 U	0.001 U	0.061 U	0.17 U
Isopropylbenzene			0.0025 U	0.0011 U	0.0017 U	21 U	0.0011 U	0.0014 U	0.066 U	0.001 U	0.0018 U	0.0011 U	0.0021 U	0.001 U	0.061 U	0.17 U
Methylene Chloride	4.46		**0.003** T	**0.0023**	**0.0036**	42 U	**0.0017** T	0.0028 U	0.13 U	**0.0015** T	0.0035 U	**0.0023**	**0.0042**	**0.0023**	0.12 U	0.35 U
Naphthalene	6.56		0.012 U	0.0057 U	0.0086 U	100 U	0.0056 U	0.0071 U	0.33 U	0.0048 U	0.0088 U	0.0054 U	0.01 U	0.0051 U	**0.098** T	0.86 U
sec-Butylbenzene			0.0025 U	0.0011 U	0.0017 U	21 U	0.0011 U	0.0014 U	0.066 U	0.001 U	0.0018 U	0.0011 U	0.0021 U	0.001 U	0.061 U	0.17 U
Tetrachloroethene	0.015		0.0025 U	**0.0018**	0.0017 U	21 U	0.0011 U	0.0014 U	**0.45**	0.001 U	0.0018 U	**0.0066**	0.0021 U	0.001 U	0.061 U	**0.82**
Toluene	0.189		0.0025 U	0.0011 U	0.0017 U	21 U	0.0011 U	0.0014 U	0.066 U	0.001 U	0.0018 U	0.0011 U	0.0021 U	0.001 U	0.061 U	0.17 U
trans-1,2-Dichloroethene	1.09		0.0025 U	0.0011 U	0.0017 U	21 U	0.0011 U	0.0014 U	0.066 U	0.001 U	0.0018 U	0.0011 U	0.0021 U	0.001 U	0.061 U	0.75
Trichloroethene	0.0023		0.0025 U	**0.0009** T	0.0017 U	21 U	0.0011 U	0.0014 U	**2**	0.001 U	0.0018 U	**0.0053**	0.0021 U	0.001 U	0.061 U	**4.6**
Vinyl Chloride	0.0005[e]		0.0025 U	**0.033**	**0.0021** J	21 U	**0.0024** J	0.0014 U	**0.11**	**0.006** J	**0.004**	0.0011 U	0.0021 U	**0.014**	0.061 U	**23**
Total Xylenes	9[c]		0.0025 U	0.0011 U	0.0017 U	21 U	0.0011 U	0.0014 U	0.066 U	0.001 U	0.0018 U	0.0011 U	0.0021 U	0.001 U	0.061 U	0.17 U

Notes:

a. Value provided is the Three-Phase Partitioning Model screening level calculated with MTCA equation 747-1 using the lowest surface water level for protection of human health considering food ingestion only (WAC 173-340-474). The cleanup levels provided are based on potential for groundwater migration to surface water.
b. Value based on regional natural background for Puget Sound (Ecology 1994).
c. MTCA Method A Soil Unrestricted Land Use Table Value.
d. Washington State Maximum Concentration of Contaminants for the Toxicity Characteristic Dangerous Waste (WAC 173-303-100).
e. The screening level is lower than the method PQL; MTCA defaults the screening level up to the PQL.
f. MTCA Method B Soil Unrestricted Land Use Direct Contact Formula Value, Carcinogen.

C = The chromotogram indicates the presence of PCBs, not DRO or RRO. Laboratory-reported results were updated to non-detect (U) for DRO/RRO.
J = Estimated value.
T = Value is between the MDL and MRL.
U = Not detected at the reporting limit indicated.
Bold = Detected value.
Shaded = Value exceeds the screening level.

Table 1 – Soil Sample Analytical Results

Sample ID	MTCA	JT-US-018-S3	JT-US-018-S4	JT-US-019-S2	JT-US-019-S3	JT-US-019-S4	JT-US-020-S2	JT-US-020-S3	JT-US-020-S4	JT-US-021-S1	JT-US-021-S2	JT-US-021-S3	JT-US-022-S1	JT-US-022-S2	JT-US-022-S3	JT-US-023-S2
Sampling Date	Method B Soil	1/3/2014	1/3/2014	1/3/2014	1/3/2014	1/3/2014	1/6/2014	1/6/2014	1/6/2014	1/6/2014	1/6/2014	1/6/2014	1/6/2014	1/6/2014	1/6/2014	1/6/2014
Depth in feet	Screening Level[a]	15 to 15.5	16.5 to 17	10.5 to 11.5	14 to 14.5	16.5 to 17	5.5 to 6.5	10.5 to 11.5	16 to 17	2 to 3	10 to 11	15 to 15.75	2 to 3	10 to 11.5	15 to 16	6 to 7
Conventionals in %																
Total Organic Carbon				2.64			11.1									
Metals in mg/kg																
Arsenic	7[b]	**1.8**		**7.4**			**5.3**			**3.3**			**2.8**			**11.8**
Cadmium	5.6	0.1 U		**0.4**			0.1 U			**0.2**			0.2 U			**0.5**
Chromium	2000[c]	**24.6**		**46.2**			**23.6**			**19**			**23**			**16**
Lead	250[c]	**1.6**		**13.9**			**1.4**			**23.3**			**14.1**			**75.3**
Mercury	0.146	**0.03**		**0.07**			0.02 U			0.03 U			**0.05**			**0.14**
TCLP Lead in mg/L	5[d]					3.1										
TPH in mg/kg																
Diesel Range Organics	2000[c]			290 U, C			1000 U, C									
Lube Oil	2000[c]			260 U, C			**1500** J, C									
Electrical Insulating Oil	2000[c]			320 U, C			1300 U, C									
Gasoline Range Organics	30[c]															
PCBs in mg/kg																
Aroclor 1016		0.0038 U	0.0038 U	150 U	0.024 U	0.0039 U	0.27 U	0.0038 U	0.004 U	0.004 U	0.0038 U	0.0038 U	0.0038 U	0.004 U	0.0038 U	0.0038 U
Aroclor 1221		0.0038 U	0.0038 U	150 U	0.024 U	0.0039 U	0.27 U	0.0038 U	0.004 U	0.004 U	0.0038 U	0.0038 U	0.0038 U	0.004 U	0.0038 U	0.0038 U
Aroclor 1232		0.0038 U	0.0038 U	150 U	0.024 U	0.0039 U	0.27 U	0.0038 U	0.004 U	0.004 U	0.0038 U	0.0038 U	0.0038 U	0.004 U	0.0038 U	0.019 U
Aroclor 1242		0.0038 U	0.0038 U	150 U	0.024 U	0.0039 U	0.27 U	0.0038 U	0.004 U	0.004 U	0.0038 U	0.0038 U	0.0038 U	0.004 U	0.013 U	0.0038 U
Aroclor 1248		0.0038 U	0.0057 U	150 U	0.036 U	0.0039 U	20 U	0.0076 U	0.004 U	0.004 U	0.0077 U	0.013 U	0.0038 U	0.004 U	0.0038 U	0.0038 U
Aroclor 1254		0.0038 U	0.038 U	230 U	0.36 U	0.029 U	20 U	0.011 U	0.004 U	0.016 U	0.0077 U	0.038 U	0.0076 U	0.004 U	0.0095 U	0.0038 U
Aroclor 1260		**0.02**	**0.093**	**580**	**0.27**	**0.046**	**59**	**0.005**	0.004 U	**0.035**	0.0049 U	**0.064**	0.015 U	0.004 U	**0.015**	0.0038 U
Aroclor 1262		0.0038 U	0.0038 U	150 U	0.024 U	0.0039 U	0.27 U	0.0038 U	0.004 U	0.004 U	0.0038 U	0.0038 U	0.0038 U	0.004 U	0.0038 U	0.0038 U
Aroclor 1268		0.0038 U	0.0038 U	150 U	0.024 U	0.0039 U	0.27 U	0.0038 U	0.004 U	0.004 U	0.0038 U	0.0038 U	0.0038 U	0.004 U	0.0038 U	0.0038 U
Total PCBs	0.0000787[e]	**0.02**	**0.093**	**580**	**0.27**	**0.046**	**59**	**0.005**	0.004 U	**0.035**	0.0049 U	**0.064**	0.015 U	0.004 U	**0.015**	0.019 U
Select Detected Volatiles in mg/kg																
1,1-Dichloroethene	0.0011	0.0011 U	0.001 U	1.4 U	0.063 U	0.0012 U	0.39 U	0.0011 U	0.001 U	0.0012 U	0.066 U	0.057 U	0.0029 U	0.001 U	0.072 U	0.18 U
1,2,3-Trichlorobenzene		0.0055 U	0.0052 U	7 U	0.31 U	0.0058 U	1.9 U	0.0055 U	0.0052 U	0.0058 U	0.33 U	0.28 U	0.014 U	0.0052 U	0.36 U	0.92 U
1,2,4-Trichlorobenzene	0.0056	0.0055 U	0.0052 U	**13**	**0.17** T	0.0058 U	**1** T	**0.0029** T	0.0052 U	0.0058 U	**0.17** T	0.28 U	**0.0061** T	**0.0046** T	**0.27** T	0.92 U
1,2,4-Trimethylbenzene		0.0011 U	0.001 U	1.4 U	0.063 U	0.0012 U	0.39 U	0.0011 U	0.001 U	**0.0007** T	**0.066**	0.057 U	**0.022**	0.001 U	0.072 U	0.18 U
1,2-Dichlorobenzene	2.33	0.0011 U	0.001 U	**1.7**	**0.05** T	0.0012 U	**0.22** T	0.0011 U	0.001 U	0.0012 U	**0.064** T	0.057 U	**0.0054**	**0.0008** T	0.072 U	**0.4**
1,3,5-Trimethylbenzene		0.0011 U	0.001 U	1.4 U	0.063 U	0.0012 U	0.39 U	0.0011 U	0.001 U	0.0012 U	**0.036** T	0.057 U	**0.0036**	0.001 U	0.072 U	0.18 U
1,3-Dichlorobenzene	0.011	0.0011 U	0.001 U	**7.6**	**0.42**	0.0012 U	**1.5**	**0.0018**	0.001 U	**0.0008** T	**0.31**	**0.76**	**0.031**	**0.0043**	**0.15**	**2.6**
1,4-Dichlorobenzene	0.02	0.0011 U	0.001 U	**15**	**0.7**	0.0012 U	**4.1**	**0.0035**	0.001 U	**0.0024**	**0.58**	**0.91**	**0.053**	**0.0084**	**0.85**	**4.6**
2-Butanone		0.0055 U	0.0052 U	7 U	0.31 U	0.0058 U	1.9 U	0.0055 U	0.0052 U	**0.0037** T	0.33 U	0.28 U	**0.0089** T	0.0052 U	0.36 U	0.92 U
4-Isopropyltoluene		0.0011 U	0.001 U	1.4 U	0.063 U	0.0012 U	0.39 U	0.0011 U	0.001 U	0.0012 U	0.066 U	0.057 U	**0.013**	0.001 U	0.072 U	0.18 U
Acetone	24,100	0.0055 U	0.0052 U	7 U	0.31 U	**0.021** J	1.9 U	**0.033** J	**0.01** J	**0.02** J	0.33 U	0.28 U	**0.12** J	0.0052 U	0.36 U	0.92 U
Benzene	0.0064	0.0011 U	0.001 U	1.4 U	0.063 U	0.0012 U	**0.43**	**0.0026**	0.001 U	0.0012 U	**0.054** T	0.057 U	**0.0056**	**0.0008** T	0.072 U	0.18 U
Bromomethane	7.08	0.0011 U	0.001 U	1.4 U	0.063 U	0.0012 U	0.39 U	0.0011 U	0.001 U	0.0012 U	**0.1**	0.057 U	0.0029 U	0.001 U	**0.051** T	**0.16** T
Carbon Disulfide	170	0.0011 U	0.001 U	1.4 U	0.063 U	**0.0012**	0.39 U	**0.012**	**0.0013**	**0.0007** T	0.066 U	0.057 U	0.0029 U	**0.0057**	0.072 U	0.18 U
Chlorobenzene	0.434	0.0011 U	0.001 U	**57**	**0.27**	0.0012 U	**33**	**0.066**	0.001 U	**0.012**	**1.2**	**1.2**	**0.22**	**0.061**	**0.72**	**12**
cis-1,2-Dichloroethene		**0.0015**	**0.0014**	1.4 U	0.063 U	**0.0079**	0.39 U	**0.0009** T	**0.013**	0.0012 U	**0.53**	0.057 U	0.0029 U	**0.0006** T	0.072 U	0.18 U
Ethylbenzene	0.056	0.0011 U	0.001 U	1.4 U	0.063 U	0.0012 U	0.39 U	0.0011 U	0.001 U	0.0012 U	**0.079**	0.057 U	**0.0022** T	0.001 U	0.072 U	0.18 U
Iodomethane		0.0011 U	0.001 U	1.4 U	0.063 U	0.0012 U	0.39 U	0.0011 U	0.001 U	0.0012 U	**0.1** J	0.057 U	0.0029 U	0.001 U	0.072 U	0.18 U
Isopropylbenzene		0.0011 U	0.001 U	1.4 U	0.063 U	0.0012 U	0.39 U	0.0011 U	0.001 U	0.0012 U	0.066 U	0.057 U	**0.0026** T	0.001 U	0.072 U	0.18 U
Methylene Chloride	4.46	**0.0023**	**0.0011** T	2.8 U	0.13 U	0.0018 T	0.78 U	**0.0025**	**0.0016** T	**0.003**	0.13 U	0.11 U	**0.0062**	**0.0023**	**0.17**	0.37 U
Naphthalene	6.56	0.0055 U	0.0052 U	7 U	0.31 U	0.0058 U	1.9 U	0.0055 U	0.0052 U	**0.058**	0.33 U	0.28 U	**1.4**	0.0052 U	0.36 U	**1.2**
sec-Butylbenzene		0.0011 U	0.001 U	1.4 U	0.063 U	0.0012 U	0.39 U	0.0011 U	0.001 U	0.0012 U	0.066 U	0.057 U	0.0029 U	0.001 U	0.072 U	0.18 U
Tetrachloroethene	0.015	0.0011 U	0.001 U	1.4 U	0.063 U	0.0012 U	0.39 U	0.0011 U	0.001 U	0.0012 U	**0.057** T	0.057 U	0.0029 U	0.001 U	0.072 U	0.18 U
Toluene	0.189	0.0011 U	0.001 U	1.4 U	0.063 U	0.0012 U	0.39 U	0.0011 U	0.001 U	0.0012 U	**0.13**	0.057 U	**0.0024** T	0.001 U	0.072 U	**0.45**
trans-1,2-Dichloroethene	1.09	0.0011 U	0.001 U	1.4 U	0.063 U	0.0012 U	0.39 U	0.0011 U	0.001 U	0.0012 U	**0.092**	0.057 U	0.0029 U	0.001 U	0.072 U	0.18 U
Trichloroethene	0.0023	0.0011 U	0.001 U	1.4 U	0.063 U	0.0012 U	0.39 U	0.0011 U	0.001 U	0.0012 U	**0.24**	0.057 U	0.0029 U	0.001 U	0.072 U	0.18 U
Vinyl Chloride	0.0005[e]	**0.0006** T	**0.011**	1.4 U	0.063 U	**0.014**	0.39 U	0.0011 U	**0.0034**	0.0012 U	0.066 U	0.057 U	0.0029 U	0.001 U	0.072 U	0.18 U
Total Xylenes	9[c]	0.0011 U	0.001 U	1.4 U	0.063 U	0.0012 U	0.39 U	0.0011 U	0.001 U	0.0012 U	**0.287**	0.057 U	**0.0074** J	0.001 U	0.072 U	0.18 U

Notes:

a. Value provided is the Three-Phase Partitioning Model screening level calculated with MTCA equation 747-1 using the lowest surface water level for protection of human health considering food ingestion only (WAC 173-340-474). The cleanup levels provided are based on potential for groundwater migration to surface water.
b. Value based on regional natural background for Puget Sound (Ecology 1994).
c. MTCA Method A Soil Unrestricted Land Use Table Value.
d. Washington State Maximum Concentration of Contaminants for the Toxicity Characteristic Dangerous Waste (WAC 173-303-100).
e. The screening level is lower than the method PQL; MTCA defaults the screening level up to the PQL.
f. MTCA Method B Soil Unrestricted Land Use Direct Contact Formula Value, Carcinogen.

C = The chromotogram indicates the presence of PCBs, not DRO or RRO. Laboratory-reported results were updated to non-detect (U) for DRO/RRO.
J = Estimated value.
T = Value is between the MDL and MRL.
U = Not detected at the reporting limit indicated.
Bold = Detected value.
Shaded = Value exceeds the screening level.

Table 1 – Soil Sample Analytical Results

Sample ID	MTCA	JT-US-023-S3	JT-US-023-S4	JT-US-024-S2	JT-US-024-S3	JT-US-024-S4	JT-US-025-S2	JT-US-025-S3	JT-US-025-S5	JT-US-26-S2	JT-US-26-S3	JT-US-27-S2	JT-US-27-S3	JT-US-27-S4	JT-US-28-S1	JT-US-28-S2
Sampling Date	Method B Soil	1/6/2014	1/6/2014	1/6/2014	1/6/2014	1/6/2014	1/6/2014	1/6/2014	1/6/2014	3/11/2014	3/11/2014	3/11/2014	3/11/2014	3/11/2014	3/12/2014	3/12/2014
Depth in feet	Screening Level[a]	10 to 11.5	15 to 16	6 to 7	11 to 12	16 to 17	6.5 to 7.5	10 to 12	16 to 17	5 to 6	12 to 13	6.5 to 7.5	11 to 12	15 to 16	5 to 6	10 to 11
Conventionals in %																
Total Organic Carbon				3.5												
Metals in mg/kg																
Arsenic	7[b]			**7.1**	**6.8**		**5.3**	**4.4**								
Cadmium	5.6			**0.2**	0.1 U		**0.2**	0.1 U								
Chromium	2000[c]			**38.6**	**24.4**		**20.9**	**27.6**								
Lead	250[c]			**33.4**	**1.7**		**54.6**	**3.3**								
Mercury	0.146			**0.05**	**0.02**		**0.07**	**0.04**								
TCLP Lead in mg/L	5[d]															
TPH in mg/kg																
Diesel Range Organics	2000[c]			**64**								74 U			**50**	
Lube Oil	2000[c]			**15**								150 U, C			**100**	
Electrical Insulating Oil	2000[c]			54 U												
Gasoline Range Organics	30[c]											**30**			**20**	
PCBs in mg/kg																
Aroclor 1016		0.0039 U	0.0038 U	0.004 U	0.0038 U	0.0039 U	0.0039 U	0.0038 U	0.0038 U	0.039 U	0.0039 U	2400 U	0.094 U	0.038 U	0.12 U	0.011 U
Aroclor 1221		0.0039 U	0.0038 U	0.004 U	0.0038 U	0.0039 U	0.0039 U	0.0038 U	0.0038 U	0.039 U	0.0039 U	2400 U	0.094 U	0.038 U	0.12 U	0.011 U
Aroclor 1232		0.02 U	0.019 U	0.004 U	0.0094 U	0.0039 U	0.0078 U	0.0038 U	0.0038 U	0.039 U	0.0039 U	2400 U	0.094 U	0.038 U	0.12 U	0.011 U
Aroclor 1242		0.0039 U	0.0038 U	0.0059 U	0.0038 U	0.016 U	0.0039 U	0.0038 U	0.0038 U	0.039 U	0.0039 U	2400 U	0.094 U	0.038 U	0.12 U	0.011 U
Aroclor 1248		0.0039 U	0.0038 U	0.004 U	0.0038 U	0.0039 U	0.0039 U	0.019 U	0.0038 U	0.2 U	0.0039 U	2400 U	0.094 U	0.038 U	0.14 U	0.011 U
Aroclor 1254		0.0039 U	0.0038 U	0.004 U	0.0038 U	0.0039 U	0.012 U	0.058	0.0038 U	0.59 U	0.0059 U	9400 U	0.094 U	0.038 U	2.3 U	0.029 U
Aroclor 1260		0.0039 U	**0.0025** T	**0.0028** T	**0.0068**	0.0039 U	**0.031**	**0.077**	**0.0056**	**0.94**	**0.014**	**30000**	**0.16**	**0.075**	**2**	**0.039**
Aroclor 1262		0.0039 U	0.0038 U	0.004 U	0.0038 U	0.0039 U	0.0039 U	0.0038 U	0.0038 U	0.039 U	0.0039 U	2400 U	0.094 U	0.038 U	0.12 U	0.011 U
Aroclor 1268		0.0039 U	0.0038 U	0.004 U	0.0038 U	0.0039 U	0.0039 U	0.0038 U	0.0038 U	0.039 U	0.0039 U	2400 U	0.094 U	0.038 U	0.12 U	0.011 U
Total PCBs	0.0000787[e]	0.02 U	**0.0025** J	**0.0028** J	**0.0068**	0.0039 U	**0.031**	**0.077**	**0.0056**	**0.94**	**0.014**	**30000**	**0.16**	**0.075**	**2**	**0.039**
Select Detected Volatiles in mg/kg																
1,1-Dichloroethene	0.0011	0.0011 U	0.061 U	0.077 U	0.001 U	0.0013 U	0.0011 U	0.062 UJ		0.063 U	0.0011 U	32 U	0.001 U	0.001 U	0.001 U	0.0043 U
1,2,3-Trichlorobenzene		0.0053 U	0.31 U	0.38 U	0.0051 U	0.0064 U	0.0055 U	0.31 U		0.31 U	0.0054 U	160 U	0.0051 U	0.0052 U	0.0048 U	0.022 U
1,2,4-Trichlorobenzene	0.0056	**0.0051** T	**0.12** T	**0.14** T	**0.0063**	0.0064 U	0.0055 U	**0.062** T		**0.11** T	**0.0035** T	160 U	**0.0032** T	**0.038**	**0.0021** T	0.022 U
1,2,4-Trimethylbenzene		0.0011 U	0.061 U	0.077 U	0.001 U	0.0013 U	0.0011 U	0.062 U		0.063 U	0.0011 U	32 U	0.001 U	0.001 U	0.001 U	0.0043 U
1,2-Dichlorobenzene	2.33	**0.0008** T	**0.16**	**0.35**	**0.0006** T	0.0013 U	0.0011 U	0.062 U		0.063 U	**0.003**	32 U	**0.006**	**0.0036**	0.001 U	0.0043 U
1,3,5-Trimethylbenzene		0.0011 U	0.061 U	0.077 U	0.001 U	0.0013 U	0.0011 U	0.062 U		0.063 U	0.0011 U	32 U	0.001 U	0.001 U	0.001 U	0.0043 U
1,3-Dichlorobenzene	0.011	**0.008**	**2**	**2.3**	**0.0066**	0.0013 U	0.0011 U	**0.17**		**0.2**	**0.042**	32 U	**0.046**	**0.12**	**0.0005** T	0.0043 U
1,4-Dichlorobenzene	0.02	**0.014**	**3.6**	**3.9**	**0.0077**	0.0013 U	0.0011 U	**0.28**		**0.32**	**0.071**	**19** T	**0.067**	**0.095**	**0.0008** T	0.0043 U
2-Butanone		**0.006**	0.31 U	0.38 U	**0.0069**	0.0064 U	0.0055 U	0.31 U		0.31 U	0.0054 U	160 U	0.0051 U	0.0052 U	0.0048 U	0.022 U
4-Isopropyltoluene		0.0011 U	0.061 U	0.077 U	0.001 U	0.0013 U	0.0011 U	0.062 U		0.063 U	0.0011 U	32 U	0.001 U	0.001 U	**0.0055**	0.0043 U
Acetone	24,100	**0.06**	0.31 U	0.38 U	**0.051**	0.0064 U	**0.021**	0.31 U		0.31 U	**0.017** J	160 U	**0.013** J	**0.016** J	**0.029** J	**0.28** J
Benzene	0.0064	**0.001** T	0.061 U	**0.12**	0.001 U	0.0013 U	0.0011 U	0.062 U		0.063 U	0.0011 U	**170**	**0.018**	0.001 U	0.001 U	0.0043 U
Bromomethane	7.08	0.0011 U	**0.037** T	0.077 U	0.001 U	0.0013 U	0.0011 U	**0.088**		0.063 UJ	0.0011 UJ	32 UJ	0.001 UJ	0.001 UJ	0.001 UJ	0.0043 UJ
Carbon Disulfide	170	**0.062**	0.061 U	0.077 U	**0.024**	0.0013 U	**0.0045**	0.062 U		0.063 U	0.0011 U	32 U	**0.0027**	0.001 U	**0.0009** T	**0.007**
Chlorobenzene	0.434	**0.14**	**1.7**	**3.2**	**0.059**	0.0013 U	0.0011 U	**1.7** J		**0.64**	**0.011**	**3800**	**1.2**	**0.013**	0.001 U	0.0043 U
cis-1,2-Dichloroethene		**0.0021**	0.061 U	**0.071** T	**0.0016**	**0.0064**	0.0011 U	0.062 U		0.063 U	**0.0017**	32 U	**0.0008** T	**0.0063**	0.001 U	0.0043 U
Ethylbenzene	0.056	0.0011 U	0.061 U	0.077 U	0.001 U	0.0013 U	0.0011 U	0.062 U		0.063 U	0.0011 U	32 U	0.001 U	0.001 U	0.001 U	0.0043 U
Iodomethane		0.0011 U	**0.045** JT	0.077 U	0.001 U	0.0013 U	0.0011 U	**0.062** J		0.063 U	0.0011 U	32 U	0.001 U	0.001 U	0.001 U	0.0043 U
Isopropylbenzene		0.0011 U	0.061 U	0.077 U	0.001 U	0.0013 U	0.0011 U	0.062 U		0.063 U	0.0011 U	32 U	0.001 U	0.001 U	**0.0006** T	0.0043 U
Methylene Chloride	4.46	**0.0025**	0.12 U	0.15 U	**0.0024**	**0.0023** T	**0.0024**	0.12 UJ		0.13 U	**0.0041**	64 U	**0.0039**	**0.0039**	**0.0017** T	0.0087 U
Naphthalene	6.56	0.0053 U	0.31 U	0.38 U	**0.0015** T	0.0064 U	0.0055 U	0.31 U		0.31 U	0.0054 U	160 U	0.0051 U	0.0052 U	0.0048 U	0.022 U
sec-Butylbenzene		0.0011 U	0.061 U	0.077 U	0.001 U	0.0013 U	0.0011 U	0.062 U		0.063 U	0.0011 U	32 U	0.001 U	0.001 U	**0.0015**	0.0043 U
Tetrachloroethene	0.015	0.0011 U	0.061 U	0.077 U	0.001 U	0.0013 U	0.0011 U	0.062 U		0.063 U	0.0011 U	32 U	0.001 U	0.001 U	0.001 U	0.0043 U
Toluene	0.189	0.0011 U	0.061 U	**0.074** T	0.001 U	0.0013 U	0.0011 U	0.062 U		0.063 U	**0.0006** T	32 U	0.001 U	0.001 U	0.001 U	0.0043 U
trans-1,2-Dichloroethene	1.09	0.0011 U	0.061 U	0.077 U	0.001 U	0.0013 U	0.0011 U	0.062 UJ		0.063 U	0.0011 U	32 U	0.001 U	0.001 U	0.001 U	0.0043 U
Trichloroethene	0.0023	0.0011 U	0.061 U	0.077 U	0.001 U	0.0013 U	0.0011 U	0.062 U		0.063 U	0.0011 U	32 U	0.001 U	0.001 U	0.001 U	0.0043 U
Vinyl Chloride	0.0005[e]	0.0011 U	0.061 U	0.077 U	0.001 U	**0.0044**	0.0011 U	0.062 UJ		0.063 U	0.0011 U	32 U	0.001 U	**0.0038** J	0.001 U	0.0043 U
Total Xylenes	9[c]	0.0011 U	0.061 U	0.077 U	0.001 U	0.0013 U	0.0011 U	0.062 U		0.063 U	0.0011 U	32 U	0.001 U	0.001 U	**0.0008** T	0.0043 U

Notes:

a. Value provided is the Three-Phase Partitioning Model screening level calculated with MTCA equation 747-1 using the lowest surface water level for protection of human health considering food ingestion only (WAC 173-340-474). The cleanup levels provided are based on potential for groundwater migration to surface water.
b. Value based on regional natural background for Puget Sound (Ecology 1994).
c. MTCA Method A Soil Unrestricted Land Use Table Value.
d. Washington State Maximum Concentration of Contaminants for the Toxicity Characteristic Dangerous Waste (WAC 173-303-100).
e. The screening level is lower than the method PQL; MTCA defaults the screening level up to the PQL.
f. MTCA Method B Soil Unrestricted Land Use Direct Contact Formula Value, Carcinogen.

C = The chromotogram indicates the presence of PCBs, not DRO or RRO. Laboratory-reported results were updated to non-detect (U) for DRO/RRO.
J = Estimated value.
T = Value is between the MDL and MRL.
U = Not detected at the reporting limit indicated.
Bold = Detected value.
Shaded = Value exceeds the screening level.

Table 1 – Soil Sample Analytical Results

Sample ID	MTCA	JT-US-28-S3	JT-US-29-S1	JT-US-29-S2	JT-US-30-S2	JT-US-30-S4	JT-US-31-S2	JT-US-31-S3	JT-US-31-S5	JT-US-32-S2	JT-US-32-S4	JT-US-33-S2	JT-US-33-S3	JT-US-33-S4	JT-US-33-S5	JT-US-34-S1
Sampling Date	Method B Soil	3/12/2014	3/11/2014	3/11/2014	3/12/2014	3/12/2014	3/12/2014	3/12/2014	3/12/2014	3/12/2014	3/12/2014	3/11/2014	3/11/2014	3/11/2014	3/11/2014	3/11/2014
Depth in feet	Screening Level[a]	15.5 to 16.5	1.5 to 2.5	6 to 7	10.5 to 11.5	20 to 21	5 to 6	12 to 13	21 to 22	5 to 6	15.5 to 16.5	6.5 to 7.5	10 to 11	16 to 17	20 to 21	17 to 18
Conventionals in %																
Total Organic Carbon																
Metals in mg/kg																
Arsenic	7[b]															
Cadmium	5.6															
Chromium	2000[c]															
Lead	250[c]															
Mercury	0.146															
TCLP Lead in mg/L	5[d]															
TPH in mg/kg																
Diesel Range Organics	2000[c]		**50**													
Lube Oil	2000[c]		**100**													
Electrical Insulating Oil	2000[c]															
Gasoline Range Organics	30[c]		**20**													
PCBs in mg/kg																
Aroclor 1016		0.0039 U	0.02 U	0.019 U	0.0039 U	0.0038 U	0.15 U	0.019 U	0.0039 U	0.0038 U	0.0039 U	0.0038 U	0.0038 U	0.0038 U	0.0039 U	0.0039 U
Aroclor 1221		0.0039 U	0.02 U	0.019 U	0.0039 U	0.0038 U	0.15 U	0.019 U	0.0039 U	0.0038 U	0.0039 U	0.0038 U	0.0038 U	0.0038 U	0.0039 U	0.0039 U
Aroclor 1232		0.0039 U	0.02 U	0.019 U	0.0039 U	0.0038 U	0.15 U	0.019 U	0.0039 U	0.0038 U	0.0039 U	0.0038 U	0.0038 U	0.0038 U	0.0039 U	0.0078 U
Aroclor 1242		0.0039 U	0.02 U	0.019 U	0.0039 U	0.0038 U	0.15 U	0.019 U	0.0039 U	0.0038 U	0.0039 U	0.0038 U	0.0038 U	0.0038 U	0.0039 U	0.0039 U
Aroclor 1248		0.0039 U	0.02 U	0.019 U	0.0039 U	0.0038 U	0.15 U	0.019 U	0.0039 U	0.0038 U	0.0039 U	0.0038 U	0.0038 U	0.0038 U	0.0039 U	0.0039 U
Aroclor 1254		0.0039 U	0.049 U	0.038 U	0.0039 U	0.0038 U	1.1 U	0.019 U	0.0078 U	0.028 U	0.0039 U	0.0038 U	0.0076 U	0.0038 U	0.0039 U	0.078 U
Aroclor 1260		**0.0023** T	0.15 U	**0.12**	**0.0082**	**0.0061**	**3.7**	**0.035**	**0.024**	**0.076**	**0.0029** T	**0.0045**	**0.017**	**0.0034** T	**0.0032** T	**0.26**
Aroclor 1262		0.0039 U	0.02 U	0.019 U	0.0039 U	0.0038 U	0.15 U	0.019 U	0.0039 U	0.0038 U	0.0039 U	0.0038 U	0.0038 U	0.0038 U	0.0039 U	0.0039 U
Aroclor 1268		0.0039 U	0.02 U	0.019 U	0.0039 U	0.0038 U	0.15 U	0.019 U	0.0039 U	0.0038 U	0.0039 U	0.0038 U	0.0038 U	0.0038 U	0.0039 U	0.0039 U
Total PCBs	0.0000787[e]	**0.0023 J**	0.15 U	**0.12**	**0.0082**	**0.0061**	**3.7**	**0.035**	**0.024**	**0.076**	**0.0029 J**	**0.0045**	**0.017**	**0.0034 J**	**0.0032 J**	**0.26**
Select Detected Volatiles in mg/kg																
1,1-Dichloroethene	0.0011	0.0011 U	0.088 U	0.0009 U	0.001 U	0.0011 U	0.0011 U	0.001 U	0.0008 U	0.086 U	0.0011 U	0.071 U	0.081 U	0.0011 U	0.0009 U	0.0016 U
1,2,3-Trichlorobenzene		0.0054 U	0.44 U	0.0044 U	0.0049 U	0.0054 U	0.0054 U	0.0051 U	0.0042 U	0.43 U	0.0054 U	0.35 U	0.4 U	0.0053 U	0.0043 U	0.0081 U
1,2,4-Trichlorobenzene	0.0056	0.0054 U	0.44 U	0.0044 U	0.0049 U	0.0054 U	0.0054 U	0.0051 U	0.0042 U	0.43 U	0.0054 U	0.35 U	0.4 U	0.0053 U	0.0043 U	0.0081 U
1,2,4-Trimethylbenzene		0.0011 U	0.088 U	0.0009 U	0.001 U	0.0011 U	0.0011 U	0.001 U	0.0008 U	0.086 U	0.0011 U	0.071 U	0.081 U	0.0011 U	0.0009 U	0.0016 U
1,2-Dichlorobenzene	2.33	0.0011 U	0.088 U	0.0009 U	0.001 U	0.0011 U	0.0011 U	0.001 U	0.0008 U	0.086 U	0.0011 U	0.071 U	0.081 U	0.0011 U	0.0009 U	0.0016 U
1,3,5-Trimethylbenzene		0.0011 U	0.088 U	0.0009 U	0.001 U	0.0011 U	0.0011 U	0.001 U	0.0008 U	0.086 U	0.0011 U	0.071 U	0.081 U	0.0011 U	0.0009 U	0.0016 U
1,3-Dichlorobenzene	0.011	0.0011 U	0.088 U	0.0009 U	0.001 U	0.0011 U	0.0011 U	0.001 U	0.0008 U	0.086 U	0.0011 U	**0.19**	0.081 U	0.0011 U	0.0009 U	0.0016 U
1,4-Dichlorobenzene	0.02	0.0011 U	0.088 U	0.0009 U	0.001 U	0.0011 U	**0.001** T	0.001 U	0.0008 U	0.086 U	0.0011 U	**0.4**	0.081 U	0.0011 U	0.0009 U	0.0016 U
2-Butanone		0.0054 U	0.44 U	0.0044 U	**0.0031** T	0.0054 U	0.0054 U	0.0051 U	0.0042 U	0.43 U	0.0054 U	0.35 U	0.4 U	0.0053 U	0.0043 U	0.0081 U
4-Isopropyltoluene		0.0011 U	0.088 U	0.0009 U	0.001 U	0.0011 U	0.0011 U	0.001 U	0.0008 U	0.086 U	0.0011 U	0.071 U	0.081 U	0.0011 U	0.0009 U	0.0016 U
Acetone	24,100	**0.022** J	0.44 U	**0.021** J	**0.039** J	**0.034** J	0.052 J	**0.02** J	0.0042 U	0.43 U	**0.019** J	0.35 U	**0.68** J	**0.03** J	**0.016** J	0.0081 U
Benzene	0.0064	0.0011 U	0.088 U	0.0009 U	0.001 U	0.0011 U	**0.02**	0.001 U	0.0008 U	0.086 U	**0.0014**	0.071 U	**0.64**	0.0011 U	0.0009 U	0.0016 U
Bromomethane	7.08	0.0011 UJ	0.088 UJ	0.0009 UJ	0.001 UJ	0.0011 UJ	0.0011 UJ	0.001 UJ	0.0008 U	**0.092**	0.0011 U	0.071 U	0.081 U	0.0011 U	0.0009 U	0.0016 U
Carbon Disulfide	170	**0.0043**	**0.061** T	**0.002**	0.001 U	0.0011 U	**0.001** T	**0.0007** T	0.0008 U	0.086 U	**0.0025**	0.071 U	0.081 U	**0.0037**	0.0009 U	0.0016 U
Chlorobenzene	0.434	0.0011 U	0.088 U	0.0009 U	0.001 U	0.0011 U	**0.012**	0.001 U	0.0008 U	0.086 U	0.0011 U	**2.7**	**0.33**	0.0011 U	0.0009 U	0.0016 U
cis-1,2-Dichloroethene		**0.001** T	0.088 U	0.0009 U	**0.0015**	**0.015**	**0.01**	**0.014**	0.0008 U	**0.59**	**0.0015**	0.071 U	**1.5**	**0.002**	0.0009 U	0.0016 U
Ethylbenzene	0.056	0.0011 U	0.088 U	0.0009 U	0.001 U	0.0011 U	0.0011 U	0.001 U	0.0008 U	0.086 U	0.0011 U	0.071 U	0.081 U	0.0011 U	0.0009 U	0.0016 U
Iodomethane		0.0011 U	0.088 U	0.0009 U	0.001 U	0.0011 U	0.0011 U	0.001 U	0.0008 U	0.086 U	0.0011 U	0.071 U	0.081 U	0.0011 U	0.0009 U	0.0016 U
Isopropylbenzene		0.0011 U	0.088 U	0.0009 U	0.001 U	0.0011 U	0.0011 U	0.001 U	0.0008 U	0.086 U	0.0011 U	0.071 U	0.081 U	0.0011 U	0.0009 U	0.0016 U
Methylene Chloride	4.46	**0.0037**	0.18 U	**0.0023**	**0.0033**	**0.0036**	**0.0023**	**0.0024**	**0.0017**	0.17 U	**0.0026**	0.14 U	0.16 U	**0.0031**	**0.0022**	0.0032 U
Naphthalene	6.56	0.0054 U	0.44 U	0.0044 U	0.0049 U	0.0054 U	0.0054 U	0.0051 U	0.0042 U	0.43 U	0.0054 U	0.35 U	0.4 U	0.0053 U	0.0043 U	0.0081 U
sec-Butylbenzene		0.0011 U	0.088 U	0.0009 U	0.001 U	0.0011 U	0.0011 U	0.001 U	0.0008 U	0.086 U	0.0011 U	0.071 U	0.081 U	0.0011 U	0.0009 U	0.0016 U
Tetrachloroethene	0.015	0.0011 U	0.088 U	0.0009 U	**0.016**	0.0011 U	0.0011 U	0.001 U	0.0008 U	**2.7**	0.0011 U	0.071 U	0.081 U	**0.0027**	0.0009 U	0.0016 U
Toluene	0.189	0.0011 U	0.088 U	0.0009 U	0.001 U	0.0011 U	**0.0085**	0.001 U	0.0008 U	0.086 U	0.0011 U	0.071 U	0.081 U	0.0011 U	0.0009 U	0.0016 U
trans-1,2-Dichloroethene	1.09	0.0011 U	0.088 U	0.0009 U	0.001 U	0.0011 U	0.0011 U	0.001 U	0.0008 U	0.086 U	0.0011 U	0.071 U	**0.12**	0.0011 U	0.0009 U	0.0016 U
Trichloroethene	0.0023	0.0011 U	0.088 U	0.0009 U	**0.0039**	**0.0012**	**0.0024**	0.001 U	0.0008 U	**1.9**	0.0011 U	0.071 U	**0.11**	0.0011 U	0.0009 U	0.0016 U
Vinyl Chloride	0.0005[e]	**0.032** J	0.088 U	0.0009 U	0.001 U	**0.0041** J	0.0011 U	**0.035**	0.0008 U	0.086 U	**0.015**	0.071 U	0.081 U	0.0011 U	0.0009 U	0.0016 U
Total Xylenes	9[c]	0.0011 U	0.088 U	0.0009 U	0.001 U	0.0011 U	0.0011	0.001 U	0.0008 U	0.086 U	0.0011 U	0.071 U	0.081 U	0.0011 U	0.0009 U	0.0016 U

Notes:

a. Value provided is the Three-Phase Partitioning Model screening level calculated with MTCA equation 747-1 using the lowest surface water level for protection of human health considering food ingestion only (WAC 173-340-474). The cleanup levels provided are based on potential for groundwater migration to surface water.
b. Value based on regional natural background for Puget Sound (Ecology 1994).
c. MTCA Method A Soil Unrestricted Land Use Table Value.
d. Washington State Maximum Concentration of Contaminants for the Toxicity Characteristic Dangerous Waste (WAC 173-303-100).
e. The screening level is lower than the method PQL; MTCA defaults the screening level up to the PQL.
f. MTCA Method B Soil Unrestricted Land Use Direct Contact Formula Value, Carcinogen.

C = The chromotogram indicates the presence of PCBs, not DRO or RRO. Laboratory-reported results were updated to non-detect (U) for DRO/RRO.
J = Estimated value.
T = Value is between the MDL and MRL.
U = Not detected at the reporting limit indicated.
Bold = Detected value.
Shaded = Value exceeds the screening level.

Table 1 – Soil Sample Analytical Results

Sample ID	MTCA	JT-US-34-S3	JT-US-35-S1	JT-US-35-S2	JT-US-36-S1	JT-US-36-S2	JT-US-37-S1	JT-US-37-S2	JT-US-38-S1	JT-US-38-S2	JT-MW-100-S2	JT-MW-100-S3	JT-MW-200-S5	JT-MW-200-S6
Sampling Date	Method B Soil	3/11/2014	3/11/2014	3/12/2014	3/12/2014	3/12/2014	3/12/2014	3/12/2014	3/12/2014	3/12/2014	3/13/2014	3/13/2014	3/13/2014	3/13/2014
Depth in feet	Screening Level[a]	20 to 21	16 to 17	20 to 21	0.7 to 1.7	6 to 7	2 to 3	5 to 6	0.5 to 1.5	6.5 to 7.5	15 to 15.75	25 to 25.75	25 to 26	30 to 30.7
Conventionals in %														
Total Organic Carbon														
Metals in mg/kg														
Arsenic	7[b]													
Cadmium	5.6													
Chromium	2000[c]													
Lead	250[c]													
Mercury	0.146													
TCLP Lead in mg/L	5[d]													
TPH in mg/kg														
Diesel Range Organics	2000[c]				**50**									
Lube Oil	2000[c]				**100**									
Electrical Insulating Oil	2000[c]													
Gasoline Range Organics	30[c]				**20**									
PCBs in mg/kg														
Aroclor 1016		0.0056 U	0.0038 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.0038 U	0.0038 U	0.0038 U	0.004 U	0.0039 U	0.004 U
Aroclor 1221		0.0056 U	0.0038 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.0038 U	0.0038 U	0.0038 U	0.004 U	0.0039 U	0.004 U
Aroclor 1232		0.0056 U	0.0038 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.0038 U	0.0095 U	0.0038 U	0.004 U	0.0039 U	0.004 U
Aroclor 1242		0.0056 U	0.0038 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.0038 U	0.0038 U	0.0038 U	0.004 U	0.0039 U	0.004 U
Aroclor 1248		0.007 U	0.0096 U	0.004 U	0.0086	0.004 U	0.004 U	**0.028**	0.0094 U	0.0038 U	**0.015**	**0.0033** T	0.0039 U	0.057
Aroclor 1254		0.42 U	0.048 U	0.004 U	0.012 U	0.004 U	0.004 U	0.3 U	0.076 U	0.0057 U	**0.024**	**0.0044**	0.024 U	0.11
Aroclor 1260		**1.6**	**0.15**	**0.0036** T	**0.028**	**0.0072**	**0.0043**	**0.94**	**0.29**	**0.012**	**0.0095**	0.004 U	**0.06**	**0.11**
Aroclor 1262		0.0056 U	0.0038 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.0038 U	0.0038 U	0.0038 U	0.004 U	0.0039 U	0.004 U
Aroclor 1268		0.0056 U	0.0038 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.0038 U	0.0038 U	0.0038 U	0.004 U	0.0039 U	0.004 U
Total PCBs	0.0000787[e]	**1.6**	**0.15**	**0.0036** J	**0.0366**	**0.0072**	**0.0043**	**0.968**	**0.29**	**0.012**	**0.0485**	**0.0077** J	**0.06**	**0.277**
Select Detected Volatiles in mg/kg														
1,1-Dichloroethene	0.0011	0.0009 U	0.0012 U	0.0008 U	0.056 U	0.0011 U	0.059 U	0.061 U	3.4 U	0.082 U	0.001 UJ	0.0009 UJ	0.0011 UJ	0.0009 UJ
1,2,3-Trichlorobenzene		0.0043 U	0.0059 U	0.0042 U	0.28 U	0.0055 U	0.3 U	0.31 U	17 U	0.41 U	0.0051 UJ	0.0043 UJ	0.0057 UJ	0.0045 UJ
1,2,4-Trichlorobenzene	0.0056	0.0043 U	0.0059 U	0.0042 U	0.28 U	0.0055 U	0.3 U	0.31 U	17 U	0.41 U	0.0051 UJ	0.0043 UJ	0.0057 UJ	0.0045 UJ
1,2,4-Trimethylbenzene		0.0009 U	0.0012 U	0.0008 U	0.056 U	0.0011 U	0.059 U	0.061 U	3.4 U	0.082 U	0.001 UJ	0.0009 UJ	0.0011 UJ	0.0009 UJ
1,2-Dichlorobenzene	2.33	0.0009 U	0.0012 U	0.0008 U	0.056 U	0.0011 U	0.059 U	0.061 U	3.4 U	0.082 U	0.001 UJ	0.0009 UJ	0.0011 UJ	0.0009 UJ
1,3,5-Trimethylbenzene		0.0009 U	0.0012 U	0.0008 U	0.056 U	0.0011 U	0.059 U	0.061 U	3.4 U	0.082 U	0.001 UJ	0.0009 UJ	0.0011 UJ	0.0009 UJ
1,3-Dichlorobenzene	0.011	0.0009 U	0.0012 U	0.0008 U	0.056 U	0.0011 U	0.059 U	**0.11**	3.4 U	**0.37**	**0.0027** J	0.0009 UJ	0.0011 UJ	0.0009 UJ
1,4-Dichlorobenzene	0.02	0.0009 U	0.0012 U	0.0008 U	0.056 U	0.0011 U	**0.38**	**0.73**	3.4 U	**0.96**	**0.0024** J	0.0009 UJ	0.0011 UJ	0.0009 UJ
2-Butanone		0.0043 U	0.0059 U	0.0042 U	0.28 U	0.0055 U	0.3 U	0.31 U	17 U	0.41 U	0.0051 UJ	0.0043 UJ	0.0057 UJ	0.0045 UJ
4-Isopropyltoluene		0.0009 U	0.0012 U	0.0008 U	0.056 U	0.0011 U	0.059 U	0.061 U	3.4 U	0.082 U	**0.024** J	**0.027** J	0.0011 UJ	0.0009 UJ
Acetone	24,100	0.0043 U	0.0059 U	**0.013** J	0.28 U	**0.042** J	0.3 U	**0.81** J	17 U	**0.64** J	**0.049** J	**0.031** J	**0.028** J	**0.025** J
Benzene	0.0064	0.0009 U	0.0012 U	0.0008 U	0.056 U	0.0011 U	0.059 U	0.061 U	3.4 U	0.082 U	**0.001** JT	0.0009 UJ	0.0011 UJ	0.0009 UJ
Bromomethane	7.08	0.0009 U	0.0012 U	0.0008 U	0.056 U	0.0011 U	0.059 U	0.061 U	3.4 U	0.082 U	0.001 UJ	0.0009 UJ	0.0011 UJ	0.0009 UJ
Carbon Disulfide	170	0.0009 U	**0.0018**	0.0008 U	0.056 U	0.0011 U	0.059 U	0.061 U	3.4 U	0.082 U	**0.0064** J	**0.0005** JT	0.0011 UJ	0.0009 UJ
Chlorobenzene	0.434	0.0009 U	**0.0035**	0.0008 U	0.056 U	0.0011 U	**0.42**	**1.4**	3.4 U	**0.11**	**0.054** J	0.0009 UJ	0.0011 UJ	0.0009 UJ
cis-1,2-Dichloroethene		0.0009 U	0.0012 U	0.0008 U	0.056 U	0.0011 U	0.059 U	0.061 U	3.4 U	0.082 U	**0.0011** J	0.0009 UJ	0.0011 UJ	0.0009 UJ
Ethylbenzene	0.056	0.0009 U	0.0012 U	0.0008 U	0.056 U	0.0011 U	0.059 U	0.061 U	3.4 U	0.082 U	0.001 UJ	0.0009 UJ	0.0011 UJ	0.0009 UJ
Iodomethane		0.0009 U	0.0012 U	0.0008 U	0.056 U	0.0011 U	0.059 U	0.061 U	3.4 U	0.082 U	0.001 UJ	0.0009 UJ	0.0011 UJ	0.0009 UJ
Isopropylbenzene		0.0009 U	0.0012 U	0.0008 U	0.056 U	0.0011 U	0.059 U	0.061 U	3.4 U	0.082 U	0.001 UJ	0.0009 UJ	0.0011 UJ	0.0009 UJ
Methylene Chloride	4.46	0.0017 U	**0.0032**	**0.0023**	0.11 U	**0.0023**	0.12 U	0.12 U	6.7 U	0.16 U	**0.0068** J	**0.0027** J	**0.0027** J	**0.005** J
Naphthalene	6.56	0.0043 U	0.0059 U	0.0042 U	0.28 U	0.0055 U	0.3 U	**0.59**	**130**	0.41 U	0.0051 UJ	0.0043 UJ	0.0057 UJ	0.0045 UJ
sec-Butylbenzene		0.0009 U	0.0012 U	0.0008 U	0.056 U	0.0011 U	0.059 U	0.061 U	3.4 U	0.082 U	0.001 UJ	0.0009 UJ	0.0011 UJ	0.0009 UJ
Tetrachloroethene	0.015	0.0009 U	0.0012 U	0.0008 U	0.056 U	0.0011 U	0.059 U	0.061 U	3.4 U	0.082 U	**0.0013** J	0.0009 UJ	0.0011 UJ	0.0009 UJ
Toluene	0.189	0.0009 U	0.0012 U	0.0008 U	0.056 U	0.0011 U	0.059 U	0.061 U	3.4 U	0.082 U	**0.0005** JT	0.0009 UJ	0.0011 UJ	0.0009 UJ
trans-1,2-Dichloroethene	1.09	0.0009 U	0.0012 U	0.0008 U	0.056 U	0.0011 U	0.059 U	0.061 U	3.4 U	0.082 U	0.001 UJ	0.0009 UJ	0.0011 UJ	0.0009 UJ
Trichloroethene	0.0023	0.0009 U	0.0012 U	0.0008 U	0.056 U	0.0011 U	0.059 U	0.061 U	3.4 U	0.082 U	**0.0005** JT	0.0009 UJ	0.0011 UJ	0.0009 UJ
Vinyl Chloride	0.0005[e]	0.0009 U	0.0012 U	0.0008 U	0.056 U	0.0011 U	0.059 U	0.061 U	3.4 U	0.082 U	0.001 UJ	0.0009 UJ	0.0011 UJ	0.0009 UJ
Total Xylenes	9[c]	0.0009 U	0.0012 U	0.0008 U	0.056 U	0.0011 U	0.059 U	0.062	3.4 U	0.082 U	0.001 UJ	0.0009 UJ	0.0011 UJ	0.0009 UJ

Notes:

a. Value provided is the Three-Phase Partitioning Model screening level calculated with MTCA equation 747-1 using the lowest surface water level for protection of human health considering food ingestion only (WAC 173-340-474). The cleanup levels provided are based on potential for groundwater migration to surface water.

b. Value based on regional natural background for Puget Sound (Ecology 1994).

c. MTCA Method A Soil Unrestricted Land Use Table Value.

d. Washington State Maximum Concentration of Contaminants for the Toxicity Characteristic Dangerous Waste (WAC 173-303-100).

e. The screening level is lower than the method PQL; MTCA defaults the screening level up to the PQL.

f. MTCA Method B Soil Unrestricted Land Use Direct Contact Formula Value, Carcinogen.

C = The chromotogram indicates the presence of PCBs, not DRO or RRO. Laboratory-reported results were updated to non-detect (U) for DRO/RRO.

J = Estimated value.

T = Value is between the MDL and MRL.

U = Not detected at the reporting limit indicated.

Bold = Detected value.

Shaded = Value exceeds the screening level.

Table 2 – Anaytical Results for Dioxins and Furans in Soil Samples

Sample ID Depth in feet Sampling Date	MTCA Method B Screening Level[a]	JT-US-003-S2 7.5 to 8 1/2/14		JT-US-004-S2 7 to 7.5 1/2/14		JT-US-005-S2 10 to 10.5 1/2/14	
Dioxins in pg/g							
2,3,7,8-TCDD		0.287	U	0.303	U	0.518	U
1,2,3,7,8-PeCDD		0.599	U	**0.771**	T	**1.56**	
1,2,3,4,7,8-HxCDD		0.747	U	**0.332**	T	**0.445**	T
1,2,3,6,7,8-HxCDD		**0.803**	T	0.532	U	**1.13**	
1,2,3,7,8,9-HxCDD		**1.19**		**0.597**	T	**0.862**	T
1,2,3,4,6,7,8-HpCDD		4.95	U	3.15	U	3.53	U
OCDD		25.2	U	8.02	U	17.1	U
2,3,7,8-TCDF		**5.96**		**1.26**		**1.7**	
1,2,3,7,8-PeCDF		**2.16**	JL	**0.916**	T	**1.05**	JL
2,3,4,7,8-PeCDF		**1.55**		**1.12**		**1.56**	
1,2,3,4,7,8-HxCDF		**2.95**		**0.855**	T	**20.5**	
1,2,3,6,7,8-HxCDF		1.12	U	**0.831**	T	**2.51**	
1,2,3,7,8,9-HxCDF		**1.43**		**0.331**	T	**2.2**	
2,3,4,6,7,8-HxCDF		**1.05**		**0.932**	T	**1.02**	
1,2,3,4,6,7,8-HpCDF		**3.45**		**1.83**		**30.1**	
1,2,3,4,7,8,9-HpCDF		**2.55**		**0.322**	T	**32**	
OCDF		**38.1**		1.14	U	**204**	
Total TCDD		**4.28**	J	**10.9**	J	**20.9**	J
Total PeCDD		**4.82**	J	**10.1**		**21.8**	J
Total HxCDD		**9.37**	J	**9.17**	J	**17.2**	J
Total HpCDD		**12.4**	J	**6.76**		**8.76**	
Total TCDF		**23.5**	J	**29.1**	J	**27.1**	J
Total PeCDF		**11.2**	J	**14.2**	J	**27.6**	J
Total HxCDF		**10.8**	J	**7.4**	J	**54.5**	J
Total HpCDF		**8.44**	J	**2.91**		**125**	
TEQ Equivalent	0.049	**1.94**		**1.59**		**5.53**	

Values that exceed the screening level are shaded.
U = Not detected at the reporting limit indicated.
J = Estimated value.
T = Value is between the MDL and MRL.
TEQ = Toxicity Equivalency Quotient
JL = Analyte was positively identified and the value may be less than the reported estimate.
Bold = Detected value.
Shaded = Value exceeds the screening level.
a. Value provided is the Three-Phase Partitioning Model screening level calculated with MTCA equation 747-1 using the lowest surface water level for protection of human health considering food ingestion only (WAC 173-340-474). The cleanup levels provided are based on potential for groundwater migration to surface water.

Table 3 – Water Sample Analytical Results

Sample ID	MTCA Method B	IP-14		JT-MW-IP-9		JT-MW-JT-3		JT-5		JT-MW-JT-6		JT-MW-JT-7		JT-MW-JT-8	
Monitoring Well	Freshwater	IP-14		IP-9		JT-3		JT-5		JT-6		JT-7		JT-8	
Sampling Date	Screening Levels[a]	1/9/2014		1/8/2014		1/7/2014		3/18/2014		1/7/14, 1/14/14		1/7/14, 1/14/14		1/8/2014	
Conventionals in mg/L															
Alkalinity as Bicarbonate		**152**		**455**		**135**				**548**		**562**		**94.5**	
Alkalinity as Carbonate		1	U	1	U	1	U			1	U	1	U	1	U
Alkalinity as Hydroxide		1	U	1	U	1	U			1	U	1	U	1	U
Alkalinity, Total		**152**		**455**		**135**				**548**		**562**		**94.5**	
Chloride		**8.6**		**9.2**		**16.8**				**26.4**		**17.3**		**2.8**	
Nitrate		**0.1**		**0.1**						0.05	U	0.01	U	**0.1**	
Nitrate															
Nitrate-Nitrite as N										0.05	U	0.01	U		
Nitrite as N										0.029		0.01	U		
Sulfate		0.5		0.1	U	1.1				0.1	U	**0.3**		0.6	
Total Organic Carbon		2.2		10.5		6.61				20.4		**20.4**		4.77	
Total Suspended Solids								**119**							
Dissolved Metals in μg/L															
Arsenic	0.098[b]	**24.7**		**5**		**22.7**				**15.2**		**20**		**23.2**	
Cadmium	40.5[c]	0.1	U	0.1	U	0.1	U			0.1	U	0.1	U	0.1	U
Chromium	50[d]	1	U	**1**		**1**				**2**		**2**		**0.6**	
Lead	15[d]	0.1	U	0.1	U	0.1	U			0.1	U	0.1	U	0.1	U
Mercury	0.146	0.1	U	0.1	U	0.1	U			0.1	U	0.1	U	0.1	U
Total Metals in μg/L															
Arsenic	0.098[b]	**21.6**		**4.9**		**23**				**15.1**		**20.3**		**20.6**	
Cadmium	40.5[c]	0.1	U	0.1	U	0.1	U			0.1	U	0.1	U	0.1	U
Chromium	50[d]	1	U	**2**		**1.2**				**3**		**2**		**1.1**	
Lead	15[d]	**0.6**		**0.1**		**0.2**				**0.8**		**0.3**		**1.4**	
Mercury	0.146	0.1	U	0.1	U	0.1	U			0.1	U	0.1	U	0.1	U
TPH in μg/L															
Diesel Range Organics	500[d]													3600	U, C
Lube Oil	500[d]														
Combine Diesel and Oil	500[d]														
Residual Range Organics	500[d]													1400	U, C
PCBs in μg/L															
Aroclor 1016		0.25	U	2.5	U	0.01	U	0.011	U	0.01	U	0.01	U	20	U
Aroclor 1221		0.25	U	2.5	U	0.01	U	0.011	U	0.01	U	0.01	U	20	U
Aroclor 1232		0.25	U	2.5	U	0.035	U	0.011	U	0.04	U	0.012	U	20	U
Aroclor 1242		0.25	U	2.5	U	0.01	U	0.011	U	0.01	U	0.01	U	20	U
Aroclor 1248		0.75	U	2.5	U	0.01	U	0.011	U	0.01	U	0.01	U	20	U
Aroclor 1254		2.5	U	12	U	0.75	U	0.28	U	0.05	U	0.15	U	200	U
Aroclor 1260		**0.79**		**18**		**0.76**		**0.91**		**0.05**		**0.17**		**280**	
Aroclor 1262		0.25	U	2.5	U	0.01	U	0.011	U	0.01	U	0.01	U	20	U
Aroclor 1268		0.25	U	2.5	U	0.01	U	0.011	U	0.01	U	0.01	U	20	U
Total PCBs	0.000064[b]	**0.79**		**18**		**0.76**		**0.91**		**0.05**		**0.17**		**280**	
Select Detected Volatiles in μg/L															
1,1-Dichloroethene	3.2[e]	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
1,2,3-Trichlorobenzene		**76**		**15**		**0.13**	T	0.5	U	0.5	U	0.5	U	**1300**	
1,2,4-Trichlorobenzene	2.03[c]	**960**		**130**		**0.86**		**0.13**	JT	0.5	U	**0.58**		**9900**	
1,2,4-Trimethylbenzene		0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	**0.12**	T
1,2-Dichlorobenzene	3,000	**110**		**4.7**		**0.13**	T	0.2	U	**0.12**	T	**0.08**	T	**800**	
1,3,5-Trimethylbenzene		0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
1,3-Dichlorobenzene	10	**580**		**15**		**0.83**		0.2	U	**1.3**		**0.91**		**220**	
1,4-Dichlorobenzene	21[c]	**670**		**33**		**1.7**		0.2	U	**2.7**		**2.3**		**730**	
2-Butanone		5	U	5	U	5	U	5	U	5	U	5	U	**2.2**	T
4-Isopropyltoluene		0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Acetone	6 x 10[6(f)]	5	U	5	U	5	U	5	U	5	U	5	U	16	U
Benzene	5[d]	**13**		**11**		**0.97**		0.2	U	**4.4**		**0.63**		**1.5**	
Carbon Disulfide	2.26 x 10[4(f)]	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Chlorobenzene	800	**1200**		**370**		**43**		0.2	U	**300**		**95**		**150**	
Chloromethane		0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	0.5	U
cis-1,2-Dichloroethene		**0.82**		**0.91**		**0.16**	T	0.2	U	0.2	U	**0.13**	T	0.28	
Ethylbenzene	130	**0.15**	T	0.2	U	0.2	U	0.2	U	**0.12**	T	0.2	U	0.2	U
Isopropylbenzene		0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Methyl tert-Butyl Ether		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Naphthalene	4,710[f]	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
n-Butylbenzene		0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
n-Propylbenzene		0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
sec-Butylbenzene		0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Tetrachloroethene	29	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	**0.29**	
Toluene	520	**0.29**		**0.18**	T	**0.11**	T	0.2	U	0.2	U	0.2	U	**0.4**	
trans-1,2-Dichloroethene	4,000	**0.11**	T	**0.38**		**0.11**	T	0.2	U	0.2	U	0.2	U	0.2	U
Trichloroethene	7	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	**0.17**	T
Vinyl Chloride	1.6	**0.99**		**1.3**		**0.17**	T	0.2	U	**0.14**	T	0.2	U	**0.14**	T
Total Xylenes	1000[d]	**0.14**		**0.14**		0.4	U	0.4	U	**0.17**		**0.29**	J	**0.38**	J

Notes:

a. Clean Water Act S304 Freshwater Screening Level for Consumption of Organisms groundwater migration to surface water.

b. Screening level is lower than the method PQL; MTCA defaults the screening level up to the PQL.

c. MTCA Method B, Carcinogen, Surface Water Screening Level, standard formula value.

d. MTCA Method A Cleanup Levels for Groundwater.

e. National Toxics Rule 40 CFR 131 Freshwater Screening Level for Consumption of Organisms based on groundwater migration to surface water.

f. MTCA Method B, Non-Carcinogen, Surface Water Screening Level, standard formula value.

C = The chromatogram indicates the presence of PCBs, not DRO or RRO.

T = Value is between the MDL and MRL.

U = Not detected at indicated detection limit.

V.I. = Vapor Intrusion

Bolded = Detected value.

Shaded = Value exceeds the MTCA Method B Freshwater screening level.

Laboratory-reported results were updated to non-detect (U) for DRO/RRO.

Table 3 – Water Sample Analytical Results

Sample ID	MTCA Method B	JT-MW-MW-8D		JT-MW-8		JT-MW-JT-11		JT-MW-JT-12		JT-MW-SRW-1		JT-MW-100		JT-MW-200	
Monitoring Well	Freshwater	MW-8D		MW-8D		JT-11		JT-12		SRW-1		MW-100		MW-200	
Sampling Date	Screening Levels[a]	1/7/14, 1/14/14		3/18/2014		1/8/14, 1/14/14		1/8/2014		1/7/14, 1/14/14		3/18/14		3/18/2014	
Conventionals in mg/L															
Alkalinity as Bicarbonate		**165**				**380**		**141**		**35.4**					
Alkalinity as Carbonate		1	U			1	U	1	U	159					
Alkalinity as Hydroxide		1	U			1	U	1	U	1	U				
Alkalinity, Total		**165**				**380**		**141**		**195**					
Chloride		**8.7**				**18.2**		**38.4**		**12.2**					
Nitrate		0.01	U			0.01	U	**0.1**		0.01	U				
Nitrate															
Nitrate-Nitrite as N		0.01	U			0.01	U			0.01	U				
Nitrite as N		0.01	U			0.01	U			0.01	U				
Sulfate		0.1				0.1	U	**0.7**		**0.8**					
Total Organic Carbon		1.8				**10.6**		**5.17**		**2.52**					
Total Suspended Solids				1	U							**45.2**		**25.6**	
Dissolved Metals in µg/L															
Arsenic	0.098[b]	**4.8**				**18.2**		**12**		0.2	U				
Cadmium	40.5[c]	0.1	U			0.2		0.1	U	0.1	U				
Chromium	50[d]	1	U			1	U	1	U	0.5	U				
Lead	15[d]	0.1	U			**0.4**		0.1	U	0.1	U				
Mercury	0.146	0.1	U			0.1	U	0.1	U	0.1	U				
Total Metals in µg/L															
Arsenic	0.098[b]	**4.5**				**18.5**		**13.2**		**0.2**					
Cadmium	40.5[c]	0.1	U			**0.3**		0.1	U	0.1	U				
Chromium	50[d]	1	U			**1**		**0.8**		0.5	U				
Lead	15[d]	**0.2**				**3.9**		**0.1**		0.1	U				
Mercury	0.146	0.1	U			0.1	U	0.1	U	0.1	U				
TPH in µg/L															
Diesel Range Organics	500[d]														
Lube Oil	500[d]														
Combine Diesel and Oil	500[d]														
Residual Range Organics	500[d]														
PCBs in µg/L															
Aroclor 1016		0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
Aroclor 1221		0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
Aroclor 1232		0.035	U	0.01	U	0.025	U	0.015	U	0.02	U	0.01	U	0.01	U
Aroclor 1242		0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
Aroclor 1248		0.01	U	0.015	U	0.01	U	0.01	U	0.01	U	0.012	U	0.01	U
Aroclor 1254		0.25	U	0.15	U	0.25	U	0.012	U	0.05	U	0.4	U	0.04	U
Aroclor 1260		**0.49**		**0.18**		**0.91**		**0.018**		**0.13**		**1.1**		**0.057**	
Aroclor 1262		0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
Aroclor 1268		0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
Total PCBs	0.000064[b]	**0.49**		**0.18**		**0.91**		**0.018**		**0.13**		**1.1**		**0.057**	
Select Detected Volatiles in µg/L															
1,1-Dichloroethene	3.2[e]	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
1,2,3-Trichlorobenzene		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	**15**	
1,2,4-Trichlorobenzene	2.03[c]	**0.45**	T	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U	**100**	**J**
1,2,4-Trimethylbenzene		0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
1,2-Dichlorobenzene	3,000	0.2	U	0.2	U	**0.06**	T	**0.19**	T	0.2	U	0.2	U	**5.3**	
1,3,5-Trimethylbenzene		0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
1,3-Dichlorobenzene	10	0.2	U	0.2	U	**0.84**		**1.1**		0.2	U	0.2	U	**1.1**	
1,4-Dichlorobenzene	21[c]	0.2	U	0.2	U	**1.8**		**1.5**		0.2	U	**0.17**	T	**4**	
2-Butanone		5	U	5	U	5	U	5	U	5	U	5	U	**2.6**	T
4-Isopropyltoluene		0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	**4.2**		0.2	U
Acetone	6×10^{6}[f]	5	U	5	U	5	U	5	U	5	U	**33**		**46**	
Benzene	5[d]	0.2	U	0.2	U	**4.8**		**0.42**		0.2	U	**0.84**		**1.5**	
Carbon Disulfide	2.26×10^{4}[f]	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	**0.18**	T	**0.1**	T
Chlorobenzene	800	**0.4**		**0.28**		**170**		**42**		**0.12**	T	**16**		**1.4**	
Chloromethane		0.5	U	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	UJ
cis-1,2-Dichloroethene		0.2	U	0.2	U	0.2	U	**0.25**		0.2	U	**0.17**	T	0.2	U
Ethylbenzene	130	0.2	U	0.2	U	0.1	T	0.2	U	0.2	U	0.2	U	0.2	U
Isopropylbenzene		0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Methyl tert-Butyl Ether		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	**0.13**	T	0.5	U
Naphthalene	4,710[f]	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	**0.19**	T
n-Butylbenzene		0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
n-Propylbenzene		0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
sec-Butylbenzene		0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Tetrachloroethene	29	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Toluene	520	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	**0.36**		**0.62**	
trans-1,2-Dichloroethene	4,000	0.2	U	0.2	U	0.2	U	**0.13**	T	0.2	U	0.2	U	0.2	U
Trichloroethene	7	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Vinyl Chloride	1.6	0.2	U	0.2	U	**0.15**	T	**0.21**		0.2	U	**0.58**		0.2	U
Total Xylenes	1000[d]	0.4	U	0.4	U	0.4	U	**0.32**	J	0.4	U	0.4	U	**0.15**	T

Notes:

a. Clean Water Act S304 Freshwater Screening Level for Consumption of Organisms groundwater migration to surface water.

b. Screening level is lower than the method PQL; MTCA defaults the screening level up to the PQL.

c. MTCA Method B, Carcinogen, Surface Water Screening Level, standard formula value.

d. MTCA Method A Cleanup Levels for Groundwater.

e. National Toxics Rule 40 CFR 131 Freshwater Screening Level for Consumption of Organisms based on groundwater migration to surface water.

f. MTCA Method B, Non-Carcinogen, Surface Water Screening Level, standard formula value.

C = The chromatogram indicates the presence of PCBs, not DRO or RRO.

T = Value is between the MDL and MRL.

U = Not detected at indicated detection limit.

V.I. = Vapor Intrusion

Bolded = Detected value.

Shaded = Value exceeds the MTCA Method B Freshwater screening level.

Laboratory-reported results were updated to non-detect (U) for DRO/RRO.

Table 4 – Sediment Sample Analytical Results

Sample ID	SCO	CSL	JT-SS-01-S1		JT-SS-01-S2		JT-SS-02-S1		JT-SS-03-S1		JT-SS-03-S2	
Sampling Date	Screening	Screening	1/14/2014		1/14/2014		1/14/2014		1/14/2014		1/14/2014	
Depth in feet	Levels	Levels	0 to 1		1 to 2		0 to 1		0 to 1		1 to 1.5	
Conventionals in %												
Total Organic Carbon			**3.16**		**0.293**		**0.422**		**0.776**		**0.178**	
Preserved Total Solids												
Total Solids			**58.42**		**82.81**		**85.72**		**78.76**		**84.85**	
Conventionals in mg/kg												
Sulfide												
Ammonia (NH3) as Nitrogen (N)												
Metals in mg/kg												
Arsenic	14	120	**11.7**		**4.7**		**7.1**		**17.2**		**12.5**	
Cadmium	2.1	5.4	**0.9**		0.1	U	**0.3**		**0.3**		0.1	U
Chromium	72	88	**37.8**		**19.4**		**23.8**		**23.2**		**20.8**	
Lead	360	1300	**108**		**2.3**		**17.8**		**24.3**		**4.7**	
Mercury	0.66	0.8	**0.24**	J	0.03	U	**0.06**		**0.12**		0.02	U
PCBs in mg/kg												
Aroclor 1016			0.0038	U	0.0038	U	0.0039	U	0.0038	U	0.0039	U
Aroclor 1221			0.0038	U	0.0038	U	0.0039	U	0.0038	U	0.0039	U
Aroclor 1232			0.0038	U	0.0094	U	0.0039	U	0.0038	U	0.0039	U
Aroclor 1242			0.0038	U	0.0038	U	0.0039	U	0.0038	U	0.0039	U
Aroclor 1248			**0.064**		0.0038	U	**0.037**		0.047	U	0.0077	U
Aroclor 1254			**0.15**		**0.0072**		**0.072**		**0.29**		**0.046**	
Aroclor 1260			**0.069**		0.0081	U	**0.024**		**0.056**		0.012	U
Aroclor 1262			0.0038	U	0.0038	U	0.0039	U	0.0038	U	0.0039	U
Aroclor 1268			0.0038	U	0.0038	U	0.0039	U	0.0038	U	0.0039	U
Total PCBs	0.11	2.5	**0.283**		**0.0072**		**0.133**		**0.346**		**0.046**	
Selected Detected Volatiles in µg/kg												
1,2,4-Trimethylbenzene			1.6	U	1.1	U	1.4	U	1.3	U	1.1	U
1,3,5-Trimethylbenzene			1.6	U	1.1	U	1.4	U	1.3	U	1.1	U
1,3-Dichlorobenzene			1.6	U	1.1	U	1.4	U	**2**		1.1	U
1,4-Dichlorobenzene			1.6	U	1.1	U	1.4	U	**1.4**		1.1	U
2-Butanone			7.9	U	**3.3**	T	6.8	U	6.3	U	5.6	U
4-Isopropyltoluene			1.6	U	1.1	U	1.4	U	1.3	U	1.1	U
Acetone			**35**		**27**		**28**		**32**		**20**	
Benzene			1.6	U	**0.7**	T	0.9	T	**1.2**	T	**1.1**	T
Carbon Disulfide			**4.5**		**9.9**		**3.6**		**2.3**		**3.1**	
Chlorobenzene			1.6	U	1.1	U	1.4	U	**1.2**	T	1.1	U
cis-1,2-Dichloroethene			1.6	U	**0.6**	T	1.4	U	1.3	U	**0.7**	T
Ethylbenzene			1.6	U	1.1	U	1.4	U	1.3	U	1.1	U
Methyl ethyl ketone			7.9	U	**3.3**	T	6.8	U	6.3	U	5.6	U
p-Isopropyltoluene			1.6	U	1.1	U	1.4	U	1.3	U	1.1	U
n-Butylbenzene			1.6	U	1.1	U	1.4	U	1.3	U	1.1	U
n-Propylbenzene			1.6	U	1.1	U	1.4	U	1.3	U	1.1	U
m, p-Xylene			1.6	U	1.1	U	1.4	U	1.3	U	1.1	U
O-Xylene			1.6	U	1.1	U	1.4	U	1.3	U	1.1	U
Toluene			**1**	T	**0.7**	T	1.4	U	**0.7**	T	1.1	U

Notes:
U = Not detected at the reporting limit indicated.
J = Estimated value.
T = Value is between the MDL and MRL.
P = Confirmation criteria exceeded. Relative percent difference is greater than 40 percent between the two analytical results.
Shaded = value exceeds Ecology sediment management standards (SMS) sediment cleanup objective (SCO) screening level.
CSL = cleanup screening level.
Bolded = Detected value
Shaded = Value exceeds the CSL

Table 4 – Sediment Sample Analytical Results

Sample ID	SCO	CSL	JT-SS-04-S1		JT-SS-05-S1		JT-SS-05-S2	
Sampling Date	Screening	Screening	1/14/2014		1/14/2014		1/14/2014	
Depth in feet	Levels	Levels	0 to 1		0 to 1		1 to 2	
Conventionals in %								
Total Organic Carbon			**1.13**		**3.48**		**1.62**	
Preserved Total Solids								
Total Solids			**82.92**		**71.48**		**77.35**	
Conventionals in mg/kg								
Sulfide								
Ammonia (NH3) as Nitrogen (N)								
Metals in mg/kg								
Arsenic	14	120	**71.8**		**23.5**		**13**	
Cadmium	2.1	5.4	**0.7**		**0.8**		**0.6**	
Chromium	72	88	**30.8**		**32.2**		**29.6**	
Lead	360	1300	**68.2**		**126**		**115**	
Mercury	0.66	0.8	**0.08**		**0.21**		**0.34**	
PCBs in mg/kg								
Aroclor 1016			0.004	U	0.0039	U	0.0039	U
Aroclor 1221			0.004	U	0.0039	U	0.0039	U
Aroclor 1232			0.004	U	0.0039	U	0.0039	U
Aroclor 1242			0.004	U	0.0039	U	0.0039	U
Aroclor 1248			**0.013**		**0.082**		**0.15**	
Aroclor 1254			**0.029**	JP	**0.14**		**0.16**	
Aroclor 1260			**0.016**		**0.07**		**0.095**	
Aroclor 1262			0.004	U	0.0039	U	0.0039	U
Aroclor 1268			0.004	U	0.0039	U	0.0039	U
Total PCBs	0.11	2.5	**0.058**	J	**0.292**		**0.405**	
Selected Detected Volatiles in µg/kg								
1,2,4-Trimethylbenzene			1.2	U	**1.4**	T	1.4	U
1,3,5-Trimethylbenzene			1.2	U	2.2	U	1.4	U
1,3-Dichlorobenzene			**1.6**		**1.6**	T	1.4	U
1,4-Dichlorobenzene			**0.9**	T	2.2	U	1.4	U
2-Butanone			5.9	U	16		**4**	T
4-Isopropyltoluene			1.2	U	2.2	U	**0.8**	T
Acetone			**20**		**110**		**28**	
Benzene			1.2	U	**2.2**	T	1.4	U
Carbon Disulfide			**7**		**4.2**		**2.3**	
Chlorobenzene			**0.7**	T	**1.5**	T	1.4	U
cis-1,2-Dichloroethene			1.2	U	2.2	U	1.4	U
Ethylbenzene			1.2	U	2.2	U	1.4	U
Methyl ethyl ketone			5.9	U	**16**		**4**	T
p-Isopropyltoluene			1.2	U	2.2	U	**0.8**	T
n-Butylbenzene			1.2	U	2.2	U	1.4	U
n-Propylbenzene			1.2	U	2.2	U	1.4	U
m, p-Xylene			1.2	U	2.2	U	1.4	U
O-Xylene			1.2	U	2.2	U	1.4	U
Toluene			1.2	U	**2.8**		**0.8**	T

Notes:
U = Not detected at the reporting limit indicated.
J = Estimated value.
T = Value is between the MDL and MRL.
P = Confirmation criteria exceeded. Relative percent difference is greater than 40 percent between the two analytical results.
Shaded = value exceeds Ecology sediment management standards (SMS) sediment cleanup objective (SCO) screening level.
CSL = cleanup screening level.
Bolded = Detected value
Shaded = Value exceeds the CSL

Table 5 – Potential Applicable or Relevant and Appropriate Requirements

Authority	Resource	Implementing Laws/Regulations	ARAR?	Applicability
Contaminant-Specific ARARs				
State	Soil	Washington State Model Toxics Control Act [RCW 70.105D; Chapter 173-340 WAC]	Yes	The Model Toxics Control Act (MTCA) soil cleanup levels are applicable.
State	Groundwater	Washington State Model Toxics Control Act [RCW 70.105D; Chapter 173-340 WAC]	Yes	The Model Toxics Control Act (MTCA) groundwater cleanup levels are applicable.
State	Sediment	Washington State Model Toxics Control Act [RCW 70.105D; Chapter 173-204 WAC]	Yes	The Sediment Management Standards are applicable.
Action-Specific ARARs				
Federal	Soil and Groundwater	Federal Toxic Substances Control Act [15 U.S.C. § 2601; 40 CFR 761]	Yes	The TSCA program regulates PCB remedial actions and disposal. EPA will need to grant approval of the Interim Action and waste material must be disposed of per TSCA regulations.
Federal/ State	Surface Water	Federal Water Pollution Control Act--National Pollution Discharge Elimination System [Clean Water Act; 33 USC § 1342, Section 402] and Implementing Regulations Washington State Construction Stormwater General Permit [RCW 90.48]	Yes	The NPDES program establishes requirements for point source discharges, including stormwater runoff. These requirements would be applicable for any point source discharge of stormwater during construction or following cleanup.
Federal	Surface Water	Federal Water Pollution Control Act--Water Quality Certification [Clean Water Act; 33 USC § 1341, Section 401] and Implementing Regulations	No	Section 401 of the CWA provides that applicants for a permit to conduct any activity involving potential discharges into waters or wetlands shall obtain certification from the state that discharges will comply with applicable water quality standards. No discharges are expected to waters or wetlands of the state.
State	Surface Water	Hydraulic Code [RCW 77.55; Chapter 220-110 WAC]	No	The Hydraulic Code requires that any construction activity that uses, diverts, obstructs, or changes the bed or flow of state waters must be done under the terms of a Hydraulics Project Approval permit issued by Washington State Department of Fish and Wildlife (WDFW). These activities are not expected for the proposed alternatives.
Federal	Surface Water and Wetlands	Federal Water Pollution Control Act--Discharge of Dredge and Fill Materials [Clean Water Act; 33 USC § 1344, Section 404] and Implementing Regulations	No	Section 404 of the CWA establishes a program to regulate the discharge of dredged and fill materials into the waters of the United States, including wetlands. These activities are not expected for the proposed alternatives.
Federal/ State	Solid Waste	Transportation of Hazardous Materials [49 CFR Parts 105 to 177] [Chapter 446-50 WAC]	Yes	Transportation of hazardous waste or materials is required to meet state and federal requirements. This requirement is potentially applicable to alternatives that involve the off-site transport of impacted soil.

Table 5 – Potential Applicable or Relevant and Appropriate Requirements

Authority	Resource	Implementing Laws/Regulations	ARAR?	Applicability
Federal/ State	Solid waste	Resource Conservation and Recovery Act [42 USC § 6901 et seq.], Subtitle C – Hazardous Waste Management [40 CFR Parts 260 to 279] Dangerous Waste Regulations [Chapter 173-303 WAC]	Yes	Subtitle C of the Resource Conservation and Recovery Act (RCRA) pertains to the management of hazardous waste. Off-site disposal of impacted soil meeting hazardous waste criteria may require disposal at a Subtitle C landfill. These requirements are applicable to the remediation alternatives that involve off-site disposal of impacted soil.
Federal	Solid Waste	Resource Conservation and Recovery Act [42 USC § 6901 et seq.], Subtitle D – Managing Municipal and Solid Waste [40 CFR Parts 257 and 258]	Yes	Subtitle D of RCRA establishes a framework for management of non-hazardous solid waste. These regulations establish guidelines and criteria from which states develop solid waste regulations. These requirements are applicable to the remediation alternatives that involve off-site disposal of impacted soil.
State	Solid Waste	Washington State Solid Waste Handling Standards [RCW 70.95; Chapter 173-350 WAC]	Yes	Washington State Solid Waste Handling Standards apply to facilities and activities that manage solid waste. The regulations set minimum functional performance standards for proper handling and disposal of solid waste; describe responsibilities of various entities; and stipulate requirements for solid waste handling facility location, design, construction, operation, and closure. These requirements are applicable to remediation alternatives that involve off-site disposal of impacted soil.
Federal/ State	Solid Waste	Land Disposal Restrictions [40 CFR Part 268] [Chapter 173-303-140 WAC]	Yes	Best management practices for dangerous wastes are required to meet state and federal requirements. These requirements are applicable to the remediation alternatives that involve off-site disposal of soil classified as dangerous waste.
Federal	Air	Clean Air Act [42 USC § 7401 et seq.; 40 CFR Part 50]	Yes	The federal Clean Air Act creates a national framework designed to protect ambient air quality by limiting air emissions.
State	Air	Washington Clean Air Act and Implementing Regulations [Chapter 173-400-040(8) WAC]	Yes	These regulations require the owner or operator of a source of fugitive dust to take reasonable precautions to prevent fugitive dust from becoming airborne and to maintain and operate the source to minimize emissions. These regulations are applicable to all alternatives during construction.
State	Groundwater	Minimum Standards for Construction and Maintenance of Water Wells [RCW 18.104; Chapter 173-160 WAC]	Yes	Washington State has developed minimum standards for constructing water and monitoring wells, and for the decommissioning of wells. These regulations are applicable to all alternatives prior to construction.
Federal	Endangered Species, Critical Habitats	Endangered Species Act [16 USC §§ 1531 - 1544] and Implementing Regulations	No	The Endangered Species Act (ESA) protects species of fish, wildlife, and plants that are listed as threatened or endangered with extinction. It also protects designated critical habitat for listed species. The ESA outlines procedures for federal agencies to follow when taking actions that may jeopardize listed species, including consultation with resource agencies. No threatened or endangered species or habitat areas are expected to be impacted by the remediation alternatives.

Table 5 – Potential Applicable or Relevant and Appropriate Requirements

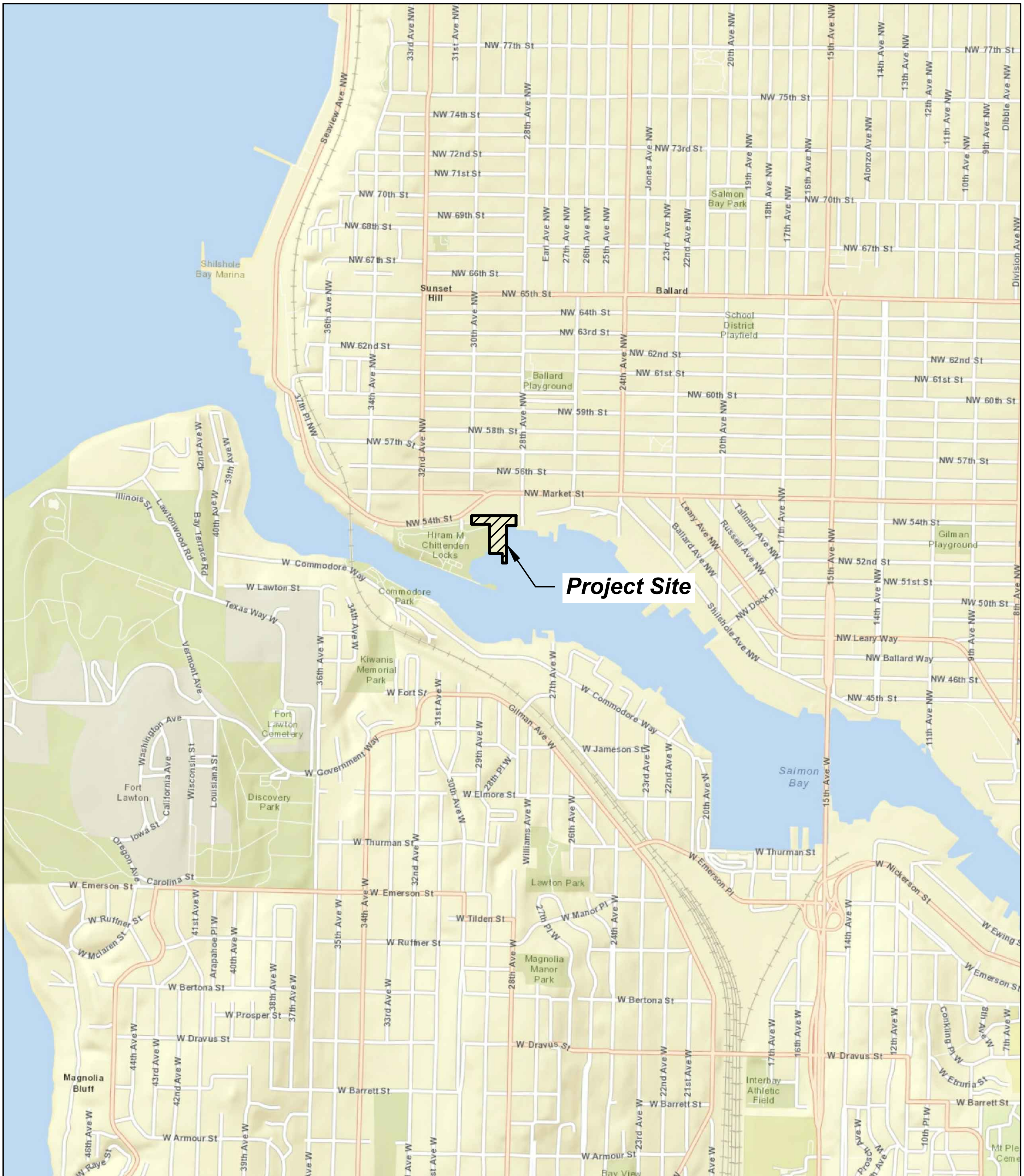
Authority	Resource	Implementing Laws/Regulations	ARAR?	Applicability
State	Remedy Construction	Washington Industrial Safety and Health Act [RCW 49.17; Chapter 296-24 WAC]	Yes	Site worker and visitor health and safety requirements established by the Washington Industrial Safety and Health Act are to be met during implementation of the remedial action.
Local	Remedy Construction	Local Ordinances	Yes	Appropriate substantive requirements are to be met for implementation of the remedial action.
Location-Specific ARARs				
State	Aquatic Lands	Aquatic Lands Management – Washington State [RCW 79.90; Chapter 332-30 WAC]	No	The Aquatic Lands Management law develops criteria for managing state-owned aquatic lands. Aquatic lands are to be managed to promote uses and protect resources as specified in the regulations. The area of concern (AOC) to which the remediation alternatives apply is not on aquatic lands.
State	Public Lands	Public Lands Management [RCW 79.02]	No	Activities on public lands are restricted, regulated, or proscribed. The remediation alternatives do not occur on public lands.
Federal/ State	Historic Areas	Archaeological and Historic Preservation Act [16 USC § 469, 470 et seq.; 36 CFR Parts 65 and 800] [RCW 24.34, 27.44, 27.48, and 27.53; Chapters 25-46 and 25-48 WAC]	No	Actions must be taken to preserve and recover significant artifacts, preserve historic and archaeological properties and resources, and minimize harm to national landmarks. There are no known historic or archaeological sites in the vicinity of the AOC.
State	Shorelines and Surface Water	Shoreline Management Act of 1971 [RCW 90.58] and Implementing Regulations	Yes	Actions are prohibited within 200 feet of shorelines of statewide significance unless permitted. Remediation alternatives occur within 200 feet of the Lake Washington Ship Canal.
State	Wetlands	Shoreline Management Act of 1971 [RCW 90.58] and Implementing Regulations	No	The construction or management of property in wetlands is required to minimize potential harm, avoid adverse effects, and preserve and enhance wetlands. The remediation alternatives do not occur within delineated wetlands.

Table 8 - Disproportionate Cost Analysis

DCA Criteria	Alternative 1: *In Situ* Solidification/Stabilization	Alternative 2: Excavation and Off-Site Disposal
Protectiveness	Solidification of hazardous substances would immobilize contaminants eliminating the direct contact risks to humans and the migration to groundwater and surface water in the treatment area. Groundwater flow patterns may be disturbed and may limit effectiveness of the zero-valent iron/granular activated carbon wall on impacts from sources outside of the treatment area. Alternative 1 is considered less protective than Alternative 2.	Removal of hazardous substances would eliminate direct contact risks to humans and the soil to groundwater pathway in the treatment area. Alternative 2 is considered more protective than Alternative 1.
Permanence	Provides no reduction in toxicity or volume of contaminants. Risk of contaminant mobility would be greatly reduced by solidification. Institutional controls may be required. Alternative 1 is considered less permanent than Alternative 2.	Provides no reduction in toxicity or volume of contaminants. Risk of contaminant mobility would be greatly reduced by removing the waste and placing it in an off-site engineered, lined, and monitored facility. Alternative 2 is considered more permanent than Alternative 1.
Cost	\$1.56 million (treatment of PCB >1 mg/kg) \$1.35 million (treatment of PCB >10 mg/kg)	\$3.5 million (treatment of PCB >1 mg/kg) \$2.9 million (treatment of PCB >10 mg/kg)
Effectiveness over the Long Term	Solidification is proven and expected to be effective over the long term. Changes in groundwater flow patterns may reduce the effectiveness of the existing treatment wall. Alternative 1 is considered less effective over the long term than Alternative 2.	Subtitle C and D landfills are proven and expected to be effective over the long term. Alternative 2 is considered more effective over the long term than Alternative 1.

Table 8 - Disproportionate Cost Analysis

DCA Criteria	Alternative 1: *In Situ* Solidification/Stabilization	Alternative 2: Excavation and Off-Site Disposal
Management of Short-Term Risks	Short-term risks are expected to be minimal. Risks can be managed by following construction health and safety plan, using property licensed contractors, etc. Alternative 1 is considered to have fewer short-term risks than Alternative 2.	Short-term risks are expected to be minimal and primarily associated with limited waste excavation and over-the-road transport to landfill. Risks will be managed by following construction health and safety plan, implementing dust suppression measures, using properly licensed material haulers, etc. Alternative 2 is considered to have greater short-term risks than Alternative 1.
Technical and Administrative Implementability	A treatability study would be required to determine the appropriate solidification mixture for the site. Alternatives 1 and 2 are considered equally implementable.	Aquifer testing will be required for dewatering analysis. Alternatives 1 and 2 are considered equally implementable.
Consideration of Public Concerns	Consideration of Public Concerns is not being evaluated as part of this document.	



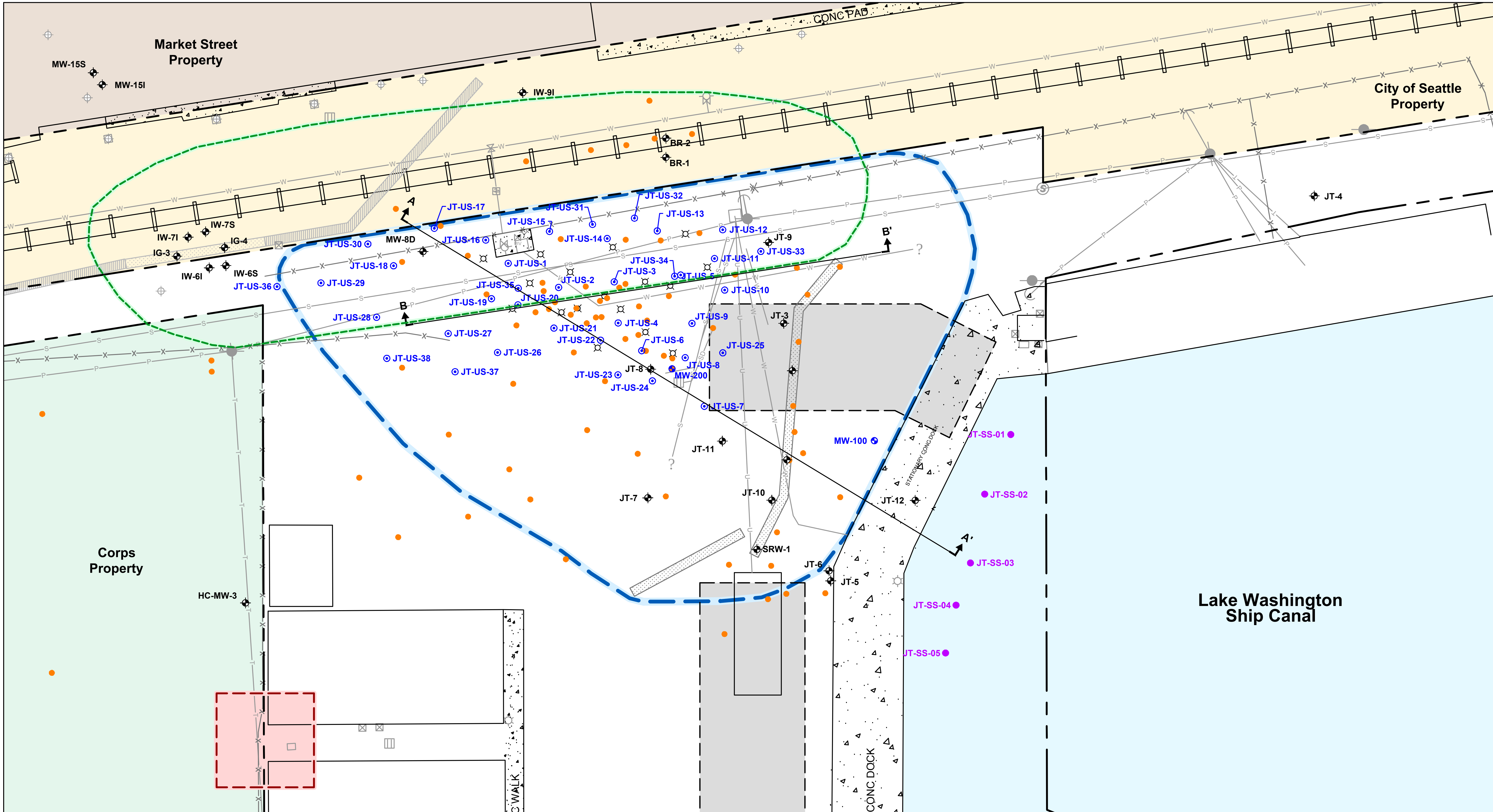
Source: Base map prepared from ArcGIS Online, 2013.

0 2000 4000

N

Vicinity Map

1



A A'

JT-SS-01

JT-US-1

Notes:

1.

2.

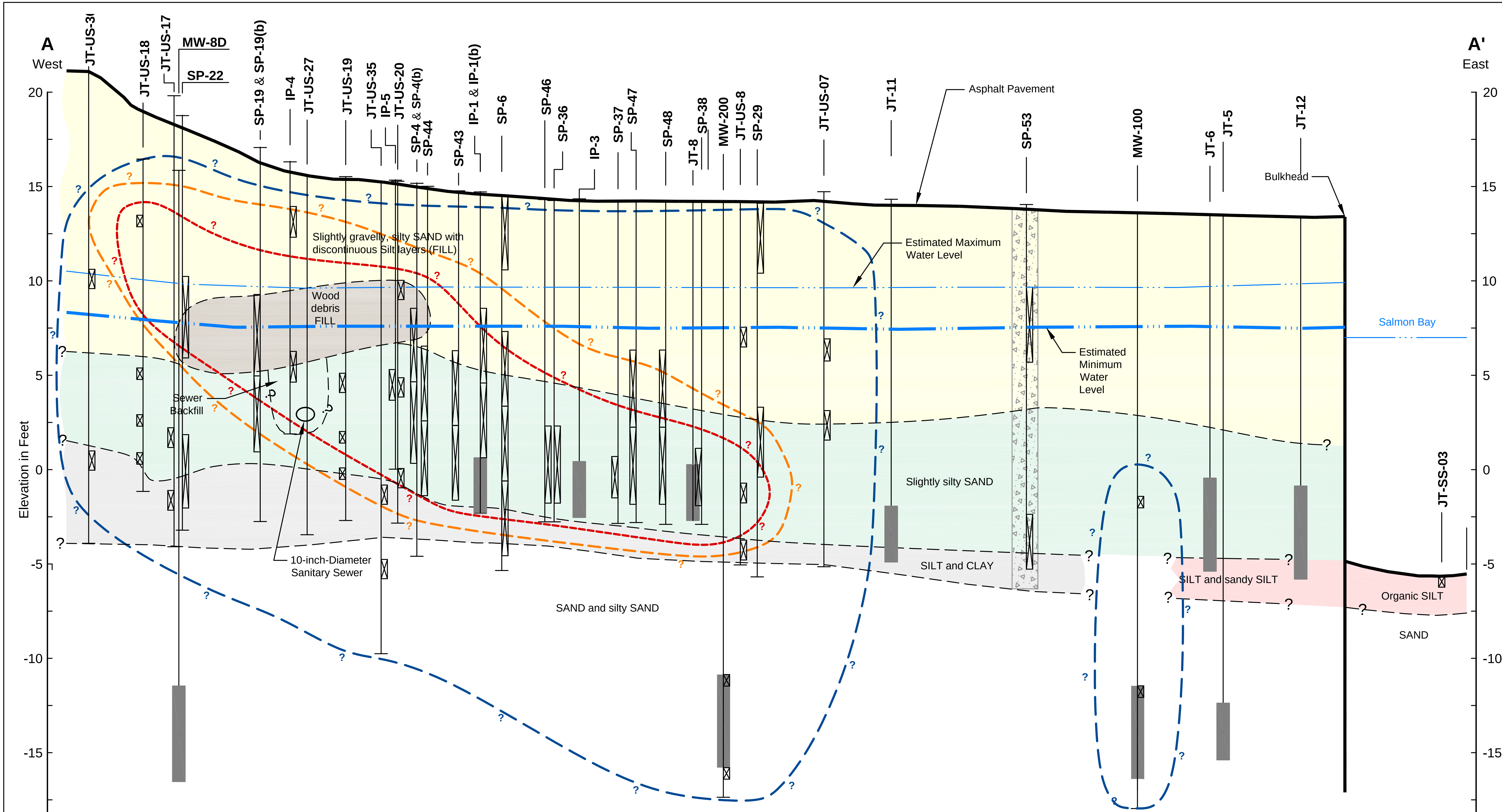
0 15 30

N

Exploration Location Plan

HARTCROWSER

2



MW-8D Selected Exploration

Sample

Screened Interval

Approximate Area of PCB Concentrations above Method A Industrial Cleanup (10 mg/kg)

Approximate Area of PCB Concentrations above Method A Unrestricted Cleanup Level (1 mg/kg)

Approximate Area of PCB Concentrations above Method B Surface Water Protection Screening Level (0.000079 mg/kg) and PQL

Iron/GAC Groundwater Treatment Wall

? — — — Geologic Contact (Approximate)

Horizontal Scale in Feet
0 15 30

0 5 10
Vertical Scale in Feet
Vertical Exaggeration x 3

Notes:

1. Contacts between soil units are based upon interpolation between borings and represent our interpretation of subsurface conditions based on currently available data.
2. Cross section developed from AutoCAD files provided by Aspect, dated 12/2005.
3. Elevation shown in City of Seattle vertical datum.

Jacobson Terminals
Seattle, Washington

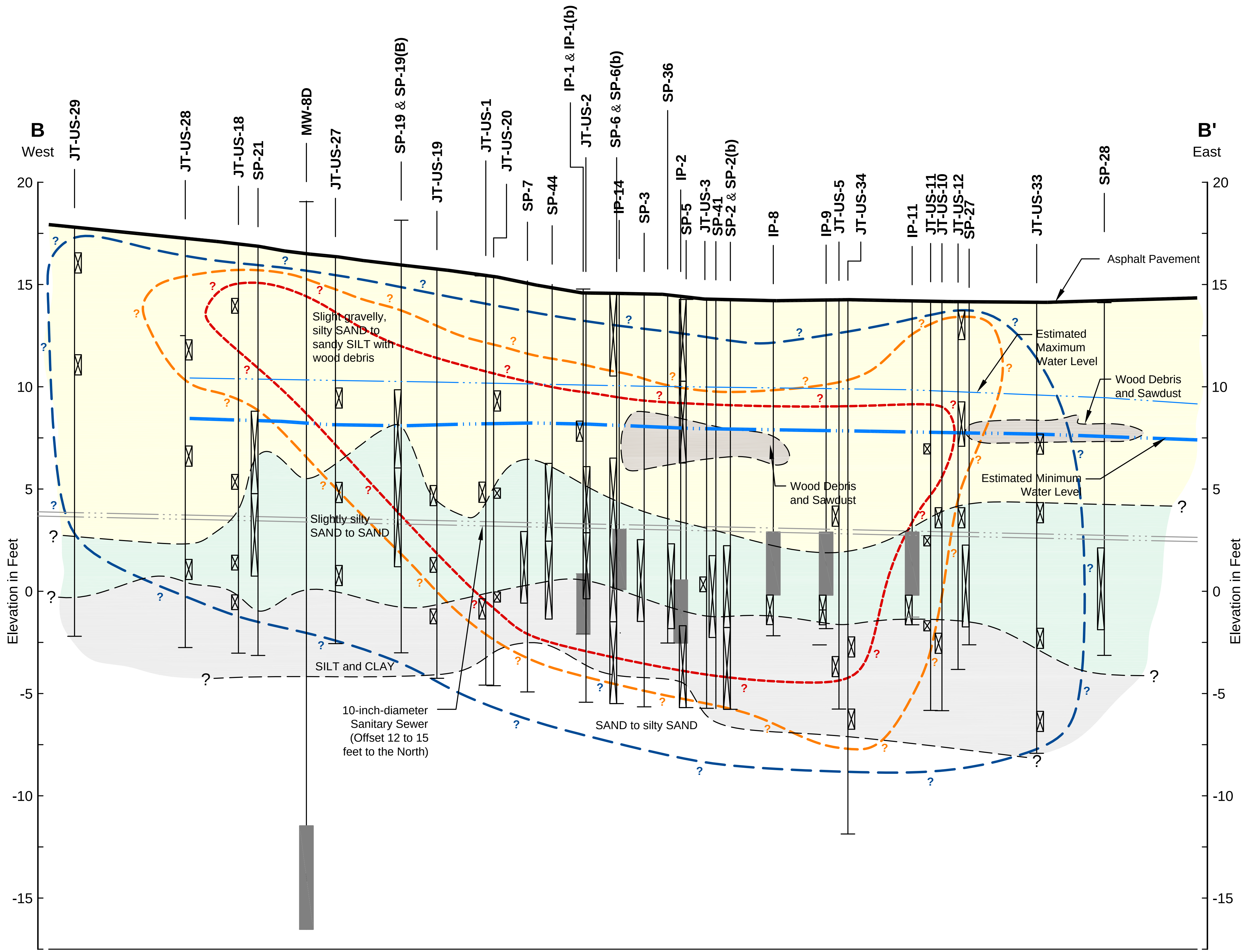
Generalized Geologic Cross Section A-A'

17800-56 3/16

HARTCROWSER

Figure
3

File: L:\Notebooks\1780056_Jacobson Terminal Property RI-FS\CAD\1780056-009 (SecA).pdf



Geologic Contact (Approximate)

SP-3 Selected Exploration

Sample

Screened Interval

Approximate Area of PCB Concentrations above Method A Industrial Cleanup (10 mg/kg)

Approximate Area of PCB Concentrations above Method A Unrestricted Cleanup Level (1 mg/kg)

Approximate Area of PCB Concentrations above Method B Surface Water Protection Screening Level (0.000079 mg/kg) and PQL

Horizontal Scale in Feet
0 15 30

0 5 10
Vertical Scale in Feet
Vertical Exaggeration x 3

Notes:

1. Contacts between soil units are based upon interpolation between borings and represent our interpretation of subsurface conditions based on currently available data.
2. Cross section developed from AutoCAD files provided by Aspect, dated 12/2005.
3. Elevations shown in City of Seattle vertical datum.

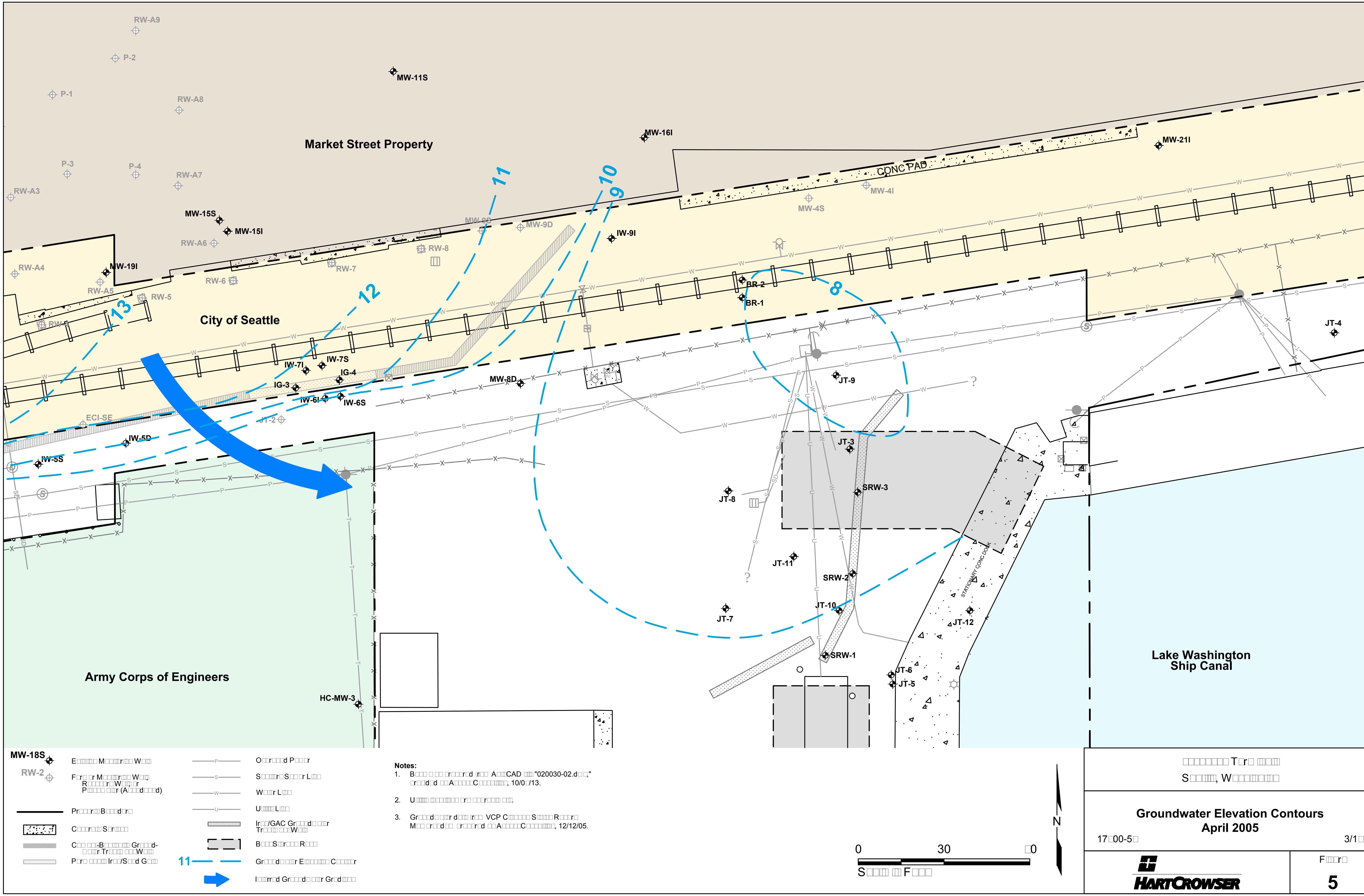
Jacobson Terminals
Seattle, Washington

Generalized Geologic Cross Section B-B'

17800-56 3/16

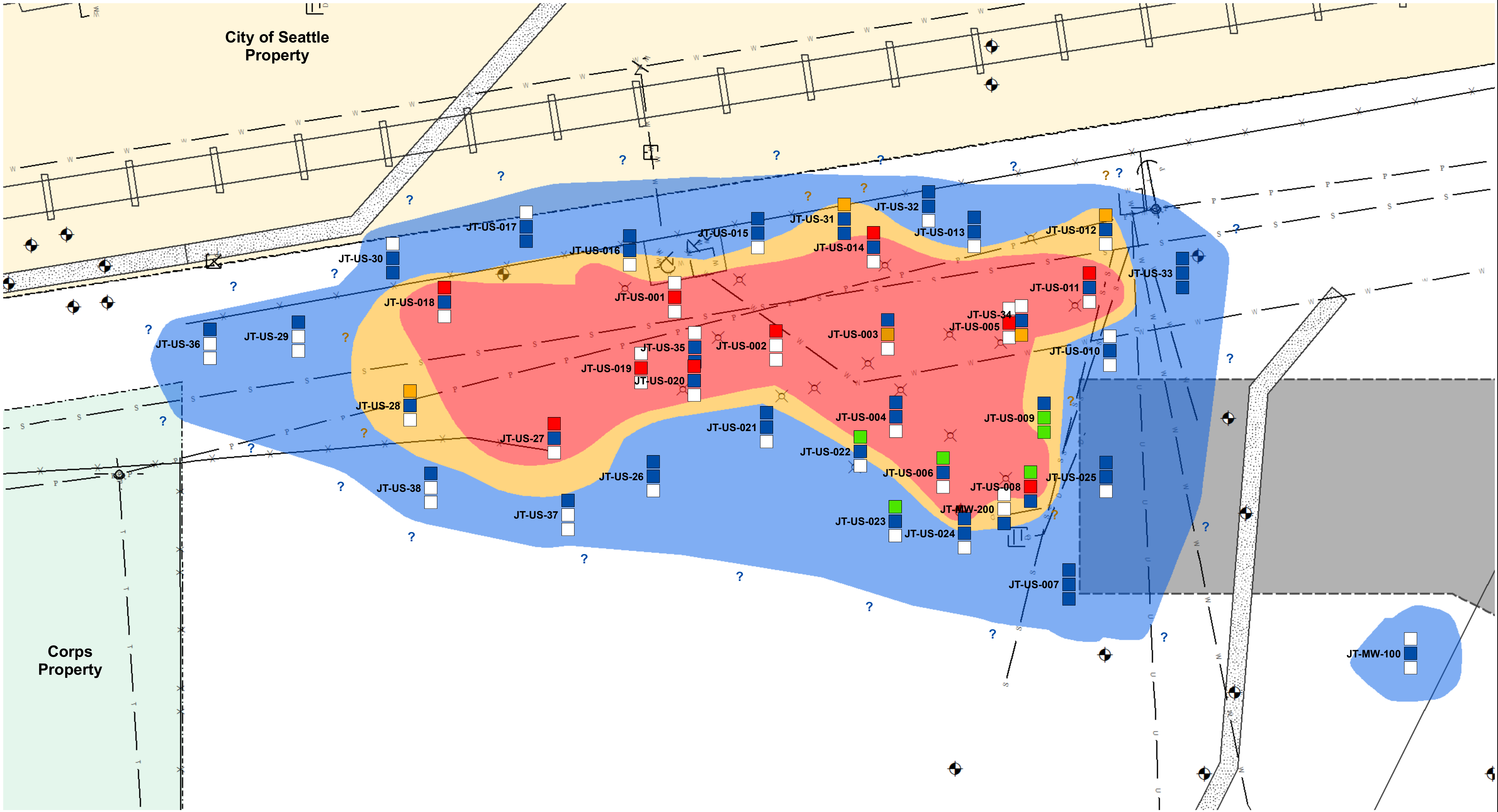
HARTCROWSER

Figure
4



Groundwater Elevation Contours
April 2005

5



Exploration ID

Depth Interval with Highest PCB Concentration Displayed

JT-US-038

0 to 10 feet bgs
10 to 18 feet bgs
Below 18 feet bgs

Above Method B Surface Water Protection Screening Level (0.0000787 mg/kg)
Above Method A (1 mg/kg)
Above Method A Industrial (10 mg/kg)
Non-detect
No Data

Injection Well
Exisiting Monitoring Wells
Treatment Wall
Boat Storage Rack

Fence Line
Property Boundary
Utility Line
Water Line
Sanitary Sewer Line
Overhead Power

Notes:
1. Base map prepared from AutoCAD file 020030-02.dwg by Aspect Consulting, 10/08/13.
2. Utility locations are approximate.

0 7.5 15 30 Feet

N

Jacobson Terminals
Seattle, Washington

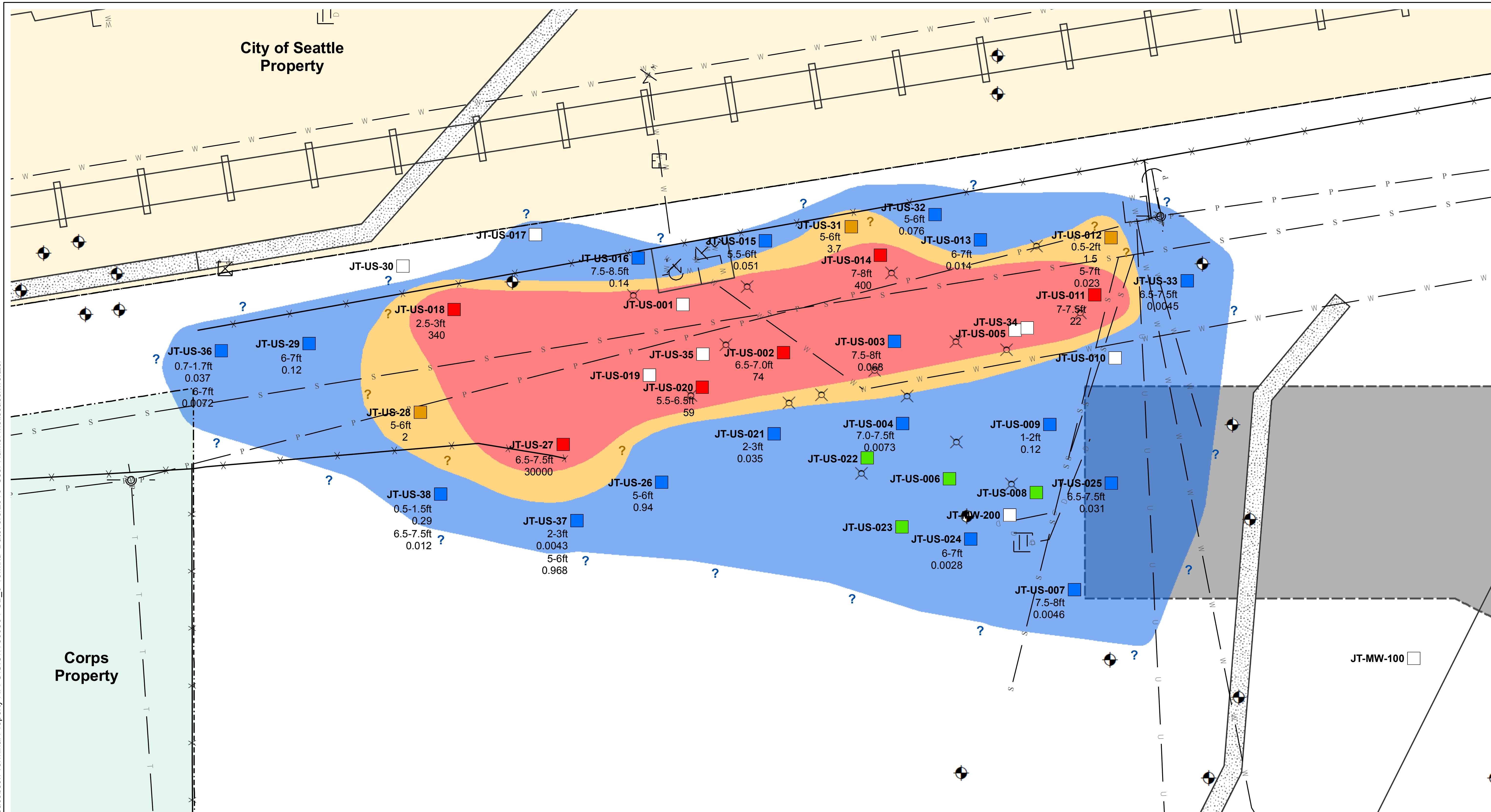
2014 PCB Occurrences in Soil

17800-56 3/16

HARTCROWSER

Figure 6

Document Path: L:\Notebooks\1780056_Jacobson Terminal Property RI-FS\GIS\1780056-PCBOccur.mxd Date: 3/8/2016 User Name: melissaschweitzer



JT-US-35	Boring ID	
20-21ft	Sample Depth	
0.0036	PCB concentration in mg/kg	

- Above Method B Surface Water Protection Screening Level (0.0000787 mg/kg)
- Above Method A (1 mg/kg)
- Above Method A Industrial (10 mg/kg)
- Non-detect
- No Data

- Injection Well
- Exisiting Monitoring Wells
- Treatment Wall
- Boat Storage Rack

- Fence Line
- Property Boundary
- U Utility Line
- W Water Line
- S Sanitary Sewer Line
- P Overhead Power

Notes:
1. Highest concentration is displayed if multiple samples were collected within the 0 to 10 foot depth interval.
2. Base map prepared from AutoCAD file 020030-02.dwg by Aspect Consulting, 10/08/13.
3. Utility locations are approximate.

0 7.5 15 30 Feet

Jacobson Terminals
Seattle, Washington

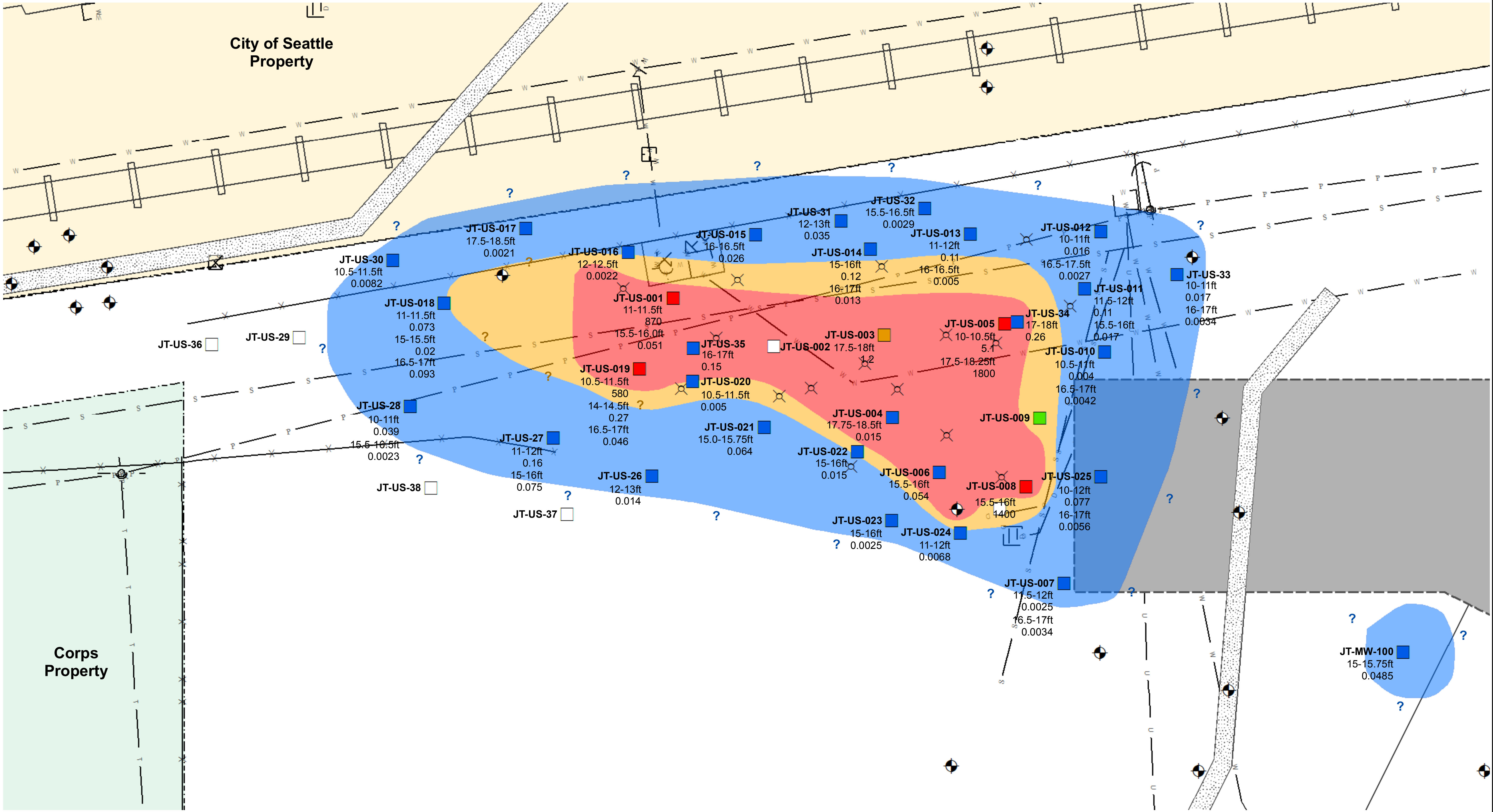
2014 PCB Concentrations in Soil to 0-10 Feet

17800-56 3/16

HARTCROWSER

Figure
6a

Document Path: L:\Notebooks\1780056_Jacobson Terminal Property RI-FS\GIS\1780056-PCB_0-10.mxd Date: 3/8/2016 User Name: melissaschweitzer



JT-US-35 Boring ID
16-17ft Sample Depth
0.15 PCB concentration in mg/kg

- Above Method B Surface Water Protection Screening Level (0.0000787 mg/kg)
- Above Method A (1 mg/kg)
- Above Method A Industrial (10 mg/kg)
- Non-detect
- No Data

- Injection Well
- Exisiting Monitoring Wells
- Treatment Wall
- Boat Storage Rack

- Fence Line
- Property Boundary
- U Utility Line
- W Water Line
- S Sanitary Sewer Line
- P Overhead Power

Notes:
1. Highest concentration is displayed if multiple samples were collected within the 0 to 10 foot depth interval.
2. Base map prepared from AutoCAD file 020030-02.dwg by Aspect Consulting, 10/08/13.
3. Utility locations are approximate.

0 7.5 15 30 Feet

N

Jacobson Terminals
Seattle, Washington

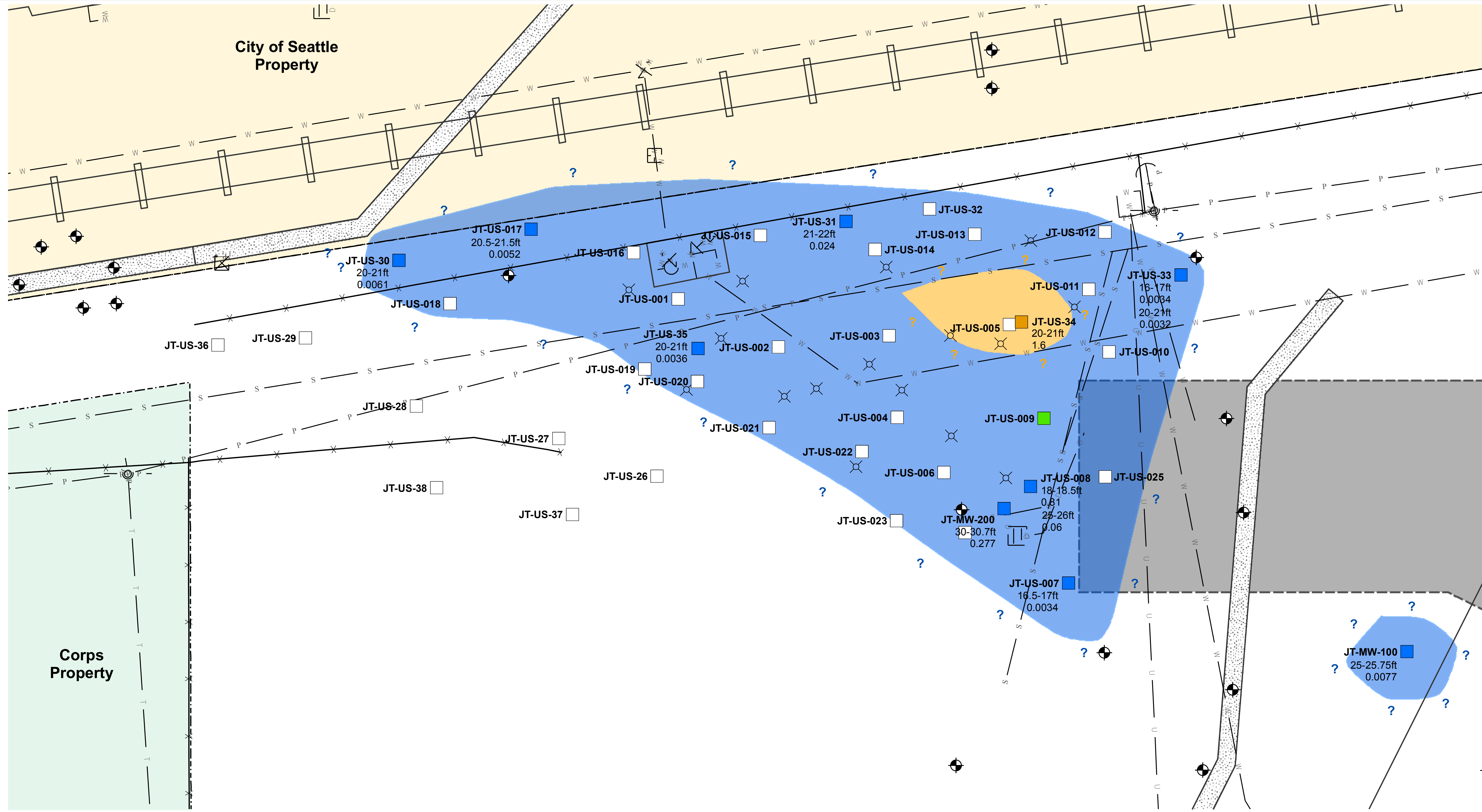
2014 PCB Concentrations in Soil - 10 to 18 Feet

17800-56 3/16

HARTCROWSER

Figure 6b

Document Path: L:\Notebooks\1780056_Jacobson Terminal Property RI-FS\GIS\1780056-PCB_10-18.mxd Date: 3/8/2016 User Name: melissaschweitzer



JT-US-35	Boring ID	
20-21ft	Sample Depth	
0.0036	PCB concentration in mg/kg	

- Above Method B Surface Water Protection Screening Level (0.0000787 mg/kg)
- Above Method A (1 mg/kg)
- Non-detect
- No Data

- Injection Well
- Exisiting Monitoring Wells
- Treatment Wall
- Boat Storage Rack

- Fence Line
- Property Boundary
- U Utility Line
- W Water Line
- S Sanitary Sewer Line
- P Overhead Power

Notes:
1. Highest concentration is displayed if multiple samples were collected within the 0 to 10 foot depth interval.
2. Base map prepared from AutoCAD file 020030-02.dwg by Aspect Consulting, 10/08/13.
3. Utility locations are approximate.

0 7.5 15 30 Feet

N

Jacobson Terminals
Seattle, Washington

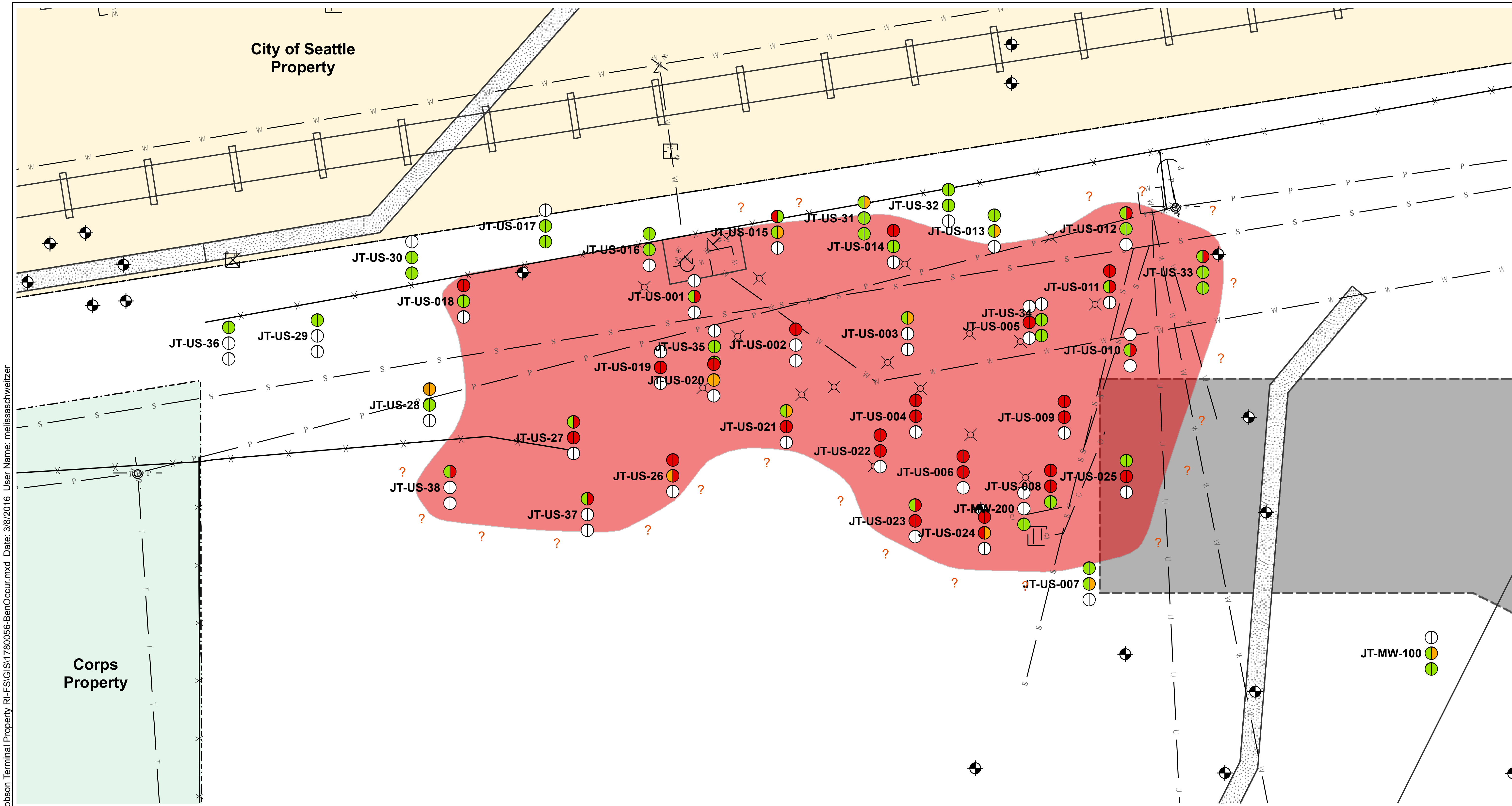
2014 PCB Concentrations in Soil - below 18 Feet

17800-56 3/16

HARTCROWSER

Figure
6c

Document Path: L:\Notebooks\1780056_Jacobson Terminal Property RI-FS\GIS\1780056-PCB_18+.mxd Date: 3/8/2016 User Name: melissaschweitzer



Exploration ID

Depth Interval with Highest Chlorinated Benzene Concentration Displayed

JT-US-038

0 to 10 feet bgs
10 to 18 feet bgs
Below 18 feet bgs

Above Method B Surface Water Protection Screening Level
Below Method B Surface Water Protection Screening Level
Non-detect
No Data

1,2,4-Trichlorobenzene
Left Right
1,4-Dichlorobenzene

Injection Well
Exisiting Monitoring Wells
Treatment Wall
Boat Storage Rack

Fence Line
Property Boundary
U Utility Line
W Water Line
S Sanitary Sewer Line
P Overhead Power

Notes:
1. Base map prepared from AutoCAD file 020030-02.dwg by Aspect Consulting, 10/08/13.
2. Utility locations are approximate.

0 7.5 15 30 Feet

N

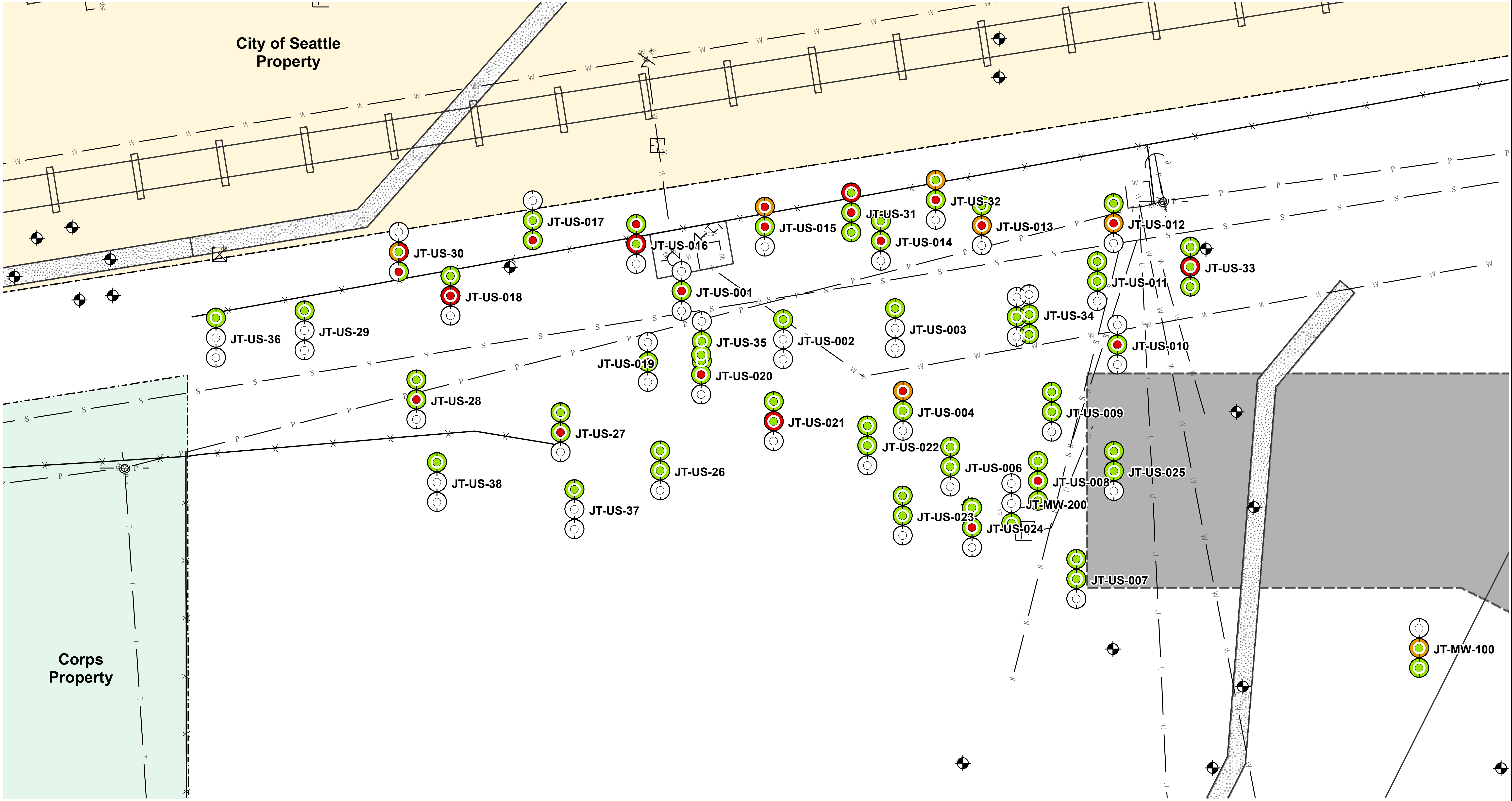
Jacobson Terminals
Seattle, Washington

2014 Chlorinated Benzene Occurrences in Soil

17800-56 3/16

HARTCROWSER

Figure 7



Exploration ID

Depth Interval with Highest Chlorinated Ethene Concentration Displayed

JT-US-038

0 to 10 feet bgs

10 to 18 feet bgs

Below 18 feet bgs

Above Method B Surface Water Protection Screening Level

Below Method B Surface Water Protection Screening Level

Non-detect

No Data

Trichloroethylene (TCE)

Tetrachloroethylene (PCE)

Analyte

Screening Level

Vinyl Chloride (VC)

Exisiting Monitoring Wells

Treatment Wall

Boat Storage Rack

Fence Line

Property Boundary

Utility Line

Water Line

Sanitary Sewer Line

Overhead Power

Notes:
1. Base map prepared from AutoCAD file 020030-02.dwg by Aspect Consulting, 10/08/13.
2. Utility locations are approximate.

0 7.5 15 30 Feet

N

Jacobson Terminals
Seattle, Washington

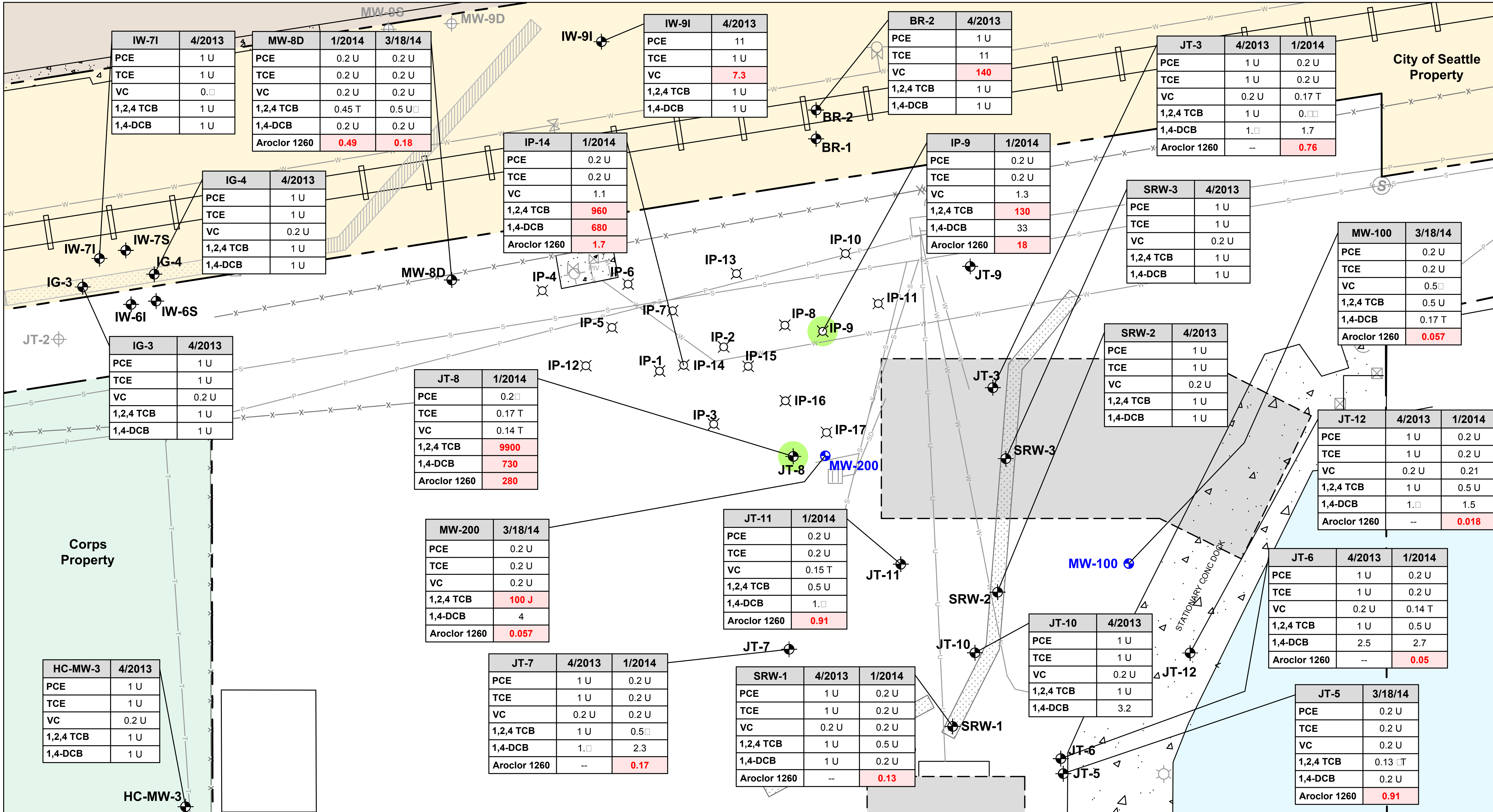
2014 Chlorinated Ethene Occurrences in Soil

17800-56 3/16

HARTCROWSER

Figure 8

Document Path: L:\Notebooks\1780056_Jacobson Terminal Property RI-FS\GIS\1780056-EtheneOccur.mxd Date: 3/8/2016 User Name: melissaschweitzer



IW-7I	4/2013
PCE	1 U
TCE	1 U
VC	[illegible]
1,2,4 TCB	1 U
1,4-DCB	1 U

MW-8D	1/2014	3/18/14
PCE	0.2 U	0.2 U
TCE	0.2 U	0.2 U
VC	0.2 U	0.2 U
1,2,4 TCB	0.45 T	0.5 U
1,4-DCB	0.2 U	0.2 U
Aroclor 1260	0.49	0.18

IW-9I	4/2013
PCE	11
TCE	1 U
VC	7.3
1,2,4 TCB	1 U
1,4-DCB	1 U

BR-2	4/2013
PCE	1 U
TCE	11
VC	140
1,2,4 TCB	1 U
1,4-DCB	1 U

JT-3	4/2013	1/2014
PCE	1 U	0.2 U
TCE	1 U	0.2 U
VC	0.2 U	0.17 T
1,2,4 TCB	1 U	[illegible]
1,4-DCB	[illegible]	1.7
Aroclor 1260	--	0.76

IP-14	1/2014
PCE	0.2 U
TCE	0.2 U
VC	1.1
1,2,4 TCB	960
1,4-DCB	680
Aroclor 1260	1.7

IG-4	4/2013
PCE	1 U
TCE	1 U
VC	0.2 U
1,2,4 TCB	1 U
1,4-DCB	1 U

IP-9	1/2014
PCE	0.2 U
TCE	0.2 U
VC	1.3
1,2,4 TCB	130
1,4-DCB	33
Aroclor 1260	18

SRW-3	4/2013
PCE	1 U
TCE	1 U
VC	0.2 U
1,2,4 TCB	1 U
1,4-DCB	1 U

MW-100	3/18/14
PCE	0.2 U
TCE	0.2 U
VC	[illegible]
1,2,4 TCB	0.5 U
1,4-DCB	0.17 T
Aroclor 1260	0.057

IG-3	4/2013
PCE	1 U
TCE	1 U
VC	0.2 U
1,2,4 TCB	1 U
1,4-DCB	1 U

SRW-2	4/2013
PCE	1 U
TCE	1 U
VC	0.2 U
1,2,4 TCB	1 U
1,4-DCB	1 U

JT-8	1/2014
PCE	[illegible]
TCE	0.17 T
VC	0.14 T
1,2,4 TCB	9900
1,4-DCB	730
Aroclor 1260	280

JT-12	4/2013	1/2014
PCE	1 U	0.2 U
TCE	1 U	0.2 U
VC	0.2 U	0.21
1,2,4 TCB	1 U	0.5 U
1,4-DCB	[illegible]	1.5
Aroclor 1260	--	0.018

MW-200	3/18/14
PCE	0.2 U
TCE	0.2 U
VC	0.2 U
1,2,4 TCB	100 J
1,4-DCB	4
Aroclor 1260	0.057

JT-11	1/2014
PCE	0.2 U
TCE	0.2 U
VC	0.15 T
1,2,4 TCB	0.5 U
1,4-DCB	[illegible]
Aroclor 1260	0.91

JT-6	4/2013	1/2014
PCE	1 U	0.2 U
TCE	1 U	0.2 U
VC	0.2 U	0.14 T
1,2,4 TCB	1 U	0.5 U
1,4-DCB	2.5	2.7
Aroclor 1260	--	0.05

JT-10	4/2013
PCE	1 U
TCE	1 U
VC	0.2 U
1,2,4 TCB	1 U
1,4-DCB	3.2

HC-MW-3	4/2013
PCE	1 U
TCE	1 U
VC	0.2 U
1,2,4 TCB	1 U
1,4-DCB	1 U

JT-7	4/2013	1/2014
PCE	1 U	0.2 U
TCE	1 U	0.2 U
VC	0.2 U	0.2 U
1,2,4 TCB	1 U	[illegible]
1,4-DCB	[illegible]	2.3
Aroclor 1260	--	0.17

SRW-1	4/2013	1/2014
PCE	1 U	0.2 U
TCE	1 U	0.2 U
VC	0.2 U	0.2 U
1,2,4 TCB	1 U	0.5 U
1,4-DCB	1 U	0.2 U
Aroclor 1260	--	0.13

JT-5	3/18/14
PCE	0.2 U
TCE	0.2 U
VC	0.2 U
1,2,4 TCB	0.13 T
1,4-DCB	0.2 U
Aroclor 1260	0.91

MW-100 — 2014 Groundwater Monitoring Well

MW-18S

RW-2

IP-5

JT-8

Well Name	4/2013	1/2014
PCE	1 U	1 U
TCE	1 U	1 U
VC	0.2 U	0.2 U
1,2,4 TCB	1 U	1 U
1,4-DCB	3.0	3.0
Aroclor 1260	0.79	0.79

Concentrations in µg/L

Notes:

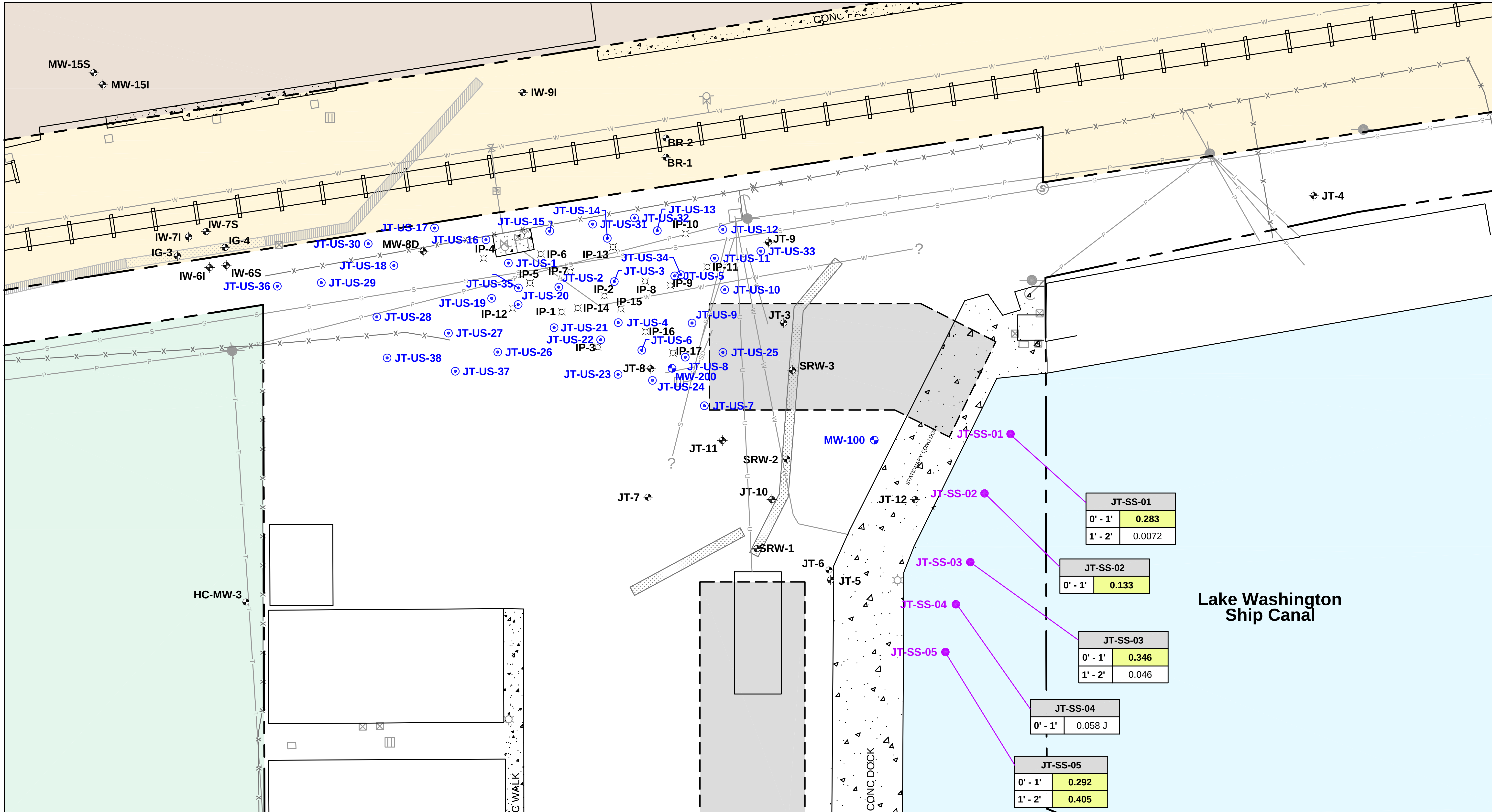
0 20 40

N

2013-2014 Groundwater COC Concentrations

HARTCROWSER

Figure 9



JT-SS-01	
0' - 1'	**0.283**
1' - 2'	0.0072

JT-SS-02	
0' - 1'	**0.133**

JT-SS-03	
0' - 1'	**0.346**
1' - 2'	0.046

JT-SS-04	
0' - 1'	0.058 J

JT-SS-05	
0' - 1'	**0.292**
1' - 2'	**0.405**

MW-18S Existing Monitoring Well
IP-5 Injection Well

Concrete Surface
Cement-Bentonite Ground-water Treatment Wall
Permeable Iron/Sand Gate
Overhead Power
Sanitary Sewer Line
Water Line
Utility Line
Property Boundary

Iron/GAC Groundwater Treatment Wall
Boat Storage Rack

Notes:

1. Base map prepared from AutoCAD file "020030-02.dwg," provided by Aspect Consulting, 10/08/13.
2. Utility locations are approximate.

Sample ID

JT-SS-03	
0' - 1'	**0.346**
1' - 2'	0.046

Sample Depth in Feet
Total PCB Concentration in mg/kg
Bold, yellow shaded value exceeds Sediment Cleanup Objective Screening Level

JT-SS-01 2014 Sediment Sampling Location and Number
JT-US-1 2014 Push Probe Sampling Location and Number
MW-100 2014 Groundwater Monitoring Well

0 30 60
Scale in Feet

N

Jacobson Terminals
Seattle, Washington

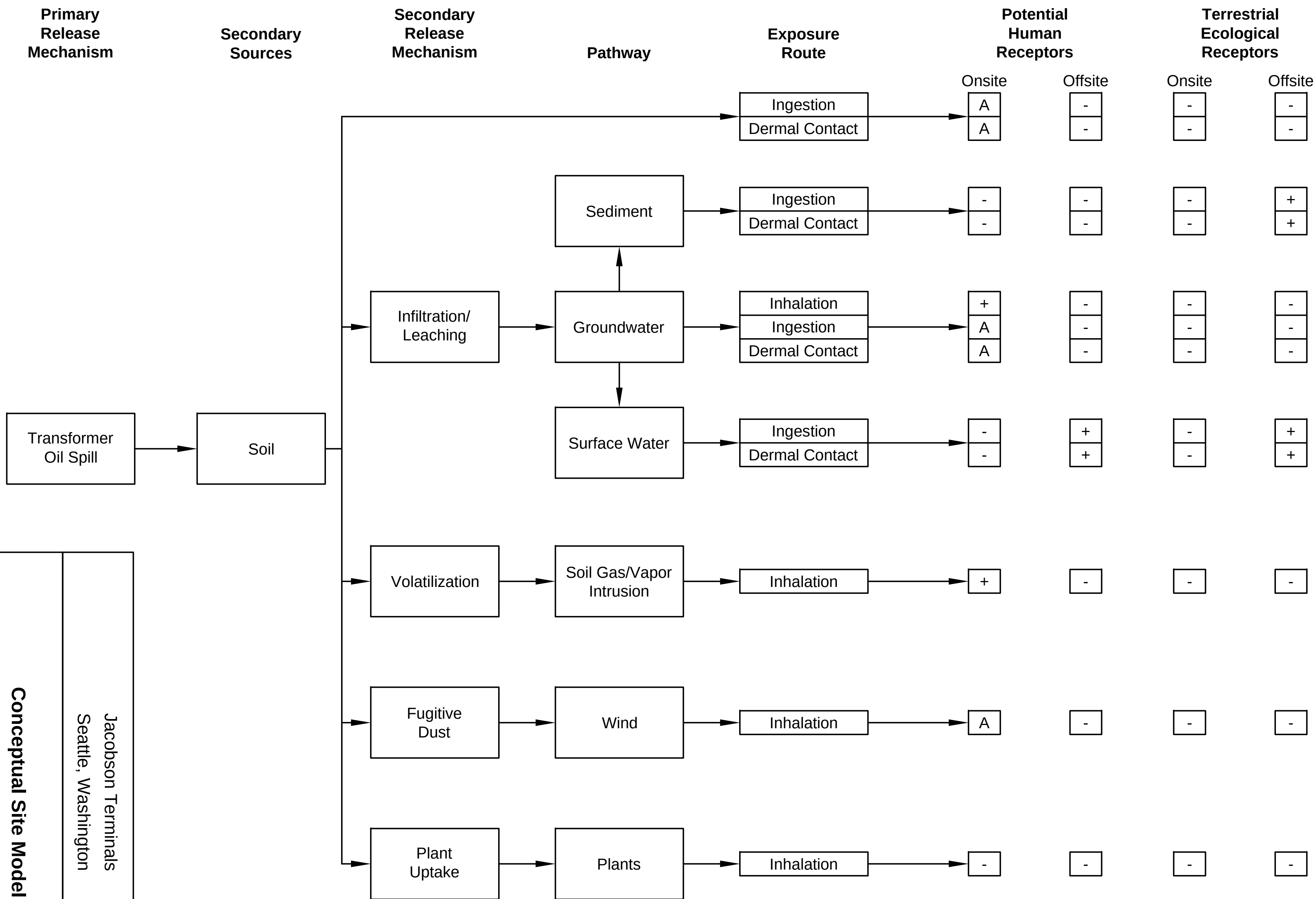
2014 PCB Occurrences in Sediment

17800-43 6/14

HARTCROWSER

Figure **10**

EAL 06/12/14 1780043-013.dwg



+ Potentially Complete Pathway

\- Incomplete Pathway

A Pathway Potentially Complete when digging in soil or groundwater

HARTCROWSER

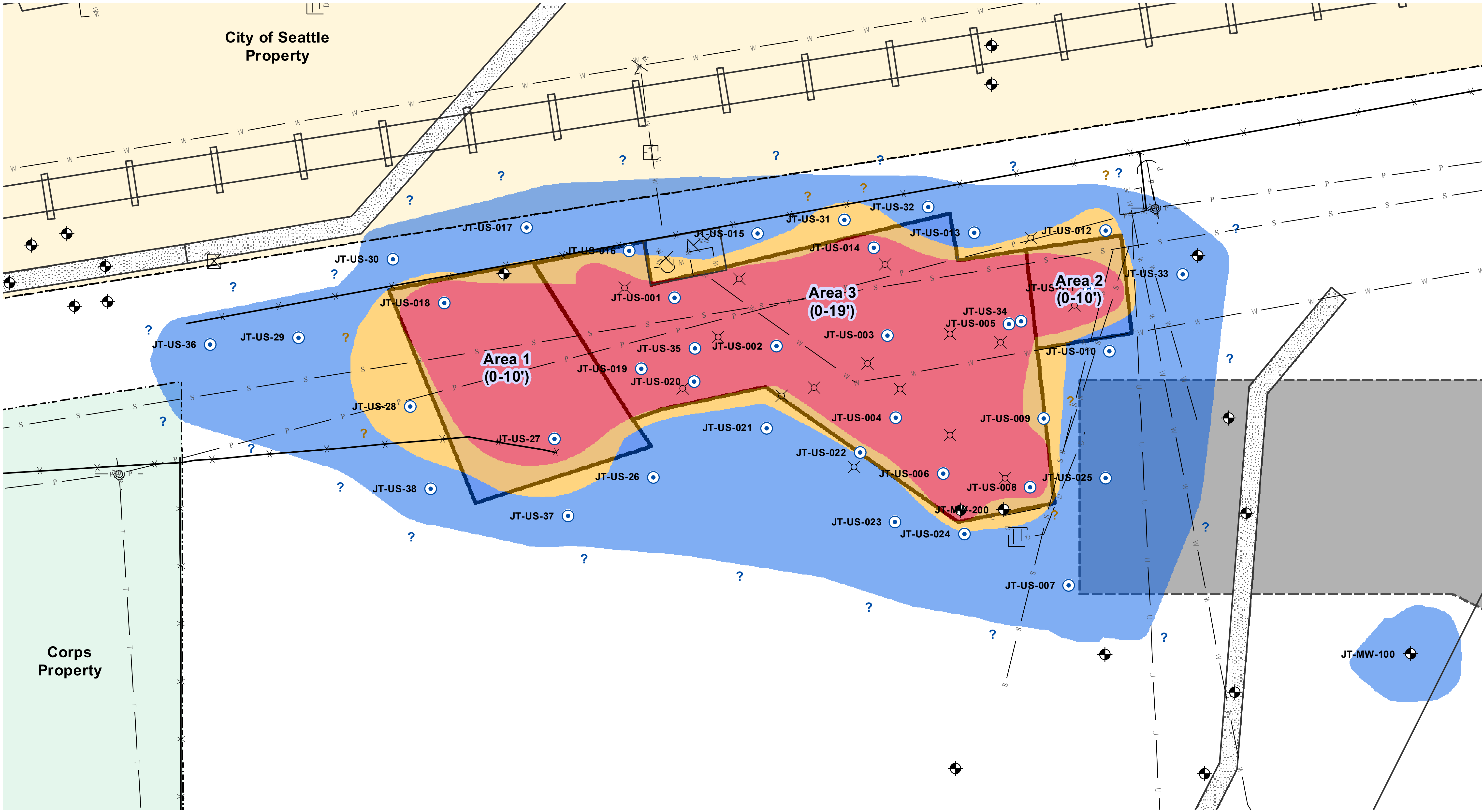
17800-43

6/14

Conceptual Site Model

Jacobson Terminals
Seattle, Washington

Figure
11



Approximate Area with PCB Concentration > MTCA Method A Industrial (10 mg/kg)

Approximate Area with PCB Concentration > MTCA Method A Unrestricted (1 mg/kg)

Approximate Area with PCB Concentration > MTCA Method B Surface Water Protection (0.000076 mg/kg)

Remediation Area (Depth Interval)

Treatment Wall

Boat Storage Rack

Fence Line

Property Boundary

Utility Line

Water Line

Sanitary Sewer Line

Overhead Power

Push Probe Location and Number

Injection Well

Exisiting Monitoring Wells

0 15 30

Scale in Feet

N

Notes:
1. Base map prepared from AutoCAD file 020030-02.dwg by Aspect Consulting, 10/08/13.
2. Utility locations are approximate.

Jacobson Terminals
Seattle, Washington

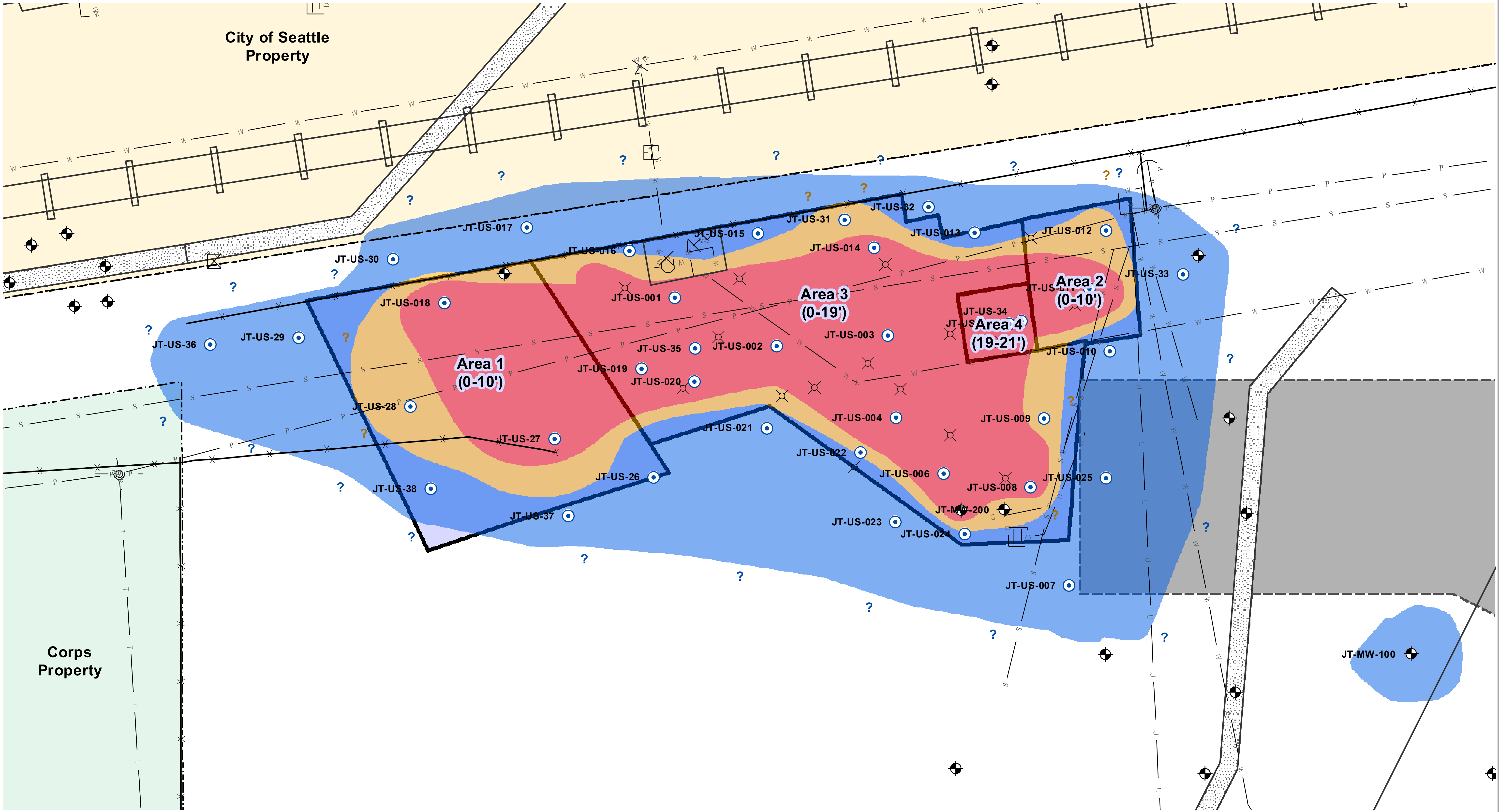
Interim Action Remediation Area Greater than 10 mg/kg

17800-43 6/14

HARTCROWSER

Figure 12

EAL 06/04/14 178004-AH.mxd



Approximate Area with PCB Concentration > MTCA Method A Industrial (10 mg/kg)	Treatment Wall
Approximate Area with PCB Concentration > MTCA Method A Unrestricted (1 mg/kg)	Boat Storage Rack
Approximate Area with PCB Concentration > MTCA Method B Surface Water Protection (0.000076 mg/kg)	
Remediation Area (Depth Interval)	

Fence Line
Property Boundary
Utility Line
Water Line
Sanitary Sewer Line
Overhead Power

Push Probe Location and Number
Injection Well
Exisiting Monitoring Wells

0 15 30
Scale in Feet

Notes:
1. Base map prepared from AutoCAD file 020030-02.dwg by Aspect Consulting, 10/08/13.
2. Utility locations are approximate.

EAL 06/04/14 178004-AJ.mxd

Jacobson Terminals
Seattle, Washington

Interim Action Remediation Area Greater than 1 mg/kg

17800-43 6/14

HARTCROWSER

Figure
13

APPENDIX A
Field Exploration Methods and Analysis with Boring and Monitoring Well Logs

APPENDIX A

Field Exploration Methods and Analysis with Boring and Monitoring Well Logs

This appendix documents the processes Hart Crowser used to determine the environmental quality of the soil, sediment, and groundwater underlying the project site. The discussion includes information on the following subjects:

- Explorations and Their Location;
- Direct Push Probes;
- Hollow-Stem Auger Borings;
- Soil Sampling Procedures;
- Soil Screening and Analysis;
- Monitoring Well Installation;
- Groundwater Sampling;
- Sediment Sampling Procedures;
- Sediment Screening and Analysis;
- Sample Handling and Laboratory Analysis; and
- Investigation-Derived Waste Storage and Disposal.

Explorations and Their Location

Subsurface explorations for this project included push-probe soil borings and hollow-stem auger borings completed as monitoring wells. Surface and subsurface sediment samples were collected from the waterway adjacent to the Jacobson Terminals property. Groundwater samples were collected from newly installed and existing monitoring wells on the site. Exploration logs in this appendix show our interpretation of the sampling and testing data. The logs indicate the depth where the physical characteristics of soils and sediment change. Note that the change may be gradual. In the field, we classified the samples taken from the explorations according to the methods presented on Figure A-1 - Key to Exploration Logs. This figure also provides a legend explaining the symbols and abbreviations used in the logs.

Figures 2 shows where the explorations were located.

Direct Push Probes

Push probes JT-US-001 through JT-US-038 were advanced to depths of 10 feet to 26 feet bgs on January 2, 3, and 6, 2014, and March 11 and 12, 2014. Holt Services, Inc., of Puyallup, Washington, completed the push-probe explorations using a limited-access 2-inch diameter Geoprobe® rig. For push probes that were advanced to 30 feet bgs, a 3-inch-diameter casing was embedded into the silt/clay layer at approximately 18 feet bgs prior to advancing the boring beyond that depth. Following placement of the casing, normal sampling continued beyond 18 feet bgs. A representative from Hart Crowser continuously observed the drilling and collected soil samples. Soil samples were collected using an acetate-lined plastic sleeve sampler pushed by the drill rig. Soil samples were generally collected in continuous 5-foot depth intervals. Samples were classified in general accordance with ASTM D 2488 and were screened for potential soil contamination. Detailed soil logs were prepared for each boring location. The soil logs are presented on Figure A-2 through A-41 at the end of this appendix.

Hollow-Stem Auger Borings

Hollow-stem auger borings JT-MW-100 and JT-MW-200 were drilled to a depth of 31.5 feet bgs on March 13, 2014. Holt Services, Inc., of Puyallup, Washington, completed the auger explorations using a truck-mounted drill rig. For JT-MW-200, a 16-inch-diameter auger was advanced to 18 feet bgs and conductor casing was embedded into the silt/clay layer. The boring was continued using an 8-inch-diameter auger to 31.5 feet bgs. JT-MW-100 was advanced using only the 8-inch-diameter auger. A representative from Hart Crowser continuously observed the drilling and collected soil samples. Soil samples were generally collected at 5-foot intervals from a clean stainless steel split-spoon sampler. Samples were classified in general accordance with ASTM D 2488 and were screened for potential soil contamination. Detailed soil logs were prepared for each boring location. The soil logs are presented on Figure A-42 and A-43 at the end of this appendix.

Soil Sampling Procedures

Soil samples were collected for chemical analysis directly from the split-spoon sampler/push probe, with a clean stainless steel spoon and/or clean disposable nitrile gloves and placed in pre-cleaned, laboratory supplied, glass sample jars and 40-ml VOA bottles. Sufficient soil was removed to overfill the glass sample jars. VOA bottles were filled with a 5-gram soil plug, based on EPA Method 5035 procedures. The jars were sealed and labeled. Filled sample jars were stored in ice-chilled cooler and submitted to the chemistry laboratory under chain of custody protocols.

Soil Screening and Analysis

Field Screening results were used as a general guideline to identify potential chemical constituents in soil samples. In addition, field screening results were used as a basis for selecting soil samples for chemical analysis.

Soil samples were continuously field screened for evidence of historical impacts using: (1) field observations, (2) sheen screening, and (3) headspace vapor screening using a MultiRAE PID. The effectiveness of field screening varies with temperature, moisture content, organic content, soil type, and age of the constituents. Visual examination consists of inspecting the soil for evidence of discoloration, staining, and/or abnormal components. Visual screening is generally more effective when impacts are related to heavy petroleum hydrocarbons, such as motor or hydraulic oil, or when hydrocarbon concentrations are high.

We conducted water sheen testing by placing a small volume of soil in a pan of water and observing the water surface for signs of sheen. Sheens were classified as follows:

No Sheen (NS)	No visible sheen on water surface.
Slight Sheen (SS)	Light colorless film, spotty to globular; spread is irregular, not rapid, areas of no sheen remain, film dissipates rapidly.
Moderate Sheen (MS)	Light to heavy film, may have some color or iridescence, globular to stringy, spread is irregular to flowing; few remaining areas of no sheen on water surface.
Heavy Sheen (HS)	Heavy colorful film with iridescence; stringy, spread is rapid; sheen flows off the sample; most of the water surface may be covered with sheen.

Headspace vapor screening is intended to indicate the presence of volatile organic vapors and involves placing a soil sample in a plastic sample bag. Air is captured in the bag and the bag is shaken to expose the soil to the air trapped in the bag. The PID probe is then inserted in the bag and the instrument measures the concentration of organic vapors in the sample headspace. The highest vapor reading for each sample is then recorded on the boring log. The PID measures concentrations in ppm (parts per million), is calibrated to isobutylene, and can typically quantify organic vapor concentrations in the range of 0 to 1,000 ppm.

All field screening observations were recorded on the boring logs, and this information was used to select which samples to submit for chemical analysis.

Monitoring Well Installation

Holt Services, Inc., installed two monitoring wells to allow for long-term groundwater level and quality monitoring. The monitoring wells were installed on March 13 and 14, 2014. The monitoring wells were installed in accordance with Washington State Department of Ecology regulations.

Two-inch-diameter Schedule 40 PVC riser pipe and 2-inch-diameter 0.020-inch machine-slotted screen were used for the well casings and screens. The well screen and casing riser were lowered down through the hollow-stem auger/casing/open hole. As the auger/casing was withdrawn, No. 10/20 silica sand was placed in the annular space from the base of the boring to approximately 2 to 3 feet above the top of the well screen. Well seals were constructed by placing bentonite chips and/or grout in the annular space on the top of the sand to within one foot of ground surface. The remaining annular space was backfilled with concrete to complete the surface seal. The wells were completed with flush-mounted monuments, and equipped with locking well caps for security. The monitoring well construction details are illustrated on the boring logs on Figures A-42 and A-43.

Well Development

Monitoring Wells IP-9, IP-14, JT-3, JT-6, JT-7, JT-8, JT-11, JT-12, MW-8D, and SRW-1 were developed on December 27 and 30, 2013. Monitoring wells JT-5, MW-100, and MW-200 were developed on March 14, 2014. All wells were developed using a stainless steel bailer and portable pump with disposable tubing. The well was developed until approximately 10 casing volumes were removed or the water cleared.

Groundwater Sampling

Groundwater samples were collected for chemical analysis on the following dates:

- JT-3, JT-6, JT-7, MW-8D, and SRW-1 on January 7, 2014;
- IP-9, JT-8, JT-11, and JT-12 on January 8, 2014;
- IP-14 on January 9, 2014;
- JT-6, JT-7, JT-11, MW-8D, and SRW-1 on January 14, 2014; and
- JT-5, JT-8, MW-100 and MW-200 on March 18, 2014.

One duplicate sample was collected for analysis of each COC; a duplicate sample was not collected for conventional analysis. The PCB sample jar for JT-5 broke during analysis, so no PCB duplicate was analyzed for PCBs during the second sampling event. PCB results from JT-500 were used for evaluation of groundwater conditions at well JT-5.

Groundwater Sampling Procedures

Upon arrival at the wellhead, field personnel recorded conditions, depth to water, depth to product (if applicable), and depth to sediment in the wells using a Solinst or equivalent interface probe. If the well was pumped dry or product was present at a thickness greater than 0.05 foot, no purging or sampling was performed from that well.

Wells were purged and sampled using a peristaltic pump and low-flow groundwater sampling techniques. Purging and sampling were conducted approximately 2 feet below the top of the water table. An In-Situ 9500 flow-through cell was used to monitor groundwater field parameters including pH, specific conductivity, ORP, dissolved oxygen, turbidity, and temperature. Groundwater samples were collected once the field parameters of pH, specific conductivity, and temperature were stabilized. The water samples were collected directly from the polyethylene tubing into the pre-cleaned containers provided by the analytical laboratory. The containers were sealed, labeled, and were stored in an ice-chilled cooler and submitted to the chemistry laboratory under chain of custody protocols.

To prevent cross-contamination of the wells, disposable polyethylene tubing was used for each groundwater sample and the interface probe was decontaminated between well locations using a non-phosphate-based cleaner and de-ionized water.

Sediment Sampling Procedures

Sediment samples were collected adjacent to the Terminals property dock using boat-mounted vibracore and pneumatic power surface grab (Van Veen) sediment sampling equipment.

Five vibracores were advanced to a depth of 5 feet below the mudline and two samples were collected for analysis from each sediment core. The samples were analyzed for volatiles (including dichlorobenzenes and 1,2,4- trichlorobenzene), PCBs, total metals, and TOC. Additional sediment was collected from each core and archived for potential PCB congener and dioxins/furans analysis. PCB congener and dioxins/furans samples were collected from areas exhibiting the most significant evidence of contamination. PCB congener and dioxins/furans sediment samples were not analyzed.

Three surface sediment samples were collected using power Van Veen sediment sampling equipment. The samples were used for analysis in the benthic survey.

Positioning Methods

A differential global positioning system (DGPS) was used aboard the sampling vessel for location positioning. Navigation systems were used to provide a target horizontal accuracy of three meters in accordance with Ecology's SAPA and PSEP protocols. The DGPS receiver was placed above the block on the sampling device deployment boom to accurately record the sampling location position. Horizontal coordinates are referenced to NAD83 State Plane North northings and eastings, and decimal minutes of latitude and longitude.

Water depths were measured directly by lead-line or sonar and converted to mudline elevations.

Vibracore Sample Collection Method

Sediment core samples were collected using a vibracore sampling device operated by Bio-Marine Enterprises. The vibracore device uses a vibration source and a piston system to drive a core tube into unconsolidated water-saturated sediments. The vibracore is a RIC 3500 unit, which weighs 400 pounds including the frame. The vibracore is rated to 250 feet water depth and 25 feet penetration. It has an impact of 3500 foot-pounds and runs at 3000 vibrations per minute. A 3.5-inch ID Lexan (polycarbonate) core tube barrel was used. A core catcher attached to the end of the barrel was used to hold the undisturbed sediment inside the barrel when withdrawn from the sediment.

During sampling, a 12-foot core tube was driven below the sediment surface with the vibracore device until the desired penetration is achieved. After sample collection, the core tube was cut into 4- to 6-foot sections and each section was labeled, sealed, and placed in a drum filled with ice.

To determine the most accurate depths for subsampling and compositing, compaction corrections were applied to the cores during logging and processing. The compaction correction is the length of sample recovery divided by the length of core penetration. Typically, sampling-induced sediment compaction will cause the recovery to be less than the total penetration. During logging and processing, the sample length was determined by dividing the actual recovery depth by the compaction correction factor. There is no way of determining the actual recovery on a foot-by-foot basis, so a uniform recovery factor was applied to the entire core.

Van Veen Sample Collection Method

A 0.1-square-meter Van Veen sampler was used to collected large-volume surface sediment samples (approximately 1 to 2 gallons from the top 10 centimeters). During sampling, the Van Veen sampler was lowered to the sediment surface and closed using a pneumatic cylinder ram.

Salinity Measurements

Salinity data was collected at each sampling location in 3-foot-depth intervals from the boat to determine whether saline or freshwater is predominant in the area at the time of the investigation. An In-Situ 9500 flow-through cell was used to monitor field parameters including pH, specific conductivity, ORP, dissolved oxygen, turbidity, and temperature. Conductivity and temperature readings were used to calculate salinity.

Sediment Screening and Analysis

Ten vibracore samples (two from each vibracore) and three power Van-Veen samples were collected adjacent to the Jacobson Terminals property dock using boat-mounted sampling device.

Each sample was photographed and visually classified in the field in accordance with ASTM D 2488. The sediment logs are presented on Figure A-44 through A-48 at the end of this appendix.

Vibracore Sediment Processing and Handling

After core recovery and compaction corrections were determined, two samples were collected from each core using a decontaminated stainless steel spoon or a disposable sampling tool, taking care to exclude material that was in contact with the core walls. The first sample was collected from the compaction-corrected top 10 cm, and an additional sample was collected from the remaining core in the area exhibiting the highest likelihood for contamination.

Sediment samples were analyzed for volatile organics, PCBs, total metals, and TOC. Additional sediment was collected from each core and archived for potential PCB congener and dioxins/furans analysis. PCB congener and dioxins/furans samples were collected from areas exhibiting the highest likelihood for contamination. The sample containers for volatile organic compounds were filled first. The remaining sediment was placed in a stainless steel bowl and mixed with a stainless steel spoon until homogenous. The homogenized sediment was then spooned into the sample jars.

Van Veen Sediment Processing and Handling

Following classification, surface sediments collected from the Van Veen sampler were transferred to a clean 5-gallon bucket and passed through a quarter-inch sieve to remove cobbles, gravel, and debris. This process was closely monitored and any macroinvertebrates that passed through the sieve were collected and placed in an ethanol preserved container. After processing the sediment through the quarter-inch sieve, the remaining sediment was then passed through a 500-micron mesh net to remove finer material while retaining the larger taxa. The remaining sediment and organisms were transferred to empty wide-mouth polyethylene jars and preserved in 95 percent ethanol.

Sample Handling and Laboratory Analysis

Soil, groundwater, and vibracore sediment samples collected were analyzed by Analytical Resources, Inc., (ARI) of Tukwila, Washington, for chemical analysis. Van Veen surface sediment samples collected were analyzed by Rhithron Associates, Inc., of Missoula, Montana.

Duplicate samples were collected and submitted to the laboratory to assess combined field and laboratory variability. The samples were assigned the same exploration label with two zeroes at the end of the number.

At the time of collection, samples were placed in an ice-chilled cooler and submitted to the laboratory using chain of custody protocols.

Investigation-Derived Waste Storage and Disposal

Soil cuttings, excess sediments, and purge water generated during exploration activities and groundwater sampling were placed in separate labeled drums and left on site, pending receipt of chemical analysis results from the analytical laboratory and determination of appropriate disposal procedures.

Key to Exploration Logs

Sample Description

Classification of soils in this report is based on visual field and laboratory observations which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field nor laboratory testing unless presented herein. Visual-manual classification methods of ASTM D 2488 were used as an identification guide.

Soil descriptions consist of the following:
Density/consistency, moisture, color, minor constituents, MAJOR CONSTITUENT, additional remarks.

Density/Consistency

Soil density/consistency in borings is related primarily to the Standard Penetration Resistance. Soil density/consistency in test pits and probes is estimated based on visual observation and is presented parenthetically on the logs.

SAND or GRAVEL Density	Standard Penetration Resistance (N) in Blows/Foot	SILT or CLAY Consistency	Standard Penetration Resistance (N) in Blows/Foot	Approximate Shear Strength in TSF
Very loose	0 to 4	Very soft	0 to 2	<0.125
Loose	4 to 10	Soft	2 to 4	0.125 to 0.25
Medium dense	10 to 30	Medium stiff	4 to 8	0.25 to 0.5
Dense	30 to 50	Stiff	8 to 15	0.5 to 1.0
Very dense	>50	Very stiff	15 to 30	1.0 to 2.0
		Hard	>30	>2.0

Sampling Test Symbols

1.5" I.D. Split Spoon
Grab (Jar)
3.0" I.D. Split Spoon
Shelby Tube (Pushed)
Bag
Cuttings
Core Run

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		(LITTLE OR NO FINES)		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SANDS		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		(LITTLE OR NO FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES		SM	SILTY SANDS, SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

Moisture

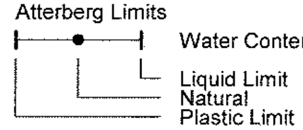
Dry	Little perceptible moisture
Damp	Some perceptible moisture, likely below optimum
Moist	Likely near optimum moisture content
Wet	Much perceptible moisture, likely above optimum

Minor Constituents

Minor Constituents	Estimated Percentage
Trace	<5
Slightly (clayey, silty, etc.)	5 - 12
Clayey, silty, sandy, gravelly	12 - 30
Very (clayey, silty, etc.)	30 - 50

Laboratory Test Symbols

GS	Grain Size Classification
CN	Consolidation
UU	Unconsolidated Undrained Triaxial
CU	Consolidated Undrained Triaxial
CD	Consolidated Drained Triaxial
QU	Unconfined Compression
DS	Direct Shear
K	Permeability
PP	Pocket Penetrometer Approximate Compressive Strength in TSF
TV	Torvane Approximate Shear Strength in TSF
CBR	California Bearing Ratio
MD	Moisture Density Relationship
AL	Atterberg Limits



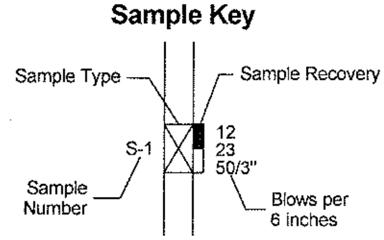
PID	Photoionization Detector Reading
CA	Chemical Analysis
DT	In Situ Density in PCF
OT	Tests by Others

Groundwater Indicators

Groundwater Level on Date or (ATD) At Time of Drilling

Groundwater Seepage (Test Pits)

Sample Key



HARTCROWSER

17800-43 1/14

Figure A-1

Push Probe Log JT-US-001

Location: Lat: 47.667668 Long: -122.394320
Approximate Ground Surface Elevation: ~14 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: N. Galvin Reviewed By: P. Cordell

USCS Class	Soil Descriptions
	Asphalt.
ML	Damp, light gray, sandy, gravelly SILT.
	Charred wood fragment.
	Becomes moist, gray, very sandy SILT.
	Abundant wood fragments.
ML SM	Wet, gray, very sandy SILT to very silty SAND with scattered wood fragments.
GW	Wet, gray GRAVEL.
SM	Wet, gray, slightly silty SAND.
ML	Wet, gray, slightly sandy SILT.
CL	Wet, gray CLAY.
	Bottom of Probe at 20.0 Feet. Started 01/02/14. Completed 01/02/14.

Depth in Feet: 0, 5, 10, 15, 20, 25

▽ ATD

Sample	LAB TESTS
S-1	No odor, NS
	Slight odor, NS
S-2	Slight odor, SS, CA
S-3	No odor, NS, CA

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

Push Probe Log JT-US-002

Location: Lat: 47.667648 Long: -122.394254
Approximate Ground Surface Elevation: ~13 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: N. Galvin Reviewed By: P. Cordell

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet	Sample	LAB TESTS & (PID)
		Asphalt.	0		
ML		Damp, gray to light gray, sandy SILT, trace gravel.			(<0.1) No odor, NS
		Wood fragments.		S-1	(<0.1) No odor, NS
		Becomes moist, dark brown, sandy SILT.	5		
SM		Wet, dark gray, silty SAND with trace gravel.		S-2	(<0.1) No odor, SS, CA
SM/ML		Wet, dark gray, very sandy SILT to very silty SAND with trace gravel.	ATD		
			10		(<0.1) No odor, NS
SM		Wet, dark gray to brown, slightly silty SAND with trace gravel.			
ML		Wet, gray SILT with trace sand.		S-3	(<0.1) No odor, NS, CA
		Bottom of Probe at 15.0 Feet. Started 01/02/14. Completed 01/02/14.	15		
			20		
			25		

PUSH PROBE LOG-ENV 1780043-PP.GPJ HC_CORP.GDT 6/18/14

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

17800-43 1/14

Figure A-3

Push Probe Log JT-US-003

Location: Lat: 47.667654 Long: -122.394182
Approximate Ground Surface Elevation: ~13 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: N. Galvin Reviewed By: P. Cordell

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet	Sample	LAB TESTS
		Asphalt.	0		
ML		Damp, gray, sandy SILT with trace gravel.			
SW SP		Damp, gray SAND.			No odor, NS
ML		Damp, light gray, sandy SILT.		S-1	
			5		
		Becomes moist, dark brown, slightly sandy SILT with abundant wood fragments.			
			ATD	S-2	Slight odor, HS, CA
		No recovery below 8 feet due to soft, wet material.			
			10		
			15		
		Bottom of Probe at 18.0 Feet. Started 01/02/14. Completed 01/02/14.			
			20		
			25		

PUSH PROBE LOG-ENV 1780043-PP.GPJ HC_CORP.GDT 6/18/14

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

17800-43 *1/14*

Figure A-4

Push Probe Log JT-US-003(2)

Location: Lat: 47.667654 Long: -122.394182
Approximate Ground Surface Elevation: ~13 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: N. Galvin Reviewed By: P. Cordell

USCS Class	Soil Descriptions	Depth in Feet	Sample	LAB TESTS & (PID)
	Asphalt.	0		
	No sample. See JT-US-003 log.			
SW-SM	Wet, gray, slightly silty SAND with trace gravel. Wood fragments.	5		
ML	Wet, light gray SILT.	∇ ATD		
	Becomes dark brown, sandy SILT with abundant wood fragments.		S-2.1	(<0.1) Slight odor, NS
SW	Wet, brown, gray, slightly silty SAND.	10		
ML	Wet, light gray, slightly sandy SILT.	15		
CL ML	Wet, light gray CLAY and SILT.		S-3	(<0.1) No odor, NS
	Bottom of Probe at 20.0 Feet. Started 01/03/14. Completed 01/03/14. Advanced due to poor recovery in JT-US-003.	20		
		25		

PUSH PROBE LOG-ENV 1780043-PP.GPJ HC_CORP.GDT 6/18/14

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

17800-43 1/14

Figure A-5

Push Probe Log JT-US-004

Location: Lat: 47.667618 Long: -122.394176
Approximate Ground Surface Elevation: ~13 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: N. Galvin Reviewed By: P. Cordell

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet	Sample	LAB TESTS
		Asphalt.	0		
SM		Damp to moist, gray, slightly silty SAND.			
		Wood fragment.		S-1	No odor, NS Odor, MS
			5		
		Becomes wet.			
ML		Wet, dark gray to brown, slightly sandy SILT with abundant wood fragments.	∇ ATD	S-2	Slight odor, NS, CA
			10		
SM		Wet, brown, very silty SAND.			
		Becomes gray to light brown, slightly silty SAND.			
		Brown-yellow stains with sweet odor.		S-3	Odor, NS, CA
			15		
CL		Wet, gray to light gray CLAY.			
ML		Wet, gray to light gray, slightly sandy SILT.		S-4	No odor, NS, CA
		Rock			
		Bottom of Probe at 20.0 Feet. Started 01/02/14. Completed 01/02/14.	20		
			25		

PUSH PROBE LOG-ENV 1780043-PP.GPJ HC_CORP.GDT 6/18/14

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

17800-43 1/14

Figure A-6

Push Probe Log JT-US-005

Location: Lat: 47.667660 Long: -122.394104
Approximate Ground Surface Elevation: ~13 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: N. Galvin Reviewed By: P. Cordell

USCS Class	Soil Descriptions	Depth in Feet	Sample	LAB TESTS & (PID)
	Asphalt.	0		
ML	Damp, gray, sandy SILT, trace gravel.			
SM	Damp, light gray, slightly silty SAND. (FILL)		S-1	(<0.1) No odor, NS
		5		
ML	Moist, brown, sandy SILT with abundant wood fragments.			(<0.1) No odor, NS
	Becomes wet, gray, and slightly gravelly.	ATD		
	Becomes wet, brown, gravelly, very sandy SILT with wood and brick fragments. (FILL)	10	S-2	(<0.1) Odor, SS, CA
SW SP	Wet, gray, slightly silty SAND.			
		15		
CL	Wet, light gray CLAY.			
ML	Wet, light gray, sandy SILT.		S-3	(<0.1) Slight odor, NS, CA
	Bottom of Probe at 20.0 Feet. Started 01/02/14. Completed 01/02/14.	20		
		25		

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

17800-43 *1/14*

Figure A-7

Push Probe Log JT-US-006

Location: Lat: 47.667594 Long: -122.394145
Approximate Ground Surface Elevation: ~13 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: N. Galvin   Reviewed By: P. Cordell

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet	Sample	LAB TESTS & (PID)
		Asphalt.	0		
ML		Damp, gray to brown, slightly sandy, gravelly SILT.			
SM		Damp, gray, slightly silty, very gravelly SAND. Becomes black. Becomes moist and gray.	5	S-1	(<0.1) No odor, NS
GW		Wet, gray, sandy GRAVEL, trace silt.	ATD 10	S-2	(<0.1) No odor, NS, CA
ML		Wet, dark gray to black, sandy SILT, trace gravel.		S-3	(<0.1) No odor, NS, CA
SM		Wet, gray-brown, slightly silty SAND.	15		
CL		Wet, gray CLAY.		S-4	(<0.1) No odor, NS, CA
ML		Wet, gray to light gray, slightly sandy SILT.			(<0.1) No odor, NS
		Bottom of Probe at 20.0 Feet. Started 01/02/14. Completed 01/02/14.	20		
			25		

PUSH PROBE LOG-ENV 1780043-PP.GPJ HC_CORP.GDT 6/18/14

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

17800-43 **1/14**

Figure A-8

Push Probe Log JT-US-007

Location: Lat: 47.667546 Long: -122.394062
Approximate Ground Surface Elevation: ~13 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: N. Galvin Reviewed By: P. Cordell

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet	Sample	LAB TESTS & (PID)
		Asphalt.	0		
SW		Damp, gray, silty, gravelly SAND.			
		Becomes slightly silty SAND.		S-1	(<0.1) No odor, NS
		Black wood fragment.			
			5		
		Becomes silty SAND.			
ML		Moist, gray, sandy SILT.			
		Yellow/brown staining. Becomes wet and slightly sandy.		S-2	(<0.1) No odor, NS, CA
		Wood fragments and rock.			
		Wood fragments.	10		
		2-inch layer of slightly silty SAND.			
		Becomes brown with sweet odor.		S-3	(<0.1) Odor, NS, CA
SM		Wet, brown-gray, silty SAND.			
		Becomes gray and slightly silty.			
			15		
ML		Wet, brown-gray, slightly sandy SILT.		S-4	(<0.1) No odor, NS
CL		Wet, gray CLAY.			
ML		Wet, gray, slightly sandy SILT.			
		Bottom of Probe at 20.0 Feet. Started 01/02/14. Completed 01/02/14.	20		
			25		

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

17800-43 1/14

Figure A-9

Push Probe Log JT-US-008

Location: Lat: 47.667589 Long: -122.394088
Approximate Ground Surface Elevation: ~13 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: N. Galvin Reviewed By: P. Cordell

USCS Class	Soil Descriptions	Sample	LAB TESTS & (PID)
	Asphalt.		
GP	GRAVEL.		
SW-SM	Damp, light gray, slightly silty, slightly gravelly SAND.		
ML	Moist, gray, slightly sandy SILT.	S-1	(<0.1) No odor, NS
	Becomes brown to black with wood fragments.		
	Becomes very sandy.		
SM	Moist, gray, slightly silty SAND.	S-2	(<0.1) No odor, NS, CA
	ATD		
	Becomes gravelly with abundant wood fragments.		
ML	Wet, dark gray, slightly sandy SILT, trace gravel.		
SM	Wet, brown-gray, silty SAND.	S-3	(<0.1) No odor, NS
	Becomes gray.		
	Sweet odor and heavy sheen.	S-4	(<0.1) Odor, HS, CA
CL	Wet, gray CLAY.		
ML	Very wet, gray, slightly sandy SILT.	S-5	(<0.1) No odor, NS, CA

Bottom of Probe at 20.0 Feet.
Started 01/02/14.
Completed 01/02/14.

PUSH PROBE LOG-ENV 1780043-PP.GPJ HC_CORP.GDT 6/18/14

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

17800-43 1/14

Figure A-10

Push Probe Log JT-US-009

Location: Lat: 47.667619 Long: -122.394080
Approximate Ground Surface Elevation: ~13 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: N. Galvin Reviewed By: P. Cordell

USCS Class	Soil Descriptions	Depth in Feet	Sample	LAB TESTS & (PID)
	Asphalt.	0		
ML	Damp, brown, gravelly, sandy SILT.			
SW / SP	Damp, gray SAND. Wood fragment with petroleum-like odor.		S-1	(<0.1) PHC odor, NS, CA
ML	Moist, brown, gravelly, sandy SILT with wood fragments.			
SP	Moist, gray, gravelly SAND and trace sandy silt. Becomes wet with slight sweet odor.	5	S-2	(<0.1) Slight odor, NS, CA
ML	Wet, brown, gravelly, sandy SILT with slight sweet odor. Becomes brown, sandy SILT.	∇ ATD; 10		
SW	Wet, brown, slightly silty SAND with slight sweet odor. Becomes silty SAND.	15	S-3	(<0.1) Slight odor, NS, CA; (<0.1) Slight odor, NS
CL	Wet, light gray CLAY.			
ML	Wet, light gray, slightly sandy SILT.		S-4	(<0.1) No odor, NS
	Bottom of Probe at 20.0 Feet. Started 01/03/14. Completed 01/03/14.	20		
		25		

PUSH PROBE LOG-ENV 1780043-PP.GPJ HC_CORP.GDT 6/18/14

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

17800-43 1/14

Figure A-11

Push Probe Log JT-US-010

Location: Lat: 47.667649 Long: -122.394039
Approximate Ground Surface Elevation: ~13 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: N. Galvin Reviewed By: P. Cordell

USCS Class	Soil Descriptions	Depth in Feet	Sample	LAB TESTS & (PID)
	Asphalt.	0		
ML SM	Moist, brown, sandy, gravelly SILT.			
	Becomes sandy SILT to silty SAND, trace gravel.		S-1	(<0.1) No odor, NS
		5		
GP	Wet, gray, sandy GRAVEL, trace silt.			
ML	Wet, dark brown, sandy gravelly SILT.	ATD		
		10		
	Becomes sandy SILT.		S-2	(<0.1) No odor, NS, CA
SP	Wet, brown-gray SAND.			
	Becomes gray SAND.			
		15		
ML	Wet, light gray SILT.			
CL	Wet, light gray CLAY.		S-3	(<0.1) No odor, NS, CA
ML	Wet, light gray, slightly sandy SILT.			
	Bottom of Probe at 20.0 Feet. Started 01/03/14. Completed 01/03/14.	20		
		25		

PUSH PROBE LOG-ENV 1780043-PP.GPJ HC_CORP.GDT 6/18/14

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

17800-43 1/14

Figure A-12

Push Probe Log JT-US-011

Location: Lat: 47.667676 Long: -122.394053
Approximate Ground Surface Elevation: ~13 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: N. Galvin Reviewed By: P. Cordell

USCS Class	Soil Descriptions	Depth in Feet	Sample	LAB TESTS & (PID)
	Asphalt.	0		
ML	Damp, brown-gray, sandy SILT.			(<0.1) No odor, NS
ML SM	Moist, light brown to gray, sandy SILT to silty SAND, trace gravel. (FILL)		S-1	(<0.1) No odor, NS
	Wood pulp and fragments and bricks. (FILL)	5		
	Becomes gray SILT.	ATD	S-2	(<0.1) No odor, NS, CA
GP	Wet, dark gray, sandy, silty GRAVEL with wood fragments.	10		
SM SP	Wet, light gray, slightly silty SAND.		S-3	(<0.1) No odor, NS, CA
	Becomes SAND.			
	Becomes slightly silty SAND.	15		
ML	Wet, light gray, slightly sandy SILT.			
CL	Wet, light gray CLAY.		S-4	(<0.1) No odor, NS, CA
ML	Wet, light gray, slightly sandy SILT.			
	Bottom of Probe at 20.0 Feet. Started 01/03/14. Completed 01/03/14.	20		
		25		

PUSH PROBE LOG-ENV 1780043-PP.GPJ HC_CORP.GDT 6/18/14

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

17800-43 1/14

Figure A-13

Push Probe Log JT-US-012

Location: Lat: 47.667701 Long: -122.394043
Approximate Ground Surface Elevation: ~13 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: A. Goodwin

USCS Class	Soil Descriptions	Depth in Feet	Sample	LAB TESTS & (PID)
	4 inches of Asphalt over Base Course.	0		
SM/ML	Moist, dark brown to dark gray, silty SAND to sandy SILT with abundant wood fragments with creosote-like odor.		S-1	(<0.1) Odor, MS, CA
	Wood piling with creosote odor.	5	S-2	(<0.1) Odor, MS, CA
SM	Wet, brown to gray-brown, silty SAND. ∇ ATD			
SW SP	Wet, brown SAND with slight yellow-brown tinted soil.	10	S-3	No odor, NS, CA
	Becomes gray.			
ML	Wet, gray SILT.	15	S-4	(<0.1) No odor, NS
			S-5	(<0.1) No odor, NS
SM	Wet, gray, silty SAND.			
	Bottom of Probe at 18.5 Feet. Started 01/06/14. Completed 01/06/14.	20		
		25		

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

Push Probe Log JT-US-013

Location: Lat: 47.667699 Long: -122.394128
Approximate Ground Surface Elevation: ~13 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: N. Galvin Reviewed By: P. Cordell

USCS Class	Soil Descriptions	Depth in Feet	Sample	LAB TESTS & (PID)
	Asphalt.	0		
ML	Damp, brown, sandy, gravelly SILT.			
	Charred wood fragments and sand seam.		S-1	(<0.1) No odor, NS
SP-SM	Damp, brown, gravelly, very sandy SILT to very silty SAND.			
	Wood fragments and petroleum-like odor.	5		
	Black staining with petroleum-like odor.		S-2	(<0.1) Slight odor, NS, CA
		∇ ATD		
		10		
SM	Wet, brown-gray, silty SAND.			
	Yellow/brown staining, no odor.		S-3	(<0.1) No odor, NS, CA
SW	Wet, gray SAND.			
	Becomes light gray.			
SM	Wet, light gray, silty SAND.	15		
ML	Wet, light gray SILT.			
CL	Wet, light gray CLAY.		S-4	(<0.1) No odor, NS, CA
ML	Wet, light gray, slightly sandy SILT.			
	Bottom of Probe at 20.0 Feet. Started 01/03/14. Completed 01/03/14.	20		
		25		

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

Push Probe Log JT-US-014

Location: Lat: 47.667692 Long: -122.394192
Approximate Ground Surface Elevation: ~13 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: N. Galvin Reviewed By: P. Cordell

USCS Class	Soil Descriptions	Depth in Feet	Sample	LAB TESTS & (PID)
	Asphalt.	0		
ML	Damp, gray, gravelly, sandy SILT. 4-inch Gravel seam. Wood fragments.		S-1	(<0.1) No odor, NS
	Wood fragments.	5		
SM	Wet, brown, slightly silty SAND.			
ML	Wet, brown-gray, sandy SILT with wood fragments. Black staining and petroleum-like odor.	ATD	S-2	(<0.1) Odor, SS, CA
SP	Wet, brown, slightly silty SAND. Becomes SAND. Becomes gray.	10		(<0.1) No odor, NS
ML	Wet, light gray, slightly sandy SILT.	15	S-3	(<0.1) No odor, NS, CA
CL	Wet, light gray CLAY.		S-4	(<0.1) No odor, NS, CA
ML	Wet, slightly sandy SILT.			
	Bottom of Probe at 20.0 Feet. Started 01/03/14. Completed 01/03/14.	20		
		25		

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

17800-43 1/14

Figure A-16

Push Probe Log JT-US-015

Location: Lat: 47.667697 Long: -122.394267
Approximate Ground Surface Elevation: ~14 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: N. Galvin Reviewed By: P. Cordell

USCS Class	Soil Descriptions	Depth in Feet	Sample	LAB TESTS & (PID)
	Asphalt.	0		
ML	Damp, brown, gravelly, sandy SILT.			
	Becomes light brown-gray, slightly sandy SILT. (FILL)			(<0.1) No odor, NS
	Wood fragments.	5	S-1	(<0.1) No odor, NS, CA
	Becomes gray.			
	Black staining.			
	Becomes black to dark brown.			
		∇ ATD		
		10		
SP-SM	Wet, brown, slightly silty SAND.			
	Becomes gray SAND.			(<0.1) No odor, NS
		15		
	Becomes slightly silty SAND.			
ML	Wet, light gray SILT.		S-2	(<0.1) No odor, NS, CA
CL	Wet, light gray CLAY.		S-3	(<0.1) No odor, NS
ML	Wet, light gray, slightly sandy SILT.			
	Bottom of Probe at 20.0 Feet.	20		
	Started 01/03/14.			
	Completed 01/03/14.			
		25		

PUSH PROBE LOG-ENV 1780043-PP.GPJ HC_CORP.GDT 6/18/14

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

17800-43 *1/14*

Figure A-17

Push Probe Log JT-US-016

Location: Lat: 47.667688 Long: -122.394350
Approximate Ground Surface Elevation: ~15 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: N. Galvin Reviewed By: P. Cordell

USCS Class	Soil Descriptions	Sample	LAB TESTS & (PID)
	Asphalt.		
ML	Damp, gray-brown, very gravelly, sandy SILT.		
	Becomes gray, slightly sandy SILT.	S-1	(<0.1) No odor, NS
	Becomes light brown to gray.		
	Wood pulp and fragments.	S-2	(<0.1) No odor, NS, CA
	Becomes SILT.		
	1-inch black staining and wood fragments. (ATD)		
	Becomes brown, sandy SILT.		
	Wood fragments.		
SP-SM	Wet, brown-gray, silty SAND.	S-3	(<0.1) No odor, NS, CA
SP	Wet, light gray SAND.		
SM	Wet, light gray, silty SAND.		
ML	Wet, light gray SILT.	S-4	(<0.1) No odor, NS
CL	Wet, light gray CLAY.	S-5	(<0.1) No odor, NS

Depth in Feet: 0, 5, 10, 15, 20, 25

Bottom of Probe at 20.0 Feet.
Started 01/03/14.
Completed 01/03/14.

PUSH PROBE LOG-ENV 1780043-PP.GPJ HC_CORP.GDT 6/18/14

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

17800-43 1/14

Figure A-18

Push Probe Log JT-US-017

Location: Lat: 47.667697 Long: -122.394417
Approximate Ground Surface Elevation: ~20 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: A. Goodwin

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet
		4 inches of Asphalt over Base Course.	0
SM		Damp, brown and black, slightly gravelly, silty SAND.	
SP SW-SM		Moist, brown to light brown SAND and silty SAND with scattered orange mottling.	5
		Becomes slightly gravelly.	10
		ATD	
			15
		Becomes wet, dark brown, silty SAND.	
SP SW		Wet, gray SAND with yellow-orange tint on water in liner.	20
CL		Wet, gray CLAY.	
		Bottom of Probe at 24.0 Feet. Started 01/06/14. Completed 01/06/14.	25

Sample	LAB TESTS & (PID)
S-1	(<0.1) No odor, NS
S-2	(<0.1) No odor, NS
S-3	(<0.1) No odor, NS
S-4	(<0.1) No odor, NS, CA
S-5	(<0.1) No odor, NS, CA
S-6	(<0.1) No odor, NS

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

Push Probe Log JT-US-018

Location: Lat: 47.667664 Long: -122.394469
Approximate Ground Surface Elevation: ~17 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: N. Galvin Reviewed By: P. Cordell

USCS Class	Soil Descriptions	Depth in Feet	Sample	LAB TESTS & (PID)
	Asphalt.	0		
	Crushed Rock.			
ML	Damp, gray, sandy SILT.			
	Becomes dark gray, slightly sandy SILT with wood fragments and petroleum-like odor.		S-1	(<0.1) No odor, NS, CA
	Becomes very sandy SILT.	5		(<0.1) No odor, NS
	Wood fragments and rock.			
	Becomes gray, slightly sandy SILT.			
		ATD		
	Becomes wet.	10		
	Brick fragments.			
	Wood fragments.		S-2	(<0.1) No odor, NS, CA
	Becomes brown, very sandy SILT.			
	Becomes brown.			
SW	Wet, brown to light gray, slightly silty SAND.			
		15	S-3	(<0.1) Slight odor, SS, CA
SM	Wet, gray, silty SAND.			
ML	Wet, light gray SILT.		S-4	(<0.1) No odor, NS, CA
	Bottom of Probe at 20.0 Feet. Started 01/03/14. Completed 01/03/14.	20		
		25		

PUSH PROBE LOG-ENV 1780043-PP.GPJ HC_CORP.GDT 6/18/14

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

17800-43 *1/14*

Figure A-20

Push Probe Log JT-US-019

Location: Lat: 47.667637 Long: -122.394341
Approximate Ground Surface Elevation: ~14 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: N. Galvin Reviewed By: P. Cordell

USCS Class	Soil Descriptions	Depth in Feet
	Asphalt.	0
ML	Damp, brown, sandy, gravelly SILT.	
	Wood pulp and fragments.	
	Becomes wet, gray, slightly sandy SILT with abundant wood fragments and petroleum-like odor.	∇ ATD
	Becomes gray-brown with abundant wood fragments and solvent-like odor.	10
SW-SM	Wet, brown-gray, silty SAND and SAND.	
ML	Wet, light gray, slightly sandy SILT.	
CL	Wet, light gray CLAY.	
	Bottom of Probe at 20.0 Feet. Started 01/03/14. Completed 01/03/14.	20

Depth scale: 0, 5, 10, 15, 20, 25

Sample	LAB TESTS & (PID)
S-1	(<0.1) No odor, NS
	(<0.1) No odor, NS
S-2	(<0.1) Odor, HS, CA
S-3	(<0.1) Slight odor, NS, CA
S-4	(<0.1) No odor, NS, CA
S-5	

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

Push Probe Log JT-US-020

Location: Lat: 47.667632 Long: -122.394306
Approximate Ground Surface Elevation: ~13 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: A. Goodwin

USCS Class	Soil Descriptions	Depth in Feet	Sample	LAB TESTS & (PID)
GW	2 inches of Asphalt over damp, gray, silty, sandy GRAVEL.	0		
SM	Damp, gray, very silty SAND with slight petroleum-like odor.		S-1	(<0.1) Slight odor, NS
SW SP	Damp, gray SAND, trace silt.			
	Becomes moist, brown-black, silty SAND with wood pulp and fragments.	5		
	Petroleum-like odor.		S-2	(<0.1) Odor, NS, CA
GP	Wet, gray, sandy GRAVEL.	∇ ATD		
SM/ML	Wet, dark gray to black, silty SAND to sandy SILT.	10		
SW SP	Wet, gray-brown SAND.		S-3	(<0.1) No odor, NS, CA
	Becomes gray.			
ML	Wet, gray SILT.	15	S-4	(<0.1) No odor, NS, CA
CL	Wet, gray CLAY.			
SM	Wet, gray SAND to silty SAND.			
	Bottom of Probe at 17.8 Feet. Started 01/06/14. Completed 01/06/14.	20		
		25		

PUSH PROBE LOG-ENV 1780043-PP.GPJ HC_CORP.GDT 6/18/14

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

Push Probe Log JT-US-021

Location: Lat: 47.667612 Long: -122.394259
Approximate Ground Surface Elevation: ~13 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: A. Goodwin

USCS Class	Soil Descriptions	Depth in Feet
	Asphalt.	0
GW	Damp, brown-black, silty, sandy GRAVEL with debris.	
SW SP	Damp, gray SAND, trace gravel.	
	Brown mottled with sweet odor.	
	Becomes gravelly.	5
	Limited recovery.	
	∇ ATD	
	Becomes wet.	10
SM	Wet, gray, very silty SAND.	15
ML CL	Wet, gray SILT to CLAY.	
SM	Wet, gray, silty SAND.	
	Bottom of Probe at 18.5 Feet. Started 01/06/14. Completed 01/06/14.	20
		25

Sample	LAB TESTS & (PID)
S-1	(<0.1) Odor, NS, CA
S-2	(<0.1) No odor, NS, CA
S-3	(<0.1) No odor, NS, CA
S-4	(<0.1) No odor, NS

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

Push Probe Log JT-US-022

Location: Lat: 47.667602 Long: -122.394198
Approximate Ground Surface Elevation: ~13 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: A. Goodwin

USCS Class	Soil Descriptions	Depth in Feet	Sample	LAB TESTS & (PID)
	Asphalt.	0		
SW	Damp, gray, slightly gravelly SAND.			
	Wood debris with moderate sheen and creosote-like odor.		S-1	(<0.1) Odor, MS, CA
	No recovery.	5		
	Wet, brown to black, slightly gravelly SAND.	10 ∇ ATD		
	Becomes gray.		S-2	(<0.1) No odor, NS, CA
SM	Wet, gray, silty SAND.	15	S-3	(<0.1) No odor, NS, CA
ML CL	Wet, gray SILT and CLAY with occasional sand seams.		S-4	(<0.1) No odor, NS
SW	Wet, gray SAND.			
	Bottom of Probe at 20.0 Feet. Started 01/06/14. Completed 01/06/14.	20		
		25		

PUSH PROBE LOG-ENV 1780043-PP.GPJ HC_CORP.GDT 6/18/14

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

17800-43 1/14

Figure A-24

Push Probe Log JT-US-023

Location: Lat: 47.667572 Long: -122.394175
Approximate Ground Surface Elevation: ~13 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: A. Goodwin

USCS Class	Soil Descriptions	Sample	LAB TESTS & (PID)
	4 inches of Asphalt over Base Course.		
SP	Damp, gray, slightly gravelly SAND. (FILL)	S-1	(<0.1) No odor, NS
SM	Damp, gray, very silty SAND. (FILL)		
SW	Wet, black to dark brown, gravelly SAND over 2 to 3-inch wood layer. (FILL)	S-2	(<0.1) No odor, NS, CA
GP	Wet, gray, sandy GRAVEL.		
SP	Wet, brown-gray, slightly gravelly SAND with slight yellow-brown tint to water in liner.	S-3	(<0.1) No odor, NS, CA
SM	Wet, gray SAND to silty SAND.	S-4	(<0.1) No odor, NS, CA
ML CL	Wet, gray SILT/CLAY.	S-5	(<0.1) No odor, NS
SM	Wet, gray, silty SAND.		

Depth in Feet: 0, 5, 10, 15, 20, 25

ATD

Bottom of Probe at 20.0 Feet.
Started 01/06/14.
Completed 01/06/14.

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

Push Probe Log JT-US-024

Location: Lat: 47.667568 Long: -122.394130
Approximate Ground Surface Elevation: ~13 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: A. Goodwin

USCS Class	Soil Descriptions	Depth in Feet	Sample	LAB TESTS & (PID)
	4 inches of Asphalt over Base Course.	0		
SW-SM	Dry to damp, gray, slightly gravelly SAND.		S-1	(<0.1) No odor, NS
FILL	Dark brown to black Wood.	5		
SM	Wet, gray, silty, gravelly SAND.	▽ ATD	S-2	(<0.1) No odor, NS, CA
SP	Wet, dark brown SAND.	10	S-3	(<0.1) No odor, NS, CA
	Becomes gray.			
SM	Wet, gray, silty SAND.	15		
ML CL	Wet, gray SILT/CLAY.		S-4	(<0.1) No odor, NS, CA
SM	Wet, gray, silty SAND.			
	Bottom of Probe at 20.0 Feet. Started 01/06/14. Completed 01/06/14.	20		
		25		

PUSH PROBE LOG-ENV 1780043-PP.GPJ HC_CORP.GDT 6/18/14

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

17800-43 1/14

Figure A-26

Push Probe Log JT-US-025

Location: Lat: 47.667594 Long: -122.394040
Approximate Ground Surface Elevation: ~13 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: A. Goodwin

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet	Sample	LAB TESTS & (PID)
		4 inches of Asphalt over Base Course.	0		
SW SP		Dry to damp, gray SAND, trace gravel.		S-1	(<0.1) No odor, NS
			5		
SM		Moist to wet, gray, slightly gravelly, silty SAND. Slight petroleum-like odor.	ATD	S-2	(<0.1) Slight odor, NS, CA
FILL		Wood pulp, fibers, fragments.			
SP SW		Wet, gray-brown SAND, trace gravel.			
		Slight sheen on water in sleeve, no sheen on soil.	10	S-3	(<0.1) No odor, NS, CA
		Becomes gray.			
			15	S-4	(<0.1) No odor, NS
ML CL		Wet, gray SILT/CLAY.		S-5	(<0.1) No odor, NS, CA
SM		Damp to moist, gray, very silty SAND, trace gravel.			
		Bottom of Probe at 20.0 Feet. Started 01/06/14. Completed 01/06/14.	20		
			25		

PUSH PROBE LOG-ENV 1780043-PP.GPJ HC_CORP.GDT 6/18/14

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

17800-43 1/14

Figure A-27

Push Probe Log JT-US-26

Location: Lat: 47.667590 Long: -122.394332
Approximate Ground Surface Elevation: ~13 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: A. Goodwin

USCS Class	Soil Descriptions	Depth in Feet	Sample	LAB TESTS & (PID)
	Asphalt	0		
SM	Moist, brown to black, silty, gravelly SAND with moderate petoleum-like odor. (FILL)		S-1	(<0.1) Odor, HS
SW-SM	Damp, gray, silty and slightly silty SAND. (FILL)			
GW SW	Wet, gray, sandy GRAVEL to gravelly SAND with slight petroleum-like odor.	5 (▽ ATD)	S-2	(<0.1) Slight odor, NS, CA
SP	Wet, gray-brown, SAND with trace silt and slight brown tint on water.	10	S-3	(<0.1) No odor, NS, CA
ML	Wet, gray, sandy SILT.	15		
CL-ML	Wet, gray SILT/CLAY.		S-4	(<0.1) No odor, NS
	Bottom of Probe at 18.0 Feet. Started 03/11/14. Completed 03/11/14.			
		20		
		25		

PUSH PROBE LOG-ENV 1780043-PP-3-14.GPJ HC_CORP.GDT 6/18/14

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

17800-43 *3/14*

Figure A-28

Push Probe Log JT-US-27

Location: Lat: 47.667606 Long: -122.394396
Approximate Ground Surface Elevation: ~14 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: A. Goodwin

USCS Class	Soil Descriptions	Sample	LAB TESTS & (PID)
	Asphalt		
SM	Damp, gray and brown, silty, gravelly SAND with scattered wood debris and very slight petroleum-like odor. (FILL) Becomes very gravelly.	S-1	(3) Slight odor
FILL	Wood fragments and fibers with dark brown to black SILT matrix and strong petroleum-like odor.	S-2	(567) Strong odor, HS, CA
ML	Wet, brown, sandy SILT.		
SP	Wet, gray SAND.	S-3	(6) No odor, NS, CA
SM	Wet, gray, silty SAND.	S-4	(<0.1) No odor, NS, CA
CL-ML	Wet, gray SILT/CLAY.	S-5	

Depth in Feet: 0, 5, 10, 15, 20, 25

Bottom of Probe at 19.0 Feet.
Started 03/11/14.
Completed 03/11/14.

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

Push Probe Log JT-US-28

Location: Lat: 47.667619 Long: -122.394489
Approximate Ground Surface Elevation: ~17 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: A. Goodwin

USCS Class	Soil Descriptions	Depth in Feet	Sample	LAB TESTS & (PID)
	Asphalt	0		
SM/ML	Moist, gray-brown, sandy SILT to silty SAND with wood debris and petroleum-like odor. (FILL)			(18) Odor
		5	S-1	(58) Odor, SS, CA
FILL	Wood fragments and fibers in moist to wet, gray, SILT matirx			
SM	Wet, gray, silty SAND. (FILL)			
ML	Wet, gray-brown, sandy SILT. (FILL)			
SM	Wet, brown, silty SAND with shredded wood (FILL).	10 ATD	S-2	(<0.1) No odor, NS, CA
GM	Wet, gray, silty, sandy GRAVEL.			
SM	Wet, gray-black, very silty SAND.			
SP	Wet, gray SAND with trace silt.	15	S-3	(5) No odor, NS, CA
CL-ML	Wet, gray SILT/CLAY.			
	Bottom of Probe at 20.0 Feet. Started 03/12/14. Completed 03/12/14.	20		
		25		

PUSH PROBE LOG-ENV 1780043-PP-3-14.GPJ HC_CORP.GDT 6/18/14

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

17800-43 3/14

Figure A-30

Push Probe Log JT-US-29

Location: Lat: 47.667648 Long: -122.394562
Approximate Ground Surface Elevation: ~18 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: A. Goodwin

USCS Class	Soil Descriptions	Depth in Feet	Sample	LAB TESTS & (PID)
	Asphalt	0		(2)
GM	Damp, gray, silty, sandy GRAVEL with petroleum-like odor. (FILL)			
FILL	Wood with damp, brown-black, silty SAND matrix.		S-1	(86) Odor, SS, CA
ML SM	Moist, gray with brown mottling, sandy SILT to silty SAND with trace gravel and abundant wood debris. (FILL)	5	S-2	(1) No odor, NS, CA
ML	Moist, gray with brown mottling SILT. (FILL)	10 ATD		
SM	Wet, gray, silty SAND with wood fragments. (FILL)		S-3	(<0.1) No odor, NS
GM	Wet, dark gray to black, silty, sandy GRAVEL with abundant wood debris. (FILL)			
SM	Wet, gray, silty SAND.			
SP	Wet, gray SAND with trace silt.	15	S-4	(<0.1) No odor, NS
CL-ML	Wet, gray SILT/CLAY.			
	Bottom of Probe at 20.0 Feet. Started 03/11/14. Completed 03/11/14.	20		
		25		

PUSH PROBE LOG-ENV 1780043-PP-3-14.GPJ HC_CORP.GDT 6/18/14

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

17800-43 *3/14*

Figure A-31

Push Probe Log JT-US-30

Location: Lat: 47.667682 Long: -122.394502
Approximate Ground Surface Elevation: ~20 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: A. Goodwin

Depth in Feet	USCS Class	Soil Descriptions	Sample	LAB TESTS & (PID)
0		Asphalt		
0		No recovery.		
5	SM	Moist, light brown, silty SAND with trace gravel.		
		Black staining.	S-1	(<0.1) No odor, NS
10 (▽ ATD)		Become brown to gray with orange mottling.		
		Becomes wet.	S-2	(<0.1) No odor, NS, CA
15		Becomes gray.		
		6-inch dark brown layer.	S-3	(<0.1) No odor, NS
20	SP	Wet, gray SAND.	S-4	(<0.1) No odor, NS, CA
	CL-ML	Wet, gray SILT/CLAY.		
25				

Bottom of Probe at 25.0 Feet.
Started 03/12/14.
Completed 03/12/14.

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

Push Probe Log JT-US-31

Location: Lat: 47.667704 Long: -122.394212
Approximate Ground Surface Elevation: ~14 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: A. Goodwin

USCS Class	Soil Descriptions	Depth in Feet	Sample	LAB TESTS & (PID)
	Asphalt over moist, brown, sandy GRAVEL.	0		
SM	Moist, gray with orange mottling, slightly gravelly, silty SAND. (FILL)		S-1	(<0.1) No odor, NS
	Becomes wet.	∇ ATD		
SM/ML	Wet, gray to black, silty SAND to sandy SILT with scattered wood debris. (FILL)	5	S-2	(<0.1) No odor, NS, CA
SP	Wet, brown SAND with trace silt.	10		
	Grades to gray.		S-3	(<0.1) No odor, NS, CA
SM	Wet, gray, silty SAND.	15		
CL-ML	Wet, gray SILT/CLAY.		S-4	(<0.1) No odor, NS
SM	Wet, gray, silty SAND.			
	Becomes slightly gravelly.	20	S-5	(<0.1) No odor, NS, CA
	Bottom of Probe at 25.0 Feet.	25		

Started 03/12/14.
Completed 03/12/14.

Casing advanced to 17.5 feet bgs.

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

Push Probe Log JT-US-32

Location: Lat: 47.667710 Long: -122.394158
Approximate Ground Surface Elevation: ~13 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: A. Goodwin

USCS Class	Soil Descriptions	Depth in Feet	Sample	LAB TESTS & (PID)
	Asphalt.	0		
SM	Damp, gray, gravelly, silty SAND with scattered debris, including wood fragments. (FILL)		S-1	(<0.1) No odor, NS
SM	Wet, brown-black, very silty SAND with silt lens at 6 feet.	5 ATD	S-2	(<0.1) No odor, NS, CA
SP	Wet, light brown SAND with trace silt.			
	Becomes dark brown and slightly silty from 10 to 11 ft bgs.	10	S-3	(<0.1) No odor, NS
	Becoms gray.			
		15	S-4	(<0.1) No odor, NS, CA
CL-ML	Wet, gray SILT/CLAY.			
	Bottom of Probe at 18.0 Feet. Started 03/12/14. Completed 03/12/14.			
		20		
		25		

PUSH PROBE LOG-ENV 1780043-PP-3-14.GPJ HC_CORP.GDT 6/18/14

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

17800-43 3/14

Figure A-34

Push Probe Log JT-US-33

Location: Lat: 47.667683 Long: -122.393993
Approximate Ground Surface Elevation: ~13 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: A. Goodwin

USCS Class	Soil Descriptions	Sample	LAB TESTS & (PID)
GW	Asphalt over damp, gray-brown, sandy GRAVEL (FILL).		
SM	Damp, gray-black, silty SAND with black stained wood fragments. (FILL)		
SP	Damp, light brown SAND. (FILL)	S-1	(1.0) No odor, NS
SM	Damp, gray, silty SAND. (FILL)		
FILL	Wood fragments and fibers in moist, brown-black SILT matirx.		
GM	Wet, gray-black, silty, sandy GRAVEL. (FILL)	S-2	(1.0) No odor, SS, CA
ML	Wet, gray SILT and sandy SILT. (FILL)		
GW	Wet, gray-black, silty, sandy GRAVEL with scattered wood fragments. (FILL)	S-3	(1.0) No odor, NS, CA
ML	Wet, brown, sandy SILT.		
SP	Wet, gray SAND.	S-4	(1.0) No odor, NS, CA
SM	Wet, gray, silty SAND with occasional silt and clay seams.	S-5	(1.0) No odor, NS, CA
	Bottom of Probe at 22.0 Feet. Started 03/11/14. Completed 03/11/14.		

Depth in Feet: 0, 5 (▽ ATD), 10, 15, 20, 25

PUSH PROBE LOG-ENV 1780043-PP-3-14.GPJ HC_CORP.GDT 6/18/14

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

17800-43 3/14

Figure A-35

Push Probe Log JT-US-34

Location: Lat: 47.667661 Long: -122.394096
Approximate Ground Surface Elevation: ~13 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: A. Goodwin

USCS Class	Soil Descriptions	Depth in Feet	Sample	LAB TESTS & (PID)
GM	Asphalt over dry to damp, gray, silty, sandy GRAVEL. (FILL)	0		
SM	Damp, gray-brown, silty SAND with trace gravel and scattered wood fragments. (FILL)			
SW-SM	Damp, gray, slightly silty to silty SAND with trace gravel. (FILL)	5 ∇ ATD		(<0.1) No odor, NS
FILL	Wood fibers, fragments, and pulp. (FILL)			
ML	Wet to moist, gray, sandy SILT to SILT. (FILL)			(<0.1) No odor, NS
SM	Wet, dark brown, slightly gravelly, silty SAND with abundant wood debris and strong petroleum-like odor. (FILL)	10	S-2	Strong odor
ML	Wet, dark brown SILT.			
SP	Wet, gray SAND.			
SM/ML	Wet, gray, silty SAND to sandy SILT.	15		
CL-ML	Wet, gray SILT/CLAY.		S-1	(<0.1) No odor, NS, CA
SM	Wet, gray, silty to very silty SAND.	20	S-3	(<0.1) No odor, NS, CA
			S-4	(<0.1) No odor, NS
		25		

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

Push Probe Log JT-US-34

Location: Lat: 47.667661 Long: -122.394096
Approximate Ground Surface Elevation: ~13 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: A. Goodwin

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet	Sample	LAB TESTS & (PID)
SM		Wet, gray, silty to very silty SAND. (cont'd)	25		
		Bottom of Probe at 26.0 Feet. Started 03/11/14. Completed 03/11/14. Casing advanced to 17.5 feet bgs.			
			30		
			35		
			40		
			45		
			50		

PUSH PROBE LOG-ENV 1780043-PP-3-14.GPJ HC_CORP.GDT 6/18/14

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

Push Probe Log JT-US-35

Location: Lat: 47.667646 Long: -122.394306
Approximate Ground Surface Elevation: ~14 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: A. Goodwin

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet	Sample	LAB TESTS & (PID)
		No samples collected.	0		
			5		
			∇ ATD		
			10		
CL-ML		Wet, gray SILT/CLAY.	15		
				S-1	(<0.1) No odor, NS, CA
SM		Wet, gray, silty SAND.	20	S-2	(<0.1) No odor, NS, CA
				S-3	(<0.1) No odor, NS
			25		

Bottom of Probe at 20.0 Feet.
Started 03/11/14.
Completed 03/11/14.

Casing advanced to 17.5 feet bgs.

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

PUSH PROBE LOG-ENV 1780043-PP-3-14.GPJ HC_CORP.GDT 6/18/14

HARTCROWSER

17800-43 **3/14**

Figure A-37

Push Probe Log JT-US-36

Location: Lat: 47.667644 Long: -122.394619
Approximate Ground Surface Elevation: ~19 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: A. Goodwin

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet	Sample	LAB TESTS & (PID)
		Asphalt	0		
SM		Moist, brown, gravelly, silty SAND. (FILL)			
		Gray-black staining from 0.7 to 1.7 feet bgs with petroleum-like odor.		S-1	(104) Odor, MS, CA
		Becomes moist, light brown with orange mottling, silty SAND with trace gravel.	5		
		Becomes wet.	∇ ATD	S-2	(<0.1) No odor, NS, CA
		Bottom of Probe at 10.0 Feet. Started 03/12/14. Completed 03/12/14.	10		
			15		
			20		
			25		

PUSH PROBE LOG-ENV 1780043-PP-3-14.GPJ HC_CORP.GDT 6/18/14

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

17800-43 3/14

Figure A-38

Push Probe Log JT-US-37

Location: Lat: 47.667572 Long: -122.394386
Approximate Ground Surface Elevation: ~13 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: A. Goodwin

USCS Class	Soil Descriptions	Depth in Feet	Sample	LAB TESTS & (PID)
ML	Asphalt over damp, gray, silty, sandy GRAVEL.	0		
ML	Damp, gray SILT.			(<0.1) No odor, NS
SM	Moist to damp, gray, silty SAND. Very slight petorleum-like odor.		S-1	(1.1) Slight odor, NS, CA
SW	Wet, gray SAND with trace silt. Black staining 5 to 5.3 feet bgs. Becomes slightly gravelly, coarse SAND.	5 ▽ ATD	S-2	(1.2) No odor, NS, CA
	Becomes wet, gray SAND. Slightly silty from 10 to 10.5 feet.	10	S-3	(<0.1) No odor, NS
		15	S-4	(<0.1) No odor, NS
CL-ML	Wet, gray SILT/CLAY.			
	Bottom of Probe at 20.0 Feet. Started 03/12/14. Completed 03/12/14.	20		
		25		

PUSH PROBE LOG-ENV 178043-PP-3-14.GPJ HC_CORP.GDT 6/18/14

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

17800-43 *3/14*

Figure A-39

Push Probe Log JT-US-38

Location: Lat: 47.667583 Long: -122.394475
Approximate Ground Surface Elevation: ~13 Feet
Horizontal Datum: WGS1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Direct Push
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: A. Goodwin

USCS Class	Soil Descriptions	Depth in Feet	Sample	LAB TESTS & (PID)
GM	2 inches of Asphalt over moist, gray, silty, sandy GRAVEL.	0		
SM	Wood fragments with creosote-like odor over damp to moist, gray, silty SAND. Very slight petroleum-like odor to 2.2 feet bgs.		S-1	(1.1) Slight odor, NS, CA
FILL	Wood fragments and fibers.	5		
ML	Wet, gray, slightly sandy SILT. Wood fragments and fibers with slight creosote-like odor.	ATD (groundwater)	S-2	(0.6) Slight odor, NS, CA
SP	Wet, gray, slightly gravelly SAND.	10	S-3	(<0.1) No odor, NS
ML	Wet, gray, sandy SILT to SILT.			
	Bottom of Probe at 15.0 Feet. Started 03/12/14. Completed 03/12/14.	15		
		20		
		25		

PUSH PROBE LOG-ENV 1780043-PP-3-14.GPJ HC_CORP.GDT 6/18/14

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

17800-43 3/14

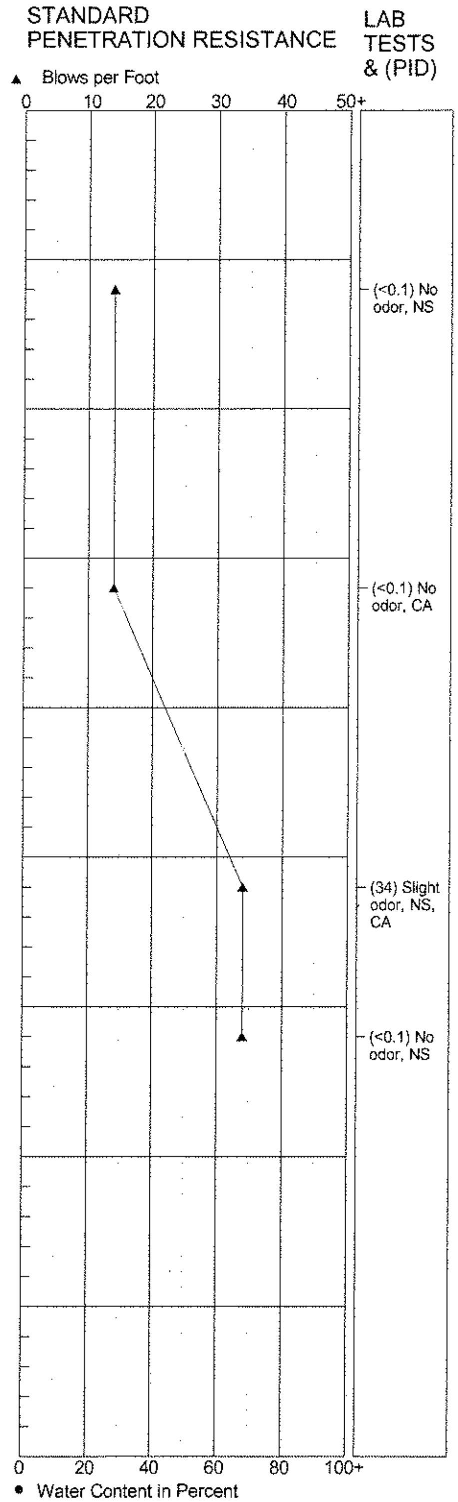
Figure A-40

Boring Log JT-MW-100

Location: Lat: 47.667519 Long: -122.393841
Approximate Ground Surface Elevation: ~13 Feet
Horizontal Datum: WGS 1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Hollow Stem Auger
Sample Type: SPT w/140 lb. Autohammer
Hole Diameter: ~10 inches
Logged By: S. Faubl   Reviewed By: P. Cordell

USCS Class	Soil Descriptions	Depth in Feet	Well Construction	Sample	Blows	Lab Tests & (PID)
SW	Asphalt.	0	Flush mount monument			
	Medium dense, dry to damp, light browm to gray-brown, slightly gravelly SAND with trace silt.		Concrete; Bentonite chips			
		5		S-1	4, 6, 8	(<0.1) No odor, NS
	No recovery.	10				
	Becomes moist to wet, gray-brown SAND with scattered wood fragments.	15 (ATD)		S-2	8, 6, 8	(<0.1) No odor, CA
	Wood chunck stuck in sampler, no recovery.	20				
			10-20 Silica sand			
SM/ML	Dense, moist to wet, gray-brown, silty SAND to sandy SILT with slight organic odor. Layer of wood waste.	25	Screened 2" PVC	S-3	12, 16, 18	(34) Slight odor, NS, CA
	Becomes wet, sandy SILT with trace gravel and wood fragments.	30		S-4	13, 16, 18	(<0.1) No odor, NS
	Bottom of Boring at 31.5 Feet. Started 03/13/14. Completed 03/13/14. Ecology Well Tag #BIH-194					



NEW BORING LOG-ENV 1780043-MW.GPJ HC_CORP.GDT 6/18/14

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

HARTCROWSER

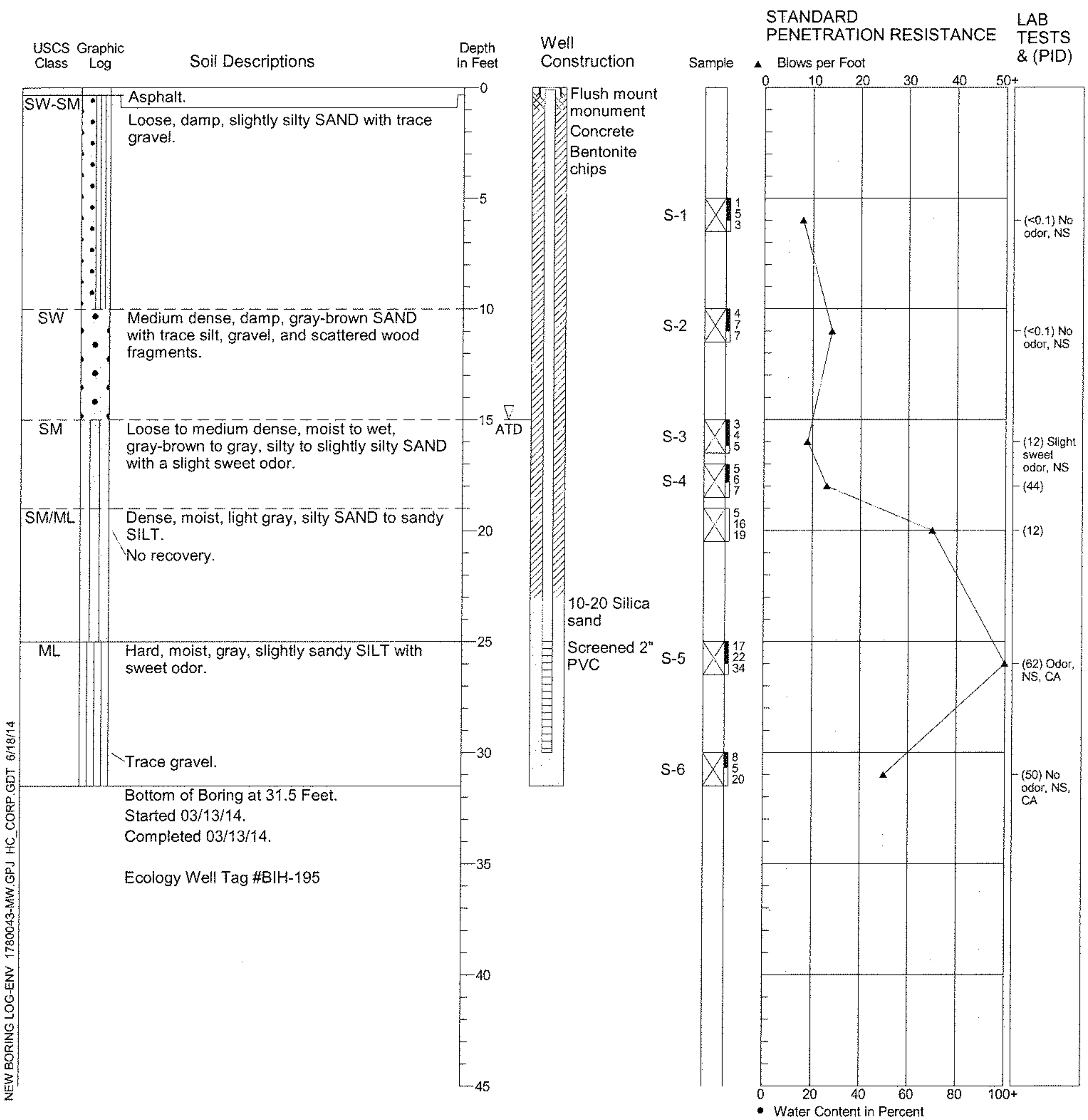
17800-43   3/14

Figure A-41

Boring Log JT-MW-200

Location: Lat: 47.667579 Long: -122.394105
Approximate Ground Surface Elevation: ~13 Feet
Horizontal Datum: WGS 1984
Vertical Datum: City of Seattle Datum

Drill Equipment: Hollow Stem Auger
Sample Type: SPT w/140 lb. Autohammer
Hole Diameter: ~18 inches
Logged By: S. Faubl Reviewed By: P. Cordell



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

HARTCROWSER

17800-43 3/14

Figure A-42

Vibracore Log HC-JT-01

Location: Lat: 47 40.0511 Long: -122 23.6180
Mudline Elevation in Feet (NAVD 88): 9.6 Feet
Water Depth in Feet: 7.15 Feet

Type of Sample: Vibracore
Core Diameter: 3.5 inches
Logged By: A. Conrad Reviewed By: P. Cordell

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet	Sample	Sediment Recovery in Core Tube	LAB TESTS
OL		Wet, black, organic SILT with wood fibers, wood fragments, and plastic debris.	0			
SP		Wet, gray-brown SAND with lenses of coarse SAND.		JT-SS-01-S1		CA
				JT-SS-01-S2		CA
		Bottom of Sediment in Tube at 2.8 Feet.				
			5			
		Bottom of Core Tube at 8.0 Feet. Drive length: 3.95 feet Laboratory Recovery Length: 2.8 feet Laboratory Recovery: 71% Date/Time: 1/13/14 14:27				
			10			

VIBROCORE LOG 1780043-VC.GPJ HC_CORP.GDT 6/18/14

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Sediment descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Outer core diameter: 4 inches; Inner core diameter: 3.5 inches.

HARTCROWSER

17800-43 *1/14*

Figure A-43

Vibracore Log HC-JT-02

Location: Lat: 47 40.0480 Long: -122 23.6200
Mudline Elevation in Feet (NAVD 88): 7.37 Feet
Water Depth in Feet: 9.38 Feet

Type of Sample: Vibracore
Core Diameter: 3.5 inches
Logged By: A. Conrad Reviewed By: P. Cordell

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet	Sample	Sediment Recovery in Core Tube	LAB TESTS
OL		Wet, black, organic SILT with wood fibers and chips.	0			
SM		Wet, dark gray, silty SAND with trace wood.		JT-SS-02-S1		CA
SP		Moist, olive-brown, very fine SAND. Coarse SAND lens with trace gravel.		JT-SS-02-S2		
		Bottom of Sediment in Tube at 2.0 Feet.				
			5			
		Bottom of Core Tube at 8.0 Feet.				
		Drive length: 1.8 feet Laboratory Recovery Length: 2.0 feet Laboratory Recovery: 111% Date/Time: 1/13/14 13:50				
			10			

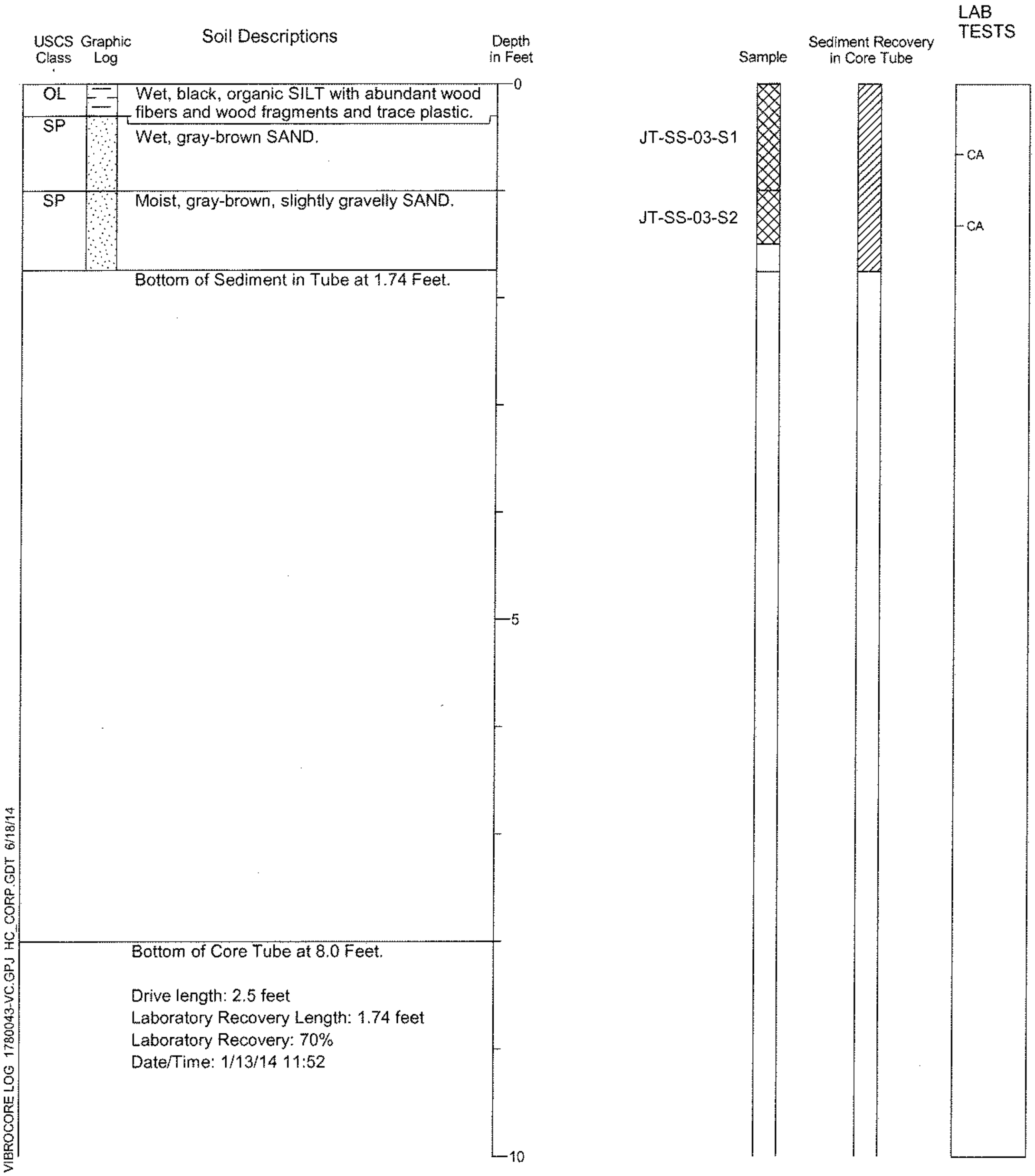
VIBROCORE LOG 1780043-VC.GPJ HC_CORP.GDT 6/18/14

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Sediment descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Outer core diameter: 4 inches; inner core diameter: 3.5 inches.

Vibracore Log HC-JT-03

Location: Lat: 47 40.0444 Long: -122 23.6211
Mudline Elevation in Feet (NAVD 88): 4.45 Feet
Water Depth in Feet: 12.3 Feet

Type of Sample: Vibracore
Core Diameter: 3.5 inches
Logged By: A. Conrad   Reviewed By: P. Cordell



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Sediment descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Outer core diameter: 4 inches; Inner core diameter: 3.5 inches.

HARTCROWSER

17800-43   1/14

Figure A-45

Vibracore Log HC-JT-04

Location: Lat: 47 40.0422 Long: -122 23.6222
Mudline Elevation in Feet (NAVD 88): 2.95 Feet
Water Depth in Feet: 13.8 Feet

Type of Sample: Vibracore
Core Diameter: 3.5 inches
Logged By: A. Conrad Reviewed By: P. Cordell

USCS Class	Soil Descriptions	Depth in Feet	Sample	LAB TESTS
OL SM	Wet, black, organic SILT grading to very loose, saturated, silty SAND with wood chips and plastic debris. Sheen observed at top.	0	JT-SS-04-S1	CA
SP	Moist, dark gray, very fine SAND with lenses of gravelly SAND.		JT-SS-04-S2	
	Bottom of Sediment in Tube at 2.8 Feet.			
		5		
	Bottom of Core Tube at 8.0 Feet. Drive length: 3.9 feet Laboratory Recovery Length: 2.8 feet Laboratory Recovery: 72% Date/Time: 1/13/14 11:20			
		10		

Sediment Recovery in Core Tube

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Sediment descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Outer core diameter: 4 inches; Inner core diameter: 3.5 inches.

Vibracore Log HC-JT-05

Location: Lat: 47 40.0404 Long: -122 23.6240
Mudline Elevation in Feet (NAVD 88): 1.75 Feet
Water Depth in Feet: 15 Feet

Type of Sample: Vibracore
Core Diameter: 3.5 inches
Logged By: A. Conrad   Reviewed By: P. Cordell

USCS Class	Soil Descriptions	Depth in Feet	Sample	LAB TESTS
SM	Wet, black, slightly sandy SILT with shell fragments.	0	JT-SS-05-S1	CA
SM	Wet, gray-black, slightly silty SAND.			
GP	Wet, gray-black, sandy GRAVEL.		JT-SS-05-S2	CA
SP	Wood chunk.			
	Wet, gray-brown, coarse SAND.			
	Bottom of Sediment in Tube at 2.23 Feet.			
		5		
	Bottom of Core Tube at 8.0 Feet.			
		10		

Drive length: 3.2 feet
Laboratory Recovery Length: 2.23 feet
Laboratory Recovery: 70%
Date/Time: 1/13/14 10:44

VIBROCORE LOG 1780043-VC.GPJ HC_CORP.GDT 6/18/14

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Sediment descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Outer core diameter: 4 inches; Inner core diameter: 3.5 inches.

HARTCROWSER

17800-43   *1/14*

Figure A-47

APPENDIX B
Chemical Data Quality Review

APPENDIX B
CHEMICAL DATA QUALITY REVIEW

In January and March 2014, 169 soil samples, 20 groundwater samples, 2 field duplicates, and multiple trip blanks were collected. One product sample was collected on January 10, 2014. Twelve sediment samples were collected on January 14, 2014. The samples were submitted to Analytical Resources, Inc., of Tukwila, Washington, for analysis. The laboratory reported results as ARI Job numbers XT25, XT66, XT67, XT68, XU08, XU23, XU70, XU77, XU99, YC68, YC69, YC70, YD09, and YD46.

Selected soil samples were analyzed for one or more of the following:

- Volatile organic compounds (VOCs) by EPA Method 8260C;
- Diesel and motor oil range organics by Washington State Department of Ecology (Ecology) method NWTPH-Dx with acid and silica gel cleanup;
- Total organic carbon (TOC) following Plumb, 1981;
- Polychlorinated biphenyls (PCBs) by EPA Method 8082A;
- Dioxins/furans by EPA Method 1613;
- Petroleum hydrocarbon identification by Ecology method NWTPH-HCID;
- Total metals (arsenic, cadmium, chromium, and lead) by EPA Method 200.8;
- Total mercury by EPA Method 7471A; and
- Total solids by EPA 160.3 modified.

The water samples were analyzed for one or more of the following:

- Anions (nitrate, sulfate, and chloride) by EPA Method 300.0;
- TOC by SM 5310;
- PCBs by EPA Method 8082A;
- Diesel- and motor oil-range organics by Ecology method NWTPH-Dx;
- Volatile organic compounds (VOCs) by EPA Method 8260C;
- Total metals (arsenic, cadmium, chromium, and lead) by EPA Method 200.8;
- Total mercury by EPA Method 7470A;
- Dissolved metals (arsenic, cadmium, chromium, and lead) by EPA Method 200.8;
- Dissolved mercury by EPA Method 7470A;
- Total suspended solids (TSS) by SM 2540D;
- Alkalinity by SM 2320; and
- Nitrate and nitrite by EPA Method 353.2.

The product sample was analyzed for the following:

- Diesel and motor oil range organics by Ecology method NWTPH-Dx;

The sediment samples were analyzed for one or more of the following:

- TOC by Plumb, 1981;

- PCBs by EPA Method 8082A;
- Volatile organic compounds (VOCs) by EPA Method 8260C;
- Total metals (arsenic, cadmium, chromium, and lead) by EPA Method 200.8;
- Total mercury by EPA Method 7470A; and
- Total solids by SM 2540G.

Quality assurance/quality control (QA/QC) reviews of laboratory procedures were performed on an ongoing basis by the laboratory. Hart Crowser performed the data review using laboratory quality control results summary sheets to ensure they met data quality objectives for the project. Our data review followed the format outlined in the National Functional Guidelines for Superfund Organic Methods Data Review (EPA 2008), and National Functional Guidelines for Inorganic Superfund Data Review (EPA 2010), modified to include specific criteria of the individual analytical methods. Dioxin/furan data review followed the format outlined in the National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review modified to include specific criteria of the analytical method. The following criteria were evaluated in the validation process:

- Sample Preservation and Holding times;
- Method blanks;
- Surrogate recoveries;
- Laboratory control sample (LCS) recoveries;
- Laboratory duplicate relative percent differences (RPDs);
- Laboratory replicate relative standard deviations (RSDs);
- Matrix spike (MS) recoveries;
- Field duplicate RPDs (where applicable);
- Standard Reference Material (SRM) recoveries;
- Internal Standard (IS) recoveries;
- Calibration criteria; and
- Reporting limits (RL).

The data were determined to be acceptable for use, as qualified. Full laboratory results are presented at the end of this Appendix. Results of the data review follows.

SAMPLE RECEIVING NOTES AND DISCREPANCIES

XT25: The Chain of Custody (CoC) did not include the total number of containers listed on pages 2 and 3, and no analyses were marked. The release date on the CoC was incorrect. The sampler did not sign off on the CoC. On January 6, 2014, a revised CoC was submitted to the laboratory with the sample analyses marked. One sample was missing from the original CoC, but was added to the revised CoC. Twelve samples were placed on hold. On January 7, 2014, acid/silica gel cleanup was added to the NWTPH-Dx analysis. On January 9, 2014, dioxin/furan analysis was added to sample JT-US-003-S2.

XT66 and XT67: The CoC did not include the total number of containers listed on page 2, and no analyses were marked. On January 7, 2014, a revised CoC was submitted to the laboratory with the sample analyses marked.

Sample JT-US-020-S3: Two 2-ounce sample jars were submitted. One 2-ounce jar was received empty. Sufficient sample volume was available for all analyses.

XT68: On January 7, 2014, a revised CoC was submitted with the following changes to the original CoC: TOC and NWTPH-Dx analyses were removed from samples JT-US-009-S3 and JT-US-013-S2; PCB, total solids, and VOC analyses were added to samples JT-US-013-S4, JT-US-014-S4, and JT-US-015-S1.

Sample JT-US-011-S4: The container lid was labelled JT-US-010-S4. The sample was logged into the LIMS with the sample ID from the container label.

XU08: The CoC did not include the total number of containers. Sixteen trip blanks were received. The laboratory submitted three trip blanks for analysis, and placed the remainder on hold.

Samples IP-14 and IP-1400: The samples were incorrectly listed on the CoC as JT-14 and JT-1400. The samples were logged in following the sample labels. Additional acid was added to the dissolved metals containers at the laboratory to properly preserve the samples.

Sample IP-14: One 1-liter amber glass jar was received broken. Sufficient sample volume remained for analysis.

Samples JT-MW-JT-6, JT-MW-SRW-1, JT-MW-JT-3, JT-MW-MW-8D, and JT-MW-JT-7: The samples were received past the holding time or with insufficient holding time available for nitrate analysis. The samples were re-collected for nitrate and reported in SDG XU70.

XU23: The water/product sample was collected in a soil jar without preservation. Sufficient volume was collected and holding times were met for unpreserved samples. The sample was split at the laboratory into two samples: JT-8-P-A was a water sample, and JT-8-P-B was the product layer.

XU70: The samples were incorrectly identified on the CoC. The sample IDs were hand-corrected on the CoC, laboratory report, and electronic data deliverable (EDD).

Sample JT-MW-MW-8D: The sample ID on the bottle was JT-MW-MW-8, while the sample ID on the CoC was HC-MW-MW-8. The sample name was hand-corrected.

XU77 and XU99: Four samples were placed on hold. Two samples (JT-SS-01-S2 and JT-SS-03-S2) were taken off hold on January 15, 2014, and logged into the LIMS as XU99.

YC68 and YC69: The original CoC did not have any analyses marked. A revised CoC was submitted to the laboratory with the sample analyses marked. On March 24, 2014, the CoC was revised again with additional analyses marked.

YC70: Some pages of the CoC did not include the sampler's signature. The COCs included in the data package did not have the laboratory "Received by" section completed. On March 13, 2014, five samples were taken off hold and analyzed for PCBs.

YD09: The original CoC did not list the total number of containers, and no analyses were marked. On March 17, 2014, a revised CoC was submitted to the laboratory with the sample analyses marked. The temperature of the cooler received at the laboratory was 7.9^{o} C, outside the method recommended range of 2 to 6^{o} C. The elevated temperature would not affect the stability of PCBs, and PCB sample analyses were not qualified. Results for VOC analyses were qualified as estimated (J) in samples JT-MW-100-S2, JT-MW-100-S3, JT-MW-200-S5, and JT-MW-200-S6.

LABORATORY DETECTION LIMITS

Reported detection limits and analytical results were adjusted for moisture content and any required dilution factors. Detections that fell between the Method Detection Limit (MDL) and the Reporting Limit (RL) were qualified as estimated (J) by ARI. The J qualifier was changed to T to be consistent with Washington State's Environmental Information Management database.

SOIL SAMPLES

VOCs

Analytical Methods

The samples were prepared following EPA Method 5035. The samples were analyzed by Gas Chromatograph fitted with a Mass Spectrometer (GC/MS) following EPA Method 8260C.

Sample Holding Times

The samples were prepared and analyzed within the holding time limits.

Blank Contamination

No target analytes were detected in the method blanks.

Surrogate Recovery

Surrogate recoveries were within laboratory control limits with the following exceptions:

- Sample JT-US-013-S2 RE: The recovery for d4-1,2-Dichloroethane failed high in the diluted reanalysis. The recovery was in control in the initial analysis, and no results were qualified.
- Sample JT-US-019-S3: The recovery for d4-1,2-Dichloroethane failed high. As all other surrogate recoveries were within control limits, sample results were not qualified.
- Sample JT-US-021-S3: The recovery for d4-1,2-Dichloroethane failed high. As all other surrogate recoveries were within control limits, sample results were not qualified.

- Sample JT-US-027-S3 RE: The recovery for d4-1,2-Dichloroethane failed high in the diluted reanalysis. The recovery was in control in the initial analysis, and no results were qualified.

Laboratory Control Sample Recovery

Laboratory control sample (LCS) recoveries were within laboratory control limits with the following exceptions:

- LCS/LCSD-011014: The recovery for 2-butanone in the LCS failed high, but was within control in the LCSD. The associated samples (JT-US-009-S2, JT-US-009-S3, JT-US-010-S3, JT-US-011-S2, JT-US-011-S3, JT-US-011-S4, JT-US-006-S3, JT-US-007-S2, JT-US-008-S2, and JT-US-008-S5) were non-detect for that analyte and not qualified.

- LCS/LCSD-011714: The recovery for Benzene in the LCSD failed low, but was within control in the LCS. The associated samples (JT-US-022-S2, JT-US-021-S2, JT-US-025-S2, JT-US-025-S3, JT-US-024-S4, JT-US-017-S4, JT-US-017-S5, JT-US-012-S1, JT-US-012-S2, JT-US-012-S3, JT-US-023-S3, JT-US-022-S3, JT-US-015-S2, and JT-US-024-S3) were non-detect for benzene and not qualified. Sample JT-US-024-S2 was not qualified as the LCS was in control.

- LCS/LCSD-031714: The recoveries for acetone, naphthalene, MTBE, and 1,1,2,2-tetrachloroethane failed high in the LCSD, but were within control in the LCS. The recoveries for Acrolein failed low in the LCS and the LCSD. The results for Acrolein were qualified as estimated (J) in all associated samples (JT-US-26-S2, JT-US-26-S3, JT-US-27-S2, JT-US-27-S3, JT-US-27-S4, JT-US-28-S1, JT-US-28-S2, JT-US-28-S3, JT-US-29-S1, JT-US-29-S2, JT-US-30-S2, JT-US-30-S4, JT-US-31-S2, and JT-US-31-S3). As the recoveries for acetone, naphthalene, MTBE, and 1,1,2,2-tetrachloroethane were within control in the LCS, those analytes were not qualified in the associated samples.

- LCS-032014 – The recovery for acetone failed high in the LCSD, but was in control in the LCS. The laboratory qualified detections in the associated samples with Q (JT-US-36-S2, JT-US-37-S1, JT-US-37-S2, JT-US-38-S1, JT-US-38-S2, JT-MW-100-S2, JT-MW-100-S3, JT-MW-200-S5, and JT-MW-200-S6). As the recovery for acetone was in control in the LCS, the associated samples were not qualified, and the Q qualifiers were removed.

Matrix Spike Recovery

Matrix spike (MS) recoveries were within laboratory control limits with the following exceptions:

- JT-US-025-S3 MS/MSD: The recoveries for vinyl chloride, 1,1-dichloroethene, trans-1,2-dichloroethene, chlorobenzene, bromoethane, 2,2-dichloropropane, and methylene chloride fell below the control limits in the MS and MSD. The recoveries for carbon disulfide, 1,1,1-trichloroethane, 2-hexanone, 1,1,2-trichloro-1,2,2-trifluoromethane, and acrolein fell below the control limits in the MS, but were within control limits in the MSD. The recoveries for acetone, 1,1,2,2-tetrachloroethane, MTBE, and trans-1,4-dichloro-2-butene fell below the control limits in the MSD, but were within control limits in the MS. The RPDs for trans-1,4-dichloro-2-butene and 1,1,2,2-tetrachloroethane exceeded the control limits. The associated LCS/LCSD were within control limits for the affected analytes, and associated samples were not qualified. The source sample was non-detect for those analytes except chlorobenzene. The results for vinyl chloride, 1,1-dichloroethene, trans-1,2-dichloroethene, chlorobenzene, bromoethane, 2,2-dichloropropane, and methylene chloride were qualified as estimated (J) in JT-US-025-S3.

- JT-US-008-S2 MS/MSD: The recoveries for vinyl chloride fell below the control limits in the MS and MSD. The recoveries for acetone, 1,1,2,2-tetrachloroethane, and vinyl acetate fell below the control limits in the MS, but were within control in the MSD. The recoveries for 1,1-dichloroethane and bromoethane fell below the control limits in the MSD, but were within control in the MS. The RPDs for vinyl acetate and 1,1,2,2-tetrachloroethane exceeded the control limits. The associated LCS/LCSD were within control limits for the affected analytes, and associated samples were not qualified. The source sample was non-detect for those analytes. The result for vinyl chloride was qualified as estimated (J) in JT-US-008-S2.

Internal Standard Recoveries

The internal standard (IS) recoveries were within acceptance criteria with the following exceptions:

- Sample JT-US-016-S2: The IS d4-1,4-Dichlorobenzene fell below the criteria. A low bias in the IS leads to a high bias in the associated analytes (bromobenzene, bromoform, n-butylbenzene, 1,1,2,2-tetrachloroethane, 1,2,3-trichloropropane, trans-1,4-dichloro-2-butene, d4-1,2-dichlorobenzene, sec-butylbenzene, tert-butylbenzene, 2-chlorotoluene, 4-chlorotoluene, 1,2-dibromo-3-chloropropane, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, hexachlorobutadiene, isopropylbenzene, p-isopropyltoluene, naphthalene, n-propylbenzene, 1,1,2,2-tetrachloroethane, 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, 1,2,3-trichloropropane, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene). Those analytes were ND in the sample and not qualified.

- Sample JT-US-003-S2: The IS d4-1,4-Dichlorobenzene fell below the criteria. A low bias in the IS leads to a high bias in the associated analytes (bromobenzene, bromoform, n-butylbenzene, 1,1,2,2-tetrachloroethane, 1,2,3-trichloropropane, trans-1,4-dichloro-2-butene, d4-1,2-dichlorobenzene, sec-butylbenzene, tert-butylbenzene, 2-chlorotoluene, 4-chlorotoluene, 1,2-dibromo-3-chloropropane, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, hexachlorobutadiene, isopropylbenzene, p-isopropyltoluene, naphthalene, n-propylbenzene, 1,1,2,2-tetrachloroethane, 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, 1,2,3-trichloropropane, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene). The analytes 1,2,4-trimethylbenzene, 1,3-dichlorobenzene, and 1,4-dichlorobenzene were detected in the sample and were qualified as estimated (J).

- Sample JT-US-010-S2: The IS d4-1,4-Dichlorobenzene fell below the criteria. A low bias in the IS leads to a high bias in the associated analytes (bromobenzene, bromoform, n-butylbenzene, 1,1,2,2-tetrachloroethane, 1,2,3-trichloropropane, trans-1,4-dichloro-2-butene, d4-1,2-dichlorobenzene, sec-butylbenzene, tert-butylbenzene, 2-chlorotoluene, 4-chlorotoluene, 1,2-dibromo-3-chloropropane, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, hexachlorobutadiene, isopropylbenzene, p-isopropyltoluene, naphthalene, n-propylbenzene, 1,1,2,2-tetrachloroethane, 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, 1,2,3-trichloropropane, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene). The analyte 1,2,4-trichlorobenzene was detected in the sample and was qualified as estimated with a (J).

Calibration Criteria

The Initial Calibration Curve (ICAL) was within acceptance criteria. The Continuing Calibration Verification Checks (CCVs) were in control with the following exceptions:

- CCV 010814: The recoveries for acetone, methylene chloride, and vinyl acetate failed low. Those analytes in associated samples (JT-US-003-S2, JT-US-007-S3, and JT-US-008-S4) were qualified as estimated (J).

- CCV 011014: The recoveries for chloroethane, trichlorofluoromethane, and 1,1,1-trichloroethane failed high. Those analytes in the associated samples (JT-US-006-S3, JT-US-007-S2, JT-US-008-S2, JT-US-008-S5, JT-US-009-S2, JT-US-009-S3, JT-US-010-S3, JT-US-011-S2, JT-US-011-S3, and JT-US-011-S4) were non-detect for those analytes and not qualified.

- CCV 011414: The recoveries for Trichlorofluoromethane, 1,1,2-trichloro-1,2,2-trifluoroethane, and 1,1-dichloroethene failed high. The recovery for acetone failed low. The results for acetone in the associated samples (JT-US-015-S1, JT-US-015-S2, JT-US-009-S1, JT-US-010-S2, JT-US-013-S2, JT-US-013-S3, JT-US-013-S4, JT-US-014-S2, JT-US-014-S3, JT-US-014-S4, JT-US-018-S1 and JT-US-018-S2) were qualified as estimated (J). The recovery for 1,1-dichloroethene in sample JT-US-018-S2 was qualified as estimated (J).

- CCV 011514: The recoveries for Iodomethane, trichlorofluoromethane, 1,1,1-trichloroethane, and Dibromofluoromethane failed high. Those analytes in the associated samples (JT-US-016-S2, JT-US-016-S3, JT-US-018-S2, JT-US-018-S3, JT-US-018-S4, JT-US-019-S3, JT-US-021-S3, and JT-US-022-S1) were non-detect and not qualified.

- CCV 011614: The recoveries for acetone, bromoethane, and Iodomethane failed high. Detections for those analytes in the associated samples (JT-US-019-S2, JT-US-019-S4, JT-US-020-S2, JT-US-020-S3, JT-US-020-S4, JT-US-021-S1, JT-US-022-S1, JT-US-023-S2, and JT-US-023-S4) were qualified as estimated (J) (JT-US-019-S4 [acetone], JT-US-020-S3 [acetone], JT-US-020-S4 [acetone], JT-US-021-S1 [acetone], JT-US-022-S1 [acetone], and JT-US-023-S4 [Iodomethane]).

- CCV 011714: The recovery for Iodomethane failed high. Detections for that analyte in the associated samples (JT-US-022-S2, JT-US-021-S2, JT-US-025-S2, JT-US-025-S3, JT-US-024-S4, JT-US-015-S2, JT-US-017-S4, JT-US-017-S5, JT-US-012-S1, JT-US-012-S2, JT-US-012-S3, JT-US-023-S3, JT-US-022-S3, and JT-US-024-S3) were qualified by the laboratory with Q. The Q qualifier was changed to J in samples JT-US-021-S2 and JT-US-025-S3.

- CCV 031714: The recoveries for Bromomethane and Acrolein failed low. The recoveries for acetone and 1,1,2,2-tetrachloroethane failed high. Detections for those analytes in the associated samples were qualified with Q by the laboratory. The results Bromomethane and acrolein were qualified as estimated (J) in the associated samples (JT-US-26-S2, JT-US-26-S3, JT-US-27-S2, JT-US-27-S3, JT-US-27-S4, JT-US-28-S1, JT-US-28-S2, JT-US-28-S3, JT-US-29-S1, JT-US-29-S2, JT-US-30-S2, JT-US-30-S4, JT-US-31-S2, and JT-US-31-S3). The Q qualifier was changed to J (estimated) for detections for acetone and 1,1,2,2-tetrachloroethane in the following samples (JT-US-26-S3, JT-US-27-S3, JT-US-27-S4, JT-US-28-S1, JT-US-28-S2, JT-US-28-S3, JT-US-29-S2, JT-US-30-S2, JT-US-30-S4, JT-US-31-S2, and JT-US-31-S3).

- CCV 031914: The recovery for acetone failed high. Detections for acetone in the associated samples were qualified with Q by the laboratory. The Q qualifier was changed to J (estimated) for detections for acetone in the following samples (JT-US-32-S4, JT-US-33-S3, JT-US-33-S4, JT-US-33-S5, and JT-US-35-S2).

- CCV 032014: The recovery for acetone failed high, while the recovery for dichlorodifluoromethane failed low. Detections for those analytes in the associated samples were qualified with Q by the laboratory. The results for dichlorodifluoromethane were qualified as estimated (J) in all associated samples (JT-US-36-S2, JT-US-37-S1, JT-US-37-S2, JT-US-38-S1, JT-US-38-S2, JT-MW-100-S2, JT-MW-100-S3, JT-MW-200-S5, and JT-MW-200-S6). The Q qualifier was changed to J (estimated) for detections for acetone in the following samples (JT-US-36-S2, JT-US-37-S2, JT-US-38-S2, JT-MW-100-S2, JT-MW-100-S3, JT-MW-200-S5, and JT-MW-200-S6).

Sample Notes

- Samples JT-US-27-S4, JT-US-28-S3, JT-US-30-S4, JT-US-013-S4, JT-US-015-S2, and JT-US-014-S3: The results for vinyl chloride were qualified by the laboratory with M due to low spectral match parameters. The M qualifier was changed to J (estimated).

- Samples JT-MW-100-S2, JT-MW-100-S3, JT-MW-200-S5, and JT-MW-200-S6: The samples were received at the laboratory with an elevated temperature above 6^{o}C. All sample results were qualified as estimated (J) due to the temperature exceedance.

Diesel- and Motor Oil-Range Hydrocarbons

Analytical Methods

The samples were prepared following EPA Method 3546. The sample extracts were acid and silica gel cleaned following the NWTPH-Dx method. The samples were analyzed by a GC fitted with a Flame Ionization Detector (GC/FID) following the NWTPH-Dx method.

Sample Holding Times

The samples were prepared and analyzed within the holding time limits.

Blank Contamination

No target analytes were detected in laboratory blanks.

Surrogate Recovery

Surrogate recoveries were within laboratory control limits with the following exceptions:

- Sample JT-US-001-S2: The recovery for o-Terphenyl was not reported in the undiluted and diluted analyses. The recovery for Triacontane was within control. There were high levels of target analytes present, and sample results were not qualified.

- Sample JT-US-005-S2: The recovery for o-Terphenyl was not reported in the undiluted and diluted analyses. The recovery for Triacontane was within control. There were high levels of target analytes present, and sample results were not qualified.

- Sample JT-US-003-S2: The recovery for Triacontane was not reported in the undiluted analysis. The surrogate recoveries were in control in the diluted analysis and sample results were not qualified.

Laboratory Control Sample Recovery

The LCS recoveries were within laboratory control limits.

Matrix Spike Recovery

The MS recoveries were within laboratory control limits with the following exceptions:

- JT-US-02-S2 MS/MSD: The recoveries for diesel exceeded the control limits. There were high levels of diesel in the source sample compared to the spiking amount, and sample results were not qualified.

Calibration Criteria

The ICAL was within acceptance criteria. The CCVs were in control.

Sample Notes

The sample chromatograms were reviewed and identifications were modified as follows:

- Sample JT-US-019-S2: The sample was reported as non-detect (U) at the reported result for Diesel Range Organics (DRO), Residual Range Organics (RRO), and transformer oil, with a note that PCBs were identified (C).

- Sample JT-US-024-S2: The samples was reported as non-detect at the reported result for transformer oil. The result for motor oil was reported as RRO.

- Sample JT-US-020-S2: The sample was reported as non-detect (U) for DRO and transformer oil. The result for motor oil was reported as RRO and qualified as estimated (J), with a note that PCBs were identified (C).

- Sample JT-US-001-S2: The sample was reported as non-detect (U) at the reported result for DRO, RRO, and transformer oil, with a note that PCBs were identified (C).
- Sample JT-US-002-S2: The sample was reported as non-detect (U) at the reported result for DRO, RRO, and transformer oil, with a note that PCBs were identified (C).
- Sample JT-US-005-S2: The sample was reported as non-detect (U) at the reported result for DRO, RRO, and transformer oil, with a note that PCBs were identified (C).
- Sample JT-US-014-S2: The sample was reported as non-detect (U) at the reported result for DRO, RRO, and transformer oil, with a note that PCBs were identified (C).
- Sample JT-US-008-S4: The sample was reported as non-detect (U) at the reported result for DRO, RRO, and transformer oil, with a note that PCBs were identified (C).
- Sample JT-US-003-S2: The sample was reported as non-detect at the reported result for DRO and transformer oil. The result for motor oil was reported as RRO and qualified as estimated (J).

Petroleum Hydrocarbon Identification

Analytical Methods

The samples were prepared following EPA Method 3580A. The samples were analyzed by GC/FID following the NWTPH-HCID method.

Sample Holding Times

The samples were prepared and analyzed within the holding time limits.

Blank Contamination

No target analytes were detected in laboratory blanks.

Surrogate Recovery

Surrogate recoveries were within laboratory control limits.

Sample Notes

The sample chromatograms were reviewed and identifications were modified as follows:

- Sample JT-US-27-S2: The sample was reported as non-detect (U) at the reported result for DRO and RRO, with a note that PCBs were identified (C). Gasoline was reported as GRO, as the chromatogram indicated individual peaks, not a gasoline pattern.

PCBs

Analytical Methods

The samples were prepared following EPA Method 3546. The sample extracts were sulfur, acid, and silica gel cleaned. The samples were analyzed by a GC fitted with an Electron Capture Detector (GC/ECD) following EPA Method 8082A.

Sample Holding Times

The samples were frozen to extend holding times. The samples were prepared and analyzed within six months of sample collection.

Blank Contamination

No target analytes were detected in laboratory blanks with the following exceptions:

- MB-010914: The method blank had a detection for Aroclor 1260 above the RL. The associated samples (JT-US-016-S2, JT-US-016-S3, JT-US-018-S2, JT-US-018-S3, JT-US-018-S4, JT-US-019-S3, JT-US-019-S4, JT-US-020-S2, JT-US-020-S3, JT-US-020-S4, JT-US-021-S1, JT-US-021-S2, JT-US-021-S3, JT-US-022-S1, and JT-US-022-S2) were evaluated and qualified:

    - Samples JT-US-016-S3, JT-US-020-S3 and JT-US-018-S3 were re-extracted on January 22, 2104 due to the presence of low levels of Aroclor 1260, and both sets of results were reported by the laboratory. The results were reported from the re-extraction on January 22, 2014, without qualification.

    - Samples JT-US-021-S1, JT-US-021-S2, and JT-US-022-S1 were re-extracted, but the re-extracted results were not reported as the results did not match the original extraction. Those samples were qualified with B (blank contamination) by the laboratory. The B qualifier was removed.

    - Samples JT-US-016-S2, JT-US-018-S2, JT-US-018-S4, JT-US-019-S3, JT-US-019-S4, JT-US-020-S2, JT-US-021-S1, and JT-US-021-S3: The results for Aroclor 1260 were greater than five times the amount in the MB and not qualified.

    - Samples JT-US-020-S4 and JT-US-022-S2 were non-detect for Aroclor 1260 and not qualified.

    - Samples JT-US-021-S2 and JT-US-022-S1: The results for Aroclor 1260 were less than five times the amount in the MB and U-flagged.

Surrogate Recovery

Surrogate recoveries were within laboratory control limits with the following exceptions:

- Sample JT-US-020-S2: The surrogate recoveries were not reported for the dilution reanalysis. The recoveries were in control for the initial analysis, and sample results were not qualified.

- Sample JT-US-024-S4: The recovery for the surrogate TCMX exceeded the control limits, while the recovery for the surrogate DCBP fell within the control limits. As one surrogate recovery was within control, sample results were not qualified.

- Sample JT-US-005-S3: The surrogate recoveries were not reported for the dilution reanalysis. The recoveries were in control for the initial analysis, and sample results were not qualified.

- Sample JT-US-27-S2: The surrogate recoveries were not reported for the initial analysis, dilution reanalysis, or MS and MSD analyses. PCB screening results required a minimum 200-fold dilution due to high levels of PCBs present. Sample results were not qualified.

Laboratory Control Sample Recovery

LCS recoveries were within laboratory control limits.

Matrix Spike Recovery

MS recoveries were within laboratory control limits with the following exceptions:

- JT-US-025-S2 MS/MSD: The recovery for Aroclor 1260 in the MS fell below the control limits, but was within control in the MSD. Sample results were not qualified.

- JT-US-002-S2 MS/MSD: The recoveries for Aroclor 1016 exceeded the control limits in the MS and MSD. The recoveries for Aroclor 1260 were not reported. There were high levels of PCBs in the source sample which interfered with calculating the Aroclor 1016 recoveries. The amount of Aroclor 1260 in the source sample was greater than the spiking amount. Sample results were not qualified.

- JT-US-27-S2 MS/MSD: The recoveries for Aroclor 1016 and Aroclor 1260 were not reported. There were high levels of PCBs in the source sample which interfered with calculating the recoveries. Sample results were not qualified.

Calibration Criteria

The ICAL was within acceptance criteria. The CCVs were in control with the following exception:

- CCV 03/25/14 at 1444: The recovery for Aroclor 1248 failed high on the ZB5 column, but passed on the ZB35 column. The associated samples were reported from the passing column, and no results were qualified.

Sample Notes

- Sample JT-US-025-S3: The result for Aroclor 1248 was reported by the laboratory with Y due to interferences. The Y qualifier was changed to U.

- Samples JT-US-024-S2 and JT-US-024-S4: The results for Aroclor 1242 were reported by the laboratory with Y due to interferences. The Y qualifier was changed to U.

- Samples JT-US-003-S3, JT-MW-200-S5, JT-US-28-S2, JT-US-31-S2, JT-US-31-S5, JT-US-32-S2, JT-US-33-S3, JT-US-36-S1, JT-US-37-S2, JT-US-26-S3, JT-US-27-S2, JT-US-016-S2, JT-US-018-S1, JT-US-019-S2, JT-US-019-S4, JT-US-021-S1, JT-US-022-S1, JT-US-009-S1 diluted, JT-US-011-S2, JT-US-013-S3, JT-US-013-S3 diluted, JT-US-014-S2 diluted, JT-US-014-S3, and JT-US-014-S3 diluted: The results for Aroclor 1254 were reported by the laboratory lab with Y due to interferences. The Y qualifier was changed to U.

- Samples JT-US-26-S2, JT-US-28-S1, JT-US-29-S2, JT-US-34-S3, JT-US-38-S1, JT-US-35-S1, JT-US-015-S1, JT-US-009-S1, JT-US-011-S4, JT-US-013-S2, JT-US-011-S3, JT-US-014-S3, JT-US-011-S3 dilution, JT-US-018-S2, JT-US-018-S4, JT-US-019-S3, JT-US-020-S2, JT-US-020-S3, JT-US-02-S3 rex, JT-US-021-S2, JT-US-021-S3, JT-US-012-S1, JT-US-012-S2, and JT-US-018-S3 rex: The results for Aroclors 1248 and 1254 were reported by the laboratory with Y due to interferences. The Y qualifier was changed to U.

- Samples JT-US-023-S2, JT-US-023-S3, JT-US-024-S3, JT-US-017-S4, JT-US-017-S5, and JT-US-023-S4: The results for Aroclor 1232 were reported by the laboratory with Y due to interferences. The Y qualifier was changed to U.

- Sample JT-US-022-S3: The results for Aroclors 1254 and 1242 were reported by the laboratory with Y due to interferences. The Y qualifier was changed to U.

- Sample JT-US-29-S1: The results for Aroclors 1254 and 1260 were reported by the laboratory with Y due to interferences. The Y qualifier was changed to U.

- Samples JT-US-34-S1, JT-US-38-S2, JT-US-014-S4, JT-US-015-S2, JT-US-025-S2 and JT-US-012-S3: The results for Aroclors 1254 and 1232 were reported by the laboratory with Y due to interferences. The Y qualifier was changed to U.

Total Metals

Analytical Methods

Total arsenic, cadmium, chromium, and lead were prepared and analyzed by EPA Method 200.8. Total mercury was prepared and analyzed by EPA Method 7471A.

Sample Holding Times

The samples were prepared and analyzed within holding time limits.

Blank Contamination

No target analytes were detected in laboratory blanks.

Laboratory Control Sample Recovery

LCS recoveries were within method control limits.

Matrix Spike Recovery

MS recoveries were within method control limits.

Laboratory Duplicate Sample Analysis

The RPD between replicate measurements were within method control limits or not applicable when the sample and duplicate were less than five times the reporting limit, with the following exceptions:

- JT-US-023-S2 Dup: The RPDs for arsenic, chromium, and lead exceeded the control limits. Results for those analytes in sample JT-US-023-S2 were qualified as estimated (J).

- JT-US-009-S2 Dup: The RPD for chromium exceeded the control limits. The result for chromium in sample JT-US-009-S2 was qualified as estimated (J).

Calibration Criteria

The CCVs were in control.

Conventional Analysis

Analytical Methods

Total organic carbon (TOC) was prepared and analyzed following Plumb, 1981. Total solids were prepared and analyzed following EPA 160.3 modified.

Sample Holding Times

The samples were prepared and analyzed within holding time limits.

Blank Contamination

No target analytes were detected in laboratory blanks.

Laboratory Control Sample Recovery

LCS recoveries were within laboratory control limits.

Matrix Spike Recovery

MS recoveries were within laboratory control limits.

Standard Reference Material (SRM) Recovery

SRM recoveries were within control limits.

Laboratory Replicate Sample Analysis

The RSD between replicate measurements were within laboratory control limits.

Sample Notes

- Samples JT-US-022-S1, JT-US-28-S2, and JT-US-017-S4 were less than 50 percent total solids. The reporting limits for these samples will be elevated.

Dioxins/Furans

Analytical Methods

Dioxins/furans were prepared and analyzed by EPA Method 1613B.

Sample Holding Time

Samples were extracted and analyzed within holding time limits.

Sample Reporting Limits

Detections that fell between the Estimated Detection Limit (EDL) and the Reporting Limit (RL) were qualified as estimated (J) by ARI. The J qualifier was changed to T to be consistent with Washington State's EIM database.

Mass Calibration and Resolution

Mass spectrometer resolution was greater than 10,000 resolving power.

The laboratory uses an RTX-Dioxin 2 column rather than DB5 and DB225 columns to confirm 2,3,7,8-TCDF detects. A resolution test mixture was designed specifically for this column, consisting of 2,3,4,8-TCDF, 2,3,7,8-TCDF, and 3,4,6,7-TCDF to evaluate the minimum valley between isomers of 25 percent or less. The column met the valley resolution criteria.

Window Defining Mixture

The homolog window defining mixture was run and retention time windows were appropriately established.

Instrument Stability

The absolute RT of the first internal standard was greater than 25 minutes on the RTX-Dioxin 2 column.

The RRTs of the native and labeled CDDs/CDFs were within the method specified limits.

All native and labeled CDDs/CDFs in the CS3 standard were within their respective ion abundance ratios.

All peaks representing both native and labeled analytes in the CS3 standard had signal-to-noise ratios greater than 10:1.

The Percent Difference (%D) of the Relative Response (RR) was within ±25% of the mean RR of the initial calibration. The %D of the mean Relative Response Factor (RRF) was within ±35% of the initial calibration.

Initial Calibration

The absolute RT of the first internal standard was greater than 25 minutes.

The RRTs of the native and labeled CDDs/CDFs were within the method specified limits.

All native and labeled CDDs/CDFs were within their respective ion abundance ratios.

All peaks representing both native and labeled analytes in the CS3 standard had signal-to-noise ratios greater than 10:1.

Continuing Calibration Verification Checks

CCVs were performed at the proper frequency.

The absolute RT of the first internal standard was greater than 25 minutes.

The RRTs of the native and labeled CDDs/CDFs were within the method specified limits. Absolute RTs of the internal standards were within ± 15 seconds of the RTs obtained during the initial calibration.

All native and labeled CDDs/CDFs in the CS3 standard were within their respective ion abundance ratios.

All peaks representing both native and labeled analytes in the CS3 standard had signal-to-noise ratios greater than 10:1.

The Percent Difference (%D) of the Relative Response (RR) was within ±25% of the mean RR of the initial calibration. The %D of the mean Relative Response Factor (RRF) was within ±35% of the initial calibration.

Ongoing Precision and Recovery Sample Results

An ongoing precision and recovery (OPR) sample was used to evaluate accuracy. Sample percent recoveries were within specified control limits.

Compound Identification

The laboratory reported EMPC or "estimated maximum possible concentration" values for one or more of the target analytes. An EMPC value is reported when a peak was detected but did not meet identification criteria as required by the method; therefore, the result cannot be considered as positive identification for the analyte. To indicate that the reported result for an individual analyte is, in effect, an elevated detection limit, the EMPC values were qualified as not detected (U) at the reported values. EMPC values on Total Homologue groups were qualified as estimated (J).

Blank Contamination

MB-011514: The method blank had detections above the RL for 1,2,3,4,6,7,8-HpCDD, OCDD, and Total HpCDD. The MB had detections between the EDL and the RL for 2,3,7,8-TCDF, OCDF, and Total TCDF.

The laboratory qualified detected results in the associated samples that were less than ten times the amount in the method blank with B. The results for the analytes were evaluated and qualifiers updated thus:

- Results that were less than five times (ten times for OCDF and OCDD) the amount in the MB, had the B qualifier changed to U.
    - Sample JT-US-003-S2 [1,2,3,4,6,7,8-HpCDD and OCDD].
    - Sample JT-US-004-S2 [1,2,3,4,6,7,8-HpCDD, OCDF, and OCDD].
    - Sample JT-US-005-S2 [1,2,3,4,6,7,8-HpCDD and OCDD].

The method blank had detections for the following analytes that did not meet ion ratio criteria and were EMPC qualified:

- 1,2,3,7,8-PeCDF
- 1,2,3,4,6,7,8-HpCDF
- Total PeCDF
- Total PeCDD
- Total HxCDD
- Total HpCDF

EMPC qualified results in the method blank are considered as false positives, and no action levels were established for these analytes.

Stable Isotope Labeled Compound Recoveries

The labeled compound recoveries and ion abundance ratios were within control limits.

Internal Standard and Cleanup Standard Recoveries

Internal Standard and Cleanup Standard recoveries were acceptable.

Sample Qualifiers

Results for the following samples/analytes were qualified by the laboratory with an X due to interferences from chlorodiphenyl ethers. The X qualifiers were changed to JL (estimated).

Sample	Analyte
JT-US-003-S2	1,2,3,7,8-PeCDF
JT-US-005-S2	1,2,3,7,8-PeCDF

GROUNDWATER SAMPLES

VOCs

Analytical Methods

The samples were prepared following EPA Method 5030B. The samples were analyzed by GC/MS following EPA Method 8260C.

Sample Holding Times

The samples were prepared and analyzed within the holding time limits.

Blank Contamination

No target analytes were detected in the method blanks or trip blanks with the following exceptions:

- MB-011314: The MB had a detection for hexachlorobutadiene between the MDL and the RL. The associated samples (JT-MW-JT-6, JT-MW-SRW-1, JT-MW-JT-3, JT-MW-MW-8D, JT-MW-JT-7, JT-MW-TB, JT-MW-JT-12, JT-MW-JT-11, JT-MW-JT-8, JT-MW-IP-9, IP-14, and IP-1400) were non-detect for that analyte and not qualified.

- MB-011414: The MB had detections for hexachlorobutadiene and 1,2,4-trichlorobenzene between the MDL and the RL. The associated samples (JT-MW-JT-6, JT-MW-SRW-1, JT-MW-JT-7, JT-MW-JT-11, JT-MW-JT-8, JT-MW-IP-9, IP-14, and IP-1400) were dilution reanalyses. The analyte hexachlorobutadiene was not reported from these analyses. The analyte 1,2,4-trichlorobenzene was reported from the initial undiluted analyses for JT-MW-JT-6, JT-MW-SRW-1, JT-MW-JT-7, and JT-MW-JT-11 on January 13, 2014. The analyte 1,2,4-trichlorobenzene was reported from the January 15, 2014 dilution reanalysis for JT-MW-JT-8. The analyte 1,2,4-trichlorobenzene was reported for JT-MW-IP-9, IP-1400, and IP-14 with a B qualifier by the laboratory from the January 14, 2014 sequence. As the on-column result was greater than ten times the amount in the MB, the B qualifier was removed from those samples.

- MB-011514: The MB has detections for hexachlorobutadiene, n-butylbenzene, 1,2,4-trichlorobenzene, and 1,2,3-trichlorobenzene between the MDL and the RL. The associated sample JT-MW-JT-8, was a dilution reanalysis. The analytes hexachlorobutadiene and n-butylbenzene were reported from the undiluted analysis on January 13, 2014. The analyte 1,2,3-trichlorobenzene was reported from the dilution reanalysis on January 14, 2014. The analyte 1,2,4-trichlorobenzene was reported with a B qualifier by the laboratory on January 15, 2014. As the on-column result was greater than ten times the amount in the MB, the B qualifier was removed.

- MB-032714: The MB had detections for hexachlorobutadiene and n-butylbenzene between the MDL and the RL. The associated samples (JT-MW-100 and Trip Blanks) were non-detect for those analytes and not qualified.

- MB-032814: The MB had detections for hexachlorobutadiene and n-butylbenzene between the MDL and the RL. The associated samples (JT-MW-200, JT-MW-200 dilution, JT-MW-8, JT-5, and JT-500) were non-detect for those analytes and not qualified

- Trip blank JT-MW-TB: The TB has detections for chloromethane and acetone between the MDL and the RL. Detections for chloromethane and acetone in the associated samples that fell between the MDL and the RL were raised to the RL and U-flagged (JT-MW-JT-6 [chloromethane], JT-MW-MW-8D [chloromethane], JT-MW-JT-12 [acetone], JT-MW-JT-11 [acetone], and IP-1400 [acetone]). Non-detect results were not qualified. Detections above the RL but less than ten times the amount in the trip blank were U-flagged (JT-MW-JT-8 [acetone]).

Surrogate Recovery

Surrogate recoveries were within laboratory control limits with the following exceptions:

- Samples IP-14 and IP-1400: The recoveries for two surrogates exceeded the control limits in the undiluted analyses due to matrix interferences. The surrogate recoveries were in control in the diluted analyses, and no sample results were qualified.

- IP-14 MS/MSD: The recoveries for two surrogates exceeded the control limits in the undiluted analyses due to matrix interferences. No sample results were qualified.

- Sample JT-MW-200 dilution: The recovery for Bromofluorobenzene fell below the control limits for the diluted reanalysis, but was within control in the undiluted analysis. The sample results were not qualified.

Field Duplicate Sample Analysis

The RPD between replicate measurements was within control limits or were not applicable when the sample and duplicate were less than five times the reporting limit.

Laboratory Control Sample Recovery

LCS recoveries were within laboratory control limits with the following exceptions:

- LCS/LCSD-032714 – The recovery for Chloromethane in the LCSD failed low, but was in control in the LCS. The recoveries for Chloroethane failed high in the LCS and LCSD. The recovery for 1,2-dibromo-3-chloropropane failed low in the LCS, but was in control in the LCSD. The associated samples (JT-MW-100 and Trip Blanks) were non-detect for chloroethane and not qualified. As one batch QC sample was in control, the associated samples were not qualified for other analytes.

- LCS/LCSD-032814 – The recovery for Chloromethane in the LCSD failed low, but was in control in the LCS. The recoveries for Vinyl chloride and chloroethane failed high in the LCS, but were in control in the LCSD. The recovery for 1,2-dibromo-3-chloropropane failed low in the LCS, but was in control in the LCSD. As one batch QC sample was in control, the associated samples (JT-MW-200, JT-MW-200 dilution, JT-MW-8, JT-5, and JT-500) were not qualified for these analytes.

Matrix Spike Recovery

MS recoveries were within laboratory control limits with the following exceptions:

- IP-14 MS/MSD: The recoveries for dibromochloromethane, 1,1,2,2-tetrachloroethane, styrene, m,p-Xylene, o-Xylene, 1,1,1,2-tetrachloroethane, 1,3,5-trimethylbenzene, 1,2,4-trimethylbenzene, 1,3-dichloropropane, isopropyl benzene, n-propyl benzene, bromobenzene, 2-chlorotoluene, 4-chlorotoluene,tert-butylbenzene,sec-butylbenzene, 4-isopropyltoluene,n-butylbenzene, naphthalene, and tetrachloroethene exceeded the control limits in the MS and MSD. There were no detections for those analytes in the source sample, and no results qualified.

  There was no recovery for 2-chloroethylvinyl ether in the MS or MSD. The results for 2-chloroethylvinyl ether were qualified as estimated (J) in IP-14 and IP-1400. The recoveries for 1,2-dibromo-3-chloropropane and 1,2,3-trichloropropane exceeded the control limits in the MS, but were within control limits in the MSD. As the recoveries were in control in the LCS, LCSD, and MSD, sample results were not qualified.

  The analytes chlorobenzene, 1,4-dichlorobenzene, 1,2,4-trichlorobenzene, and 1,3-dichlorobenzene did not recover in the MS due to high levels of those analytes in the source sample compared to the spiking amount. The analyte 1,2-Dichlorobenzene did not recover in the MSD due to high levels of that analyte in the source sample compared to the spiking amount. The associated sample results were not qualified.

Internal Standard Recoveries

The IS recoveries were within acceptance criteria.

Calibration Criteria

The ICAL was within acceptance criteria. The CCVs were in control with the following exception:

- CCV 011314: The recovery for Dichlorodifluoromethane failed high. As Dichlorodifluoromethane was not a target analyte, no results were qualified.

- CCV 032714: The recoveries for Chloromethane, dichlorodifluoromethane, and acrolein failed low. The recovery for Chloroethane failed high. The results for Chloroethane in the associated samples (JT-MW-100 and Trip Blanks) were non-detect and not qualified. Dichlorodifluoromethane was not a target analyte, and sample results were not qualified. The results for Chloromethane and acrolein in the associated samples (Trip Blanks and JT-MW-100) were qualified as estimated (J).

- CCV 032814: The recoveries for Chloromethane, 2,2-dichloropropane, 1,2,4-trichlorobenzene, dichlorodifluoromethane, and acrolein failed low. The recovery for Chloroethane failed high. The results for Chloroethane in the associated samples (JT-MW-200, JT-5, JT-500, JT-MW-8, and JT-MW-200) were non-detect and not qualified. Dichlorodifluoromethane was not a target analyte, and sample results were not qualified. The results for Chloromethane, 2,2-dichloropropane, 1,2,4-

trichlorobenzene, and acrolein in the associated samples (JT-MW-200, JT-5, JT-500, JT-MW-8, and JT-MW-200) were qualified as estimated (J).

Diesel and Motor Oil Range Hydrocarbons

Analytical Methods

The sample was prepared following EPA Method 3510C. The sample was analyzed by GC/FID following NWTPH-Dx method.

Sample Holding Times

The samples were prepared and analyzed within the holding time limits.

Blank Contamination

No target analytes were detected in laboratory blanks.

Surrogate Recovery

Surrogate recoveries were within laboratory control limits.

Laboratory Control Sample Recovery

LCS recoveries were within laboratory control limits.

Calibration Criteria

The ICAL was within acceptance criteria. The CCVs were in control.

Sample Notes

The sample chromatograms were reviewed and identifications were modified as follows:

- Sample JT-8-P: The sample was reported as non-detect (U) at the reported result for Diesel Range Organics (DRO), Residual Range Organics (RRO), and transformer oil, with a note that PCBs were identified (C).

PCBs

Analytical Methods

The samples were prepared following EPA Method 3510C. The sample extracts were sulfur, acid, and silica gel cleaned. The samples were analyzed by GC/ECD following EPA Method 8082A.

Sample Holding Times

The samples were prepared and analyzed within the holding time limits.

Blank Contamination

No target analytes were detected in laboratory blanks with the following exceptions:

- MB-011314: The method blank had a detection for Aroclor 1232, which was reported as non-detect with an elevated RL. The results for Aroclor 1232 in the associated samples (JT-MW-JT-6, JT-MW-SRW-1, JT-MW-JT-3, JT-MW-MW-8D, JT-MW-JT-7, JT-MW-JT-12, JT-MW-JT-11, JT-MW-JT-8, JT-MW-IP-9, IP-14, and IP-1400) were reported with elevated RL and qualified with Y/BY. The Y/BY qualifier was changed to U.

Surrogate Recovery

Surrogate recoveries were within laboratory control limits with the following exceptions:

- Samples JT-MW-JT-8, JT-MW-IP-9, and IP-14: The samples were analyzed at dilutions, and the surrogate recoveries were not reported as they were diluted below the RL. The sample results were not qualified.

- IP-14 MS: The recovery for the surrogate TCMX was not reported, but the recovery for the surrogate DCBP fell within the control limits. As one surrogate recovery was within control, sample results were not qualified.

Laboratory Control Sample Recovery

LCS recoveries were within laboratory control limits.

Matrix Spike Recovery

MS recoveries were within laboratory control limits with the following exceptions:

- IP-14 MS/MSD: The recoveries for Aroclor 1016 and Aroclor 1260 exceeded the control limits in the MS and MSD. There were high levels of PCBs in the source sample which interfered with calculating the Aroclor 1016 recoveries. The amount of Aroclor 1260 in the source sample was greater than the spiking amount. Sample results were not qualified.

Field Duplicate Sample Analysis

The RPD between replicate measurements were within control limits with the following exception:

- Samples IP-14/IP-1400: The RPD exceeded 40 percent. The samples were both analyzed at 5-fold dilutions, but surrogate recoveries were not reported for sample IP-14, while the surrogates were reported and in control in sample IP-1400. Calculation of the surrogate recoveries for sample IP-14 indicated that the recoveries were in control. Sample results were not qualified due to field duplicate exceedances.

Internal Standard Recoveries

The IS recoveries were within acceptance criteria with the following exceptions:

Sample JT-MW-200: The IS 1-bromo-2-nitrobenzene exceeded the acceptance criteria on the ZB5 column, but passed on the ZB35 column. Sample results were reported from the ZB35 column, and not qualified.

Calibration Criteria

The ICAL was within acceptance criteria. The CCVs were in control with the following exception:

- CCV 012314 at 0715: The recovery for Aroclor 1254 failed high on the ZB5 column, but passed on the ZB35 column. The results for Aroclor 1254 in the associated samples (JT-MW-JT-8, JT-MW-IP-9, IP-14, IP-14 MS/MSD, and IP-1400) were reported from the passing column.

- CCV 032714 at 1327: The recovery for Aroclor 1248 failed high on the ZB5 column, but passed on the ZB35 column. The associated samples were non-detect for Aroclor 1248, and no results were qualified.

Sample Notes

- Sample JT-5: The sample was lost during the extraction procedure. As a field duplicate (JT-500) had been collected, results for JT-5 were reported from the JT-500 analysis.

- Samples JT-MW-200, JT-MW-JT-8, JT-MW-IP-9, JT-MW-JT-3 dilution, and JT-MW-JT-11 dilution: The results for Aroclor 1254 were reported by the laboratory lab with Y due to interferences. The Y qualifier was changed to U.

- Samples IP-14, IP-1400, JT-MW-100, JT-500, and JT-MW-8: The results for Aroclors 1248 and 1254 were reported by the laboratory with Y due to interferences. The Y qualifier was changed to U.

- Samples JT-MW-JT-6, JT-MW-SRW-1, JT-MW-JT-3, JT-MW-MW-8D, JT-MW-JT-7, JT-MW-JT-12, and JT-MW-JT-11: The results for Aroclors 1254 and 1232 were reported by the laboratory with Y due to interferences. The Y qualifier was changed to U.

Total and Dissolved Metals

Analytical Methods

Total and dissolved arsenic, cadmium, chromium, and lead were prepared and analyzed by EPA Method 200.8. Total and dissolved mercury was prepared and analyzed by EPA Method 7470A.

Sample Holding Times

The samples were prepared and analyzed within holding time limits.

Blank Contamination

No target analytes were detected in laboratory blanks.

Laboratory Control Sample Recovery

LCS recoveries were within method control limits.

Matrix Spike Recovery

MS recoveries were within method control limits.

Laboratory Duplicate Sample Analysis

The RPD between replicate measurements were within control limits or not applicable if the sample and duplicate were less than five times the reporting limit.

Field Duplicate Sample Analysis

The RPD between replicate measurements were within control limits or not applicable if the sample and duplicate were less than five times the reporting limit.

Calibration Criteria

The CCVs were in control.

Conventional Analyses

Analytical Methods

Nitrate, sulfate and chloride were determined by EPA Method 300.0. TOC was determined by SM 5310. Alkalinity was determined by SM 2320B. Nitrate and nitrite were determined by EPA Method 353.2. Total suspended solids (TSS) was determined by SM 2540D.

Sample Holding Times

The samples met holding time limits for alkalinity, nitrate, sulfate, chloride, TSS, and TOC.

Samples JT-MW-JT-6, JT-MW-SRW-1, JT-MW-JT-3, JT-MW-MW-8D, and JT-MW-JT-7. The samples did not meet holding time requirements for nitrate. The samples were recollected and resubmitted for nitrate analysis.

Blank Contamination

No target analytes were detected in laboratory blanks.

Laboratory Control Sample Recovery

LCS recoveries for TSS were within laboratory control limits.

Laboratory Duplicate Sample Analysis

The RPDs between replicate measurements were within control limits.

Matrix Spike Recovery

MS recoveries for TOC, chloride, sulfate, and nitrate were within method control limits.

Standard Reference Material Recovery

SRM recoveries for alkalinity, TOC, nitrate, sulfate, and chloride were within control limits.

Calibration Criteria

The ICAL was within acceptance criteria. The CCVs were in control.

PRODUCT SAMPLE

Diesel and Motor Oil Range Hydrocarbons

Analytical Methods

The sample was prepared following EPA Method 3580A. The sample was analyzed by GC/FID following the NWTPH-Dx method.

Sample Holding Times

The sample was prepared and analyzed within the holding time limits.

Blank Contamination

No target analytes were detected in laboratory blanks.

Surrogate Recovery

Surrogate recoveries were within laboratory control limits.

Laboratory Control Sample Recovery

LCS recoveries were within laboratory control limits.

Calibration Criteria

The ICAL was within acceptance criteria. The CCVs were in control.

Sample Notes

The sample chromatograms were reviewed and identifications were modified as follows:

- Sample JT-8-P: The sample was reported as non-detect (U) at the reported result for Diesel Range Organics (DRO), Residual Range Organics (RRO), and transformer oil, with a note that PCBs were identified (C).

SEDIMENT SAMPLES

VOCs

Analytical Methods

The samples were prepared following EPA Method 5035. The samples were analyzed by GC/MS following EPA Method 8260C.

Sample Holding Times

The samples were prepared and analyzed within the holding time limits.

Blank Contamination

No target analytes were detected in the method blanks with the following exception:

- MB-012314: The MB had a detection for methylene chloride between the MDL and the RL (1.0 ug/kg). The laboratory qualified detections for methylene chloride that were less than ten times the amount in the MB in the associated samples (JT-SS-01-S1, JT-SS-02-S1, JT-SS-03-S1, JT-SS-04-S1, JT-SS-05-S1, JT-SS-05-S2, JT-SS-01-S2, and JT-SS-03-S2) with B. The results were evaluated and qualifiers changed:
  - Sample results that were less than ten times the amount in the MB had the B qualifier changed to U (JT-SS-01-S1, JT-SS-02-S1, JT-SS-04-S1, JT-SS-01-S2, and JT-SS-03-S2).
  - Sample results that fell below the RL were raised to the RL and U-flagged (JT-SS-03-S1 and JT-SS-05-S1)
  - Sample results that were below the MDL were not qualified (JT-SS-05-S2).

Surrogate Recovery

Surrogate recoveries were within laboratory control limits.

Laboratory Control Sample Recovery

LCS recoveries were within laboratory control limits.

Internal Standard Recoveries

The IS recoveries were within acceptance criteria.

Calibration Criteria

The ICAL was within acceptance criteria. The CCVs were in control with the following exceptions:

- CCV 012314: The recovery for bromomethane failed low. The laboratory qualified detections for that analyte with a Q. All results for bromomethane in the associated samples (JT-SS-01-S1, JT-SS-

02-S1, JT-SS-03-S1, JT-SS-04-S1, JT-SS-05-S1, JT-SS-05-S2, JT-SS-01-S2, and JT-SS-03-S2) were qualified as estimated (J).

PCBs

Analytical Methods

The samples were prepared following EPA Method 3546. The sample extracts were sulfur, acid, and silica gel cleaned. The samples were analyzed by GC/ECD following EPA Method 8082A.

Sample Holding Times

The samples were prepared and analyzed within the holding time limits.

Blank Contamination

No target analytes were detected in laboratory blanks with the following exceptions:

- MB-012114: The method blank had a detection for Aroclor 1260 between the MDL and the RL. The laboratory qualified detections in the associated samples (JT-SS-01-S1, JT-SS-02-S1, JT-SS-03-S1, JT-SS-04-S1, JT-SS-05-S1, JT-SS-05-S2, JT-SS-01-S2, and JT-SS-03-S2) that were less than ten times the amount in the MB with B. The results were evaluated thus:
  - Samples JT-SS-01-S1, JT-SS-02-S1, JT-SS-03-S1, JT-SS-04-S1, JT-SS-05-S1, and JT-SS-05-S2: The results for Aroclor 1260 were greater than five times the amount in the MB and not qualified.
  - Samples JT-SS-01-S2 and JT-SS-03-S2: The results for Aroclor 1260 were less than five times the amount in the MB and the B qualifier was changed to U.

Surrogate Recovery

Surrogate recoveries were within laboratory control limits.

Laboratory Control Sample Recovery

LCS recoveries were within laboratory control limits.

Matrix Spike Recovery

MS recoveries were within laboratory control limits.

Calibration Criteria

The ICAL was within acceptance criteria. The CCVs were in control.

Sample Notes

- Samples JT-SS-03-S1, JT-SS-03-S1 dilution, and JT-SS-03-S2: The results for Aroclor 1248 were reported by the laboratory with Y due to interferences. The Y qualifier was changed to U.

- Sample JT-SS-04-S1: The result for Aroclor 1254 was qualified by the laboratory with P as the RPD between the chromatographic columns was greater than 40 percent. The P qualifier was changed to JP.

- Samples JT-SS-01-S2: The result for Aroclor 1232 was reported by the laboratory with Y due to interferences. The Y qualifier was changed to U.

Total Metals

Analytical Methods

Total arsenic, cadmium, chromium, and lead were prepared and analyzed by EPA Method 200.8. Total mercury was prepared and analyzed by EPA Method 7471A.

Sample Holding Times

The samples were prepared and analyzed within holding time limits.

Blank Contamination

No target analytes were detected in laboratory blanks.

Laboratory Control Sample Recovery

LCS recoveries were within method control limits.

Matrix Spike Recovery

MS recoveries were within method control limits with the following exception:

- JT-SS-01-S1 MS: The recovery for mercury failed high. The result for mercury in sample JT-SS-01-S1 was qualified as estimated (J).

Laboratory Duplicate Sample Analysis

The RPD between replicate measurements were within method control limits.

Calibration Criteria

The CCVs were in control.

Conventional Analyses

Analytical Methods

Total solids were prepared and analyzed following SM 2540G. TOC was prepared and analyzed following Plumb 1981.

Sample Holding Times

The samples met holding time limits.

Blank Contamination

No target analytes were detected in laboratory blanks.

Laboratory Control Sample Recovery

LCS recoveries for TOC were within control limits.

Matrix Spike Recovery

MS recoveries were within control limits.

Standard Reference Material Recovery

SRM recoveries for TOC were within control limits.

Laboratory Replicate Sample Analysis

The RSD between replicate measurements for total solids and TOC were within control limits.

Calibration Criteria

The CCVs were in control.

APPENDIX C
Benthic Survey

Summary of benthic assemblages in samples collected near the Ballard Locks, Seattle, Washington

Rhithron Associates, Inc.
February 10, 2014

Three benthic substrate samples, collected by Hart Crowser personnel from the vicinity of the Ballard Locks were delivered to Rhithron's laboratory facility in Missoula, Montana. A Van Veen sampler was used to make the collections. All samples arrived in good condition.

All organisms were sorted from substrate, and were individually examined by certified taxonomists, using 10x – 80x stereoscopic dissecting scopes (Leica S8E) and identified, using appropriate published taxonomic references and keys. Identification, counts, life stages, and information about the condition of specimens were recorded in the Rhithron database via an electronic data entry interface. Identified organisms were preserved in 80% ethanol in labeled vials, and archived at the Rhithron laboratory. Chironomids were carefully morphotyped using 10x – 80x stereoscopic dissecting microscopes (Leica S8E) and representative specimens were slide mounted and examined at 200x – 1000x magnification using an Olympus BX 51 compound microscope. Slide mounted organisms were archived at the Rhithron laboratory. Quality assurance procedures for sorting efficiency and taxonomic precision were carried out for a single randomly-selected sample. Sorting efficiency was measured at 96%, and taxonomic precision was 100%.

Benthic assemblages were generally depauperate, and consisted of tolerant taxa. None of the animals collected at any site could be identified as marine or intertidal. In general, the fauna at these sites were characteristic of hypoxic freshwater environments.

Site JT-SS-AI-01
A total of 48 invertebrates were present in the sample collected here. This site supported freshwater gastropods, amphipods, and aquatic mites. Several specimens of tubificid oligochaetes were also present. Five insect taxa were collected, including odonates and chironomids. Chironomid taxa collected at the site included *Xenochironomus xenolabis*, a hemoglobin-bearing taxon associated with freshwater sponges. Two glossiphoniid leeches were collected.

Site JT-SS-AI-03
The sample collected at this site contained a total of 13 invertebrates, including 2 specimens of the glossiphoniid leech. Sphaeriid clams were the most abundant taxon in the sample: these were freshwater forms. The site also supported freshwater scuds, mites, and the hemoglobin-bearing midge *Procladius* sp.

Site JT-SS-AI-05
Eight invertebrates were collected here: the non-insect fauna included a free-living nematode, a copepod, an ostracod, and an aquatic mite. Two insect taxa were present. These were the midge *Procladius* sp., and larvae of a ceratopogonid fly.

APPENDIX D
Cost Summary Backup

Table D1 - Remediation Alternative 1a Cost Estimate

Continuous Trenching Solidification of Soil with PCBs >10 mg/kg

Capital Costs Estimating Worksheet

COST COMPONENT	UNIT	QUANTITY	UNIT COST	TOTAL COST
Site Preparation and Restoration				
Monitoring Well Abandonment	EA	10	$3,000	$30,000
Sanitary Sewer Demolition and Temporay Re-route	LF	1,400	$18	$25,200
Overhead Power Re-route	LS	-	$125,000	$0
Monitoring Well Replacement	EA	3	$4,000	$12,000
Sanitary Sewer Replacement	LF	1,400	$60	$84,000
Pavement Replacement	SF	3,300	$2	$6,600
			Subtotal:	$157,800
Continuous Trenching Excavation/Solidification				
Mobilization Demobilization	LS	1	$160,000	$160,000
Decontamination Facilities	LS	1	$90,000	$90,000
Portland Cement (delivered)	Ton	461	$330	$152,213
Other Additives (delivered)	Ton	31	$1,000	$30,750
Excavate/solidify	CY	2,460	$125	$307,500
			Subtotal:	$740,463
Waste Disposal				
Non-Hazardous Water	Gal.	18,000	$1.25	$22,500
Hazardous Liquid	Drum	-	$3,000	$0
Non-Hazardous Solids	Ton	1	$75	$75
Hazardous Solids	Ton	-	$200	$0
			Subtotal:	$22,575
			Total Direct Capital Costs:	$920,838
Indirect Capital Costs				
Project Management	% of Direct Costs	8%		$73,667
Construction Management	% of Direct Costs	10%		$92,084
Contingency	% of Direct Costs	30%		$276,251
			Total Indirect Capital Costs:	$442,002
Total Capital Costs				**$1,362,840**

Table D2 - Remediation Alternative 1b Cost Estimate

Continuous Trenching Solidification of Soil with PCBs >1 mg/kg

Capital Costs Estimating Worksheet

COST COMPONENT	UNIT	QUANTITY	UNIT COST	TOTAL COST
Site Preparation and Restoration				
Monitoring Well Abandonment	EA	10	$3,000	$30,000
Sanitary Sewer Demolition and Temporay Re-route	LF	1,400	$18	$25,200
Overhead Power Re-route	LS	-	$125,000	$0
Monitoring Well Replacement	EA	3	$4,000	$12,000
Sanitary Sewer Replacement	LF	1,400	$60	$84,000
Pavement Replacement	SF	4,500	$2	$9,000
			Subtotal:	$160,200
Continuous Trenching Excavation/Solidification				
Mobilization Demobilization	LS	1	$160,000	$160,000
Decontamination Facilities	LS	1	$90,000	$90,000
Portland Cement (delivered)	Ton	630	$330	$207,900
Other Additives (delivered)	Ton	42	$1,000	$42,000
Excavate/solidify	CY	3,360	$125	$420,000
			Subtotal:	$919,900
Waste Disposal				
Non-Hazardous Water	Gal.	18,000	$1.25	$22,500
Hazardous Liquid	Drum	-	$3,000	$0
Non-Hazardous Solids	Ton	1	$75	$75
Hazardous Solids	Ton	-	$200	$0
			Subtotal:	$22,575
		Total Direct Capital Costs:		$1,102,675
Indirect Capital Costs				
Project Management	% of Direct Costs	8%		$88,214
Construction Management	% of Direct Costs	10%		$110,268
Contingency	% of Direct Costs	30%		$330,803
		Total Indirect Capital Costs:		$529,284
Total Capital Costs				**$1,631,959**

Table D3 - Remediation Alternative 1c Cost Estimate

Continuous Trenching Solidification of Soil with PCBs > 0.0000787 mg/kg

Capital Costs Estimating Worksheet

COST COMPONENT	UNIT	QUANTITY	UNIT COST	TOTAL COST
Site Preparation and Restoration				
Monitoring Well Abandonment	EA	10	$3,000	$30,000
Sanitary Sewer Demolition and Temporay Re-route	LF	1,400	$18	$25,200
Overhead Power Re-route	LS	-	$125,000	$0
Monitoring Well Replacement	EA	3	$4,000	$12,000
Sanitary Sewer Replacement	LF	1,400	$60	$84,000
Pavement Replacement	SF	13,000	$2	$26,000
			Subtotal:	$177,200
Continuous Trenching Excavation/Solidification				
Mobilization Demobilization	LS	1	$160,000	$160,000
Decontamination Facilities	LS	1	$90,000	$90,000
Portland Cement (delivered)	Ton	3,263	$330	$1,076,625
Other Additives (delivered)	Ton	218	$1,000	$217,500
Excavate/solidify	CY	17,400	$125	$2,175,000
			Subtotal:	$3,719,125
Waste Disposal				
Non-Hazardous Water	Gal.	18,000	$1.25	$22,500
Hazardous Liquid	Drum	-	$3,000	$0
Non-Hazardous Solids	Ton	1	$75	$75
Hazardous Solids	Ton	-	$200	$0
			Subtotal:	$22,575
		Total Direct Capital Costs:		$3,918,900
Indirect Capital Costs				
Project Management	% of Direct Costs	8%		$313,512
Construction Management	% of Direct Costs	10%		$391,890
Contingency	% of Direct Costs	30%		$1,175,670
		Total Indirect Capital Costs:		$1,881,072
Total Capital Costs				**$5,799,972**

Table D4 - Remediation Alternative 2a Cost Estimate

Continuous Trenching Removal of Soil with PCBs >10 mg/kg

Capital Costs Estimating Worksheet

COST COMPONENT	UNIT	QUANTITY	UNIT COST	TOTAL COST
Site Preparation and Restoration				
Monitoring Well Abandonment	EA	10	$3,000	$30,000
Sanitary Sewer Demolition and Temporay Re-route	LF	1,400	$18	$25,200
Overhead Power Re-route	LS	1	$125,000	$125,000
Monitoring Well Replacement	EA	3	$4,000	$12,000
Sanitary Sewer Replacement	LF	1,400	$60	$84,000
Pavement Replacement	SF	3,300	$2	$6,600
			Subtotal:	$282,800
Dewatering System				
Extraction Wells	EA	1	$20,000	$20,000
Media and Carbon Filters	LS	1	$30,000	$30,000
Discharge to POTW	LS	1	$25,000	$25,000
Monitoring	per Sample	40	$1,000	$40,000
Sewer Discharge Charges	Day	30	$180	$5,400
			Subtotal:	$120,400
Continuous Trenching Excavation & Backfill				
Mobilization Demobilization	LS	1	$160,000	$160,000
Decontamination Facilities	LS	1	$90,000	$90,000
Backfill (load, haul, place, compact)	CY	2,050	$50	$102,500
Excavation and Backfill	CY	2,460	$125	$307,500
			Subtotal:	$660,000
Waste Disposal				
Non-Hazardous Water	Gal.	-	$1.25	$0
Hazardous Liquid	Drum	-	$3,000	$0
Hazardous Solids - Incineration	Ton	369	$700	$258,300
Hazardous Solids - Subtitle C	Ton	3,321	$200	$664,200
			Subtotal:	$922,500
		Total Direct Capital Costs:		$1,985,700
Indirect Capital Costs				
Project Management	% of Direct Costs	8%		$158,856
Construction Management	% of Direct Costs	10%		$198,570
Contingency	% of Direct Costs	30%		$595,710
		Total Indirect Capital Costs:		$953,136
Total Capital Costs				**$2,938,836**

Table D5 - Remediation Alternative 2b Cost Estimate

Continuous Trenching Removal of Soil with PCBs >1 mg/kg

Capital Costs Estimating Worksheet

COST COMPONENT	UNIT	QUANTITY	UNIT COST	TOTAL COST
Site Preparation and Restoration				
Monitoring Well Abandonment	EA	10	$3,000	$30,000
Sanitary Sewer Demolition and Temporay Re-route	LF	1,400	$18	$25,200
Overhead Power Re-route	LS	1	$125,000	$125,000
Monitoring Well Replacement	EA	3	$4,000	$12,000
Sanitary Sewer Replacement	LF	1,400	$60	$84,000
Pavement Replacement	SF	4,500	$2	$9,000
			Subtotal:	$285,200
Dewatering System				
Extraction Wells	EA	1	$20,000	$20,000
Media and Carbon Filters	LS	1	$30,000	$30,000
Discharge to POTW	LS	1	$25,000	$25,000
Monitoring	per Sample	40	$1,000	$40,000
Sewer Discharge Charges	Day	30	$180	$5,400
			Subtotal:	$120,400
Continuous Trenching Excavation & Backfill				
Mobilization Demobilization	LS	1	$160,000	$160,000
Decontamination Facilities	LS	1	$90,000	$90,000
Backfill (load, haul, place, compact)	CY	2,800	$50	$140,000
Excavation and Backfill	CY	3,360	$125	$420,000
			Subtotal:	$810,000
Waste Disposal				
Non-Hazardous Water	Gal.	-	$1.25	$0
Hazardous Liquid	Drum	-	$3,000	$0
Non-Hazardous Solids	Ton	504	$700	$352,800
Hazardous Solids	Ton	4,536	$200	$907,200
			Subtotal:	$1,260,000
		Total Direct Capital Costs:		$2,475,600
Indirect Capital Costs				
Project Management	% of Direct Costs	8%		$198,048
Construction Management	% of Direct Costs	10%		$247,560
Contingency	% of Direct Costs	30%		$742,680
		Total Indirect Capital Costs:		$1,188,288
Total Capital Costs				**$3,663,888**

Table D6 - Remediation Alternative 2c Cost Estimate

Continuous Trenching Removal of Soil with PCBs > 0.0000787 mg/kg

Capital Costs Estimating Worksheet

COST COMPONENT	UNIT	QUANTITY	UNIT COST	TOTAL COST
Site Preparation and Restoration				
Monitoring Well Abandonment	EA	10	$3,000	$30,000
Sanitary Sewer Demolition and Temporay Re-route	LF	1,400	$18	$25,200
Overhead Power Re-route	LS	1	$125,000	$125,000
Monitoring Well Replacement	EA	3	$4,000	$12,000
Sanitary Sewer Replacement	LF	1,400	$60	$84,000
Pavement Replacement	SF	13,000	$2	$26,000
			Subtotal:	$302,200
Dewatering System				
Extraction Wells	EA	1	$20,000	$20,000
Media and Carbon Filters	LS	1	$30,000	$30,000
Discharge to POTW	LS	1	$25,000	$25,000
Monitoring	per Sample	40	$1,000	$40,000
Sewer Discharge Charges	Day	30	$180	$5,400
			Subtotal:	$120,400
Continuous Trenching Excavation & Backfill				
Mobilization Demobilization	LS	1	$160,000	$160,000
Decontamination Facilities	LS	1	$90,000	$90,000
Backfill (load, haul, place, compact)	CY	14,500	$50	$725,000
Excavation and Backfill	CY	17,400	$125	$2,175,000
			Subtotal:	$3,150,000
Waste Disposal				
Non-Hazardous Water	Gal.	-	$1.25	$0
Hazardous Liquid	Drum	-	$3,000	$0
Hazardous Solids - Incineration	Ton	522	$700	$365,400
Hazardous Solids - Subtitle C	Ton	4,176	$200	$835,200
Non-Hazardous Solids - Subtitle D	Ton	21,402	$75	$1,605,150
			Subtotal:	$2,805,750
		Total Direct Capital Costs:		$6,378,350
Indirect Capital Costs				
Project Management	% of Direct Costs	8%		$510,268
Construction Management	% of Direct Costs	10%		$637,835
Contingency	% of Direct Costs	30%		$1,913,505
		Total Indirect Capital Costs:		$3,061,608
Total Capital Costs				**$9,439,958**

APPENDIX E
Data Gaps Report

Data Gaps Report
Jacobson Terminals
Seattle, Washington

Prepared for
Washington State Department of Ecology

December 20, 2013
17800-43

HARTCROWSER

www.hartcrowser.com

Data Gaps Report
Jacobson Terminals
Seattle, Washington

Prepared for
Washington State Department of Ecology

December 20, 2013
17800-43

Prepared by
Hart Crowser, Inc.

Phil Cordell, LG
Project
Geologist
phil.cordell@hartcrowser.com

Mike Ehlebracht, LHG
Principal
Geochemist
mike.ehlebracht@hartcrowser.com

1700 Westlake Avenue North, Suite 200
Seattle, Washington 98109-6212
Fax 206.328.5581
Tel 206.324.9530

CONTENTS Page

INTRODUCTION 1

SITE DESCRIPTION AND HISTORY 2

Current Site Use 2
Historical Site Use 2

PREVIOUS ENVIRONMENTAL CHARACTERIZATION/CLEANUP ACTIVITIES 3

Contaminants of Concern 3
Remediation Activities 4

ENVIRONMENTAL SETTING 5

Geology 5
Hydrogeology 6

NATURE AND EXTENT OF CONTAMINATION 8

Chlorinated Ethene Area 8
PCB/Chlorinated Benzene Area 9
Petroleum-Contaminated Soil Area 12

PRELIMINARY CONCEPTUAL SITE MODEL FOR SOURCES, PATHWAYS, AND EXPOSURES 13

ESTABLISHMENT OF SCREENING LEVELS 15

Soil, Groundwater, and Sediment Screening Criteria 15

ENVIRONMENTAL DATA GAPS 16

Soil 16
Groundwater 17
Sediment 18

REFERENCES 18

CONTENTS (Continued)

Page

TABLES

1 Historical Soil Sampling Analytical Results
2 Historical Groundwater Monitoring Analytical Results
3 PCB Concentrations in Groundwater

FIGURES

1 Vicinity Map
2 Site Plan
3 Remediation Areas
4 Generalized Geologic Cross Section A-A′
5 Generalized Geologic Cross Section B-B′
6 Groundwater Elevation Contours April 2005
7 Estimated Extent of Chlorinated Ethenes in Groundwater
8 Estimated Extent of Chlorinated Benzenes in Groundwater
9 2013 Groundwater COC Concentrations
10 PCB Occurrences in Soil
11 1,2,4-Trichlorobenzene Occurrences in Soil
12 Concentration of 1,2,4-Trichlorobenzene in Groundwater over Time
13 Concentration of 1,4-Dichlorobenzene in Groundwater over Time
14 Concentrations of Chlorinated Solvents in Groundwater over Time
15 Conceptual Site Model

DATA GAPS REPORT
JACOBSON TERMINALS
SEATTLE, WASHINGTON

INTRODUCTION

As part of preparing the Remedial Investigation (RI) Work Plan for the Jacobson Terminals property, Hart Crowser completed this Data Gaps Report to summarize available environmental data and identify additional environmental assessment requirements. On September 19, 2013, Hart Crowser reviewed Washington State Department of Ecology's Jacobson Terminals file and received copies of selected documents. Documents used to produce this report are listed in the references section. Discussions with Aspect Consulting, Ecology, and Scott and Al Jacobson during a site walk in July 2013 provided additional information on property operations and environmental conditions.

The Jacobson Terminals facility is located at 5350 30th Avenue Northwest in the Ballard district of Seattle as shown on Figure 1. The property boundaries are the Lake Washington Ship Canal (Ship Canal) to the east and south, Seaborn property to the east, Army Corps of Engineers (Corps) property to the west, and City of Seattle (City) property to the north. The property is currently owned by A & B Jacobson, LLC.

Soil and groundwater impacts have been identified at the property and a number of remedial activities have been completed at the facility and on surrounding properties since 1991. The Jacobson Terminals facility has been enrolled in Washington State Department of Ecology's Voluntary Cleanup Program (VCP) since 2001 under VCP number NW0611. Aspect Consulting (Aspect) has been the owner's environmental consultant since 2003.

This report summarizes current environmental conditions at the Terminals property and identifies data gaps to be addressed during the RI. Information about environmental conditions on the Market Street property to the north and the City property is also provided.

Our evaluation included:

- Visiting the site to observe accessible areas of the Terminals property and assess the condition of monitoring wells;

- Reviewing available environmental documents for the property; and
- Evaluating recent sampling data provided by Aspect.

This data gaps evaluation was performed pursuant to the Washington State Department of Ecology Toxics Cleanup Program Hazardous Substance Site Investigation & Remediation Contract (No. C1100144) and Work Assignment Number C1144QQ.

SITE DESCRIPTION AND HISTORY

The Terminals property is generally flat. The northwest comer, which is used for parking, is approximately 5 feet above the elevation of the rest of the property, at the approximate elevation of the City property/railroad tracks.

Large boat storage racks are located along the Lake Washington Ship Canal. Offices and small warehouses border the Corps property to the east. Access to the site is controlled by fencing and gates. (A site map is provided on Figure 2.) The Terminals property is zoned industrial (IGlU/45).

Current Site Use

The Terminals property is primarily used for boat storage. Large boat racks are located adjacent to the waterway and various marine businesses occupy the office spaces on the property.

The Seaborn property, located to the east, is used for boat moorage and office space. The Corps property contains offices, maintenance buildings, and a tourist facility for the Ship Canal Locks. The City property consists of a former Burlington Northern Railroad right of way and contains active railroad tracks. North of the City property and railroad tracks, at 2801 NW Market Street, is the Market Street property, which consists of a climbing gym and other commercial businesses.

Historical Site Use

Terminals Property

The property is located on a former estuarine tideflat. In the 1920s, the area was filled with sand dredged from the Lake Washington Ship Canal, wood waste, and construction debris. The property was the site of a lumber mill from approximately 1890 to the 1930s. Starting around 1940, the property was used for loading and unloading boats and for storage. Alan and Brian Jacobson (partners in A&B Jacobson, LLC) purchased the property in 1975 and the property has been used as a marine support facility since that date.

Market Street Property

Approximately 14 interconnected buildings were constructed on the Market Street property from 1946 to 1955. Fuel tanks and shell casings were reportedly manufactured at the property before the factory switched to steel window frame manufacturing in the late 1940s. In 1955, the factory stopped producing steel frames and began producing aluminum window frames. This manufacturing process used extrusion presses, an anodizing circuit of 21 aboveground steel or concrete tanks, a paint room, ten underground storage tanks (USTs), and an interior drainage system that included 24 floor drains, trench drains, and sumps.

Wastewater from the Market Street property was discharged to the Lake Washington Ship Canal from approximately 1948 to 1978; in later years, the wastewater was treated on the property and discharged to the King County Metro wastewater collection system. Violations of the Metro permit for pH and metal discharge exceedances are documented in the project file. A video inspection of the sewer lines was conducted in the late 1970s and severe deterioration and disintegration of the lines was observed. The former owner of the property reportedly replaced the lines. Window manufacturing operations ceased at the Market Street property in 1989 (Hart Crowser 2000).

PREVIOUS ENVIRONMENTAL CHARACTERIZATION/CLEANUP ACTIVITIES

A number of environmental investigations and remedial actions have been completed at the Terminals, Corps, City, and Market Street properties. A summary of identified contaminants of concern and remedial activities are provided below.

Contaminants of Concern

Based on the results of historical environmental investigations completed at the properties, the major contaminants of concern (COCs) include:

- Metals in soil and groundwater on the Market Street and City properties;
- Chlorinated solvents (PCE, TCE, cis-DCE, and vinyl chloride) in groundwater on the Market Street, City, Corps, and Terminals properties;
- PCBs in soil at the Terminals property;

- Tri-, di-, and monochlorobenzenes in soil and groundwater at the Terminals property; and
- Petroleum hydrocarbons in soil at the Terminals property.

Groundwater monitoring was first conducted to delineate a vinyl chloride plume identified at the upgradient Market Street property. Historical releases of metals, low- and high-pH solutions, and solvents occurred on the Market Street and City properties during operations by Fentron Industries (Fentron). The releases created localized exceedances of metals in soil and groundwater and an extensive groundwater plume of tetrachloroethene (PCE) and associated degradation products (primarily trichloroethene [TCE], cis-1,2-dichloroethene [cis-DCE], and vinyl chloride). Prior to installation of a treatment wall in 1999, the plume extended from the Market Street and City properties onto the Corps and Terminals properties. A separate area of chlorinated solvents, located on the City property downgradient of the Market Street treatment wall was identified as the likely source of chlorinated solvent impacts on the Terminals property.

A historical release of transformer oil containing PCBs and trichlorobenzene on the northern portion of the Terminals property created a plume of several chlorinated benzene compounds in groundwater (Figure 2). Concentrations of PCBs and chlorinated benzenes above applicable cleanup levels have been identified in soil samples up to 18 feet below ground surface (bgs) near where the presumed transformer oil release occurred.

During construction activities in the early 1990s, a separate area of PCB- and petroleum-impacted soil was discovered at the Terminals property in an alley that borders that Corps property (Figure 2).

Remediation Activities

A number of remedial actions have been completed at the Terminals, City, and Market Street properties to address potential human and ecological exposure to the COCs described above. These cleanup actions were conducted under the VCP by both Fentron and Jacobson. The locations where remedial actions were implemented are shown on Figure 3.

Market Street Property

In 1989, seven of the ten USTs were taken out of service and all fluids, sludges, aboveground tanks, piping and other features associated with the anodizing process were removed from the Market Street property and disposed of, and the drains, catch basins, floors, and walls of the property were cleaned. In 1993, Fentron decommissioned all ten USTs and removed approximately 100 tons of petroleum-impacted soil from the site.

In 1991, EMCON installed a pump-and-treat system along the southwestern portion of the property to address solvents in groundwater. The system did not fully capture the solvent plume and was shut down in 1999 and replaced with a passive treatment wall and zero-valent iron gates system.

The wall consists of three impermeable funnel sections constructed of cement bentonite that captures groundwater and directs it through two permeable gates filled with a mixture of granular iron and sand. At the same time, a magnesium oxide product (ORC) was injected into groundwater on the Terminals property to treat solvents that had already migrated past the newly constructed treatment wall. A deed restriction was also placed on the Market Street property that addresses residual contamination beneath the existing building (Hart Crowser 2000).

Terminals Property

In 2001 and 2002, Fenton's Reagent (acidified hydrogen peroxide and ferrous iron) was injected on the Terminals property to provide source area treatment of the PCB/chlorinated benzene plume and to provide a more aggressive oxygen enhancement for degrading cis-DCE and vinyl chloride. In December 2003, a continuous permeable treatment wall containing granular activated carbon and zero-valent iron was installed along the Lake Washington Ship Canal to remove PCBs and chlorinated benzenes from groundwater (Aspect 2003).

In 1996, PCB and petroleum contaminated soil was removed from between two buildings bordering the Corps Property. Much of the source material was removed, but confirmation sampling showed that petroleum hydrocarbon concentrations remained above cleanup levels in sidewall and bottom samples (Hart Crowser 1997).

ENVIRONMENTAL SETTING

This section describes the environmental setting of the property including climate, geology, hydrogeology, and surface water hydrology.

Geology

Terminals property soils generally consist of approximately 10 feet of fill overlying native estuarine sediment. The fill is a diverse mixture of silty sand, silt, wood waste, and occasional debris. A layer of wood waste approximately 6 to 10 feet deep has been identified over much of the northern portion of the property. Below the fill layer is native sand or silty sand to 16 to 18 feet deep. Beneath the sand layer is a layer of silty clay, typically 1 to 4 feet thick. Below this layer are discontinuous layers of sand and silt of increasing density. Two generalized geologic cross sections are provided on Figures 4 and 5 (Hart Crowser 2002).

Hydrogeology

Groundwater Flow Patterns

Shallow groundwater in the area generally flows toward the south-southeast before discharging into the Lake Washington Ship Canal. Groundwater elevations on the upgradient Market Street property is typically 12 to 14 feet. Groundwater elevations on the Terminals property are typically 7 to 8 feet. Groundwater is typically encountered 4 to 7 feet bgs on the Site. The groundwater elevation fluctuates approximately 2 feet seasonally and depends largely on the elevation of the Ship Canal, which is adjusted seasonally by the Corps of Engineers. A map showing groundwater elevation contours from 2005 is provided on Figure 6 (Aspect 2003 and Hart Crowser 2002).

Groundwater elevations have typically been lower near the sewer line in the JT-9 area than the rest of the property. A sewer camera survey performed in April 2003 indicated that a connection to the site side sewer was located in this area. The camera noted water flowing in at the side sewer connection with significant scale buildup. The sewer line is located below the water table (see Figure 6); therefore, leakage of shallow groundwater into the sewer could result in the observed groundwater depression (Aspect 2003).

Groundwater Flow Rates

An upward gradient has been reportedly identified between the deeper water-bearing zone (beneath the silty clay layer) and the shallower water-bearing zone, with the hydrostatic head typically 1 to 2 feet greater at wells JT-5 and MW-8D than at adjacent shallower wells (Aspect 2003).

Saturated-zone soils at the site are reported to have generally low hydraulic conductivity. Slug tests performed in 2003 indicated that at five of six wells tested, the average hydraulic horizontal gradient was 0.02 foot per foot across the property, and assuming a porosity of 0.4, the estimated groundwater flow rate is 0.1 foot per day (40 feet per year). Using the maximum calculated hydraulic conductivity in the remaining well, the groundwater flow rate would be

0.7 foot per day (250 feet per year). Using vinyl chloride (a very mobile compound in groundwater) as a conservative tracer, groundwater velocity was calculated at approximately 0.4 foot per day, or 150 feet per year (Aspect 2003).

Ship Canal Surface Water Hydrology

In 1914, Lake Union was hydraulically connected to Lake Washington by construction of the Montlake Cut between Portage Bay and Union Bay. Lake Union was also connected to the then marine waters of Salmon Bay by construction of the Fremont Cut. The connection to Shilshole Bay and Puget Sound, and a manner to control water levels, was established by constructing the Hiram M. Chittenden Locks. The Fremont Cut and Montlake Cut comprise the Lake Washington Ship Canal. The locks and dam maintain the Ship Canal water level.

These modifications increased inflow to Lake Union by diverting the outflow from Lake Washington into the Montlake Cut and, hence, Lake Union, which now drains west into Salmon Bay. During periods of high water flow, the north part of Lake Union can flush (complete exchange of water) in about seven days. However, the southern part of Lake Union does not completely flush and remains relatively stagnant. Opening the locks also allows periodic influx of dense salt water from Puget Sound into the Ship Canal. Because the saltwater is heavier than freshwater, it sinks to the bottom of the canal and moves eastward following the density gradient into Lake Union. The balance between the saltwater intrusion and the flushing rate at a given time varies. During the rainy season and spring thaw, runoff from the Cascade foothills is high and the lake is flushed. In the summer, as the runoff flow decreases and lock openings increase, saltwater intrusion increases.

The US Army Corps of Engineers maintains the water level in Lake Washington and Lake Union by regulating flow through the locks on the western end of Salmon Bay. Lake Union water levels vary by roughly 2 feet on a yearly basis, from 20 feet during the winter months to 22 feet during the summer months.

The Lake Washington Ship Canal from the locks (river mile 1.0) to Lake Washington (river mile 8.6) is designated as “lake class” by the Washington State Department of Ecology (Ecology), stipulating that water quality must meet the requirements for most, if not all of the following uses: wildlife habitat; general recreation; fish reproduction, rearing, and harvest; water supply; and stock watering. However, it should be noted that elevated salinity levels within the portion of the Ship Canal adjacent to the Terminals property would likely severely limit its potential use as a source for potable water.

NATURE AND EXTENT OF CONTAMINATION

There are three areas of elevated COCs at the site. For the purposes of this report the areas have been identified as follows:

- Chlorinated ethene area along the City property boundary;
- PCB/Chlorinated benzene area on the Terminals property; and
- Petroleum area bordering the Corps property.

A description of each area and the affected media is presented below. COC areas are shown on Figure 2. Soil analytical data is presented in Table 1 and groundwater analytical data is presented in Tables 2 and 3. The estimated extent of COCs in groundwater is shown on Figures 7 and 8 and recent groundwater chemistry data is presented in Figure 9. PCB and 1,2,4-trichlorobenzene occurrences in soil are shown on Figures 10 and 11, respectively.

Chlorinated Ethene Area

This area consists of PCE and its degradation products TCE, cis-DCE, and vinyl chloride originating from properties located north of the Terminals facility. The primary source areas for the chlorinated ethenes appear to occur along the railroad tracks on the City property. The estimated extent of the chlorinated ethene occurrences in groundwater is shown on Figure 7.

Soil

The original source of the detected chlorinated ethene occurrences on the Terminals property is not known. Low soil concentrations of PCE and TCE were detected at BR-1 and BR-2 (maximums of 0.96 and 0.62 mg/kg, respectively), but no significant soil source of PCE or TCE has been identified. Soil occurrences were co-located with groundwater occurrences at depths below 20 feet, above the silt confining layer. The limited extent suggests a one-time historical release of a small quantity of contaminated material, which migrated down to the silt confining layer (Aspect 2003 and Hart Crowser 2002).

Groundwater

The depth of affected groundwater within the chlorinated ethene source area is approximately 20 to 22 feet; below this depth is a confining layer of very dense, sandy silt. The maximum detected concentrations of PCE and TCE within the City property source area (both detected at BR-1) were 900 and 1,500 ug/L, respectively. Downgradient of the chlorinated ethene source area, PCE and TCE are typically not detected, but relatively high concentrations of vinyl chloride (maximum of 650 ug/L, at IP-6) and somewhat lower concentrations of cis-DCE have been detected during past monitoring events.

Some of these concentrations may be residual levels from the Market Street property plume before the treatment wall was installed. Groundwater concentrations of chlorinated ethenes exiting the treatment wall have been very low or non-detect since it was installed in 1999. Vinyl chloride concentrations have declined steadily since installing the Market Street property iron wall and performing *in situ* oxidation on the Terminals property (Aspect 2003).

During the most recent groundwater sampling event conducted in April 2013, chlorinated ethenes were still present at concentrations exceeding screening levels in several wells upgradient of the Terminals property (including wells IW-9I and BR-2) but were generally not detected in wells sampled on the property (Figure 9).

Vapor

No VOCs were detected in vapor samples collected from sanitary sewer manholes hydraulically upgradient or downgradient of the chlorinated ethene source area and the vinyl chloride plume (Hart Crowser 2002).

PCB/Chlorinated Benzene Area

The northern portion of the Terminals property was impacted by a historical release of transformer oil containing PCBs and chlorobenzenes (Figure 2). Soils in this area contain elevated concentrations of PCBs, 1,2,4-trichlorobenzene, and other chlorobenzene compounds. Chlorinated ethenes have also been detected in soil and groundwater in this area, but have been attributed to upgradient sources.

The original source is not known, but PCB and trichlorobenzene mixtures were historically used as dielectric fluids in transformers. The shape and location of the contaminated area imply a historical release near IP-1, -4, and -5, which migrated downward until reaching the silt confining layer at an approximate depth of 16 to 18 feet. Contaminant concentrations in the PCB/chlorinated benzene source area are highest just above the silt confining layer, while occurrences in the unsaturated zone are limited and generally at much lower concentrations. No evidence of free product has been observed in wells and injection points installed in the source area, and no contamination above cleanup levels has been observed in the soil or groundwater beneath the confining silt and clay layer.

Contaminant migration along the top of the confining layer in the direction of groundwater flow may account for the southeastern lobe of the source area. The elongation along the sewer line might be from either contaminant migration toward the line or from spreading of contaminated material during installation and backfilling of the sewer line in 1974, if the release occurred earlier (Aspect 2003 and Hart Crowser 2002).

Soil

PCBs. PCBs have been detected in unsaturated zone soils in the source area at concentrations up to 18 mg/kg Concentrations exceeding the industrial direct contact soil screening level of 10 mg/kg were detected in two locations in the unsaturated zone: 17 mg/kg at SP-24 and 18 mg/kg at SP-5. Multiple PCB detections above the practical quantification limit (PQL) have also been detected in unsaturated zone soils. In the saturated zone (below 8 feet deep), PCB occurrences are more widespread at concentrations up to 880 mg/kg. The approximate area of PCB occurrences is shown on Figure 10 and includes pre- and post-Interim Action detections. Following the Interim Action, the estimated PCB hotspot area (PCB concentrations greater than 100 mg/kg) reportedly decreased by approximately 40 percent; however, PCB concentrations as high as 690 mg/kg were still detected in soil following the final injection round (Aspect 2003 and Hart Crowser 2002).

1,2,4-Trichlorobenzene. This analyte has generally not been detected in unsaturated zone soils in the source area. In the saturated zone of the source area, 1,2,4-trichlorobenzene was detected at concentrations up to 560 mg/kg before the Interim Action and at concentrations up to 360 mg/kg after the Interim Action. The approximate area of 1,2,4-trichlorobenzene occurrences is shown on Figure 11 and includes pre- and post-Interim Action detections. The distribution of 1,2,4-trichlorobenzene generally correlates with PCB occurrences shown on Figure 10 (Hart Crowser 2002).

1,4-Dichlorobenzene. This analyte has been detected in unsaturated zone source area soils at concentrations up to 0.28 mg/kg. In the saturated zone, 1,4-dichlorobenzene was been detected at concentrations up to 11 mg/kg before the Interim Action and at concentrations up to 15 mg/kg after the Interim Action. 1,4-dichlorobenzene is generally collocated with 1,2,4-trichlorobenzene but usually at concentrations 1 to 2 orders of magnitude lower (Hart Crowser 2002).

Groundwater

Groundwater monitoring data indicate that the 1,4-dichlorobenzene plume in groundwater extends from the source area southeast toward the Ship Canal. Concentrations have historically been highest in groundwater at approximate depths of 14 to 17 feet, just above the silt confining layer.

Groundwater sampling results are presented in Tables 2 and 3 and groundwater quality data collected from the most recent sampling event (April 2013) are shown on Figure 9. The estimated extent of chlorinated ethene and chlorinated benzene groundwater exceedances are presented on Figures 7 and 8, respectively.

PCBs. Before and during the Interim Action, PCBs were not detected in groundwater at wells JT-3 or JT-6, which are located downgradient of the source area. PCBs were detected in groundwater following the Interim Action at concentrations of 1.5 ug/L at JT-3 and 0.2 ug/L at JT-6 in 2002. Following construction of the treatment wall, PCBs were generally not detected in JT-6 and JT-12. PCB groundwater sampling results are presented in Table 3.

1,2,4-Trichlorobenzene. Before the Interim Action, 1,2,4-trichlorobenzene was encountered in the source area (IP-2) at a concentration of 4,700 ug/L but was not detected in groundwater downgradient. A low concentration (54 ug/L) was detected at well JT-6 in 2002, downgradient of the source area. During the 2013 groundwater sampling event, 1,2,4-trichlorobenzene was not detected above laboratory reporting limits in downgradient wells (Aspect 2013). Concentrations of 1,2,4-trichlorobenzene have been below screening levels since 2004 and are plotted on Figure 12.

1,4-Dichlorobenzene. Before the Interim Action, 1,4-dichlorobenzene was intermittently detected at well JT-3 at concentrations up to 44 ug/L, and was regularly detected at well JT-6 at concentrations up to 360 ug/L. 1,4-dichlorobenzene was also detected in the source area at concentrations up to 1,300 ug/L (at IP-1). After the Interim Action, 1,4-dichlorobenzene concentrations were generally lower, except at IP-7 and IP-8. In June 2002, the highest concentration of 1,4-dichlorobenzene detected in the Source Area was 450 ug/L at IP-8, and the 1,4-dichlorobenzene concentration detected at JT-6 was 68 ug/L. Concentrations of 1,4-dichlorobenzene in compliance monitoring wells have decreased following the Interim Action and have been below cleanup levels in long-term monitoring wells since 2007 (Aspect 2013). Concentrations of 1,4-dichlorobenzene have been below screening levels since 2001 and are plotted on Figure 13.

Vinyl Chloride. Before the Interim Action, vinyl chloride was detected across the northwestern area of the Terminals property at concentrations up to 620 ug/L. Elevated concentrations were generally detected north of the sewer line at injection points IP-6, IP-10, and IP-13, where vinyl chloride was detected at concentrations up to 650 ug/L. Vinyl chloride concentrations in groundwater downgradient of injection points decreased significantly during the Interim Action, with concentrations at injection points and wells south of the sewer line less than 100 ug/L and often below detection limits. Concentrations of vinyl chloride in downgradient wells have not been detected above cleanup levels since 2010. Concentrations near the source area have decreased but remain above cleanup levels. Concentrations of chlorinated solvents over time are plotted on Figure 14.

Sediment

On behalf of A & B Jacobson, LLC, in 1998, Hart Crowser collected two grab sediment samples, from approximately 0 to 10 centimeters bgs in the Ship Canal adjacent to monitoring wells JT-12 and JT-6. Samples were reportedly collected from behind the pier bulkhead. Sediment samples were analyzed for metals (including arsenic, cadmium, chromium, copper, lead, tin, and zinc), toluene, and trichlorofluoromethane. Arsenic was reportedly detected at 17 and 24 mg/kg, above the current Washington State Freshwater Sediment Cleanup Objective criteria of 14 mg/kg, but below the Freshwater Sediment Screening Level of 120 mg/kg. Other metal concentrations were either below applicable screening levels or not detected. These sediment samples were not analyzed for PCBs or chlorinated benzenes.

No report documenting sediment sample collection was located in Ecology or Hart Crowser files. Field notes, hand sketches, and a table were located in the Hart Crowser archive file.

Petroleum-Contaminated Soil Area

This area contained petroleum- and PCB-impacted soil originally identified during construction activities in 1993. The contamination was located east of the equipment storage building on the Corps property, in the alley between the Jacobson transformer building and the Pirelli-Jacobson Marine Storage Building (Figure 2). A remedial excavation was completed to remove the impacted soil in 1996.

Soil

Oil- and diesel-range petroleum hydrocarbons remain in soil in the western portion of the property, adjacent to the Corps property. Excavation sidewall samples contained diesel- and oil-range petroleum hydrocarbon concentrations ranging from 48 mg/kg to 22,000 mg/kg, but physical site constraints prevented further soil removal. All verification soil samples had PCB concentrations below the MTCA Method A industrial soil cleanup level of 10 mg/kg (Hart Crowser 1997).

Groundwater

Groundwater samples were collected from monitoring wells HC-MW-1 through -3 following the excavation. Oil- and diesel-range petroleum hydrocarbons and PCBs were either detected below cleanup levels or below laboratory detection limits following the cleanup action. A “No Further Action” letter was issued for the cleanup by Ecology in 1998. However, during a 2010 periodic review, Ecology indicated that the cleanup may not be protective of groundwater quality.

In 2010, Aspect installed a monitoring well (MW-4) in the area where the residual contamination was left in place (Figure 2). Groundwater samples were collected from this well and two existing wells (MW-2 and MW-3). PCBs were detected in all three wells. The total PCBs concentration measured in well MW-4 (0.6 ug/L) exceeded the surface water protection screening level, as well as the MTCA Method A cleanup level of 0.1 ug/L PCBs. Diesel was not detected in any of the wells.

Residual PCB- and petroleum-impacted soil and groundwater in this area are likely unrelated to contamination in the PCB/Chlorinated Benzene Area.

PRELIMINARY CONCEPTUAL SITE MODEL FOR SOURCES, PATHWAYS, AND EXPOSURES

A conceptual site model (CSM) presents the links between contaminant sources, release mechanisms, exposure pathways and routes, and receptors to summarize the current understanding of the risk to human health and the environment. The CSM is dynamic and may be refined throughout the cleanup action process as additional information becomes available. Figure 15 graphically illustrates the preliminary CSM developed for the PCB/chlorinated benzene area.

A historical release of transformer oil resulted in introduction of PCBs and chlorinated benzenes to Terminals property soil, creating a secondary source. Secondary release mechanisms include fugitive dust, plant uptake, infiltration and leaching to groundwater, and volatilization. Groundwater can also potentially impact surface water. Exposure routes potentially include inhalation, ingestion, and dermal contact.

Potential human receptors include workers inside the Terminals property buildings, potential workers during future development of the site, and utility workers. Terrestrial ecological receptors include plants and animals exposed to impacted media, as well as secondary food chain consumers such as birds and mammals.

A Terrestrial Ecological Evaluation (TEE) was not completed for the Terminals Property because it qualifies for a TEE exemption. As detailed in WAC 173-340-7491, the property is covered by asphalt, creating a physical barrier between contaminated media and plants and wildlife, qualifying the property for exemption from TEE requirements. To formally qualify for this exemption, institutional controls to maintain the asphalt will need to be put in place, requiring a formal written agreement between the property owner and Ecology. Assuming these steps are taken, a TEE is not required for the Terminals Property.

For a contaminant to present a risk to human health and/or the environment, the pathway from the contaminant to the receptor must be complete. The potential exposure pathways and whether they are considered complete are summarized below.

Soil. On-site soil may contain elevated concentrations of PCBs, chlorinated benzenes, and oil-range hydrocarbons. The site is paved and, therefore, there is no exposure pathway unless the pavement is removed. Workers digging in the soil for future development or utility work may be exposed to elevated concentrations without adequate personal protective equipment and safety procedures. Routes of exposure include incidental ingestion and direct contact. Available data indicate that soil contamination does not extend off-property.

Groundwater. Three potential exposure routes exist for groundwater: inhalation of vapors, incidental ingestion, and direct contact. Complete pathways for incidental ingestion and direct contact only exist if workers are digging in soil below the water table. Volatile aromatic compounds dissolved in Terminals property groundwater may volatilize out of the liquid phase and migrate upward into unsaturated soil pore spaces. Given that the nearest Terminal buildings are located over 80 feet upgradient of the PCB/chlorinated benzene plume, indoor air impacts are unlikely. There is a potential for on-site and off-site utility workers to be exposed to vapors.

Surface Water. Shallow groundwater beneath the property migrates to the Lake Washington Ship Canal. There is a potential for dissolved contaminants to impact the aquatic environment.

Soil Gas. Volatilization of chlorinated benzenes in the soil can lead to concentrations in the soil gas that may migrate to the surface. Impacts to indoor air within existing Terminal buildings is unlikely given their distance from the plume. However, this pathway may exist for utility workers.

Fugitive Dust. The fugitive dust pathway does not exist while the site it paved. Fugitive dust could be a potential pathway if the pavement is removed and workers are digging in the soil.

Plant Uptake. The PCB/chlorinated benzene area and surrounding Terminals property are predominantly paved or covered by building foundations. Plants are not grown for human consumption within the impacted areas and, therefore, the pathway is incomplete.

The main exposure pathways that exist at the site that are not currently mediated are migration of dissolved contaminants to adjacent surface water and the inhalation risk to utility workers. Several pathways are potentially complete only if property or utility work includes digging in the soil or groundwater.

ESTABLISHMENT OF SCREENING LEVELS

Preliminary soil screening levels are presented in Table 1 and groundwater screening levels are presented in Tables 2 and 3.

Soil, Groundwater, and Sediment Screening Criteria

Groundwater

Groundwater screening levels have historically been compared to surface water protection criteria. Depending on the COC, either MTCA Method B freshwater screening criteria or State freshwater screening criteria as defined in WAC 173-201A were used (Hart Crowser 1999).

For this report, screening levels were updated based on the most conservative freshwater screening levels for consumption of organisms: Federal Clean Water

Act Section 304, National Toxics Rule 40 CFR 131, or MTCA Method B surface water criteria, whichever is lower. Groundwater screening levels can be found in Table 2.

Soil

Soil screening levels have historically been compared to MTCA Method A Industrial screening levels or MTCA Method C Direct Contact Levels for Industrial Sites (Hart Crowser 1999).

To evaluate whether COC concentrations in soil are protective of adjacent surface waters, screening levels were calculated using Ecology's Three-Phase Partitioning Model (WAC 173-340-474). This model provides a conservative estimate for establishing a soil concentration that will not cause groundwater contamination above an acceptable level. Surface water screening values presented in Table 2 were used to compute soil screening levels protective of the groundwater exposure pathway. Soil screening levels can be found in Table 1.

Sediment

Sediment data collect during the RI will be compared to the Washington State Freshwater Sediment Cleanup Objective Criteria and Freshwater Sediment Screening Levels as defined in WAC 173-204.

ENVIRONMENTAL DATA GAPS

The focus of this interim action will be to remove PCB- and chlorinated benzene-impacted soil on the Terminals property. The data gaps to be addressed during the RI are listed by media below and are limited to contamination on the Terminals property.

Soil

Numerous soil investigations have been completed at the Site to delineate PCB- and chlorinated benzene-contaminated soil. To support development of the RI and IAWP, additional contaminant delineation will be needed within and around the source area. Current soil analytical data will be needed to assess contaminant concentrations and distribution to evaluate remedial options. The extent of PCB detections above screening levels is shown on Figure 10, covering approximately 2,500 square feet and extending approximately 18 feet bgs. The approximate vertical distribution of PCB detections above screening levels is shown on Cross Sections A-A′ and B-B′ (Figures 4 and 5).

Site soil data from within and around the source area was collected prior to or immediately following the previous interim actions completed in 2002 and 2003. The vertical and horizontal extent of the contamination has likely been altered by the previous interim actions. Collection of soil samples from borings installed within and around the source area will be needed to refine the current vertical and horizontal extent of the PCB, chlorinated benzene, and chlorinated ethene contamination. Metals data will be need for remediation planning and waste profiling. Soil samples should be analyzed for VOCs, PCBs, and metals. Additional soil sample analysis to assess potential *in situ* remediation options should include extended diesel-range petroleum hydrocarbons and total organic carbon (TOC) analysis.

Groundwater

Groundwater conditions have been monitored in several wells located downgradient of the PCB/chlorinated benzene source area since the 2003 Interim Action. Results of this long-term groundwater monitoring indicate that 1-4-dichlorobenzene concentrations have historically been below screening levels in compliance monitoring wells JT-6 and JT-12. However, groundwater samples have not been collected recently from within and adjacent to the source area. In general, groundwater samples from this area were last collected immediately before or after the Interim Actions. Additional sampling in and around the source area will be needed to assess current groundwater conditions.

In 2010, PCBs were detected in groundwater at the Terminals property at MW-4, located within the petroleum-contaminated soil area. Wells in this area should also be sampled to assess current groundwater PCB concentrations associated with the residual soil contamination left in place following the 1996 remedial excavation.

On October 3, 2013, Hart Crowser personnel completed a site walk and observed the condition of groundwater monitoring wells on the Terminals property. Monitoring and injection wells were determined to be in acceptable condition, but many well monuments were missing bolts and full of water. Well caps were generally in good condition and it appeared that surface water was likely not entering the wells. We recommend that all monitoring wells sampled during the RI be repaired and developed before sampling.

Groundwater samples should be analyzed for VOCs and PCBs. Analysis for total and dissolved metals will be needed to assess potential groundwater treatment options if contaminant excavation is the selected remedial action. Additional analysis, including total organic carbon, alkalinity, nitrates, sulfates, and chloride should also be analyzed to assess subsurface conditions for potential *in situ* bioremediation remediation.

Sediment

No data has been collected to determine whether COCs from the Terminals and Market Street properties have impacted adjacent sediment in the Lake Washington Ship Canal. Sediment sampling will be needed to determine if sediment has been impacted by historical contaminant releases discussed in this report.

Sediment adjacent to the Terminals property dock should be sampled using boat-mounted vibracore equipment to depths of 5 feet below the mudline. Samples should be analyzed for volatiles (including dichlorobenzenes and 1,2,4-trichlorobenzene), PCBs, total metals, and total organic carbon analysis.

REFERENCES

Aspect 2003. Draft Cleanup Action Plan, Jacobson Terminals. Prepared for A&B Jacobson, LLC, by Aspect, LLC. August 27, 2003.

Aspect 2004. Construction Report, Reactive/Sorptive Wall Groundwater Treatment System, Jacobson Terminals Site Memorandum. Prepared for A&B Jacobson, LLC, by Aspect Consulting. February 17, 2004.

Aspect 2010. Re: Comments on Periodic Review Draft Report Jacobson Terminals, Inc. Prepared for Ecology on behalf of Jacobson Terminals, Inc. by Aspect Consulting. April 9, 2010.

Aspect 2013. Analytical data and CAD files provided by Aspect. July and September 2013.

EMCON 1996. Interim Report on Independent Cleanup, 2801 Northwest Market Street, Seattle Washington. Prepared for Fentron Building Products, Inc., by EMCON. December 1996.

Hart Crowser 1997. Petroleum-Contaminated Soil Removal, Lake Washington Ship Canal, Seattle, Washington. Prepared for Seattle District Army Corps of Engineers and Jacobson Terminals, Inc. March 1997.

Hart Crowser 1999. Cleanup Action Plan Market Street Property, Seattle, Washington. Prepared for A&B Jacobson, LLC, by Hart Crowser. June 22, 1999.

Hart Crowser 2000. Construction Report, Zero-Valent Iron Groundwater Treatment Wall, prepared by Hart Crowser. January 14, 2000.

Hart Crowser 2002. Jacobson Terminals Interim Cleanup Action Summary Report Seattle, Washington. Prepared for A&B Jacobson, LLC, by Hart Crowser. July 18, 2002.

L:\Jobs\1780043\Data Gaps Report\Final\Jacobson Data Gaps Report Update.doc

Table 1 - Historical Soil Sampling Analytical Results

			PCB Concentration in mg/kg	Concentration of Chlorinated Aliphatic Compounds in ug/kg						Concentration of Chlorinated Benzenes in ug/kg						Concentration of Other Detected VOCs in ug/kg								
Location	Date	Sample Depth in Feet	Aroclor 1260	Vinyl Chloride	1,1-DCE	trans-DCE	cis-DCE	TCE	PCE	CB	1,3-DCB	1,4-DCB	1,2-DCB	1,2,4-TCB	1,2,3-TCB	Chloroform	Benzene	Toluene	Xylenes	1,2,4-TMB	1,3,5-TMB	n-Butylbenzene	HCB	Naphthalene
Screening Levels Protective of Surface Water(A)			***0.0000787***	***0.76***	***1.14***	***2,713***	***na***	***4.2***	***1.75***	***869***	***1,062***	***na***	***1,010***	***5.40***	***na***	***125***	***6.38***	***5,453***	***na***	***5.40***	***na***	***na***	***na***	***6,877***
October 2000 p-Dichlorobenzene Assessment																								
HC-31	10/24/2000	11 to 14	--	50 U	50 U	50 U	50 U	50 U	50 U	580	210	380	**4,000**	--	--	50 U	50 U	50 U	50 U	--	--	--	--	--
HC-31	10/24/2000	14 to 17	--	50 U	50 U	50 U	50 U	50 U	50 U	250 U	230	320	430	--	--	50 U	50 U	50 U	50 U	--	--	--	--	--
February 2001 Injection Point Installation																								
IP-1	2/20/2001	Drill Cuttings	**360** TIC	50 U	50 U	50 U	50 U	50 U	50 U	500 U	660	2,700	**3,200**	**230** TIC	17 TIC	50 U	50 U	560	50 U	--	--	--	--	--
IP-2	4/11/2001	Drill Cuttings	**110**	50 U	50 U	50 U	50 U	50 U	50 U	260	920	2,900	**4,700**	**560,000**	13,000	50 U	50 U	50 U	50 U	--	--	--	--	--
IP-3	4/11/2001	Drill Cuttings	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	120	170	330	50 U	**2,800**	450	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
JT-8	2/20/2001	Drill Cuttings	--	50 U	50 U	50 U	50 U	50 U	50 U	250 U	50 U	370	50 U	--	--	50 U	50 U	180	50 U	50 U	50 U	50 U	50 U	50 U
JT-8	4/11/2001	Drill Cuttings	**2.5**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May 2001 PCB/TCB Assessment																								
SP-1	5/23/2001	12 to 16	**2.7**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-2	5/22/2001	12 to 16	**550**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	840	620	50 U	**11,000**	790	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-2	5/22/2001	16 to 20	**0.31**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	**520**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-3	5/22/2001	12 to 16	**14**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	**5,800**	450	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-4	5/23/2001	8 to 12	**530**	50 U	50 U	50 U	50 U	50 U	50 U	790	250	550	50 U	**28,000**	2,000	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-4	5/23/2001	12 to 16	**3.4**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	**840**	210	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-5	5/22/2001	0 to 4	**18**	50 U	50 U	50 U	50 U	50 U	50 U	570	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-5	5/22/2001	4 to 8	**3.6**	50 U	50 U	50 U	50 U	50 U	50 U	**5,800**	50 U	210	50 U	50 U	50 U	50 U	50 U	50 U	50 U	**220**	**100**	50 U	50 U	210
SP-5	5/22/2001	16 to 20	**0.43**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	**900**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-6	5/23/2001	0 to 4	**0.35**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-6	5/23/2001	8 to 12	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	170	50 U	150	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-6	5/23/2001	12 to 16	**25**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	930	860	180	**45,000**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-6	5/23/2001	16 to 20	**1.2**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	680	560	50 U	**2,700**	2,500	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-7	5/22/2001	12 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	410	50 U	50 U	**1,600**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-8	5/22/2001	4 to 8	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	310	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-8	5/22/2001	12 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-9	5/22/2001	12 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	140	450	150	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	140
SP-10	5/22/2001	16 to 20	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-11	5/21/2001	12 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-12	5/22/2001	4 to 8	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-12	5/22/2001	16 to 20	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	240	50 U	180	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-13	5/21/2001	12 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-14	5/21/2001	4 to 8	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-14	5/21/2001	16 to 20	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-15	5/21/2001	16 to 20	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-15	5/21/2001	24 to 28	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-16	5/21/2001	0 to 4	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-16	5/21/2001	16 to 20	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-17	5/21/2001	0 to 4	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-17	5/21/2001	16 to 20	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-17	5/21/2001	20 to 24	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-18	5/21/2001	0 to 4	**0.22**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	260	50 U	50 U	50 U	50 U	**360**	50 U	**250**	440	820
SP-18	5/21/2001	4 to 8	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-18	5/21/2001	16 to 20	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-19	5/23/2001	8 to 12	**820**	50 U	50 U	50 U	50 U	50 U	50 U	**15,000**	320	1,400	50 U	**900**	50 U	50 U	**450**	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-19	5/23/2001	12 to 16	**0.5**	50 U	50 U	50 U	50 U	50 U	50 U	710	50 U	50 U	50 U	**190**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-20	6/6/2001	16 to 20	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-20	6/6/2001	20 to 24	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	130
SP-21	6/6/2001	8 to 12	**0.12** J	50 U	50 U	50 U	1,400	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-21	6/6/2001	12 to 16	**0.16** J	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-22	6/6/2001	8 to 12	**0.16** J	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-22	6/6/2001	16 to 20	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-23	6/6/2001	12 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-24	6/6/2001	4 to 8	**17**	50 U	50 U	50 U	50 U	50 U	50 U	280	50 U	170	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-24	6/6/2001	12 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-25	6/6/2001	0 to 4	**9.5**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	1,000
SP-25	6/6/2001	12 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-26	6/6/2001	4 to 8	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	**4,400**	50 U	280	50 U	50 U	1,800	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	170
SP-26	6/6/2001	12 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	340	620	530	50 U	**26,000**	280	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-27	6/6/2001	12 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	380	280	50 U	**3,200**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-28	6/6/2001	12 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	**160**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-29	6/6/2001	0 to 4	**0.6**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	210	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-29	6/6/2001	12 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	490	250	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
August 2001 Injection Point Installation																								
IP-4 S1	8/22/2001	2.5 to 4	**4.7**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
IP-4 S2	8/22/2001	10 to 11.5	**96**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
IP-5 S1	8/22/2001	10 to 11.5	**0.97**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
IP-6 S1	8/22/2001	10 to 11.5	**280**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
IP-7 S1	8/23/2001	2.5 to 4	0.2 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
IP-7 S2	8/23/2001	10 to 11.5	**0.41**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
IP-8 S1	8/22/2001	15 to 16.5	**32**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
IP-9 S1	8/21/2001	15 to 16.5	**400**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
IP-10 S1	8/24/2001	15 to 16.5	0.2 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
IP-11 S1	8/21/2001	14.5 to 16	**4.6**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
IP-12 S1	8/22/2001	10 to 11.5	**0.19** J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
IP-13 S1	8/23/2001	12.5 to 14	**0.28**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--

			PCB Concentration in mg/kg	Concentration of Chlorinated Aliphatic Compounds in ug/kg						Concentration of Chlorinated Benzenes in ug/kg						Concentration of Other Detected VOCs in ug/kg								
Location	Date	Sample Depth in Feet	Aroclor 1260	Vinyl Chloride	1,1-DCE	trans-DCE	cis-DCE	TCE	PCE	CB	1,3-DCB	1,4-DCB	1,2-DCB	1,2,4-TCB	1,2,3-TCB	Chloroform	Benzene	Toluene	Xylenes	1,2,4-TMB	1,3,5-TMB	n-Butylbenzene	HCB	Naphthalene
January 2002 Railroad Track Investigation																								
SP-32	1/15/2002	16 to 20	--	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-35	1/30/2002	16 to 20	--	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	20 U	50 U	50 U	**330**	50 U	50 U	50 U	50 U
SP-35	1/30/2002	20 to 23	--	50 U	50 U	50 U	50 U	50 U	6.7 J	50 U	50 U	50 U	50 U	50 U	50 U	50 U	20 U	50 U	50 U	**160**	50 U	50 U	50 U	50 U
January 2002 Performance Monitoring																								
IP-1(B)	1/15/2002	8 to 12	**0.2**	50 U	50 U	50 U	50 U	50 U	50 U	**950**	280	790	100	**420**	50 U	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
IP-1(B)	1/15/2002	12 to 16	**0.2**	50 U	50 U	50 U	50 U	50 U	50 U	50	200	170	50 U	**200**	50 U	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
IP-6(B)	1/15/2002	8 to 12	**6**	50 U	50 U	50 U	50 U	50 U	50 U	**3,400**	650	1,300	120	**1,200**	50 U	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-2(B)	1/15/2002	12 to 16	**410**	50 U	50 U	50 U	50 U	350	1,400	50 U	50 U	50 U	50 U	**200**	300	50 U	20 U	50 U	50 U	50 U	50 U	50 U	500	350
SP-4(B)	1/15/2002	8 to 12	**210**	50 U	50 U	50 U	50 U	50 U	330	**2,000**	**2,600**	11,000	**1,500**	**270,000**	12,000	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-6(B)	1/15/2002	12 to 16	**800**	50 U	50 U	50 U	50 U	50 U	6.7 J	210	**1,900**	2,000	500	**130,000**	5,900	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-19(B)	1/15/2002	12 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	6.7 J	50 U	120	140	50 U	**7,800**	690	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-26(B)	1/15/2002	12 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	6.7 J	220	350	290	50 U	**2,100**	140	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-36	1/29/2002	12 to 16	**210**	50 U	50 U	50 U	50 U	50 U	6.7 J	150	**1,500**	1,200	280	**240,000**	4,500	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	110
SP-37	1/29/2002	13.5 to 15.5	0.2 U	50 U	50 U	50 U	50 U	50 U	6.7 J	50 U	**1,100**	1,000	140	**8,200**	250	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	68
SP-38	1/29/2002	13 to 16	**880**	50 U	50 U	50 U	50 U	50 U	6.7 J	420	**13,000**	11,000	**3,200**	**310,000**	2,400	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-39	1/29/2002	10 to 13	0.2 U	50 U	50 U	50 U	50 U	50 U	6.7 J	88	470	410	130	**1,900**	2,400	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-39	1/29/2002	13 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	6.7 J	50 U	300	260	50 U	**3,000**	190	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-40	1/29/2002	10 to 13	**0.2**	50 U	50 U	50 U	50 U	50 U	6.7 J	170	130	180	50 U	**710**	50 U	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-40	1/29/2002	13 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	6.7 J	50 U	160	120	50 U	**440**	50 U	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
March 2002 Railroad Monitoring Well Installation																								
BR-1	4/11/2002	21.5 to 23	--	50 U	50 U	50 U	380	20 U	330	50 U	50 U	50 U	50 U	50 U	50 U	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
BR-2	4/11/2002	22 to 23.5	--	8 U	50 U	50 U	470	620	960	50 U	50 U	50 U	50 U	50 U	50 U	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
June 2002 Confirmation Soil Sampling																								
SP-41	6/5/2002	12 to 16	**290**	50 U	50 U	50 U	50 U	20 U	20 U	**6,600**	**5,600**	15,000	**1,100**	**84,000**	7,200	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	200
SP-42	6/5/2002	8 to 12	**690**	50 U	50 U	50 U	1,500	130	20 U	**5,000**	**5,600**	14,000	820	**14,000**	7,800	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	710
SP-42	6/5/2002	12 to 16	**2.4**	50 U	50 U	50 U	50 U	20 U	20 U	610	970	2,500	130	**6,300**	180	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	180
SP-43	6/5/2002	8 to 12	**42**	50 U	50 U	50 U	50 U	20 U	20 U	**22,000**	**4,200**	4,800	640	**27,000**	1,000	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-43	6/5/2002	12 to 16	0.2 U	50 U	50 U	50 U	50 U	20 U	20 U	390	700	850	**180**	**6,600**	50 U	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-44	6/5/2002	8 to 12	**200**	50 U	50 U	50 U	50 U	20 U	20 U	**880**	**2,100**	7,800	**2,100**	**180,000**	26,000	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	690
SP-44	6/5/2002	12 to 16	**290**	50 U	50 U	50 U	50 U	20 U	20 U	190	**1,500**	1,000	430	**98,000**	9,000	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-45	6/5/2002	4 to 8	**0.33**	50 U	50 U	50 U	50 U	20 U	20 U	760	290	340	100	**3,500**	370	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-45	6/5/2002	8 to 12	0.2 U	50 U	50 U	50 U	400	20 U	20 U	110	50 U	210	50 U	**1,600**	220	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-45	6/5/2002	12 to 16	0.2 U	50 U	50 U	50 U	50 U	20 U	20 U	50 U	940	550	88	**3,200**	290	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-46	6/5/2002	12 to 16	0.2 U	50 U	50 U	50 U	50 U	20 U	20 U	50 U	**1,600**	1,200	190	**4,600**	190	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-47	6/5/2002	8 to 12	0.2 U	**830**	50 U	50 U	4,300	20 U	20 U	50 U	150	200	290	**14,000**	2,200	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-47	6/5/2002	12 to 16	**250**	50 U	50 U	50 U	50 U	20 U	20 U	50 U	**1,500**	2,000	**1,300**	**360,000**	18,000	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-48	6/5/2002	8 to 12	0.2 U	50 U	50 U	50 U	50 U	20 U	20 U	50 U	**1,400**	2,000	1,000	**170,000**	4,000	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-48	6/5/2002	12 to 16	**70**	50 U	50 U	50 U	50 U	20 U	20 U	50 U	**1,200**	1,400	790	**33,000**	3,000	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-49	6/5/2002	12 to 16	0.2 U	50 U	50 U	50 U	50 U	20 U	20 U	320	250	300	50 U	**2,500**	400	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
June 2003 Installation of Well JT-11																								
JT-11	6/3/2003	13 to 19	--	50 U	50 U	50 U	50 U	20 U	20 U	50 U	400	190	50 U	50 U	50 U	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
October 2003 Wall Design Investigation																								
SP-51	10/3/2003	18 to 21	0.2 U	50 U	50 U	50 U	50 U	20 U	20 U	50 U	110	95	50 U	50 U	50 U	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-53	10/3/2003	4 to 8	0.2 U	50 U	50 U	50 U	50 U	20 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-53	10/3/2003	16 to 19	0.2 U	50 U	50 U	50 U	50 U	20 U	20 U	50 U	830	350	50 U	50 U	50 U	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U

Notes:

Data table compiled by Aspect Consulting, LLC.

A = Screening level based on soil concentrations protective of surface water (WAC 173-340-474) using the 3-Phase Partitiong Model based on groundwater migration to surface water.

PCB and many VOC screening levels for surface water protection are below the PQL.

J	Estimated value	CB	Chlorobenzene	1,2-DCB	o-Dichlorobenzene	1,2,4-TMB	1,2,4-Trimethylbenzene
U	Not detected at indicated detection limit	1,3-DCB	m-Dichlorobenzene	1,2,3-TCB	1,2,3-Trichlorobenzene	HCB	Hexachlorobutadiene
--	Not analyzed	1,4-DCB	p-Dichlorobenzene	1,2,4-TCB	1,2,4-Trichlorobenzene	TIC	Quantified by TIC Scan
Bold	Exceeds screening level protective of surface water (A).						

Table 2 - Historical Groundwater Monitoring Analytical Results

Well	Location	Date	Concentration of Chlorinated Ethene Compounds in ug/L						Concentration of Chlorinated Benzene Compounds in ug/L						Concentration of Other Detected Volatile Organic Compounds in ug/L													
			Vinyl Chloride	1,1-DCE	trans-DCE	cis-DCE	TCE	PCE	CB	1,3-DCB	1,4-DCB	1,2-DCB	1,2,4-TCB	1,2,3-TCB	Chloromethane	Dibromomethane	1,1-DCA	1,2-DCA	1,1,2-TCA	1,1,2,2,-TeCA	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	1,3,5-TMB	1,2,4-TMB	Chloroform
	Screening Level (A)		2.40	3.2[B]	10,000	na	12.7[C]	3.3	1,600	960	190	1,300	1.96[C]	na	na	na	na	37	16	4	22.7[C]	15,000	2,100	na	4940[C]		na	470
BR-1	City Property	4/15/2002	**59**	1 U	1 U	1300	**400**	**450**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	**36**	1.3	1 U	1 U	1 U	1 U	1 U	
		6/4/2002	**130**	1 U	9.3	1000	**420**	**400**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	**27**	1.2	3.7	1 U	1 U	1 U	1 U	
		3/13/2003	0.2 U	1 U	1 U	2200	**900**	**1,500**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
BR-2	City Property	4/15/2002	**41**	8.9	1 U	660	**620**	**1,400**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	**89**	1 U	1 U	8.7	1 U	1 U	1 U	
		4/15/2004	**11**	1.0	4.8	890	**400**	**700**	1 U	1 U	1 U	1 U	1 U	1 U	1.5	na	na	na	1 U	na	11	2.3	1 U	5.1	1.2	1 U	1 U	
		7/6/2004	**15**	1 U	1 U	2,400	**570**	**1,000**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	20	1 U	1 U	1 U	1 U	1 U	1 U	
		10/1/2004	**11**	1 U	1 U	950	**290**	**850**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	12	1 U	1 U	1 U	1 U	1 U	1 U	
		1/25/2005	**4**	1 U	1 U	740	**270**	**610**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	5.7	1 U	1 U	1 U	1 U	1 U	1 U	
		4/18/2005	0.22	1 U	1 U	140	35	**72**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1	1 U	1 U	1 U	1 U	1 U	1 U	
		10/19/2005	**11**	1 U	2.5	560	**160**	**550**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	4.4	2.6	2.9	2	1 U	1 U	1 U	
		4/21/2006	**5.6**	1 U	2.3	520	**81**	**210**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	2.9	1 U	1 U	1 U	1 U	1 U	1 U	
		4/24/2007	**8.9**	1 U	3.0	640	**59**	**110**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	4.5	1 U	1 U	1 U	1 U	1 U	1 U	
		4/22/2008	**10**	1 U	2.8	420	**31**	**27**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	4.2	1 U	1 U	1 U	1 U	1 U	1 U	
		4/27/2009	**33**	1 U	4.0	560	**29**	**21**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	9.2	1 U	1 U	1 U	1 U	1 U	1 U	
		4/27/2010	**22**	1 U	2.0	320	4.7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	5.4	1.2	1 U	1.6	1 U	1 U	1 U	
		4/13/2011	**7.1**	1 U	1.0	110	1.0	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	2.6	1 U	1 U	1 U	1 U	1 U	1 U	
		4/19/2012	**12**	1 U	1 U	87	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
		4/12/2013	**140**	1.2	1.8	190	1.1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	3.9	1 U	1 U	1.0	1 U	1 U	1 U	
HC-MW-3	Corps Property	12/11/1997	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	--	--	1 U	na	na	na	0.2 U	na	0.5 U	0.5 U	0.5 U	0.5 U	--	--	--	0.2 U
		4/8/1998	5 U	1 U	1 U	1 U	1 U	1 U	--	--	--	--	--	--	--	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/20/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/7/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/7/2000	5 U	5 U	5 U	5 U	16	1 U	5 U	1 U	1 U	1 U	--	--	5 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/10/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	na	na	na	5 U	na	5 U	1 U	5 U	1 U	1 U	1 U	1 U	5 U
		2/25/2003	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	na	na	na	5 U	na	5 U	1 U	5 U	1 U	1 U	1 U	1 U	5 U
		5/1/2003	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/1/2003	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		12/18/2003	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/15/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/18/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/24/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/23/2008	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2009	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2010	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/13/2011	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/19/2012	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/11/2013	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IG-1A	West Treatment Gate	1/27/2005	**2.7**	1 U	1 U	33	2.6	**14**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/18/2005	0.2 U	1 U	1 U	18	2.0	**9.6**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	1.1	1 U	1 U	16	1.1	**5.2**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/24/2007	0.5	1 U	1 U	57	1 U	3.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.0	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/23/2008	1.7	1 U	1 U	11	1 U	2.9	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/25/2009	2.1	1 U	1 U	3.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2010	0.2 U	1 U	1 U	1.6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/12/2011	0.92	1 U	1 U	9.9	1 U	1.9	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/19/2012	**3.2**	1 U	1 U	11	1 U	1.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.6	1 U	1 U	1 U	1 U	1 U	1 U
		4/12/2013	1.5	1 U	1 U	8.1	8.2	**35**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IG-2	West Treatment Gate	1/20/2000	**67**	5 U	5 U	130	**14**	**42**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/7/2000	**44**	5 U	5 U	79	**17**	**54**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/6/2000	**16**	5 U	5 U	75	11	**38**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/10/2000	**16**	5 U	5 U	60	8.9	**32**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	**15**	5 U	5 U	41	**13**	**40**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/9/2001	5 U	5 U	5 U	18	12	**50**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/9/2001	5 U	5 U	5 U	21	**14**	**45**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	**4**	5 U	5 U	7	1 U	**4.5**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/15/2002	5 U	5 U	1 U	8.1	1 U	**13**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/1/2002	5 U	5 U	5 U	15	3.2	**20**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		5/1/2003	1 U	1 U	1 U	1 U	1 U	3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	5 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		11/3/2003	5 U	5 U	5 U	2.3	1 U	**4.0**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/27/2004	**3.6**	1 U	1 U	5.2	1 U	**4.5**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	5 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2004	**4.5**	1 U	1 U	4.3	1 U	3.9	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/18/2005	**2.8**	1 U	1 U	5.0	1 U	4.1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	**5.8**	1 U	1 U	35	1 U	2.7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.3	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/24/2007	**6.8**	1 U	1 U	57	1 U	3.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	3.6	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/23/2008	**10**	1 U	1 U	27	1 U	2.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	4.3	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/25/2009	**52**	1 U	1 U	180	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	4.3	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2010	**120**	1 U	1 U	300	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5.1	1.6	1 U	1 U	1 U	1 U	1 U	1 U
		4/12/2011	**85**	1 U	1 U	350	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/19/2012	**220**	9.2	1 U	1100	4.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/12/2013	**43**	1 U	1 U	110	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

			Concentration of Chlorinated Ethene Compounds in ug/L						Concentration of Chlorinated Benzene Compounds in ug/L						Concentration of Other Detected Volatile Organic Compounds in ug/L													
Well	Location	Date	Vinyl Chloride	1,1-DCE	trans-DCE	cis-DCE	TCE	PCE	CB	1,3-DCB	1,4-DCB	1,2-DCB	1,2,4-TCB	1,2,3-TCB	Chloromethane	Dibromomethane	1,1-DCA	1,2-DCA	1,1,2-TCA	1,1,2,2,-TeCA	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	1,3,5-TMB	1,2,4-TMB	Chloroform
	Screening Level (A)		**2.40**	**3.2[B]**	**10,000**	**na**	**12.7[C]**	**3.3**	**1,600**	**960**	**190**	**1,300**	**1.96[C]**	**na**	**na**	**na**	**na**	**37**	**16**	**4**	**22.7[C]**	**15,000**	**2,100**	**na**	**4940[C]**		**na**	**470**
IG-3	East Treatment Gate	1/20/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/7/2000	5 U	5 U	5 U	5 U	5.8	3.2	5 U	4.5 C	4.7 C	4.7 C	--	--	5 U	5.1	5 U	5 U	1 U	5 U	1 U	1 U	1 U	4.2	--	--	--	1 U
		7/6/2000	5 U	5 U	5 U	3.0 J	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/10/2000	5 U	5 U	5 U	5 U	4.8	**13**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/9/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/10/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	5 U	5 U	5 U	5 U	1 U	**19**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/15/2002	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/1/2002	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		5/1/2003	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		11/3/2003	5 U	5 U	5 U	3.5	1 U	**3.6**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/27/2004	0.2 U	1 U	1 U	1.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/18/2005	0.2 U	1 U	1 U	1 U	1 U	**3.4**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/24/2007	0.2 U	1 U	1 U	1.3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/23/2008	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/25/2009	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/28/2010	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/12/2011	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/19/2012	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/12/2013	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IG-4	East Treatment Gate	1/20/2000	**15**	5 U	5 U	25	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/7/2000	5 U	5 U	5 U	5 U	1 U	3.2	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/6/2000	**21**	5 U	5 U	2.6 J	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/10/2000	5 U	5 U	5 U	5 U	1 U	2.6	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/9/2001	5 U	5 U	5 U	5 U	5.1	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/9/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/15/2002	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/1/2002	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		5/1/2003	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		11/3/2003	5 U	5 U	5 U	5 U	1 U	1.2	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/27/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/18/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/24/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/23/2008	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/25/2009	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/28/2010	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/12/2011	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/19/2012	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/11/2013	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IP-1	Terminals Property	2/20/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	140	**1300**	670	--	--	5 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/10/2001	**4.8**	1 U	1 U	7	1 U	1 U	55	100	140	59	**850**	110	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		7/10/2001	0.2 U	1 U	1 U	1 U	1 U	1 U	16	44	**330**	580	**1200**	1300	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/22/2001	0.2 U	1 U	1 U	2.9	1 U	1 U	23	34	**300**	550	**9000**	850	1 U	na	na	na	1 U	na	3.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		12/17/2001	**5.5**	1 U	1 U	11	1 U	1 U	16	17	**200**	230	**11000**	2500	14	na	na	na	1 U	na	4.7	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		6/3/2002	0.2 U	1 U	1 U	1 U	1 U	1 U	6.9	11	160	310	**4000**	92	1 U	na	na	na	1 U	na	3.1	1 U	1 U	1 U	1 U	1 U	1 U	
IP-2	Terminals Property	2/20/2001	5 U	5 U	5 U	15	1 U	1 U	120	140	**200**	54	--	--	5 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/10/2001	1 U	1 U	1 U	1 U	1 U	1 U	5	14	110	210	**4000**	590	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		7/10/2001	**16**	1 U	1 U	9.3	1 U	1 U	280	200	**280**	120	**2300**	300	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/22/2001	2.4	1 U	1 U	1.5	1 U	1 U	3.1	13	33	36	**1100**	91	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		12/17/2001							37	190	**190**	100	**1800**	140	1 U	na	na	na		na	1.7	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		6/3/2002	0.2 U	1 U	1 U	1 U	1 U	1 U	23	47	56	80	**4700**	270	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
IP-3	Terminals Property	2/20/2001	5 U	5 U	5 U	5 U	1 U	1 U	88	19	**30**	1 U	--	--	5 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/10/2001	1 U	1 U	1 U	1.2	1 U	1 U	47	7.7	9.4	1.4	19	3.1	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		7/10/2001	**6.7**	1 U	1 U	4.7	1 U	1 U	200	23.0	27.0	2.6	16	2.4	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/22/2001	0.2 U	1 U	1 U	1.1	1 U	1 U	11	1.4	2.1	1.0 U	12	1.0 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		6/3/2002	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	10	1.0 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IP-4	Terminals Property	10/22/2001	**81**	1 U	1 U	28	1 U	1 U	97	1	4	1 U	4.4	1.0 U	1 U	na	na	na	1 U	na	14	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		6/3/2002	**74**	1 U	1 U	25	1 U	1 U	50	1 U	2.5	1 U	1.0 U	1.0 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		3/13/2003	**52**	1 U	1 U	22	1 U	1 U	65	1 U	2.6	1 U	9.2	1.0 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IP-5	Terminals Property	1/30/2002	**59**	1 U	1 U	43	1 U	1 U	75	120	**220**	24	**550**	37	1 U	na	na	na	1 U	na	3.8	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		6/3/2002	**17**	1 U	1 U	1 U	1 U	1 U	250	23	62	1 U	**300**	25	1 U	na	na	na	1 U	na	11	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IP-6	Terminals Property	1/30/2002	**410**	1 U	1 U	170	1 U	1 U	15	4.6	**6**	1 U	**190**	21	3.1	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		6/3/2002	**650**	1 U	1 U	62	1 U	1 U	600	28.0	53	7.2	16	1 U	1 U	na	na	na	1 U	na	4.7	1 U	1 U	1 U	1 U	1 U	1 U	
IP-7	Terminals Property	1/30/2002	**370**	1 U	1 U	120	1 U	1 U	140	170.0	**150**	75	**7500**	650	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		6/3/2002	**42**	1 U	1 U	17	1 U	1 U	180	180.0	**330**	37	**780**	42	1 U	na	na	na	1 U	na	3.9	1 U	1 U	1 U	1 U	1 U	1 U	
IP-8	Terminals Property	10/22/2001	**32**	1 U	1 U	14	1 U	1 U	400	160	**140**	31	200	6.2	1 U	na	na	na	1 U	na	5	1	1 U	1 U	1 U	1 U	1 U	1 U
		12/17/2001	**500**	1 U	1 U	190	1 U	1 U	190	400	**320**	96	**2600**	13	4.3	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		6/3/2002	**23**	1 U	1 U	21	2.2	1 U	120	350	**450**	1 U	**250**	16	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	

Table 2 - Historical Groundwater Monitoring Analytical Results

			Concentration of Chlorinated Ethene Compounds in ug/L						Concentration of Chlorinated Benzene Compounds in ug/L						Concentration of Other Detected Volatile Organic Compounds in ug/L													
Well	Location	Date	Vinyl Chloride	1,1-DCE	trans-DCE	cis-DCE	TCE	PCE	CB	1,3-DCB	1,4-DCB	1,2-DCB	1,2,4-TCB	1,2,3-TCB	Chloromethane	Dibromomethane	1,1-DCA	1,2-DCA	1,1,2-TCA	1,1,2,2,-TeCA	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	1,3,5-TMB	1,2,4-TMB	Chloroform
	Screening Level (A)		**2.40**	**3.2[B]**	**10,000**	**na**	**12.7[C]**	**3.3**	**1,600**	**960**	**190**	**1,300**	**1.96[C]**	**na**	**na**	**na**	**na**	**37**	**16**	**4**	**22.7[C]**	**15,000**	**2,100**	**na**	**4940[C]**		**na**	**470**
IP-10	Terminals Property	10/22/2001	**340**	1 U	1 U	96	1.3	1 U	370	32	55	7.3	**88**	6.6	1 U	na	na	na	1 U	na	11	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		12/17/2001	**300**	1 U	1 U	120	4.7	1 U	31	6	15	1.1	13	1 U	25	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		6/3/2002	**300**	1 U	1 U	62	1 U	1 U	230	27	54	6.0	65	5.5	1 U	na	na	na	1 U	na	11	1 U	1 U	1 U	1 U	1 U	1 U	
		3/13/2003	**140**	1 U	1 U	29	1 U	1 U	260	41	83	7.7	9	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
IP-11	Terminals Property	10/22/2001	**68**	1 U	1 U	3.4	1 U	1 U	440	160	100	7.4	3	1 U	1 U	na	na	na	1 U	na	17	1	1 U	1 U	1 U	1 U	1 U	1 U
		12/17/2001	**160**	1 U	1 U	31	1 U	1 U	210	74	82	6.1	62	4.9	32	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		6/3/2002	**55**	1 U	1 U	1 U	1 U	1 U	150	82	66	12.0	4.4	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
IP-12	Terminals Property	6/3/2002	**32**	1 U	1 U	5	1 U	1 U	250	12	24	3.0	4.9	1 U	1 U	na	na	na	1 U	na	4.7	1 U	1 U	1 U	1 U	1 U	1 U	
IP-13	Terminals Property	1/30/2002	**650**	1 U	1 U	240	1 U	1 U	1 U	1 U	1 U	1 U	**1800**	37	5	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		6/3/2002	**380**	1 U	1 U	120	1 U	1 U	170	8.6	15	1 U	23	1 U	1 U	na	na	na	1 U	na	3.8	1 U	1 U	1 U	1 U	1 U	1 U	
IP-14	Terminals Property	6/3/2002	0.2 U	1 U	1 U	1 U	1 U	1 U	5.9	90	100	25	**2300**	32	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IP-15	Terminals Property	6/3/2002	0.2 U	1 U	1 U	13	1 U	1 U	18.0	120	98	43	**950**	72	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IP-16	Terminals Property	6/3/2002	0.2 U	1 U	1 U	1 U	1 U	1 U	32.0	14	87	120	**4600**	450	1 U	na	na	na	1 U	na	4.5	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IP-17	Terminals Property	6/3/2002	0.2 U	1 U	1 U	1 U	1 U	1 U	38.0	68	26	10	45	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IW-1I	Intermediate Zone - West End of Wall	1/20/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/7/2000	5 U	5 U	5 U	5 U	1.6	1.3	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/6/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/10/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
IW-2I	Intermediate Zone - West End of Wall	1/20/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/7/2000	**6.2**	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/6/2000	5 U	5 U	5 U	2 J	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/10/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	5 U	5 U	5 U	5 U	1 U	2.0	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	7.2	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/9/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/9/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/15/2002	1 U	1 U	1 U	7.1	1 U	1 U	5 U	1 U	1 U	1 U	--	--	1 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/1/2002	5 U	5 U	5 U	13	1 U	1 U	5 U	1 U	1 U	1 U	--	--	1 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		5/1/2003	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		11/3/2003	5 U	5 U	5 U	3.1	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/15/2004 [1]	5 U	1 U	1 U	1 U	1 U	1 U	--	--	--	--	--	--	--	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/18/2005	0.63	1 U	1 U	2.0	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	**6.4**	1 U	1 U	6.3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/24/2007	**5.1**	1 U	1 U	6.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/22/2008	**6.7**	1 U	1 U	3.8	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/25/2009	**3.8**	1 U	1 U	2.1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2010	**10**	1 U	1 U	3.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/12/2011	2.1	1 U	1 U	1.0	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/19/2012	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/11/2013	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IW-2S	Shallow Zone - West End of Wall	1/20/2000	**6.3**	5 U	5 U	22	2.2	**35**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/7/2000	5 U	5 U	5 U	21	1.9	**28**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/6/2000	5 U	5 U	5 U	6.9	2.0	**23**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/10/2000	5 U	5 U	5 U	5 U	1 U	**11**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
IW-3I	Intermediate Zone - Downgradient of West Gate	1/20/2000	**11**	5 U	5 U	1,600	**45**	11	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U		1 U	1 U	1 U	1 U	--	--	--	1 U
		4/7/2000	**64**	5 U	5 U	1,200	**18**	**4.6**	5 U	1 U	1 U	1 U	--	--	5 U	8.9	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/6/2000	**70**	50 U	50 U	890	10 U	10 U	50 U	10 U	10 U	10 U	--	--	50 U	50 U	50 U	12	10 U	50 U	10 U	10 U	10 U	10 U	--	--	--	10 U
		10/10/2000	**110**	5 U	5 U	470	3.4	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	2.6	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	**2,300**	5 U	5 U	1,200	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/24/2001	**2,400**	5 U	5 U	1,800	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/9/2001	**1,000**	5 U	5 U	900	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/9/2001	**190**	5 U	5 U	180	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	**170**	5 U	5 U	54	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/1/2002	**13**	5 U	5 U	28	1 U	**4.8**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/18/2005	**3.4**	1 U	1 U	7.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.5	1.0	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	**11**	1 U	1 U	28	2.1	1.1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.1	1.0	1 U	1 U	1 U	1 U	1 U	1 U
		4/24/2007	**4.0**	1 U	1 U	31	2.7	1.3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.3	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/23/2008	**7.5**	1 U	1 U	22	2.9	**4.4**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.1	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/25/2009	**7.5**	1 U	1 U	22	2.9	**4.4**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.1	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2010	**7.7**	1 U	1 U	24	2.7	1.8	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.7	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/12/2011	**4.3**	1 U	1 U	21	3.7	1.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.8	1.3	1 U	1 U	1 U	1 U	1 U	1 U
		4/19/2012	**5.3**	1 U	1 U	30	1.0	1.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/11/2013	**4.9**	1 U	1 U	34	3.0	1.8	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IW-3S	Shallow Zone - Downgradient of West Treatment Gate	1/20/2000	**19**	5 U	5 U	130	4.1	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1.6
		4/7/2000	**41**	5 U	5 U	91	2.6	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/6/2000	5 U	2 J	5 U	41	1 U	**7**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/10/2000	**11**	5 U	5 U	7.6	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/9/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/9/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U

Table 2 - Historical Groundwater Monitoring Analytical Results

			Concentration of Chlorinated Ethene Compounds in ug/L						Concentration of Chlorinated Benzene Compounds in ug/L						Concentration of Other Detected Volatile Organic Compounds in ug/L													
Well	**Location**	**Date**	**Vinyl Chloride**	**1,1-DCE**	**trans-DCE**	**cis-DCE**	**TCE**	**PCE**	**CB**	**1,3-DCB**	**1,4-DCB**	**1,2-DCB**	**1,2,4-TCB**	**1,2,3-TCB**	**Chloromethane**	**Dibromomethane**	**1,1-DCA**	**1,2-DCA**	**1,1,2-TCA**	**1,1,2,2,-TeCA**	**Benzene**	**Toluene**	**Ethylbenzene**	**Xylenes**	**Naphthalene**	**1,3,5-TMB**	**1,2,4-TMB**	**Chloroform**
	Screening Level (A)		**2.40**	**3.2[B]**	**10,000**	**na**	**12.7[C]**	**3.3**	**1,600**	**960**	**190**	**1,300**	**1.96[C]**	**na**	**na**	**na**	**na**	**37**	**16**	**4**	**22.7[C]**	**15,000**	**2,100**	**na**	**4940[C]**		**na**	**470**
IW-4I	Intermediate Zone -	1/20/2000	**930**	43	11	2,600	**2,500**	**22,000**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Upgradient of West	4/7/2000	**1,100**	5 U	13	3,700	**4,500**	**21,000**	5 U	1 U	1 U	1 U	--	--	5 U	82	50	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Gate	7/6/2000	**610**	140	50	8,000	**5,200**	**24,000**	500 U	100 U	100 U	100 U	--	--	500 U	500 U	500 U	500 U	100 U	500 U	100 U	100 U	100 U	100 U	--	--	--	100 U
		10/10/2000	**13**	5 U	5 U	86	**100**	**410**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	**1,900**	5 U	5 U	11,000	**10,000**	**48,000**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/9/2001	5 U	5 U	5 U	10,000	**9,800**	**62,000**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/9/2001	**1,400**	5 U	5 U	9,500	**10,000**	**74,000**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	**790**	5 U	5 U	8,000	**10,000**	**70,000**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/15/2002	**13,000**	500 U	500 U	20,000	**9,000**	**102,000**	500 U	500 U	500 U	500 U	--	--	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	--	--	--	500 U
		10/1/2002	**3,500**	5 U	5 U	18,000	**15,000**	**130,000**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		5/2/2003	**3,700**	75	25	23,000	**14,000**	**28,000**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		11/3/2003	**1,800**	62	35	14,000	**13,000**	**59,000**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/15/2004 [1]	**610**	35	16	2,400	**1,200**	**4,500**	--	--	--	--	--	--	--	--	5 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/18/2005	**220**	8.1	5.5	3,300	**7,900**	**42,000**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	**3,500**	1 U	1 U	11,000	**12,000**	**75,000**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/24/2007	**3,400**	1 U	1 U	13,000	**11,000**	**60,000**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/23/2008	**2,400**	1 U	1 U	8,500	**12,000**	**45,000**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/25/2009	**700**	1 U	1 U	4,500	**7,500**	**27,000**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2010	**3,100**	1 U	1 U	9,300	**13,000**	**90,000**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/13/2011	**2,100**	1 U	1 U	6,500	**11,000**	**110,000**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/19/2012	**800**	1 U	1 U	7,700	**11,000**	**90,000**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/12/2013	**2,200**	1 U	1 U	11,000	**12,000**	**120,000**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IW-4S	Shallow Zone -	1/20/2000	5 U	5 U	5 U	65	**32**	**230**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Upgradient of West	4/7/2000	5 U	5 U	5 U	100	**39**	**300**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Gate	7/6/2000	10 U	10 U	10 U	160	**34**	**280**	10 U	2 U	2 U	2 U	--	--	10 U	10 U	10 U	10 U	2 U	10 U	2 U	2 U	2 U	2 U	--	--	--	2 U
		10/10/2000	5 U	5 U	5 U	84	**32**	**230**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	**81**	5 U	5 U	76	**100**	**240**	61	1 U	1 U	1 U			5 U	5 U	5 U	5 U	1 U	5 U	**46**	41	1 U	1 U	--	--	--	1 U
		4/9/2001	5 U	5 U	5 U	25	**23**	**170**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/9/2001	5 U	5 U	5 U	51	**32**	**180**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	5 U	5 U	5 U	80	**31**	**210**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
IW-5D	Deep Zone -	1/20/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Downgradient of	4/10/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Wall	7/6/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/10/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/9/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/9/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
IW-5S	Shallow Zone -	1/20/2000	5 U	5 U	5 U	6.6	1 U	1.4	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	7.4	6.7	5.7	--	--	--	1 U
	Downgradient of	4/10/2000	5 U	5 U	5 U	5.3	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	5.8	14	--	--	--	1 U
	Wall	7/6/2000	5 U	5 U	5 U	7.2	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	5.4	2.0	--	--	--	1 U
		10/10/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/24/2001	5 U	5 U	5 U	15	2.8	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	3.5	3.3	--	--	--	1 U
		4/9/2001	5 U	5 U	5 U	8.9	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	4.4	5.3	--	--	--	1 U
		7/9/2001	5 U	5 U	5 U	5 U	**190**	**1,200**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/19/2001	5 U	5 U	5 U	5 U	1 U	**440**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	5 U	5 U	5 U	5 U	**360**	**1,000**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		11/2/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		12/18/2001	5 U	5 U	5 U	5.7	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/15/2002	5 U	5 U	5 U	9.8	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1.8	1.3	--	--	--	1 U
IW-6I	Intermediate Zone -	1/20/2000	**90**	5 U	6.5	100	1.4	**19**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Downgradient of	4/7/2000	**49**	5 U	5 U	12	1 U	**3.6**	5 U	2.1	1.7	1 U	--	--	5 U	5.8	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	East Gate	7/6/2000	**40**	5 U	3.7 J	34	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/10/2000	**52**	5 U	5 U	8.9	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	**110**	5 U	5 U	33	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/9/2001	**43**	5 U	5 U	19	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/10/2001	**22**	5 U	5 U	12	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	**32**	5 U	5 U	5.3	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
IW-6S	Shallow Zone -	1/20/2000	**100**	5 U	7.9	140	1 U	**3.9**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Downgradient of	4/7/2000	5 U	5 U	5 U	5 U	1 U	**3.6**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	East Gate	7/6/2000	5 U	5 U	1.1 J	1.5 J	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	1.3 J	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/10/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/9/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/10/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U

Table 2 - Historical Groundwater Monitoring Analytical Results

			Concentration of Chlorinated Ethene Compounds in ug/L						Concentration of Chlorinated Benzene Compounds in ug/L						Concentration of Other Detected Volatile Organic Compounds in ug/L													
Well	Location	Date	Vinyl Chloride	1,1-DCE	trans-DCE	cis-DCE	TCE	PCE	CB	1,3-DCB	1,4-DCB	1,2-DCB	1,2,4-TCB	1,2,3-TCB	Chloromethane	Dibromomethane	1,1-DCA	1,2-DCA	1,1,2-TCA	1,1,2,2,-TeCA	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	1,3,5-TMB	1,2,4-TMB	Chloroform
	Screening Level (A)		**2.40**	**3.2^{B}**	**10,000**	**na**	**12.7^{C}**	**3.3**	**1,600**	**960**	**190**	**1,300**	**1.96^{C}**	**na**	**na**	**na**	**na**	**37**	**16**	**4**	**22.7^{C}**	**15,000**	**2,100**	**na**	**4940^{C}**		**na**	**470**
IW-7I	Intermediate Zone -	1/20/2000	5 U	5 U	5 U	310	8.9	**18**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Upgradient of East	4/7/2000	**13**	5 U	5 U	230	11	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Gate	7/6/2000	15 U	15 U	3.9 J	260	15 U	5 U	15 U	5 U	5 U	5 U	--	--	15 U	15 U	3.2 J	15 U	5 U	5 U	5 U	5 U	5 U	5 U	--	--	--	5 U
		10/10/2000	**12**	5 U	5 U	160	5.2	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	**22**	5 U	5 U	260	7.5	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/9/2001	5 U	5 U	5 U	150	5.6	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/9/2001	**11**	5 U	5 U	170	6.2	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	1.9	5 U	5 U	190	2.2	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/15/2002	5 U	5 U	5 U	220	4.6	1.9	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1.8	1 U	1 U	--	--	--	1 U
		10/1/2002	**14**	5 U	5 U	230	4.1	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		5/2/2003	0.2 U	1 U	1 U	100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		11/3/2003	**5.2**	5 U	1.2	140	1.3	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/18/2005	0.2	1 U	1 U	27	1.1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	0.2 U	1 U	1 U	32	1.1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/24/2007	0.2 U	1 U	1 U	36	1.5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/23/2008	**3.1**	1 U	1 U	22	1 U	1.1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/25/2009	1.1	1 U	1 U	20	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/28/2010	2.1	1 U	1 U	14	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/12/2011	0.34	1 U	1 U	11	1.0	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/18/2012	0.6	1 U	1 U	10	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/11/2013	0.8	1 U	1 U	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IW-7S	Shallow Zone -	1/20/2000	**23**	5 U	5 U	200	10	**8.8**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Upgradient of East	4/7/2000	5 U	5 U	5 U	250	11	**12**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Gate	7/6/2000	15 U	15 U	5.4	440	2	5 U	15 U	5 U	5 U	5 U	--	--	15 U	15 U	15 U	15 U	5 U	15 U	5 U	5 U	5 U	5 U	--	--	--	5 U
		10/10/2000	5 U	5 U	5 U	330	7.6	3.2	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	5 U	5 U	5 U	210	**17**	**23**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	6.5	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/9/2001	5 U	5 U	5 U	180	**12**	**17**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/9/2001	5 U	5 U	5 U	430	**26**	**22**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	3.2	--	--	--	1 U
		10/22/2001	5 U	5 U	5 U	450	1 U	**300**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
IW-8D	Deep Zone -	1/20/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Downgradient of	4/7/2000	5 U	5 U	5 U	5 U	1.2	**17**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Treatment Wall	7/6/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/10/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	5 U	5 U	5 U	5 U	**22**	2.3	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	6.2	7.4	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/24/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/9/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/10/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
IW-9I	Intermediate Zone -	1/20/2000	**66**	5 U	5 U	16	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	East End of	4/10/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Treatment Wall	7/6/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/10/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/9/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/9/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/15/2002	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/1/2002	**5.0**	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		5/1/2003	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		11/3/2003	**56**	5 U	5 U	20	1 U	1.4	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/27/2004	**3.3**	1 U	1 U	1.6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/18/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	**4.1**	1 U	1 U	8.7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/24/2007	**6.1**	1 U	1 U	14	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/23/2008	**9.4**	1 U	1 U	14	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/25/2009	**3.3**	1 U	1 U	8	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2010	**2.9**	1 U	1 U	6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/12/2011	**3.5**	1 U	1 U	5.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/18/2012	**3.8**	1 U	1 U	6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/11/2013	**7.3**	1 U	1 U	4.1	1 U	**11**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

			Concentration of Chlorinated Ethene Compounds in ug/L						Concentration of Chlorinated Benzene Compounds in ug/L						Concentration of Other Detected Volatile Organic Compounds in ug/L													
Well	**Location**	**Date**	**Vinyl Chloride**	**1,1-DCE**	**trans-DCE**	**cis-DCE**	**TCE**	**PCE**	**CB**	**1,3-DCB**	**1,4-DCB**	**1,2-DCB**	**1,2,4-TCB**	**1,2,3-TCB**	**Chloromethane**	**Dibromomethane**	**1,1-DCA**	**1,2-DCA**	**1,1,2-TCA**	**1,1,2,2,-TeCA**	**Benzene**	**Toluene**	**Ethylbenzene**	**Xylenes**	**Naphthalene**	**1,3,5-TMB**	**1,2,4-TMB**	**Chloroform**
Screening Level (A)			**2.40**	**3.2[B]**	**10,000**	**na**	**12.7[C]**	**3.3**	**1,600**	**960**	**190**	**1,300**	**1.96[C]**	**na**	**na**	**na**	**na**	**37**	**16**	**4**	**22.7[C]**	**15,000**	**2,100**	**na**	**4940[C]**		**na**	**470**
JT-3	Terminals Property	3/15/1996	**12**	4 U	4 U	10 U	4 U	10 U	4 U	5 U	5 U	5 U	--	--	--	na	na	na	--	na	--	--	--	--	--	--	--	
		3/22/1999	**88**	5 U	5 U	5 U	1 U	1 U	140	77	44	10	--	--	5 U	na	na	na	1 U	na	**41**	1.2	1 U	1.7	--	--	--	1 U
		7/30/1999	**6.4**	5 U	5 U	5 U	1 U	1 U	74	25	19	3.2	--	--	5 U	na	na	na	1 U	na	**61**	1 U	1 U	1 U	--	--	--	1 U
		10/15/1999	5 U	5 U	5 U	5 U	1 U	1 U	--	15	8.7	1.4	--	--	5 U	na	na	na	1 U	na	**29**	1 U	1 U	1 U	--	--	--	1 U
		1/20/2000	5 U	5 U	5 U	5 U	1 U	1 U	130	34	25	2.8	--	--	5 U	na	na	na	1 U	na	**47**	1.3	1 U	1 U	--	--	--	1 U
		4/7/2000	5 U	5 U	5 U	5 U	1.5	1 U	100	25	16	2.8	--	--	5 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/7/2000	5 U	5 U	1.7 J	5 U	1 U	1 U	56	12	10	2	--	--	5 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/11/2000	5 U	5 U	5 U	5 U	1 U	1 U	45	1 U	1 U	1 U	--	--	5 U	na	na	na	1 U	na	**32**	1 U	1 U	1 U	--	--	--	1 U
		1/16/2001	5 U	5 U	5 U	5 U	1 U	1 U	84	24	19	3.1	--	--	5 U	na	na	na	1 U	na	**33**	1	1 U	1 U	--	--	--	1 U
		4/10/2001	1 U	1 U	1 U	1 U	1 U	1 U	50	6.9	5.6	1 U	1 U	1 U	1 U	na	na	na	1 U	na	**27**	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		7/10/2001	5 U	5 U	5 U	5 U	1 U	1 U	85	1 U	1 U	1 U	--	--	5 U	na	na	na	1 U	na	**30**	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	5 U	5 U	5 U	5 U	1 U	1 U	43	1 U	1 U	1 U	--	--	5 U	na	na	na	1 U	na	**55**	1 U	1 U	1 U	--	--	--	1 U
		12/17/2001	0.2 U	1 U	1 U	1 U	1 U	1 U	100	2.1	3.1	1 U	1 U	1 U	1 U	na	na	na	1 U	na	**26**	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/15/2002	5 U	5 U	5 U	5 U	1 U	**5.9**	81	7.4	1 U	1 U	--	--	5 U	na	na	na	1 U	na	22	1 U	1 U	1 U	--	--	--	1 U
		6/4/2002	0.2 U	1 U	1 U	1 U	1 U	1 U	64	2.6	2.7	1 U	1 U	1 U	1 U	na	na	na	1 U	na	**24**	1 U	1 U	1 U	1 U	1 U	1 U	
		5/1/2003	0.2 U	1 U	1 U	1 U	1 U	1 U	44	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	14	1 U	1 U	1 U	1 U	1 U	1 U	
		11/3/2003	0.2 U	1 U	1 U	1 U	1.0	**7.8**	115	1.3	1.9	1 U	1 U	1 U	1 U	na	na	na	1 U	na	17	1 U	1 U	1 U	2.2	1 U	1 U	
		4/15/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	16	1 U	1.2	1 U	1 U	1 U	1 U	na	na	na	1 U	na	3.3	1 U	1 U	1 U	1 U	1 U	1 U	
		7/6/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	8.7	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1	1 U	1 U	1 U	1 U	1 U	1 U	
		10/1/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	7.2	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	2.4	1 U	1 U	1 U	1 U	1 U	1 U	
		1/25/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	15	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	2.4	1 U	1 U	1 U	1 U	1 U	1 U	
		4/18/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	5.5	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1.1	1 U	1 U	1 U	1 U	1 U	1 U	
		10/19/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	6.7	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1.3	1 U	1 U	1 U	1 U	1 U	1 U	
		4/21/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	4.7	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1.6	1 U	1 U	1 U	1 U	1 U	1 U	
		4/24/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	6.5	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1.8	1 U	1 U	1 U	1 U	1 U	1 U	
		4/23/2008	0.2 U	1 U	1 U	1 U	1 U	1 U	7.1	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
		4/27/2009	0.2 U	1 U	1 U	1 U	1 U	1 U	8.1	1 U	1.1	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
		4/27/2010	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.1	1 U	1 U	1 U	1 U	na	na	na	1 U	na	3.8	1 U	1 U	1 U	1 U	1 U	1 U	
		4/13/2011	0.2 U	1 U	1 U	1 U	1 U	1 U	37	1 U	2.2	1 U	1 U	1 U	1 U	na	na	na	1 U	na	3.7	1 U	1 U	1 U	1 U	1 U	1 U	
		4/19/2012	0.2 U	1 U	1 U	1 U	1 U	1 U	54	1 U	2.0	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
		4/11/2013	0.2 U	1 U	1 U	1 U	1 U	1 U	86	1.3	1.8	1 U	1 U	1 U	1 U	na	na	na	1 U	na	2.5	1 U	1 U	1 U	1 U	1 U	1 U	
JT-5	Terminals Property	3/22/1999	5 U	5 U	5 U	5 U	1 U	**5.3**	5 U	1 U	1 U	1 U	--	--	5 U	na	na	na	1 U	na	1 U	1.8	1 U	1 U	--	--	--	1 U
		7/30/1999	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/10/2001	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
JT-6	Terminals Property Adjacent to Ship Canal	3/22/1999	**390**	5 U	7	140	2.2	1.3	300	570	**360**	47	--	--	5 U	na	na	na	1 U	na	9	1.2	1 U	2.5	--	--	--	1 U
		6/17/1999	**430**	5 U	9.5	160	1.4	1.2	5 U	580	**300**	31	--	--	5 U	na	na	na	1 U	na	16	1.4	1 U	1	--	--	--	1 U
		7/30/1999	**400**	5 U	11	160	1.5	1 U	410	400	**270**	24	--	--	5 U	na	na	na	1 U	na	20	1.1	1 U	1	--	--	--	1 U
		10/15/1999	**24**	5 U	1 U	58	1 U	1 U	--	240	**120**	19	--	--	5 U	na	na	na	1 U	na	20	1 U	1 U	1 U	--	--	--	1 U
		10/18/1999	**41**	5 U	1 U	61	1 U	1 U	--	250	**130**	9.2	--	--	5 U	na	na	na	1 U	na	**24**	1.7	1 U	1 U	--	--	--	1 U
		1/21/2000	**150**	5 U	5 U	49	1 U	1 U	840	260	**180**	13	--	--	5 U	na	na	na	1 U	na	**37**	2.8	1 U	1 U	--	--	--	1 U
		4/7/2000	**230**	5 U	6.4	84	1 U	3.1	610	270	**170**	17	--	--	5 U	na	na	na	1 U	na	**29**	2.8	1 U	3	--	--	--	1 U
		7/7/2000	**52**	20 U	12	120	4 U	4 U	300	220	**190**	18	--	--	5 U	na	na	na	4 U	na	18	4 U	4 U	4 U	--	--	--	4 U
		10/11/2000	**78**	5 U	5 U	65	1 U	1 U	550	330	**250**	1 U	--	--	5 U	na	na	na	41	na	**29**	1 U	1 U	1 U	--	--	--	1 U
		1/16/2001	**94**	5 U	5 U	31	1 U	1 U	1100	230	**190**	18	--	--	5 U	na	na	na	1 U	na	**26**	2	1	5.9	--	--	--	1 U
		4/10/2001	**77**	1 U	1 U	54	1 U	1 U	660	260	**170**	16	1 U	1 U	1 U	na	na	na	1 U	na	**27**	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		7/10/2001	**20**	5	5 U	25	4.8	**62**	480	220	**260**	19	--	--	5 U	na	na	na	1 U	na	18	2.4	1 U	1 U	--	--	--	1 U
		7/17/2001	5 U	5 U	5 U	18	1 U	**6.8**	500	310	**220**	20	--	--	5 U	na	na	na	1 U	na	20	2.9	1 U	4.1	--	--	--	1 U
		10/22/2001	**8.6**	5 U	5 U	2.2 J	1 U	1 U	550	130	140	10	--	--	5 U	na	na	na	1 U	na	**36**	1 U	1 U	6.9	--	--	--	1 U
		12/17/2001	**9.4**	5 U	5 U	5 U	1 U	1 U	930	28	20	2.5	--	--	5 U	na	na	na	1 U	na	**26**	1.7	1 U	3.8	--	--	--	1 U
		1/30/2002	5 U	5 U	5 U	5 U	1 U	1 U	1000	28	32	1 U	--	--	5 U	na	na	na	1 U	na	**24**	2.6	1 U	1 U	--	--	--	1 U
		4/15/2002	5 U	5 U	5 U	5 U	1 U	1 U	720	55	40	1 U	--	--	5 U	na	na	na	1 U	na	18	1 U	1 U	1 U	--	--	--	1 U
		6/4/2002	**20**	1 U	1 U	1 U	1 U	1 U	650	100	68	5.5	54	8.4	1 U	na	na	na	1 U	na	**23**	2	1 U	1 U	1 U	1 U	1 U	
		3/13/2003	0.2 U	1 U	1 U	1 U	1 U	1 U	1100	36	25	1 U	1 U	1 U	1 U	na	na	na	1 U	na	22	1.3	1.9	2.6	1 U	1 U	2.6	
		5/1/2003	0.2 U	1 U	1 U	1 U	1 U	1 U	740	15	12	1 U	1 U	1 U	1 U	na	na	na	1 U	na	20	1 U	1.3	1 U	63	1 U	1.7	
		11/3/2003	0.2 U	1 U	1 U	1 U	1 U	1 U	580	11	10	1 U	1 U	1 U	1 U	na	na	na	1 U	na	17	1.3	2.2	4.5	170	1.4	3	
		4/15/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	700	18	14	1 U	1 U	1 U	1 U	na	na	na	1 U	na	**23**	1.6	3.4	4.7	240	2.1	4.9	
		7/6/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	660	5.2	6.5	1 U	1 U	1 U	1 U	na	na	na	1 U	na	18	1.4	3.7	10	450	1 U	7.1	
		10/1/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	640	5.5	6.9	1 U	1 U	1 U	1 U	na	na	na	1 U	na	17	1.8	4.3	12	460	1 U	7.3	
		1/25/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	360	3.8	7.5	1 U	1 U	1 U	1 U	na	na	na	1 U	na	14	1 U	1	3	20	1 U	1.8	
		4/18/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	490	11	16	1 U	1 U	1 U	1 U	na	na	na	1 U	na	9.7	1.2	2.7	6.9	120	1 U	7.2	
		7/22/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	500	4.1	6.6	1 U	1 U	1 U	1 U	na	na	na	1 U	na	7.6	1 U	3.9	11	6	1 U	1.4	
		10/19/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	450	3.0	4.3	1 U	1 U	1 U	1 U	na	na	na	1 U	na	13	1.0	3.3	8.2	130	1 U	4.6	
		1/31/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	330	2.0	2.0	1 U	1 U	1 U	1 U	na	na	na	1 U	na	10	1 U	1 U	1 U	15	1 U	1.0	
		4/21/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	320	3.2	5.0	1 U	1 U	1 U	1 U	na	na	na	1 U	na	7.6	1 U	1.0	2.1	17	1 U	1 U	
		7/27/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	350	4.1	5.7	1 U	1 U	1 U	1 U	na	na	na	1 U	na	14	1 U	2.4	1 U	55	1 U	2.0	
		10/30/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	390	2.5	4.6	1 U	1 U	1 U	1 U	na	na	na	1 U	na	17	1 U	1 U	1 U	40	1 U	3.0	
		1/25/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	410	1.8	2.8	1 U	1 U	1 U	1 U	na	na	na	1 U	na	18	1 U	1 U	1 U	8.6	1 U	1 U	
		4/24/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	300	3.2	5.2	1 U	1 U	1 U	1 U	na	na	na	1 U	na	11	1 U	1 U	1 U	1.0	1 U	1 U	
		7/30/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	350	4.6	6.3	1 U	1 U	1 U	1 U	na	na	na	1 U	na	12	1 U	1 U	1 U	1 U	1 U	1 U	
		10/31/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	360	1.6	3.4	1 U	1 U	1 U	1 U	na	na	na	1 U	na	14	1 U	1 U	1 U	1 U	1 U	1 U	
		4/22/2008	0.2 U	1 U	1 U	1 U	1 U	1 U	280	2.5	3.0	1 U	1 U	1 U	1 U	na	na	na	1 U	na	12	1 U	1 U	1 U	1 U	1 U	1 U	
		4/23/2009	0.2 U	1 U	1 U	1 U	1 U	1 U	370	2.5	2.8	1 U	1 U	1 U	1 U	na	na	na	1 U	na	14	1 U	1 U	1 U	1 U	1 U	1 U	
		4/27/2010	0.2 U	1 U	1 U	1 U	1 U	1 U	350	2.1	3.2	1.1	1 U	1 U	1 U	na	na	na	1 U	na	12	1 U	1 U	1 U	1 U	1 U	1 U	
		4/13/2011	0.2 U	1 U	1 U	1 U	1 U	1 U	350	1.3	2.1	1 U	1 U	1 U	1 U	na	na	na	1 U	na	8.5	1 U	1 U	1 U	1 U	1 U	1 U	
		4/19/2012	0.2 U	1 U	1 U	1 U	1 U	1 U	280	1.0	1.9	1 U	1 U	1 U	1 U	na	na	na	1 U	na	5.4	1 U	1 U	1 U	1 U	1 U	1 U	
		4/11/2013	0.2 U	1 U	1 U	1 U	1 U	1 U	340	1.1	2.5	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	

Table 2 - Historical Groundwater Monitoring Analytical Results

			Concentration of Chlorinated Ethene Compounds in ug/L						Concentration of Chlorinated Benzene Compounds in ug/L						Concentration of Other Detected Volatile Organic Compounds in ug/L													
Well	Location	Date	Vinyl Chloride	1,1-DCE	trans-DCE	cis-DCE	TCE	PCE	CB	1,3-DCB	1,4-DCB	1,2-DCB	1,2,4-TCB	1,2,3-TCB	Chloromethane	Dibromomethane	1,1-DCA	1,2-DCA	1,1,2-TCA	1,1,2,2,-TeCA	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	1,3,5-TMB	1,2,4-TMB	Chloroform
	Screening Level (A)		**2.40**	**3.2^{B}**	**10,000**	**na**	**12.7^{C}**	**3.3**	**1,600**	**960**	**190**	**1,300**	**1.96^{C}**	**na**	**na**	**na**	**na**	**37**	**16**	**4**	**22.7^{C}**	**15,000**	**2,100**	**na**	**4940^{C}**		**na**	**470**
JT-7	Terminals Property	3/22/1999	**64**	5 U	5 U	7.2	1 U	1 U	160	190	180	16	--	--	5 U	na	na	na	1 U	na	2.6	4	1 U	2.7	--	--	--	1 U
		7/30/1999	**51**	5 U	5 U	5 U	1	1 U	240	140	140	16	--	--	5 U	na	na	na	1 U	na	3.4	1 U	1 U	1.4	--	--	--	1 U
		10/15/1999	**7**	5 U	5 U	3	1 U	1 U	--	110	93	6.8	--	--	5 U	na	na	na	1 U	na	2.7	2	1 U	1 U	--	--	--	1 U
		10/18/1999	**10**	5 U	5 U	2.1	1 U	1 U	--	97	88	3.3	--	--	5 U	na	na	na	1 U	na	2.1	1 U	1 U	1 U	--	--	--	1 U
		1/21/2000	**69**	5 U	5 U	6.5	1 U	1 U	140	150	150	9.1	--	--	5 U	na	na	na	1 U	na	2	1.6	1.3	1.9	--	--	--	1 U
		4/7/2000	**48**	5 U	5 U	5 U	1 U	1 U	140	120	110	6.7	--	--	5 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/7/2000	**14**	10 U	10 U	6.7	2 U	2 U	200	140	**200**	10	--	--	5 U	na	na	na	2 U	na	4.6	2 U	2 U	2 U	--	--	--	2 U
		10/11/2000	**31**	5 U	5 U	5 U	1 U	1 U	190	90	110	5.3	--	--	5 U	na	na	na	1 U	na	2.4	1 U	1 U	1 U	--	--	--	1 U
		1/16/2001	5 U	5 U	5 U	5 U	1 U	1 U	26	20	22	1 U	--	--	5 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/10/2001	**50**	1 U	1 U	2.3	1 U	1 U	180	77	82	4.1	1 U	1 U	1 U	na	na	na	1 U	na	1.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		7/10/2001	**45**	5 U	5 U	16	1 U	**9.6**	240	98	130	7.8	--	--	5 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	**32**	5 U	5 U	5 U	1 U	1 U	150	42	74	5.0	--	--	5 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		12/17/2001	**30**	1 U	1 U	1 U	1 U	1 U	170	86	91	4.7	2.8	1 U	15	na	na	na	1 U	na	2	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/15/2002	**90**	5 U	5 U	5 U	1 U	1 U	140	140	170	5.6	--	--	5 U	na	na	na	1 U	na	1 U	1.4	1.3	1 U	1 U	1 U	1 U	1 U
		6/4/2002	**37**	1 U	1 U	1 U	1 U	1 U	150	73	82	3.7	**85**	17	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
		10/1/2002	**29**	1 U	1 U	1 U	1 U	1 U	200	57	71	6.5	--	--	5 U	na	na	na	1 U	na	1.8	3.2	1.7	6.3	--	--	--	
		5/1/2003	**25**	1 U	1 U	1 U	1 U	1 U	113	33	40	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
		11/3/2003	**32**	1 U	1 U	1 U	1 U	1 U	160	49	64	1 U	1.1	1 U	1 U	na	na	na	1 U	na	1.6	1 U	1 U	1 U	1 U	1 U	1 U	
		4/15/2004	**28**	1 U	1 U	1 U	1 U	1 U	120	44	58	2.9	1 U	1 U	1 U	na	na	na	1 U	na	1	1 U	1 U	1 U	1 U	1 U	1 U	
		7/6/2004	**12**	1 U	1 U	1 U	1 U	1 U	170	21	28	5.8	1 U	1 U	1 U	na	na	na	1 U	na	1.4	1 U	1 U	2.7	1 U	1 U	1.3	
		10/1/2004	1.2	1 U	1 U	1 U	1 U	1 U	190	2.8	4.5	1 U	1 U	1 U	1 U	na	na	na	1.0 U	na	1.6	1 U	1 U	1.0	1 U	1 U	1 U	
		1/27/2005	0.5	1 U	1 U	1 U	1 U	1 U	30	2.0	2.4	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1.5	1 U	1 U	1 U	1 U	1 U	1 U	
		4/18/2005	0.21	1 U	1 U	1 U	1 U	1 U	76	7.6	7.9	1.0	1 U	1 U	1 U	na	na	na	1.0 U	na	1	1 U	1 U	1.1	1 U	1 U	1 U	
		10/19/2005	0.2 U	1 U	1 U	1 U	5.1	1 U	170	33	37	2.7	1 U	1 U	1 U	na	na	na	1.0 U	na	1	1 U	1 U	1.1	1 U	1 U	1 U	
		4/21/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	76	38	49.0	1.9	1 U	1 U	1 U	na	na	na	1 U	na	1	1 U	1 U	1 U	1 U	1 U	1 U	
		4/24/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	100	44	66	3.1	1 U	1 U	1 U	na	na	na	1 U	na	1	1 U	1 U	1 U	1 U	1 U	1 U	
		4/22/2008	0.2 U	1 U	1 U	1 U	1 U	1 U	82	16	24	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
		4/27/2009	0.2 U	1 U	1 U	1 U	1 U	1 U	61	3.6	5.2	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
		4/27/2010	0.2 U	1 U	1 U	1 U	1 U	1 U	100	2.3	4.3	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
		4/13/2011	0.2 U	1 U	1 U	1 U	1 U	1 U	130	1.0	1.8	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
		4/19/2012	0.2 U	1 U	1 U	1 U	1 U	1 U	81	1.0	2.2	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
		4/11/2013	0.2 U	1 U	1 U	1 U	1 U	1 U	98	1.1	1.8	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1.1	1 U	1 U	1 U	1 U	1 U	1 U	
JT-8	Terminals Property - TCB Source Area	1/11/2001	**86**	5 U	5 U	19	1 U	1 U	630	260	160	21	--	--	5 U	na	na	na	1 U	na	4.4	2	1 U	2.7	--	--	--	1 U
		2/20/2001	5 U	5 U	5 U	5 U	1 U	1 U	530	210	**200**	1 U	--	--	5 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/10/2001	**20**	5.8	1 U	1 U	1 U	1 U	150	660	**670**	18	**250**	26	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		7/10/2001	**42**	1 U	1 U	8.7	1 U	1 U	370	210	**210**	67	**1,300**	87	1 U	na	na	na	1 U	na	3.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/22/2001	0.2 U	1 U	1 U	1 U	1 U	1 U	46	82	150	120	**1,300**	180	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		12/17/2001	0.2 U	1 U	1 U	1 U	1 U	1 U	53	110	**340**	290	**4,500**	470	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		6/4/2002	**11**	1 U	1 U	1 U	1 U	1 U	260	79	**240**	220	**3,900**	420	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	8.9	1 U	1 U	
		3/13/2003	0.2 U	1 U	1 U	1 U	1 U	2.1	220	82	**450**	560	**9,100**	650	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
		4/15/2004	**35**	1 U	1 U	6.4	1 U	1 U	240	180	**660**	750	**8,400**	910	1 U	na	na	na	1 U	na	3.8	1 U	1 U	1 U	1 U	1 U	1 U	
		7/6/2004	**15**	1 U	1 U	5.7	1.2	2.4	130	150	**720**	1,000	**17,000**	1 U	1 U	na	na	na	1 U	na	4.6	1.2	1 U	1 U	10	1 U	1 U	
		4/25/2007	0.4	1 U	1 U	1 U	1 U	1 U	58	140	**610**	740	**5,200**	680	1 U	na	na	na	1 U	na	1.1	1 U	1 U	1 U	1 U	1 U	1 U	
JT-9	Terminals Property	3/13/2003	**7.4**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	**44**	1 U	1 U	1 U	1 U	1 U	1 U	1 U
JT-10	Terminals Property	11/3/2003	**13**	1 U	1 U	28	1 U	1 U	580	53	38	4.5	1.4	1 U	1 U	na	na	na	1.0 U	na	17	1 U	2.4	3.0	250	1 U	3.1	1 U
		4/15/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	24	10	6.3	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	3.9	1 U	1 U	1 U
		7/6/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	7.1	5.8	5.0	1.1	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/1/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	9.0	5.8	4.5	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		1/25/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	13	7.1	7.2	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/18/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	4.6	7.9	8.1	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	14	7.4	6.6	1 U	1 U	1 U	1 U	na	na	na	1.0 U	na	1.1	3.2	1 U	2.0	1 U	1 U	1 U	1 U
		4/24/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	11	4.6	4.1	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/22/2008	0.2 U	1 U	1 U	1 U	1 U	1 U	5.5	3.2	2.7	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2009	0.3	1 U	1 U	1 U	1 U	1 U	4.6	3.5	2.5	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/28/2010	0.4	1 U	1 U	1.0	1 U	1 U	21	5.6	4.3	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1.3	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/13/2011	0.2 U	1 U	1 U	1 U	1 U	1 U	55	4.3	4.1	1 U	1 U	1 U	1 U	na	na	na	1 U	na	2	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/19/2012	0.2 U	1 U	1 U	1 U	1 U	1 U	62	3.8	4.1	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/11/2013	0.2 U	1 U	1 U	1 U	1 U	1 U	98	2.3	3.2	1 U	1 U	1 U	1 U	na	na	na	1 U	na	3.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U
JT-11	Terminals Property	6/5/2003	**38**	1 U	1 U	57	1 U	1 U	360	90	50	4.8	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
JT-12	Terminals Property Adjacent to Ship Canal	11/3/2003	0.2 U	1 U	1 U	1 U	1 U	1 U	9.4	4.0	2.3	1 U	1 U	1 U	1 U	na	na	na	1 U	na	2.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/15/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	6.8	2.5	1.5	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		7/6/2004	0.2 U	1 U	1 U	1 U	1 U	1.3	5.8	2.7	2.3	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/1/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	7.7	3.6	2.2	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		1/25/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	5.8	2.9	2.0	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/18/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	9.2	2.6	1.9	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		7/27/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	4.9	3.4	2.1	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/19/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	6.5	3.3	2.3	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		1/31/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	7.8	3.4	1.0	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	4.8	2.0	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		7/27/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	6.0	2.4	1.5	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/30/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	6.1	3.7	2.4	1.5	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		1/25/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	9.3	3.9	2.4	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/24/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	5.2	1.8	1.2	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		7/30/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	6.5	2.9	1.8	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/31/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	6.3	2.6	1.7	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/22/2008	0.2 U	1 U	1 U	1 U	1 U	1 U	5.6	1.8	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/23/2009	0.2 U	1 U	1 U	1 U	1 U	1 U	6.0	1.8	1.3	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/28/2010	0.2 U	1 U	1 U	1 U	1 U	1 U	9.1	1.4	1.2	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/13/2011	0.2 U	1 U	1 U	1 U	1 U	1 U	28	2.3	2.5	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/19/2012	0.2 U	1 U	1 U	1 U	1 U	1 U	43	1.0	2.5	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/11/2013	0.2 U	1 U	1 U	1 U	1 U	1 U	55	1 U	1.6	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Table 2 - Historical Groundwater Monitoring Analytical Results

			Concentration of Chlorinated Ethene Compounds in ug/L						Concentration of Chlorinated Benzene Compounds in ug/L						Concentration of Other Detected Volatile Organic Compounds in ug/L													
Well	**Location**	**Date**	**Vinyl Chloride**	**1,1-DCE**	**trans-DCE**	**cis-DCE**	**TCE**	**PCE**	**CB**	**1,3-DCB**	**1,4-DCB**	**1,2-DCB**	**1,2,4-TCB**	**1,2,3-TCB**	**Chloromethane**	**Dibromomethane**	**1,1-DCA**	**1,2-DCA**	**1,1,2-TCA**	**1,1,2,2,-TeCA**	**Benzene**	**Toluene**	**Ethylbenzene**	**Xylenes**	**Naphthalene**	**1,3,5-TMB**	**1,2,4-TMB**	**Chloroform**
	Screening Level (A)		**2.40**	**3.2[B]**	**10,000**	**na**	**12.7[C]**	**3.3**	**1,600**	**960**	**190**	**1,300**	**1.96[C]**	**na**	**na**	**na**	**na**	**37**	**16**	**4**	**22.7[C]**	**15,000**	**2,100**	**na**	**4940[C]**		**na**	**470**
MW-15I	Intermediate Zone - Upgradient of Wall	3/18/1999	**3,500**	24	15	17,000	5.4	**4.8**	5 U	4.0	3.6	4.0	--	--	5 U	5 U	5 U	5 U	5 U	5 U	1 U	1.4	1.3	4.6	--	--	--	1 U
		1/20/2000	**1,100**	28	9.7	7,200	3.0	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/10/2000	**930**	21	9.8	6,300	**18**	**3.9**	5 U	1 U	1 U	1 U	--	--	5 U	13	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/7/2000	**1,500**	500 U	500 U	18,000	**170**	100 U	500 U	100 U	100.0 U	100 U	--	--	500 U	500 U	500 U	500 U	100 U	500 U	100 U	100 U	100 U	100 U	--	--	--	100 U
		10/10/2000	**26**	5 U	5 U	210	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	--	--	--	1 U
SRW-1	Terminals Wall	4/15/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		7/6/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/1/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		1/25/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/18/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/19/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/24/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/22/2008	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2009	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/30/2010	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/13/2011	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/19/2012	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/11/2013	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
SRW-2	Terminals Wall	4/15/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		7/6/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/1/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		1/25/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/18/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/19/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	1.6	1.5	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/24/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	1.6	1.5	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/22/2008	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2009	0.9	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2010	0.3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/13/2011	0.7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/19/2012	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/11/2013	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
SRW-3	Terminals Wall	4/15/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		7/6/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/1/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		1/25/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/18/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/19/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/24/2007	0.2 U	1 U	1 U	1.1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/22/2008	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2009	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2010	0.2 U	1 U	1 U	1 U	1 U	1 U	17	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	2.5	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/13/2011	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/19/2012	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/11/2013	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Notes:
VOCs analyzed by either EPA Method 8021B or 8260B.
(1) Water samples were collected from wells IW-2I, IW-4I, IW-7I, IG-3, IG-4, IW-9I on April 15, 2004. Due to laboratory error only data from IW-2I and IW-4I were deemed acceptable. Wells IG-3, IG-4, and IW-9I were resampled April 27, 2004.
A Clean Water Act S304 Freshwater Screening Level for Consumption of Organisms based on groundwater migration to surface water.
B National Toxics Rule 40 CFR 131 Freshwater Screening Level for Consumption of Organisms based on groundwater migration to surface water.
C MTCA Method B Surface Water Screening Level.
Bold Exceeds screening level.
J Estimated value
U Not detected at indicated detection limit
C Suspected lab analysis carry-over causing column contamination.
na Not analyzed or not provided.
-- Not analyzed

1,1-DCE 1,1-Dichloroethene
trans-DCE trans-1,2-Dichloroethene
cis-DCE cis-1,2-Dichloroethene
TCE Trichloroethene
PCE Tetrachloroethene

CB Chlorobenzene
1,3-DCB m-Dichlorobenzene
,1,4-DCB p-Dichlorobenzene
1,2-DCB o-Dichlorobenzene
1,2,3-TCB 1,2,3-Trichlorobenzene
1,2,4-TCB 1,2,4-Trichlorobenzene

1,1-DCA 1,1-Dichloroethane
1,2-DCA 1,2-Dichloroethane
1,1,2-TCA 1,1,2-Trichloroethane
1,1,2,2-TeCA 1,1,2,2-Tetrachloroethane
1,3,5-TMB 1,3,5-Trimethylbenzene
1,2,4-TMB 1,2,4-Trimethylbenzene

Table 3 - PCB Concentrations in Groundwater

Sample Location	Sampling Date	Total Suspended Solids in mg/L	PCB Concentration in ug/L (Aroclor 1260)
Screening Levels Protective of Surface Water(A)			6.400E-05
JT-3			
	4/10/2001	--	0.4 U
	12/17/2001	--	0.017 U
	6/4/2002	7.4	1.5
	10/1/2002	1 U	0.033 U
JT-6			
	4/10/2001	--	0.4 U
	12/17/2001	1.4	0.017 U
	6/4/2002	23	0.2
	10/1/2002	3.1	0.056
	6/12/2003	25	0.089
	11/3/2003	5.2	0.03 U
	1/25/2005	51	0.05 U
	7/22/2005	68.2	0.03 U
JT-12			
	11/3/2003	3.8	0.03 U
	1/25/2005	6.0	0.015 U
	8/26/2005	2.2	0.01 U
MW-4			
	3/10/2010	NA	0.6 [1]

Notes:

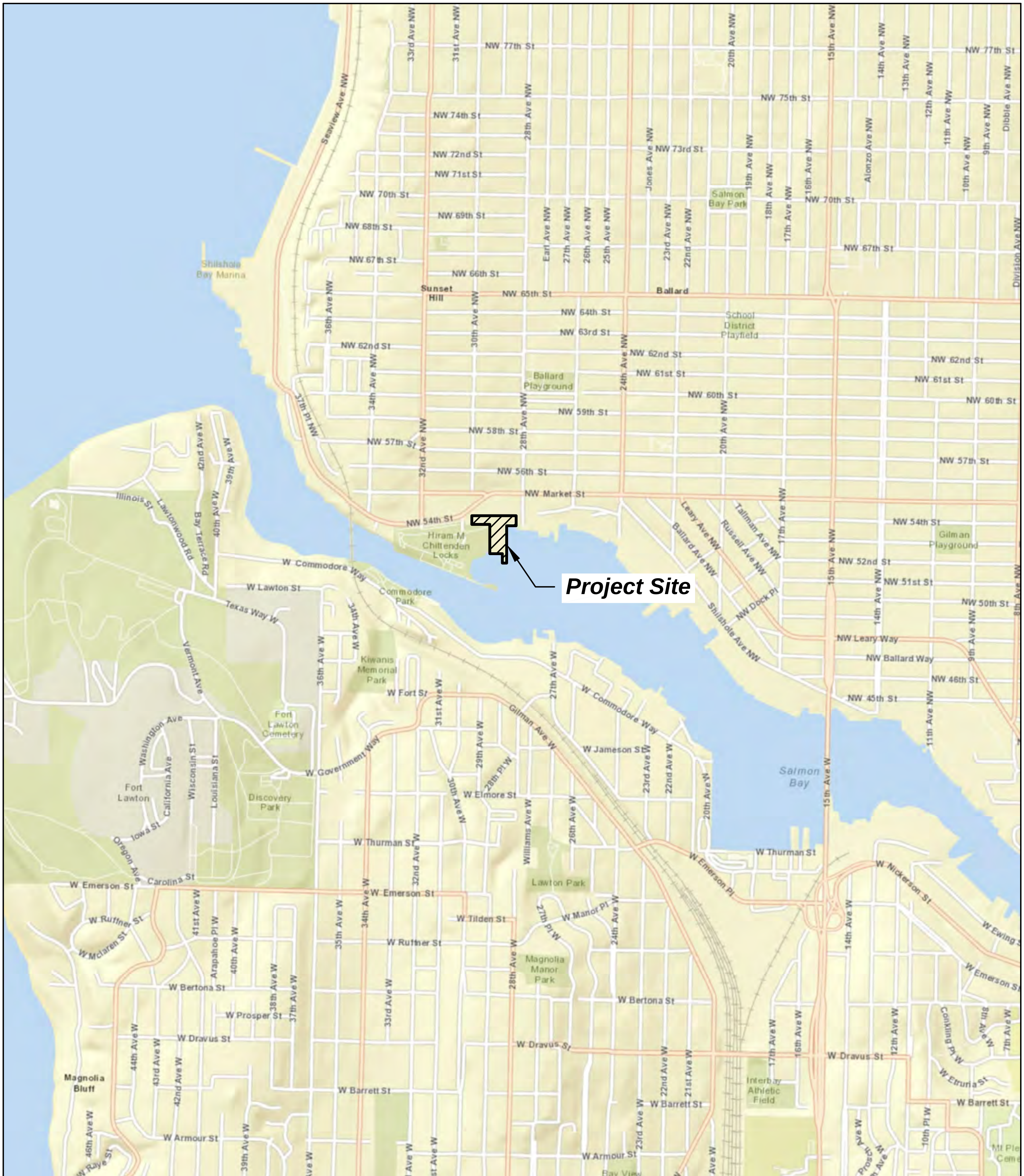
A - Clean Water Act S304 Freshwater Screening Level for Consumption of Organisms based on groundwat
Screening Level below PQL.

1 - Not known whether concentration is for PCB mixture or Aroclor 1260. (Aspect 2010)

NA - Not Available.

-- Not analyzed

U Not detected at indicated detection limit



Source: Base map prepared from ArcGIS Online, 2013.

N

0 2000 4000
Approximate Scale in Feet

Jacobson Terminals
Seattle, Washington

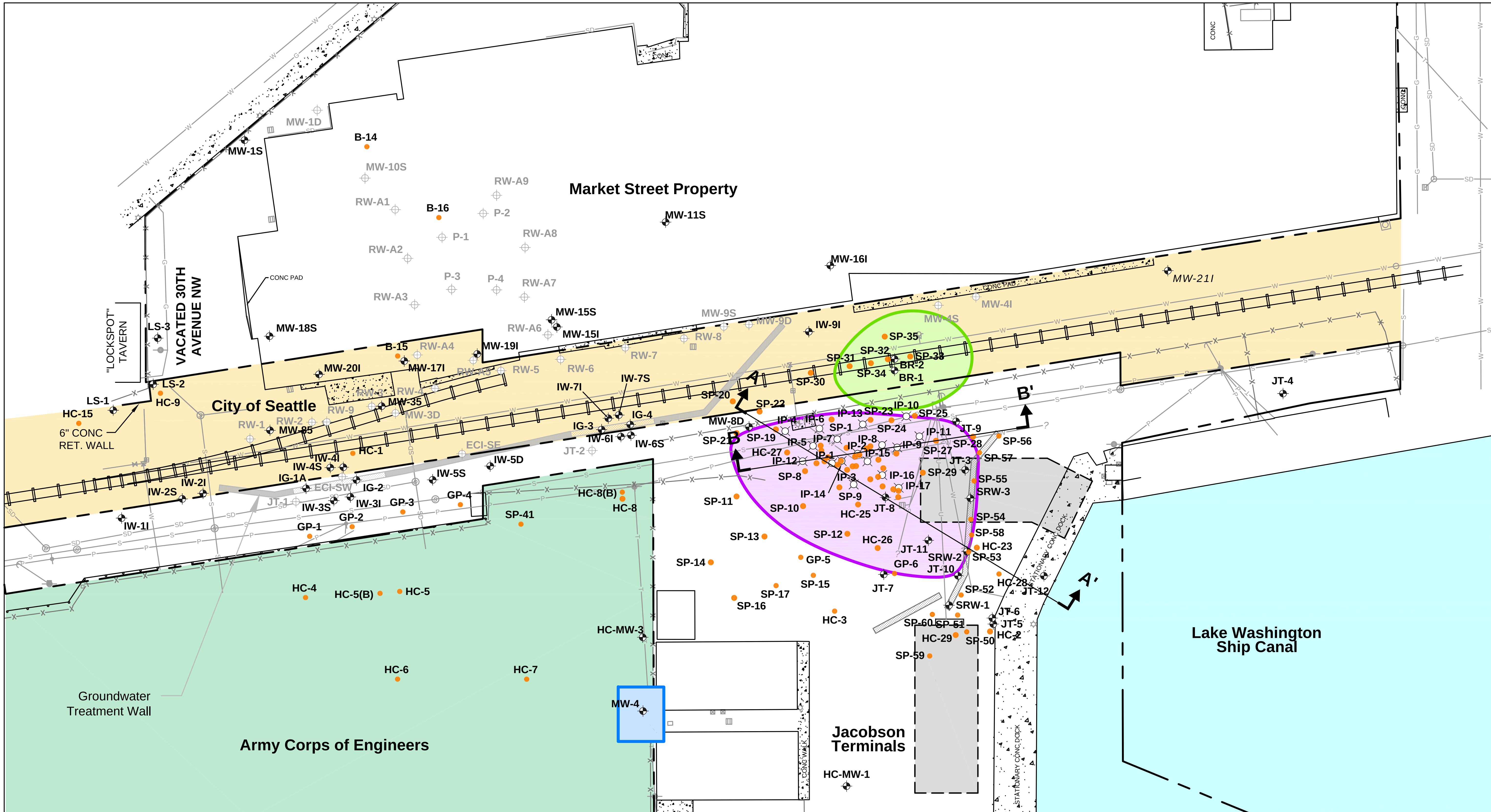
Vicinity Map

17800-43 10/13

HARTCROWSER

Figure
1

EAL 10/18/13 1780043-001.dwg



MW-18S	Existing Monitoring Well	
RW-2	Former Monitoring Well, Recovery Well, or Piezometer (Abandoned)	
IP-5	Injection Well	
SP-41	Soil Boring	Note: Labels removed from several borings in "IP" area for clarity. Refer to "Interim Cleanup Action Summary", Hart Crowser, July 18, 2002.
	Property Boundary	

Concrete Surface

Cement-Bentonite Groundwater Treatment Wall

Permeable Iron/Sand Gate

Overhead Power

Sanitary Sewer Line

Water Line

Utility Line

City of Seattle Property

Iron/GAC Groundwater Treatment Wall

Boat Storage Rack

A A' Cross Section Location and Designation

Jacobson Terminal COC Areas

- Petroleum Area
- Chlorinated Ethene Area
- PCB and Chlorinated Benzene Area

Notes:

1. Base map prepared from AutoCAD file "020030-02.dwg," provide by Aspect Consulting, 10/08/13.
2. Utility locations are approximate.

N

0 50 100

Scale in Feet

Jacobson Terminals
Seattle, Washington

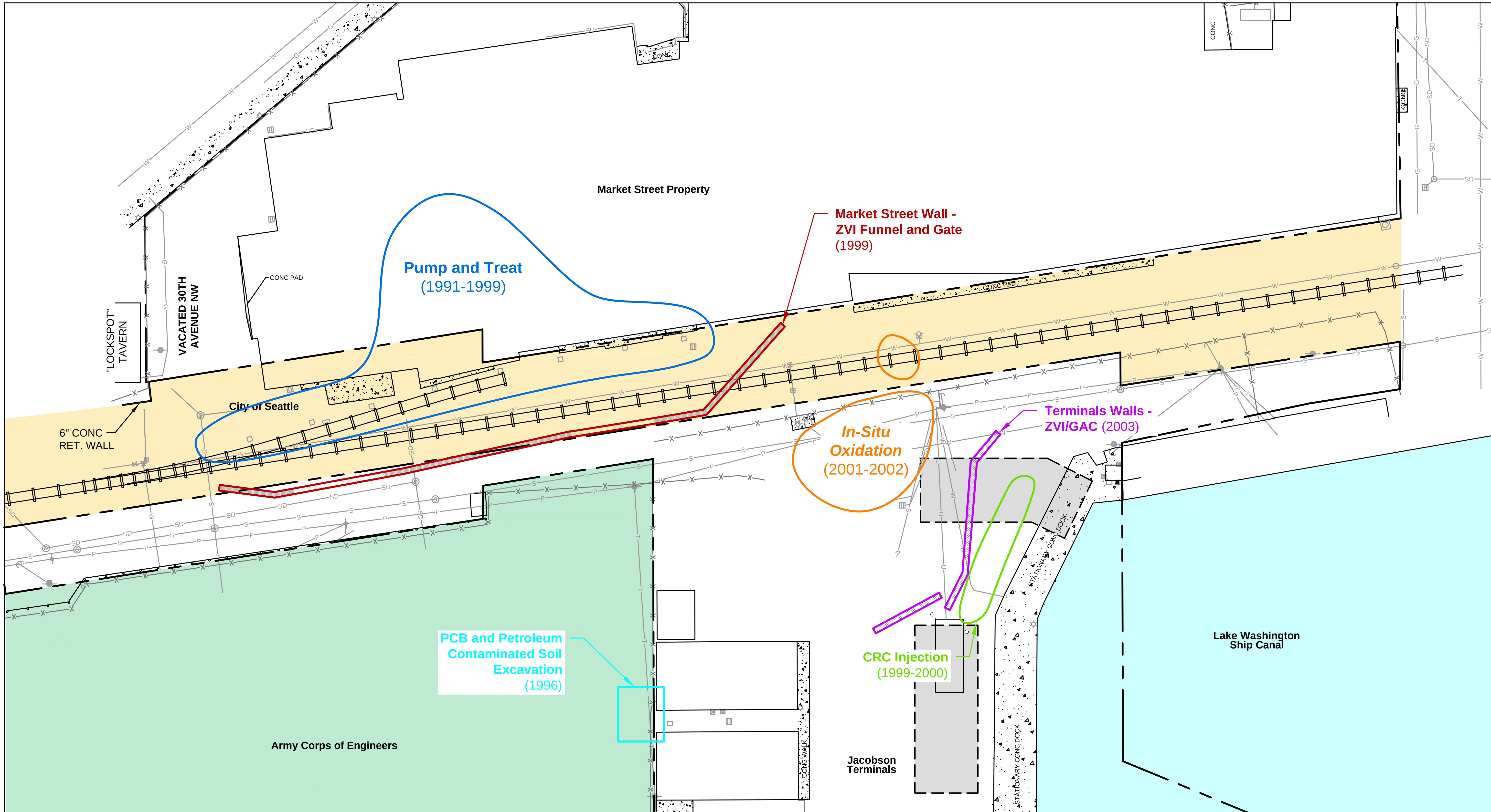
Site Plan

17800-43 11/13

HARTCROWSER

Figure **2**

EAL 11/8/13 1780043-004.dwg



Property Boundary

Concrete Surface

Cement-Bentonite Groundwater Treatment Wall

Permeable Iron/Sand Gate

Overhead Power

Sanitary Sewer Line

Water Line

Utility Line

City of Seattle Property

Iron/GAC Groundwater Treatment Wall

Boat Storage Rack

Notes:

1. Base map prepared from AutoCAD file "020030-02.dwg," provide by Aspect Consulting, 10/08/13.
2. Utility locations are approximate.

Jacobson Terminals
Seattle, Washington

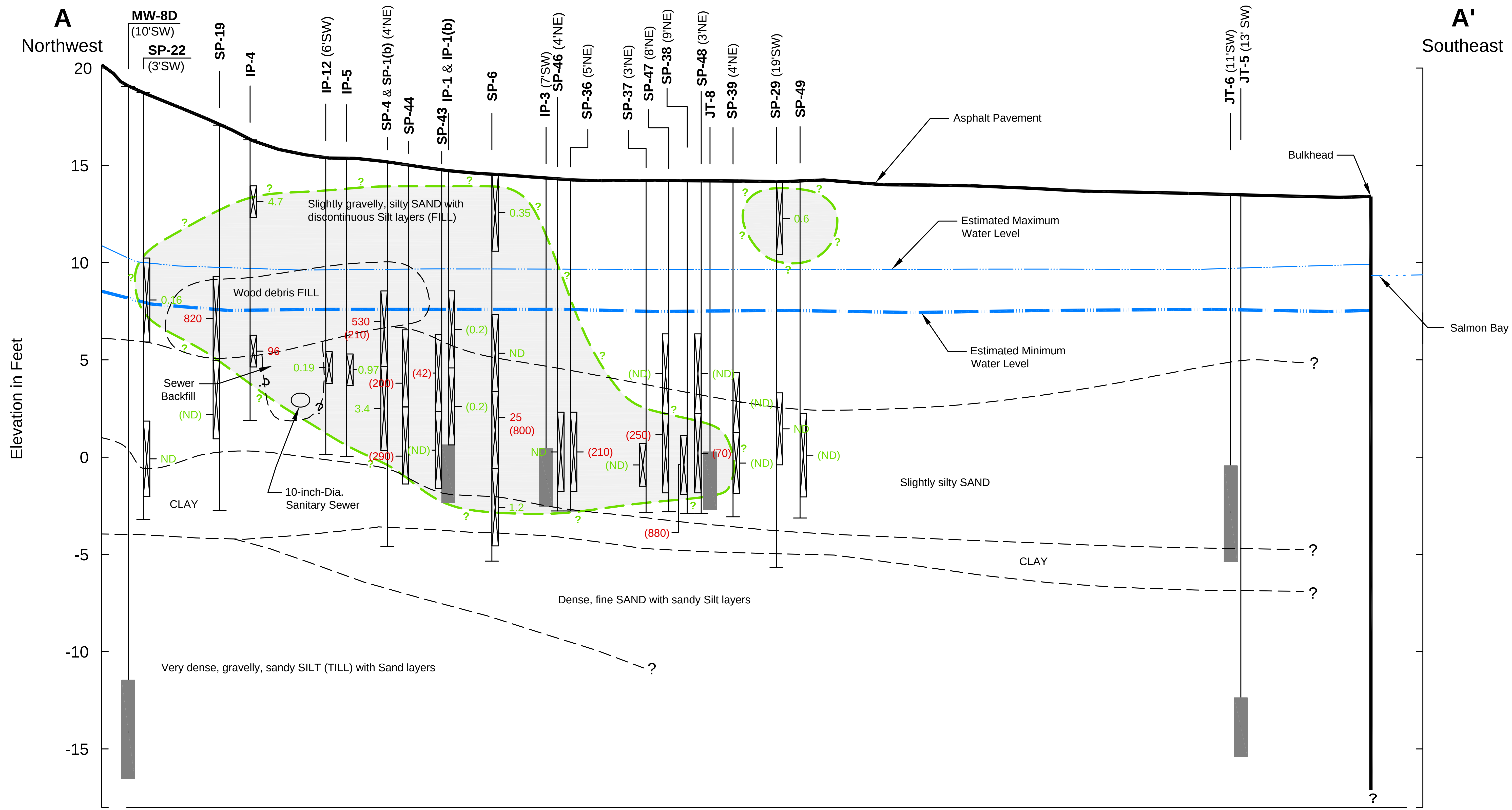
Remediation Areas

17800-43 10/13

HARTCROWSER

Figure
3

EAL 10/18/13 1780043-007.dwg



MW-8D (10' S) Exploration Number (Offset Distance and Direction) Exploration Location

0.43 PCB Concentration in mg/kg (ND=Not Detected)

(210) Performance Monitoring or Confirmation Sample

Screened Interval

? — — Geologic Contact (Approximate)

820 Exceed MTCA Method A Industrial Screening Level

0.43 Below MTCA Method A Industrial Screening Level

? Approximate Area of PCB Concentrations above Screening Level (0.000079 mg/kg)

Horizontal Scale in Feet

0 15 30

0 5 10

Vertical Scale in Feet

Vertical Exaggeration x 3

Notes:

1. Contacts between soil units are based upon interpolation between borings and represent our interpretation of subsurface conditions based on currently available data.
2. Cross section developed from AutoCAD files provided by Aspect, dated 12/2005.

Jacobson Terminals
Seattle, Washington

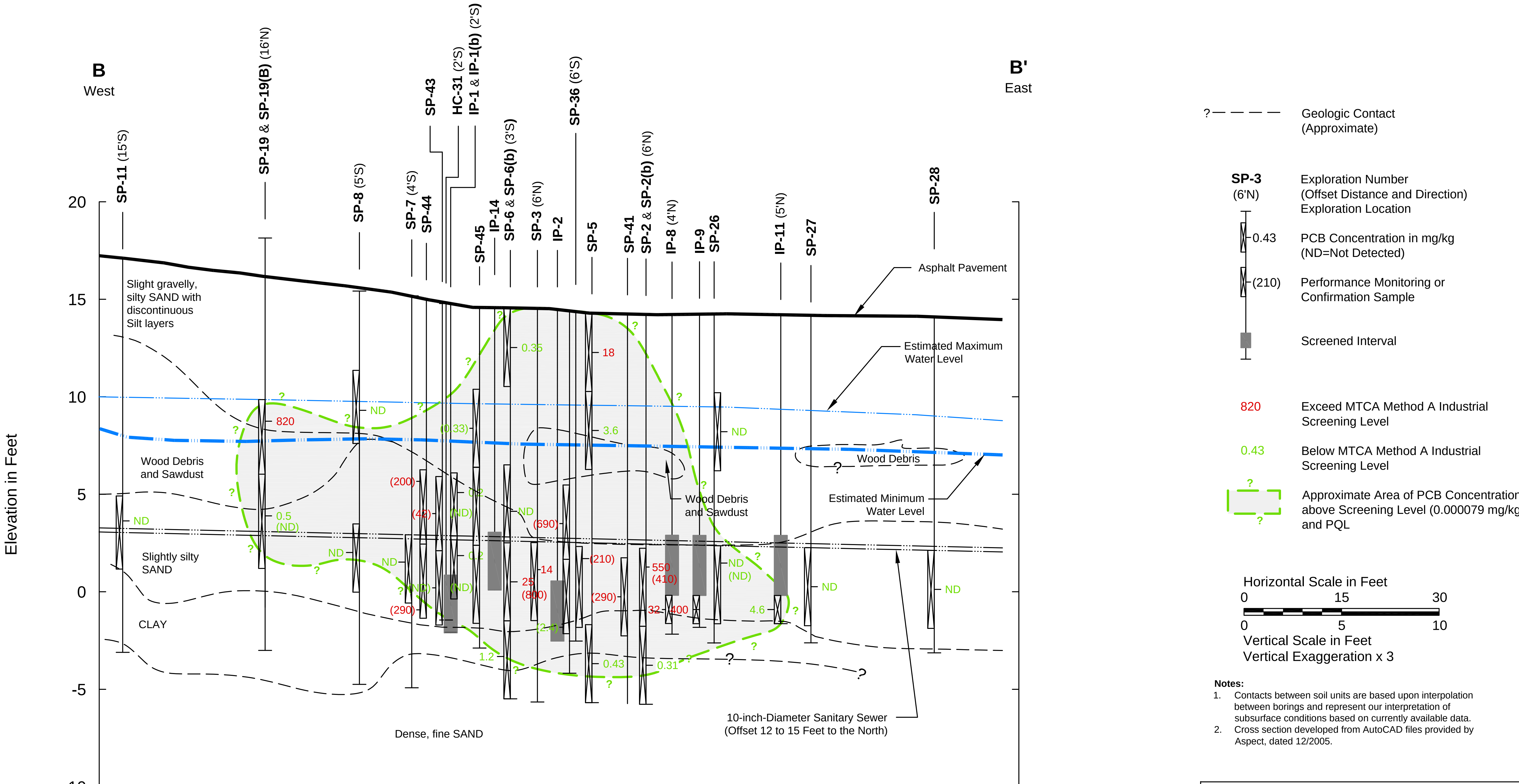
Generalized Geologic Cross Section A-A'

17800-43 11/13

HARTCROWSER

Figure **4**

EAL 11/8/13 1780043-002.dwg



Notes:

1. Contacts between soil units are based upon interpolation between borings and represent our interpretation of subsurface conditions based on currently available data.
2. Cross section developed from AutoCAD files provided by Aspect, dated 12/2005.

Jacobson Terminals
Seattle, Washington

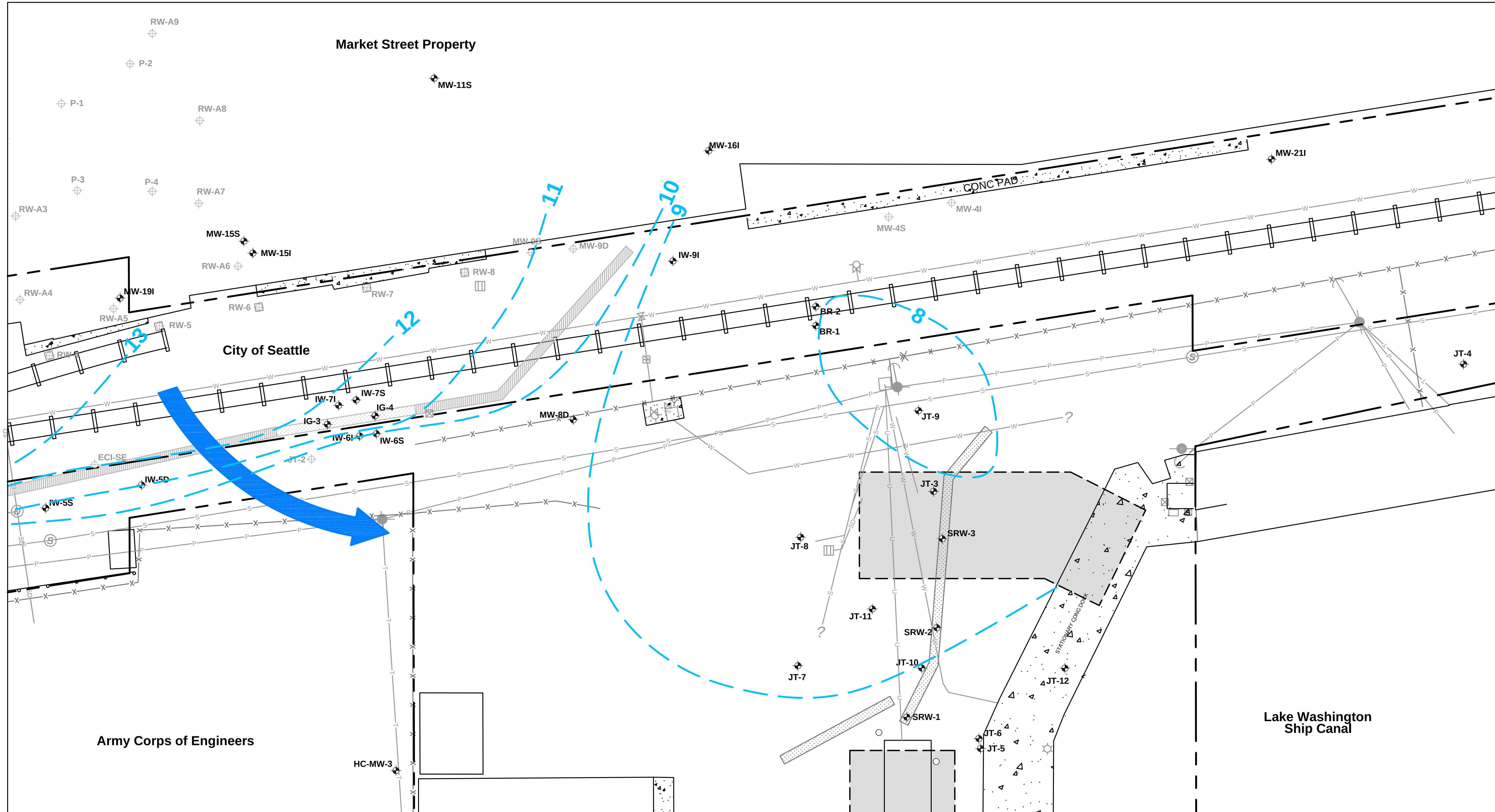
Generalized Geologic Cross Section B-B'

17800-43 11/13

HARTCROWSER

Figure 5

EAL 11/9/13 1780043-003.dwg



MW-18S	Existing Monitoring Well	—P—	Overhead Power
RW-2	Former Monitoring Well, Recovery Well, or Piezometer (Abandoned)	—S—	Sanitary Sewer Line
	Property Boundary	—W—	Water Line
	Concrete Surface	—U—	Utility Line
	Cement-Bentonite Ground-water Treatment Wall		Iron/GAC Groundwater Treatment Wall
	Permeable Iron/Sand Gate		Boat Storage Rack
		11	Groundwater Elevation Contour
			Inferred Groundwater Gradient

Notes:

1. Base map prepared from AutoCAD file "020030-02.dwg," provided by Aspect Consulting, 10/08/13.
2. Utility locations are approximate.
3. Groundwater data from VCP Cleanup Status Report Memorandum prepared by Aspect Consulting, 12/12/05.

N

0 30 60

Scale in Feet

Jacobson Terminals
Seattle, Washington

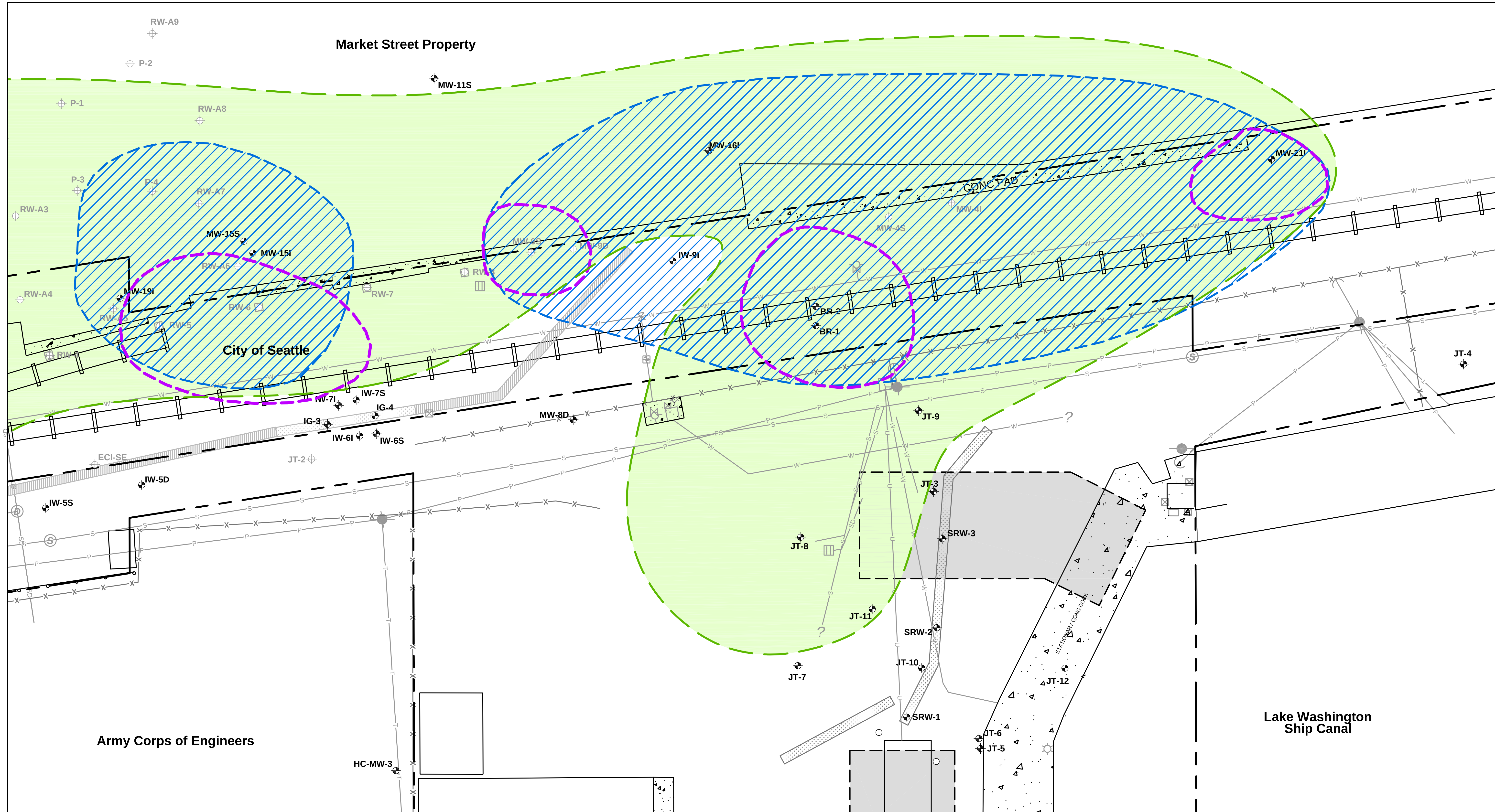
Groundwater Elevation Contours
April 2005

17800-43 10/13

HARTCROWSER

Figure
6

EAL 10/18/13 1780043-012.dwg



MW-18S Existing Monitoring Well

RW-2 Former Monitoring Well, Recovery Well, or Piezometer (Abandoned)

Property Boundary

Concrete Surface

Cement-Bentonite Groundwater Treatment Wall

Permeable Iron/Sand Gate

Overhead Power

Sanitary Sewer Line

Water Line

Utility Line

Iron/GAC Groundwater Treatment Wall

Boat Storage Rack

Notes:

1. Base map prepared from AutoCAD file "020030-02.dwg," provided by Aspect Consulting, 10/08/13.
2. Utility locations are approximate.

Estimated Extent of TCE

Estimated Extent of PCE

Estimated Extent of Vinyl Chloride

Based on 2005 estimates and 2013 groundwater sampling data

0 30 60

Scale in Feet

N

Jacobson Terminals
Seattle, Washington

Estimated Extent of Chlorinated Ethenes in Groundwater

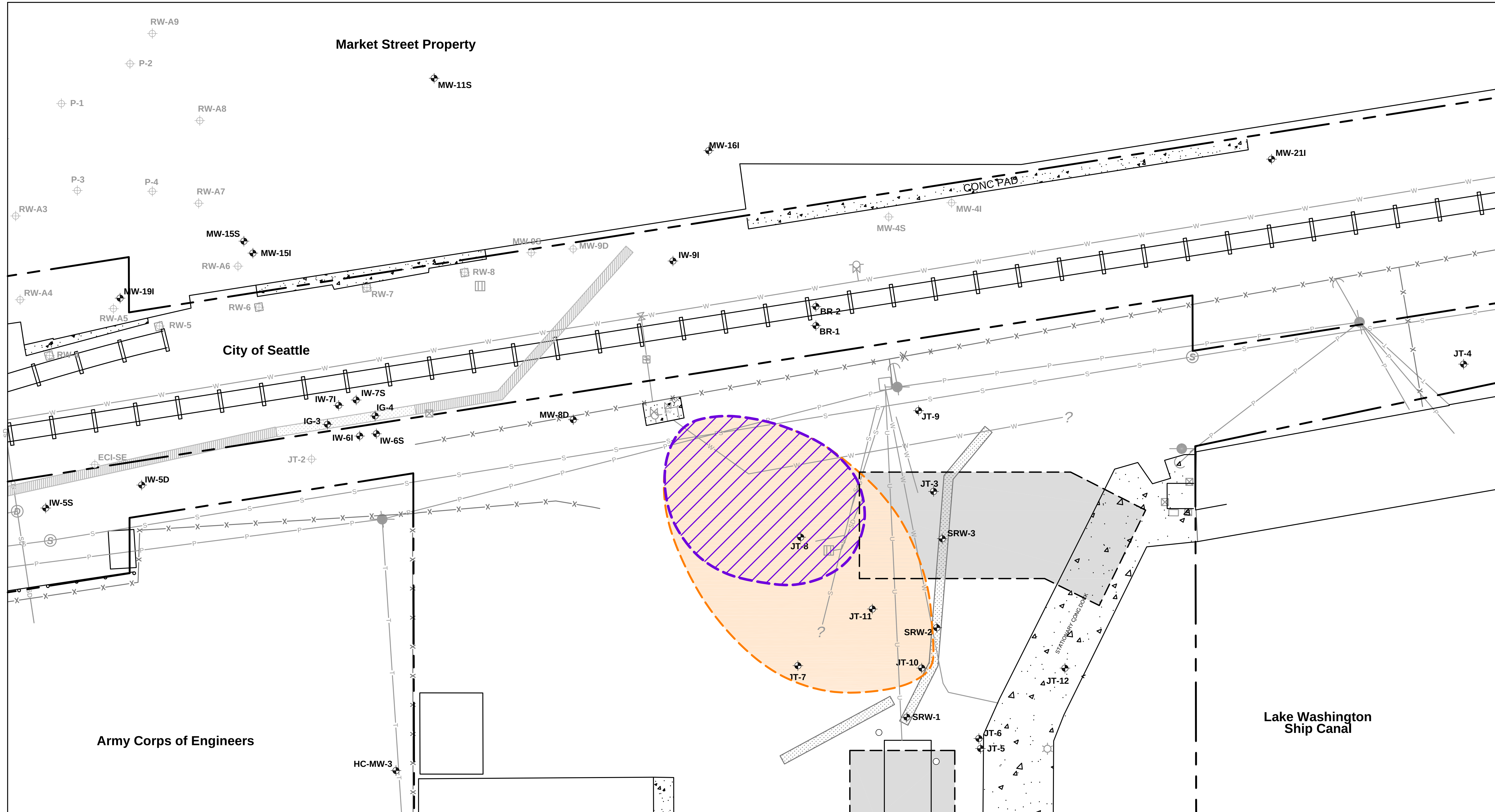
17800-43 10/13

HartCrowser

Figure

7

EAL 10/18/13 1780043-009.dwg



MW-18S Existing Monitoring Well

RW-2 Former Monitoring Well, Recovery Well, or Piezometer (Abandoned)

Property Boundary

Concrete Surface

Cement-Bentonite Groundwater Treatment Wall

Permeable Iron/Sand Gate

Overhead Power

Sanitary Sewer Line

Water Line

Utility Line

Iron/GAC Groundwater Treatment Wall

Boat Storage Rack

Notes:

1. Base map prepared from AutoCAD file "020030-02.dwg," provided by Aspect Consulting, 10/08/13.
2. Utility locations are approximate.

Estimated Extent of 1,2,4-Trichlorobenzene

Estimated Extent of 1,2,4-Dichlorobenzene

Based on 2005 estimates and 2013 groundwater sampling data

0 30 60

Scale in Feet

N

Jacobson Terminals
Seattle, Washington

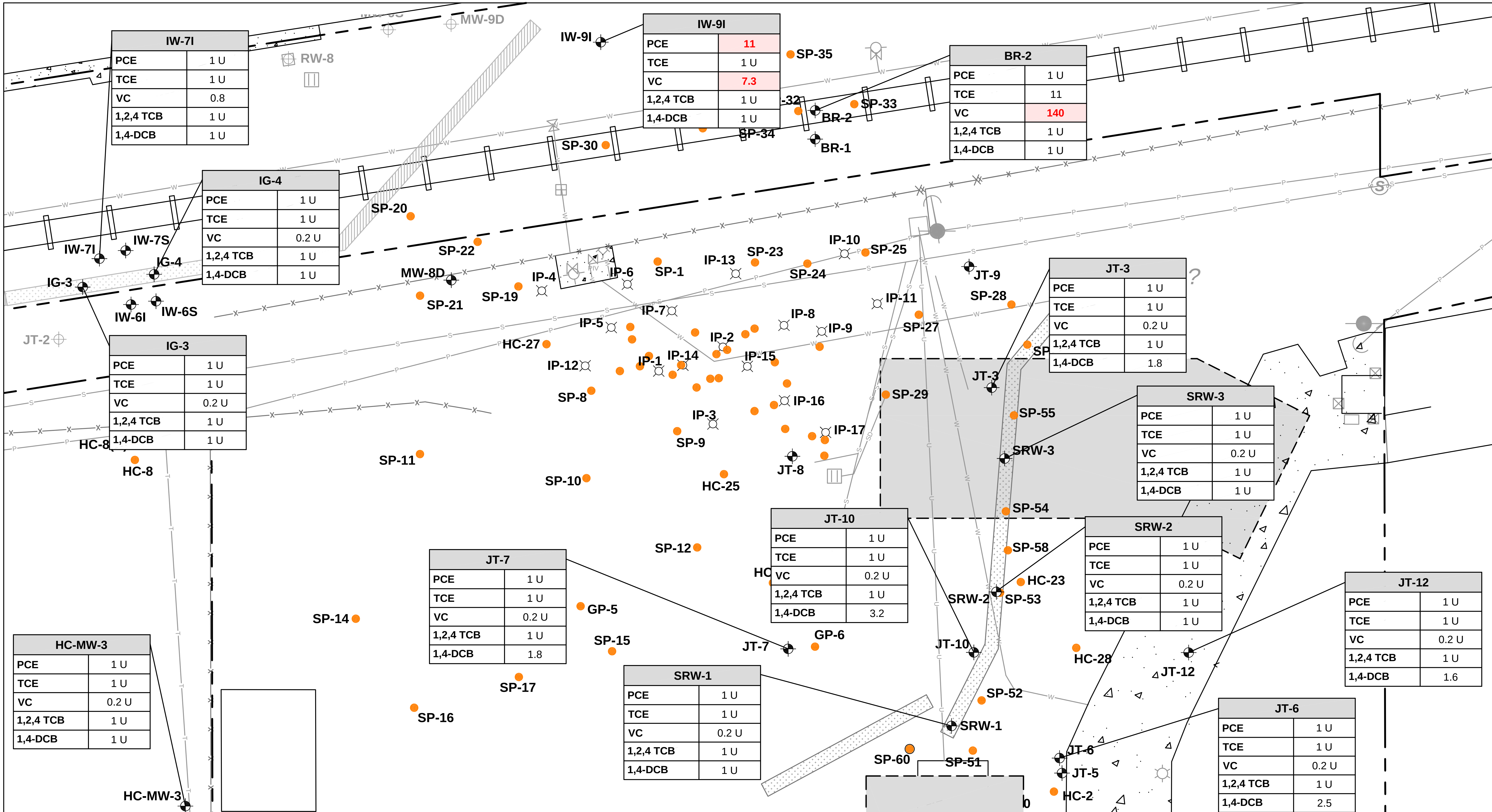
Estimated Extent of Chlorinated Benzenes in Groundwater

17800-43 11/13

HARTCROWSER

Figure **8**

EAL 11/12/13 1780043-010.dwg



IW-7I	
PCE	1 U
TCE	1 U
VC	0.8
1,2,4 TCB	1 U
1,4-DCB	1 U

IW-9I	
PCE	**11**
TCE	1 U
VC	**7.3**
1,2,4 TCB	1 U
1,4-DCB	1 U

BR-2	
PCE	1 U
TCE	11
VC	**140**
1,2,4 TCB	1 U
1,4-DCB	1 U

IG-4	
PCE	1 U
TCE	1 U
VC	0.2 U
1,2,4 TCB	1 U
1,4-DCB	1 U

IG-3	
PCE	1 U
TCE	1 U
VC	0.2 U
1,2,4 TCB	1 U
1,4-DCB	1 U

JT-3	
PCE	1 U
TCE	1 U
VC	0.2 U
1,2,4 TCB	1 U
1,4-DCB	1.8

SRW-3	
PCE	1 U
TCE	1 U
VC	0.2 U
1,2,4 TCB	1 U
1,4-DCB	1 U

JT-10	
PCE	1 U
TCE	1 U
VC	0.2 U
1,2,4 TCB	1 U
1,4-DCB	3.2

SRW-2	
PCE	1 U
TCE	1 U
VC	0.2 U
1,2,4 TCB	1 U
1,4-DCB	1 U

JT-7	
PCE	1 U
TCE	1 U
VC	0.2 U
1,2,4 TCB	1 U
1,4-DCB	1.8

JT-12	
PCE	1 U
TCE	1 U
VC	0.2 U
1,2,4 TCB	1 U
1,4-DCB	1.6

HC-MW-3	
PCE	1 U
TCE	1 U
VC	0.2 U
1,2,4 TCB	1 U
1,4-DCB	1 U

SRW-1	
PCE	1 U
TCE	1 U
VC	0.2 U
1,2,4 TCB	1 U
1,4-DCB	1 U

JT-6	
PCE	1 U
TCE	1 U
VC	0.2 U
1,2,4 TCB	1 U
1,4-DCB	2.5

MW-18S Existing Monitoring Well

RW-2 Former Monitoring Well, Recovery Well, or Piezometer (Abandoned)

IP-5 Injection Well

SP-41 Soil Boring

Note: Labels removed from several borings in "IP" area for clarity. Refer to "Interim Cleanup Action Summary", Hart Crowser, July 18, 2002.

Property Boundary

Concrete Surface

Cement-Bentonite Ground-water Treatment Wall

Permeable Iron/Sand Gate

Overhead Power

Sanitary Sewer Line

Water Line

Utility Line

City of Seattle Property

Iron/GAC Groundwater Treatment Wall

Boat Storage Rack

Notes:

1. Base map prepared from AutoCAD file "020030-02.dwg," provided by Aspect Consulting, 10/08/13.
2. Utility locations are approximate.

Well Name	
PCE	1 U
TCE	1 U
VC	0.2 U
1,2,4 TCB	1 U
1,4-DCB	**3.0**

Tetrachloroethylene — PCE; Trichloroethylene — TCE; Vinyl Chloride — VC; 1,2,4-Trichlorobenzene — 1,2,4 TCB; 1,4-dichlorobenzene — 1,4-DCB

Concentrations in µg/kg

Bold, Shaded Value Exceeds Applicable MTCA Level

Jacobson Terminals
Seattle, Washington

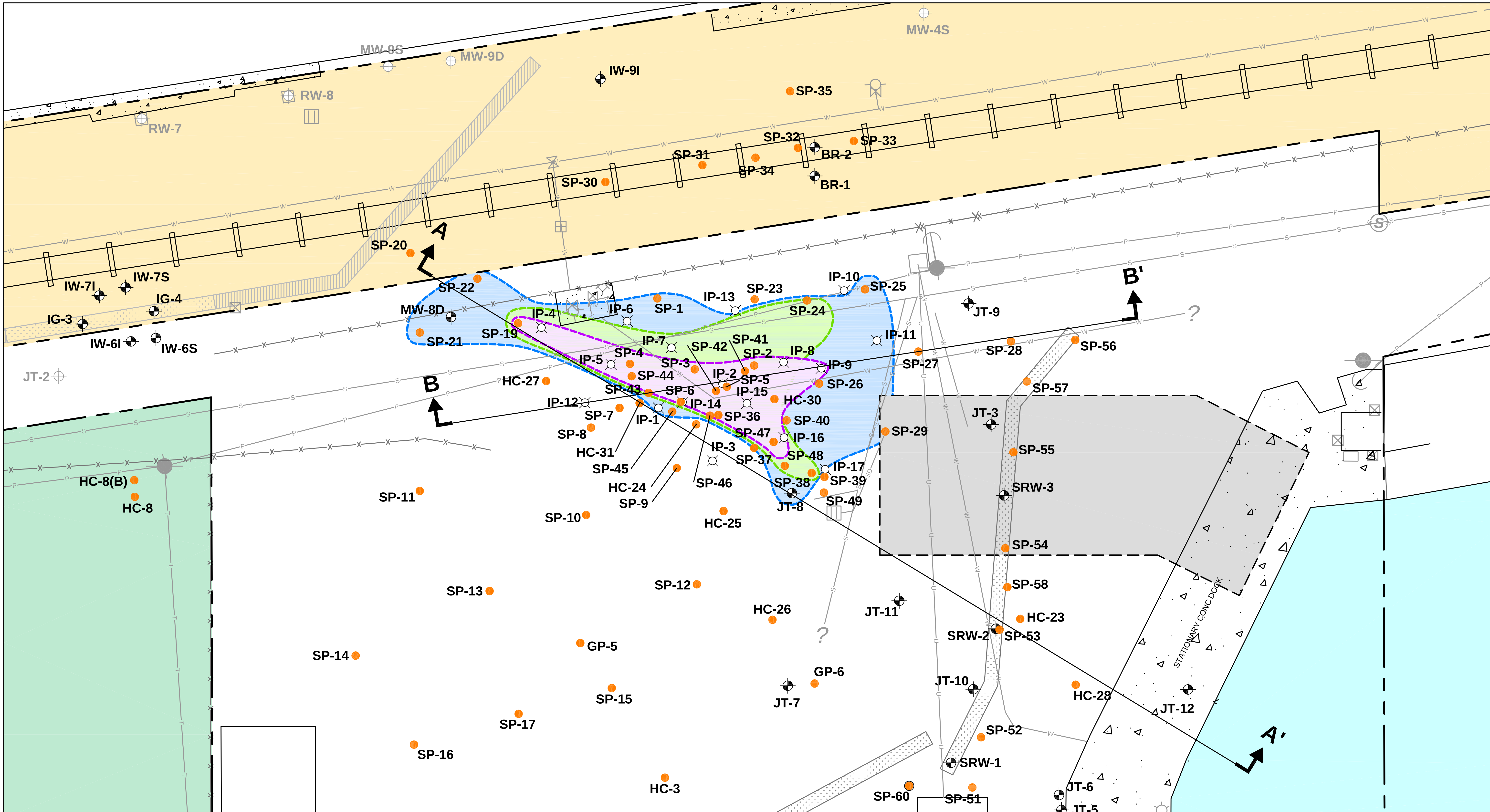
2013 Groundwater COC Concentrations

17800-43 11/13

HARTCROWSER

Figure
9

EAL 11/12/13 1780043-011.dwg



MW-18S Existing Monitoring Well

RW-2 Former Monitoring Well, Recovery Well, or Piezometer (Abandoned)

IP-5 Injection Well

SP-41 Soil Boring

Note: Labels removed from several borings in "IP" area for clarity. Refer to "Interim Cleanup Action Summary", Hart Crowser, July 18, 2002.

Property Boundary

Concrete Surface

Cement-Bentonite Ground-water Treatment Wall

Permeable Iron/Sand Gate

Overhead Power

Sanitary Sewer Line

Water Line

Utility Line

City of Seattle Property

Iron/GAC Groundwater Treatment Wall

Boat Storage Rack

A A' Cross Section Location and Designation

Estimated Extent of PCB Occurrences

PCB Concentration and/or 1,2,4-TCB Concentration > 100 mg/kg

PCB Concentration > 10 mg/kg

PCB Concentration > Screening Level (0.000076 mg/kg)

Notes:

1. Base map prepared from AutoCAD file "020030-02.dwg," provided by Aspect Consulting, 10/08/13.
2. Utility locations are approximate.
3. PCB occurrences include pre- and post-interim action detections.

0 20 40

Scale in Feet

N

Jacobson Terminals
Seattle, Washington

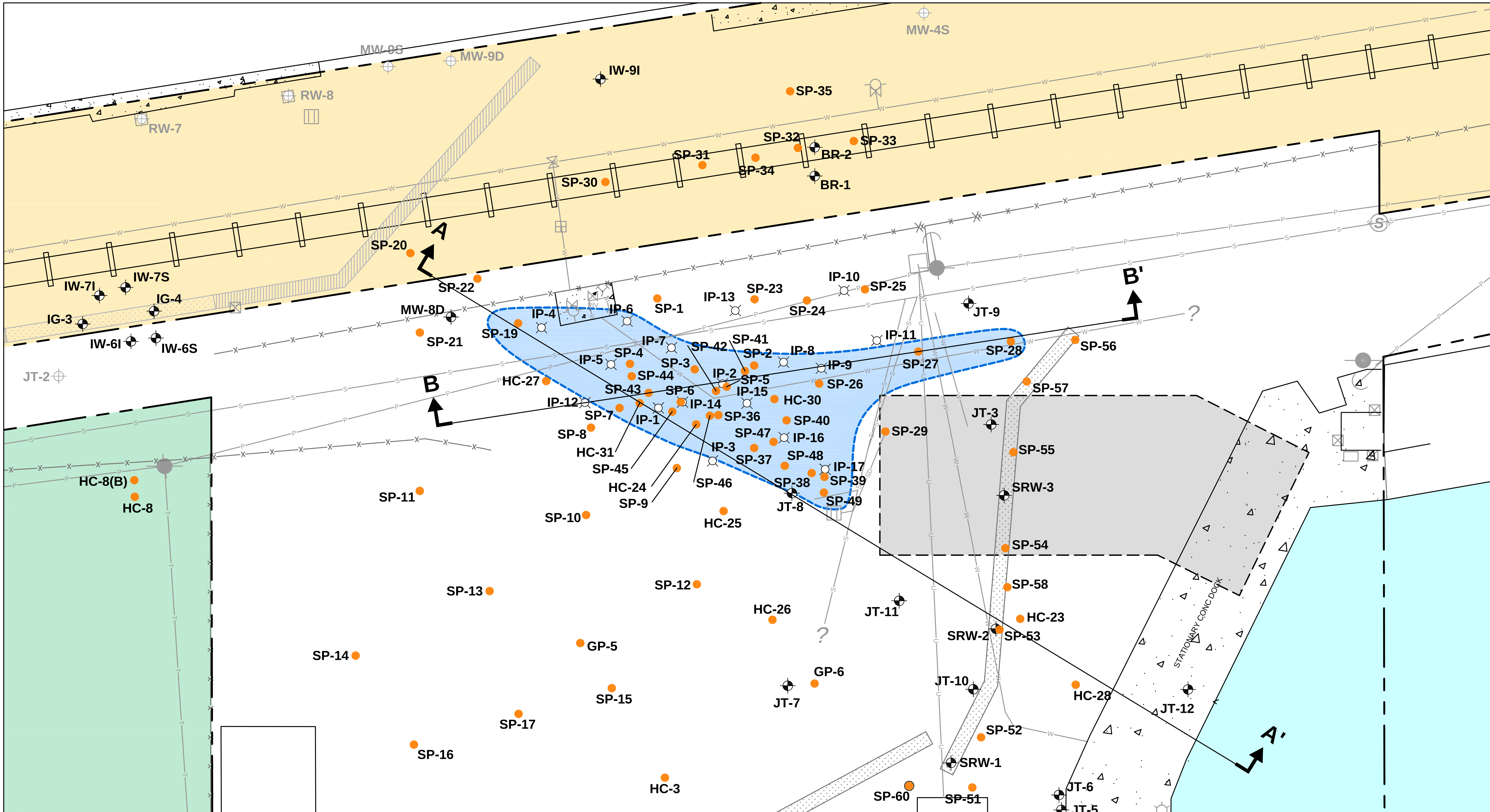
PCB Occurrences in Soil

17800-43 11/13

HARTCROWSER

Figure **10**

EAL 11/12/13 1780043-008.dwg



MW-18S	Existing Monitoring Well	
RW-2	Former Monitoring Well, Recovery Well, or Piezometer (Abandoned)	
IP-5	Injection Well	
SP-41	Soil Boring	Note: Labels removed from several borings in "IP" area for clarity. Refer to "Interim Cleanup Action Summary", Hart Crowser, July 18, 2002.
	Property Boundary	

Concrete Surface

Cement-Bentonite Groundwater Treatment Wall

Permeable Iron/Sand Gate

Overhead Power

Sanitary Sewer Line

Water Line

Utility Line

City of Seattle Property

Iron/GAC Groundwater Treatment Wall

Boat Storage Rack

A A'

Cross Section Location and Designation

Estimated extent of 1,2,4-TCB concentration above screening level (5.4 mg/kg) and PQL

Notes:

1. Base map prepared from AutoCAD file "020030-02.dwg," provided by Aspect Consulting, 10/08/13.
2. Utility locations are approximate.
3. 1,2,4-TCB occurrences include pre- and post-interim action detections.

N

0 20 40

Scale in Feet

Jacobson Terminals
Seattle, Washington

1,2,4-Trichlorobenzene Occurrences in Soil

17800-43 11/13

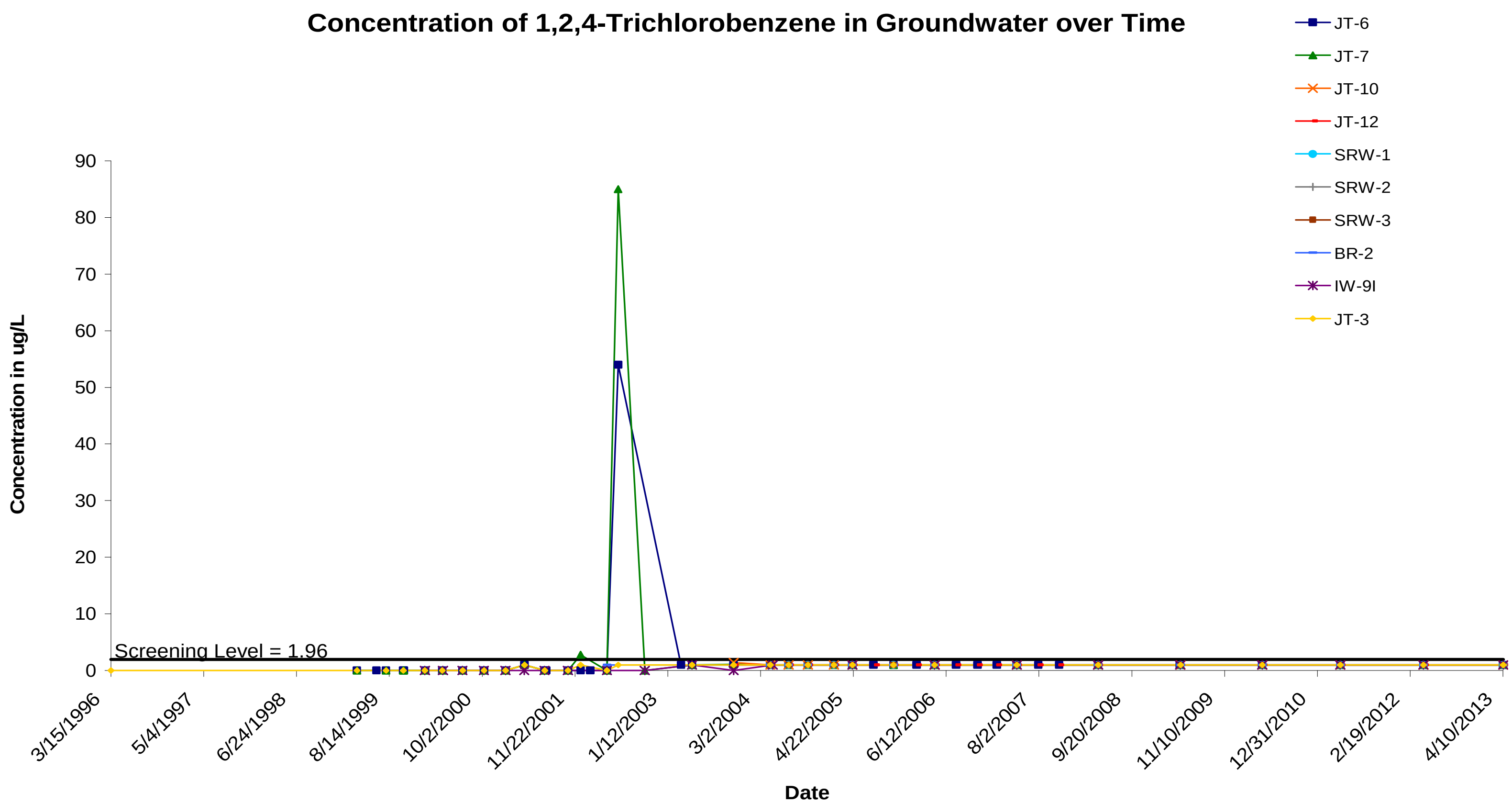
HARTCROWSER

Figure

11

EAL 11/12/13 1780043-014.dwg

initials MM/DD/YY location\filename.xls



HARTCROWSER

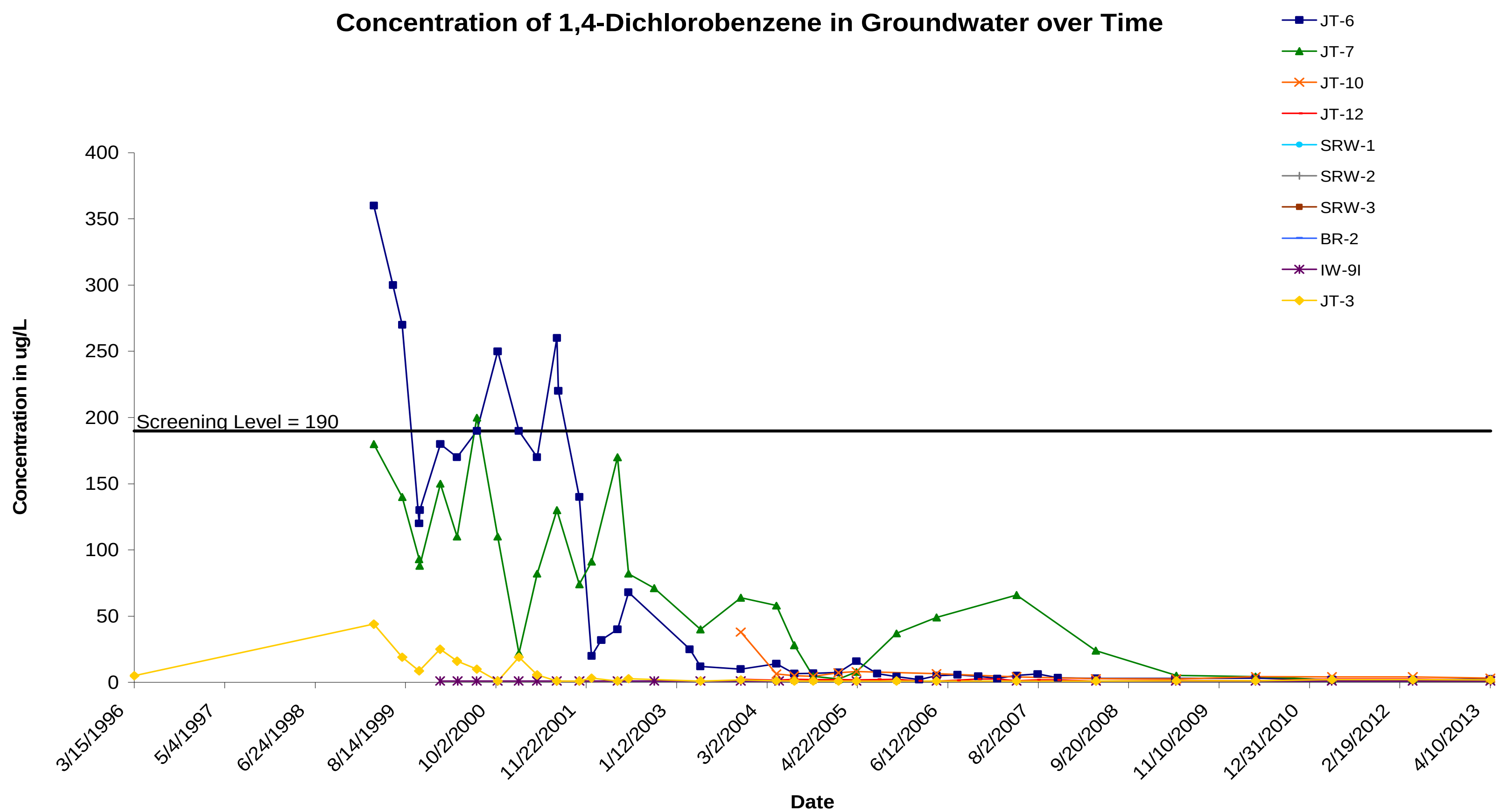
17800-43

13-Nov

Figure **12**

Concentration of 1,2,4-Trichlorobenzene in Groundwater over Time

Jacobson Terminals
Seattle, Washington



Jacobson Terminals
Seattle, Washington

Concentration of 1,4-Dichlorobenzene in Groundwater over Time

17800-43

13-Nov

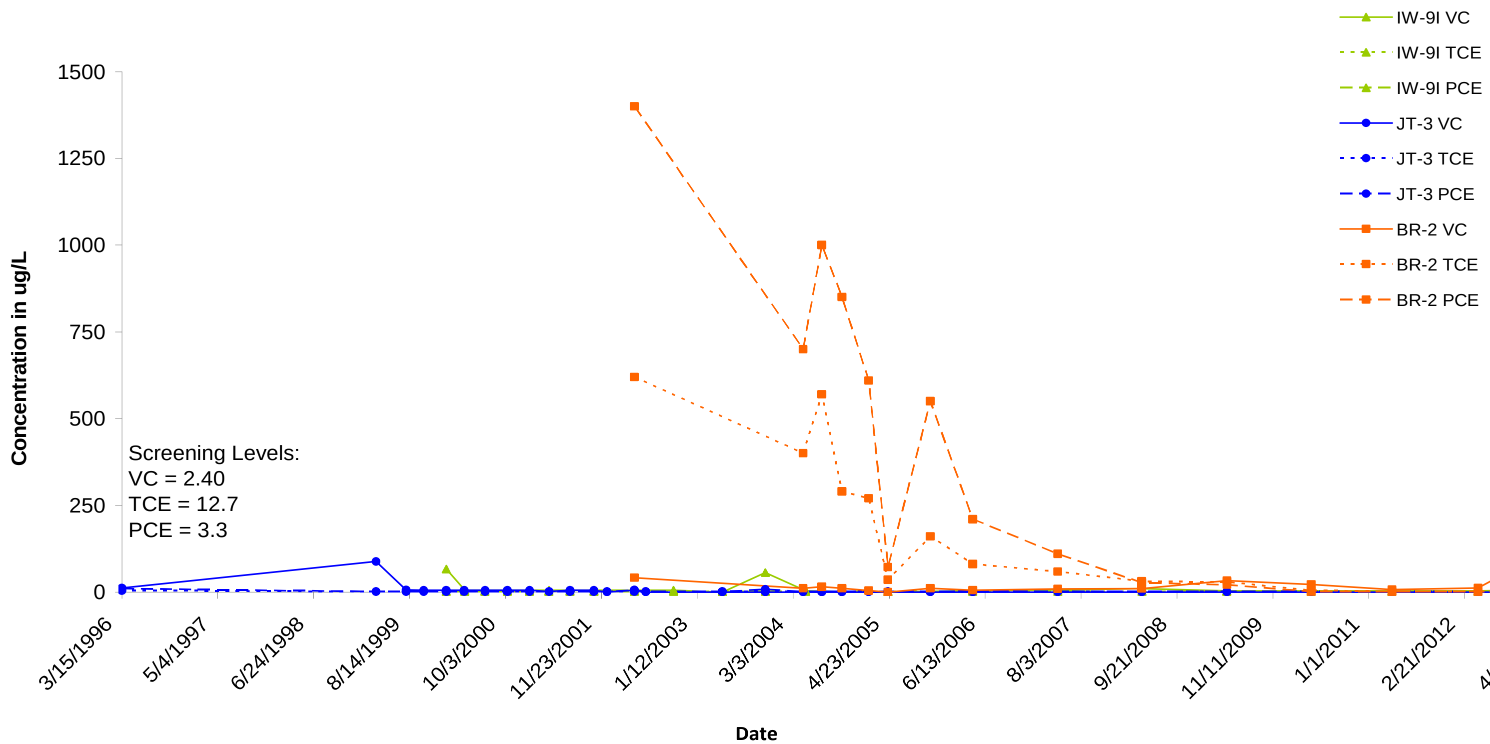
HARTCROWSER

Figure

13

initials MM/DD/YY location\filename.xls

Concentrations of Chlorinated Solvents in Groundwater over Time



Date

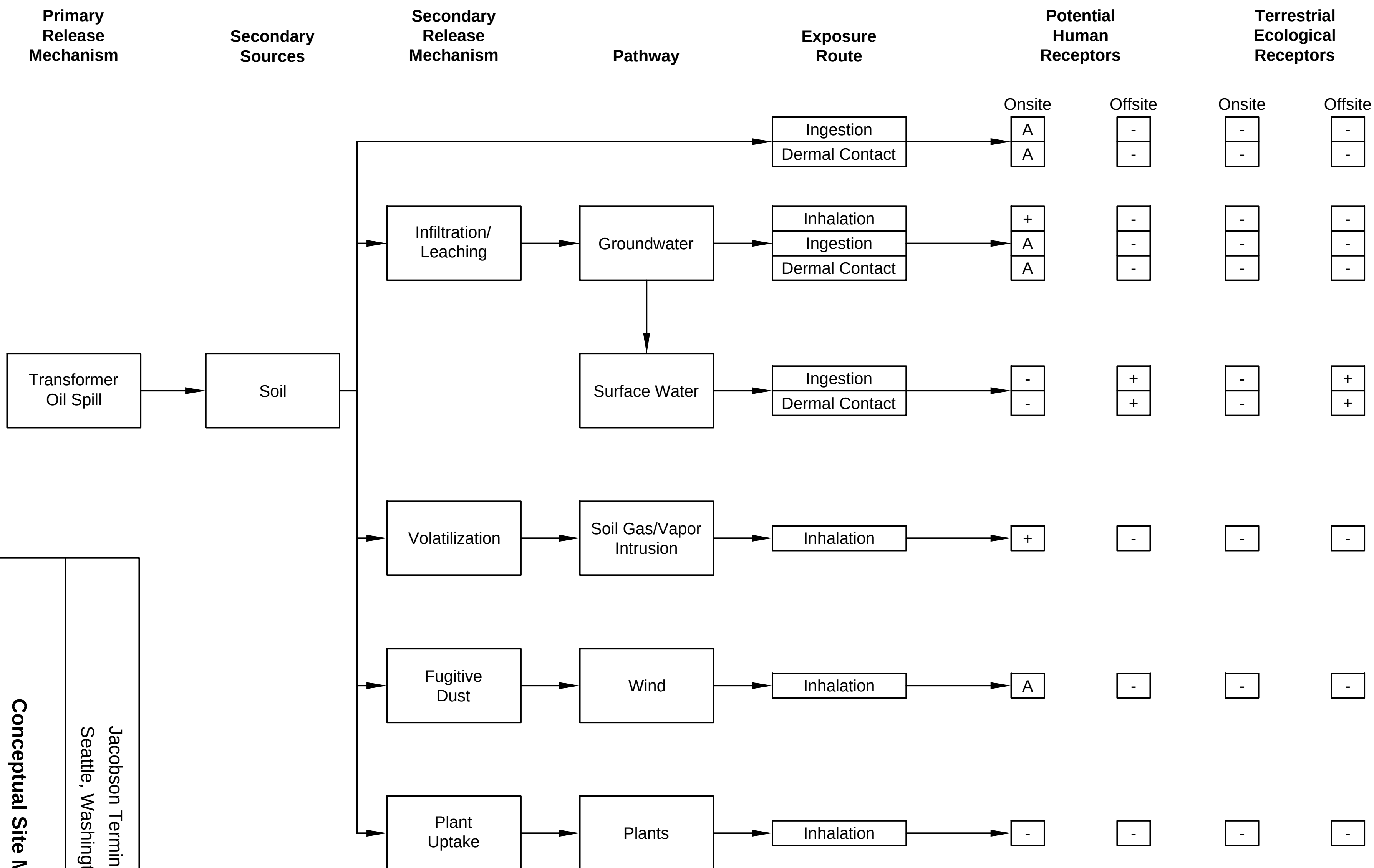
Jacobson Terminals
Seattle, Washington

Concentrations of Chlorinated Solvents in Groundwater over Time

17800-43 13-Nov

HARTCROWSER

Figure **14**



\+ Potentially Complete Pathway

\- Incomplete Pathway

A Pathway Potentially Complete when digging in soil or groundwater

HARTCROWSER

17800-43 11/13

Conceptual Site Model

Jacobson Terminals
Seattle, Washington

Figure 15

A03

Data Gaps Report

IFB XXXX TCP

JACOBSON TERMINALS PROPERTY

INTERIM REMEDIAL ACTION

[MONTH] 20XX




Data Gaps Report
Jacobson Terminals
Seattle, Washington

Prepared for
Washington State Department of Ecology

December 20, 2013
17800-43

HARTCROWSER

HARTCROWSER

www.hartcrowser.com

Data Gaps Report
Jacobson Terminals
Seattle, Washington

Prepared for
Washington State Department of Ecology

December 20, 2013
17800-43

Prepared by
Hart Crowser, Inc.

Phil Cordell, LG
Project
Geologist
phil.cordell@hartcrowser.com

Mike Ehlebracht, LHG
Principal
Geochemist
mike.ehlebracht@hartcrowser.com

1700 Westlake Avenue North, Suite 200
Seattle, Washington 98109-6212
Fax 206.328.5581
Tel 206.324.9530

CONTENTS Page

INTRODUCTION 1

SITE DESCRIPTION AND HISTORY 2

Current Site Use 2
Historical Site Use 2

PREVIOUS ENVIRONMENTAL CHARACTERIZATION/CLEANUP ACTIVITIES 3

Contaminants of Concern 3
Remediation Activities 4

ENVIRONMENTAL SETTING 5

Geology 5
Hydrogeology 6

NATURE AND EXTENT OF CONTAMINATION 8

Chlorinated Ethene Area 8
PCB/Chlorinated Benzene Area 9
Petroleum-Contaminated Soil Area 12

PRELIMINARY CONCEPTUAL SITE MODEL FOR SOURCES, PATHWAYS, AND EXPOSURES 13

ESTABLISHMENT OF SCREENING LEVELS 15

Soil, Groundwater, and Sediment Screening Criteria 15

ENVIRONMENTAL DATA GAPS 16

Soil 16
Groundwater 17
Sediment 18

REFERENCES 18

CONTENTS (Continued)

Page

TABLES

1 Historical Soil Sampling Analytical Results
2 Historical Groundwater Monitoring Analytical Results
3 PCB Concentrations in Groundwater

FIGURES

1 Vicinity Map
2 Site Plan
3 Remediation Areas
4 Generalized Geologic Cross Section A-A′
5 Generalized Geologic Cross Section B-B′
6 Groundwater Elevation Contours April 2005
7 Estimated Extent of Chlorinated Ethenes in Groundwater
8 Estimated Extent of Chlorinated Benzenes in Groundwater
9 2013 Groundwater COC Concentrations
10 PCB Occurrences in Soil
11 1,2,4-Trichlorobenzene Occurrences in Soil
12 Concentration of 1,2,4-Trichlorobenzene in Groundwater over Time
13 Concentration of 1,4-Dichlorobenzene in Groundwater over Time
14 Concentrations of Chlorinated Solvents in Groundwater over Time
15 Conceptual Site Model

DATA GAPS REPORT
JACOBSON TERMINALS
SEATTLE, WASHINGTON

INTRODUCTION

As part of preparing the Remedial Investigation (RI) Work Plan for the Jacobson Terminals property, Hart Crowser completed this Data Gaps Report to summarize available environmental data and identify additional environmental assessment requirements. On September 19, 2013, Hart Crowser reviewed Washington State Department of Ecology's Jacobson Terminals file and received copies of selected documents. Documents used to produce this report are listed in the references section. Discussions with Aspect Consulting, Ecology, and Scott and Al Jacobson during a site walk in July 2013 provided additional information on property operations and environmental conditions.

The Jacobson Terminals facility is located at 5350 30th Avenue Northwest in the Ballard district of Seattle as shown on Figure 1. The property boundaries are the Lake Washington Ship Canal (Ship Canal) to the east and south, Seaborn property to the east, Army Corps of Engineers (Corps) property to the west, and City of Seattle (City) property to the north. The property is currently owned by A & B Jacobson, LLC.

Soil and groundwater impacts have been identified at the property and a number of remedial activities have been completed at the facility and on surrounding properties since 1991. The Jacobson Terminals facility has been enrolled in Washington State Department of Ecology's Voluntary Cleanup Program (VCP) since 2001 under VCP number NW0611. Aspect Consulting (Aspect) has been the owner's environmental consultant since 2003.

This report summarizes current environmental conditions at the Terminals property and identifies data gaps to be addressed during the RI. Information about environmental conditions on the Market Street property to the north and the City property is also provided.

Our evaluation included:

- Visiting the site to observe accessible areas of the Terminals property and assess the condition of monitoring wells;

- Reviewing available environmental documents for the property; and
- Evaluating recent sampling data provided by Aspect.

This data gaps evaluation was performed pursuant to the Washington State Department of Ecology Toxics Cleanup Program Hazardous Substance Site Investigation & Remediation Contract (No. C1100144) and Work Assignment Number C1144QQ.

SITE DESCRIPTION AND HISTORY

The Terminals property is generally flat. The northwest comer, which is used for parking, is approximately 5 feet above the elevation of the rest of the property, at the approximate elevation of the City property/railroad tracks.

Large boat storage racks are located along the Lake Washington Ship Canal. Offices and small warehouses border the Corps property to the east. Access to the site is controlled by fencing and gates. (A site map is provided on Figure 2.) The Terminals property is zoned industrial (IGlU/45).

Current Site Use

The Terminals property is primarily used for boat storage. Large boat racks are located adjacent to the waterway and various marine businesses occupy the office spaces on the property.

The Seaborn property, located to the east, is used for boat moorage and office space. The Corps property contains offices, maintenance buildings, and a tourist facility for the Ship Canal Locks. The City property consists of a former Burlington Northern Railroad right of way and contains active railroad tracks. North of the City property and railroad tracks, at 2801 NW Market Street, is the Market Street property, which consists of a climbing gym and other commercial businesses.

Historical Site Use

Terminals Property

The property is located on a former estuarine tideflat. In the 1920s, the area was filled with sand dredged from the Lake Washington Ship Canal, wood waste, and construction debris. The property was the site of a lumber mill from approximately 1890 to the 1930s. Starting around 1940, the property was used for loading and unloading boats and for storage. Alan and Brian Jacobson (partners in A&B Jacobson, LLC) purchased the property in 1975 and the property has been used as a marine support facility since that date.

Market Street Property

Approximately 14 interconnected buildings were constructed on the Market Street property from 1946 to 1955. Fuel tanks and shell casings were reportedly manufactured at the property before the factory switched to steel window frame manufacturing in the late 1940s. In 1955, the factory stopped producing steel frames and began producing aluminum window frames. This manufacturing process used extrusion presses, an anodizing circuit of 21 aboveground steel or concrete tanks, a paint room, ten underground storage tanks (USTs), and an interior drainage system that included 24 floor drains, trench drains, and sumps.

Wastewater from the Market Street property was discharged to the Lake Washington Ship Canal from approximately 1948 to 1978; in later years, the wastewater was treated on the property and discharged to the King County Metro wastewater collection system. Violations of the Metro permit for pH and metal discharge exceedances are documented in the project file. A video inspection of the sewer lines was conducted in the late 1970s and severe deterioration and disintegration of the lines was observed. The former owner of the property reportedly replaced the lines. Window manufacturing operations ceased at the Market Street property in 1989 (Hart Crowser 2000).

PREVIOUS ENVIRONMENTAL CHARACTERIZATION/CLEANUP ACTIVITIES

A number of environmental investigations and remedial actions have been completed at the Terminals, Corps, City, and Market Street properties. A summary of identified contaminants of concern and remedial activities are provided below.

Contaminants of Concern

Based on the results of historical environmental investigations completed at the properties, the major contaminants of concern (COCs) include:

- Metals in soil and groundwater on the Market Street and City properties;
- Chlorinated solvents (PCE, TCE, cis-DCE, and vinyl chloride) in groundwater on the Market Street, City, Corps, and Terminals properties;
- PCBs in soil at the Terminals property;

- Tri-, di-, and monochlorobenzenes in soil and groundwater at the Terminals property; and
- Petroleum hydrocarbons in soil at the Terminals property.

Groundwater monitoring was first conducted to delineate a vinyl chloride plume identified at the upgradient Market Street property. Historical releases of metals, low- and high-pH solutions, and solvents occurred on the Market Street and City properties during operations by Fentron Industries (Fentron). The releases created localized exceedances of metals in soil and groundwater and an extensive groundwater plume of tetrachloroethene (PCE) and associated degradation products (primarily trichloroethene [TCE], cis-1,2-dichloroethene [cis-DCE], and vinyl chloride). Prior to installation of a treatment wall in 1999, the plume extended from the Market Street and City properties onto the Corps and Terminals properties. A separate area of chlorinated solvents, located on the City property downgradient of the Market Street treatment wall was identified as the likely source of chlorinated solvent impacts on the Terminals property.

A historical release of transformer oil containing PCBs and trichlorobenzene on the northern portion of the Terminals property created a plume of several chlorinated benzene compounds in groundwater (Figure 2). Concentrations of PCBs and chlorinated benzenes above applicable cleanup levels have been identified in soil samples up to 18 feet below ground surface (bgs) near where the presumed transformer oil release occurred.

During construction activities in the early 1990s, a separate area of PCB- and petroleum-impacted soil was discovered at the Terminals property in an alley that borders that Corps property (Figure 2).

Remediation Activities

A number of remedial actions have been completed at the Terminals, City, and Market Street properties to address potential human and ecological exposure to the COCs described above. These cleanup actions were conducted under the VCP by both Fentron and Jacobson. The locations where remedial actions were implemented are shown on Figure 3.

Market Street Property

In 1989, seven of the ten USTs were taken out of service and all fluids, sludges, aboveground tanks, piping and other features associated with the anodizing process were removed from the Market Street property and disposed of, and the drains, catch basins, floors, and walls of the property were cleaned. In 1993, Fentron decommissioned all ten USTs and removed approximately 100 tons of petroleum-impacted soil from the site.

In 1991, EMCON installed a pump-and-treat system along the southwestern portion of the property to address solvents in groundwater. The system did not fully capture the solvent plume and was shut down in 1999 and replaced with a passive treatment wall and zero-valent iron gates system.

The wall consists of three impermeable funnel sections constructed of cement bentonite that captures groundwater and directs it through two permeable gates filled with a mixture of granular iron and sand. At the same time, a magnesium oxide product (ORC) was injected into groundwater on the Terminals property to treat solvents that had already migrated past the newly constructed treatment wall. A deed restriction was also placed on the Market Street property that addresses residual contamination beneath the existing building (Hart Crowser 2000).

Terminals Property

In 2001 and 2002, Fenton's Reagent (acidified hydrogen peroxide and ferrous iron) was injected on the Terminals property to provide source area treatment of the PCB/chlorinated benzene plume and to provide a more aggressive oxygen enhancement for degrading cis-DCE and vinyl chloride. In December 2003, a continuous permeable treatment wall containing granular activated carbon and zero-valent iron was installed along the Lake Washington Ship Canal to remove PCBs and chlorinated benzenes from groundwater (Aspect 2003).

In 1996, PCB and petroleum contaminated soil was removed from between two buildings bordering the Corps Property. Much of the source material was removed, but confirmation sampling showed that petroleum hydrocarbon concentrations remained above cleanup levels in sidewall and bottom samples (Hart Crowser 1997).

ENVIRONMENTAL SETTING

This section describes the environmental setting of the property including climate, geology, hydrogeology, and surface water hydrology.

Geology

Terminals property soils generally consist of approximately 10 feet of fill overlying native estuarine sediment. The fill is a diverse mixture of silty sand, silt, wood waste, and occasional debris. A layer of wood waste approximately 6 to 10 feet deep has been identified over much of the northern portion of the property. Below the fill layer is native sand or silty sand to 16 to 18 feet deep. Beneath the sand layer is a layer of silty clay, typically 1 to 4 feet thick. Below this layer are discontinuous layers of sand and silt of increasing density. Two generalized geologic cross sections are provided on Figures 4 and 5 (Hart Crowser 2002).

Hydrogeology

Groundwater Flow Patterns

Shallow groundwater in the area generally flows toward the south-southeast before discharging into the Lake Washington Ship Canal. Groundwater elevations on the upgradient Market Street property is typically 12 to 14 feet. Groundwater elevations on the Terminals property are typically 7 to 8 feet. Groundwater is typically encountered 4 to 7 feet bgs on the Site. The groundwater elevation fluctuates approximately 2 feet seasonally and depends largely on the elevation of the Ship Canal, which is adjusted seasonally by the Corps of Engineers. A map showing groundwater elevation contours from 2005 is provided on Figure 6 (Aspect 2003 and Hart Crowser 2002).

Groundwater elevations have typically been lower near the sewer line in the JT-9 area than the rest of the property. A sewer camera survey performed in April 2003 indicated that a connection to the site side sewer was located in this area. The camera noted water flowing in at the side sewer connection with significant scale buildup. The sewer line is located below the water table (see Figure 6); therefore, leakage of shallow groundwater into the sewer could result in the observed groundwater depression (Aspect 2003).

Groundwater Flow Rates

An upward gradient has been reportedly identified between the deeper water-bearing zone (beneath the silty clay layer) and the shallower water-bearing zone, with the hydrostatic head typically 1 to 2 feet greater at wells JT-5 and MW-8D than at adjacent shallower wells (Aspect 2003).

Saturated-zone soils at the site are reported to have generally low hydraulic conductivity. Slug tests performed in 2003 indicated that at five of six wells tested, the average hydraulic horizontal gradient was 0.02 foot per foot across the property, and assuming a porosity of 0.4, the estimated groundwater flow rate is 0.1 foot per day (40 feet per year). Using the maximum calculated hydraulic conductivity in the remaining well, the groundwater flow rate would be

0.7 foot per day (250 feet per year). Using vinyl chloride (a very mobile compound in groundwater) as a conservative tracer, groundwater velocity was calculated at approximately 0.4 foot per day, or 150 feet per year (Aspect 2003).

Ship Canal Surface Water Hydrology

In 1914, Lake Union was hydraulically connected to Lake Washington by construction of the Montlake Cut between Portage Bay and Union Bay. Lake Union was also connected to the then marine waters of Salmon Bay by construction of the Fremont Cut. The connection to Shilshole Bay and Puget Sound, and a manner to control water levels, was established by constructing the Hiram M. Chittenden Locks. The Fremont Cut and Montlake Cut comprise the Lake Washington Ship Canal. The locks and dam maintain the Ship Canal water level.

These modifications increased inflow to Lake Union by diverting the outflow from Lake Washington into the Montlake Cut and, hence, Lake Union, which now drains west into Salmon Bay. During periods of high water flow, the north part of Lake Union can flush (complete exchange of water) in about seven days. However, the southern part of Lake Union does not completely flush and remains relatively stagnant. Opening the locks also allows periodic influx of dense salt water from Puget Sound into the Ship Canal. Because the saltwater is heavier than freshwater, it sinks to the bottom of the canal and moves eastward following the density gradient into Lake Union. The balance between the saltwater intrusion and the flushing rate at a given time varies. During the rainy season and spring thaw, runoff from the Cascade foothills is high and the lake is flushed. In the summer, as the runoff flow decreases and lock openings increase, saltwater intrusion increases.

The US Army Corps of Engineers maintains the water level in Lake Washington and Lake Union by regulating flow through the locks on the western end of Salmon Bay. Lake Union water levels vary by roughly 2 feet on a yearly basis, from 20 feet during the winter months to 22 feet during the summer months.

The Lake Washington Ship Canal from the locks (river mile 1.0) to Lake Washington (river mile 8.6) is designated as “lake class” by the Washington State Department of Ecology (Ecology), stipulating that water quality must meet the requirements for most, if not all of the following uses: wildlife habitat; general recreation; fish reproduction, rearing, and harvest; water supply; and stock watering. However, it should be noted that elevated salinity levels within the portion of the Ship Canal adjacent to the Terminals property would likely severely limit its potential use as a source for potable water.

NATURE AND EXTENT OF CONTAMINATION

There are three areas of elevated COCs at the site. For the purposes of this report the areas have been identified as follows:

- Chlorinated ethene area along the City property boundary;
- PCB/Chlorinated benzene area on the Terminals property; and
- Petroleum area bordering the Corps property.

A description of each area and the affected media is presented below. COC areas are shown on Figure 2. Soil analytical data is presented in Table 1 and groundwater analytical data is presented in Tables 2 and 3. The estimated extent of COCs in groundwater is shown on Figures 7 and 8 and recent groundwater chemistry data is presented in Figure 9. PCB and 1,2,4-trichlorobenzene occurrences in soil are shown on Figures 10 and 11, respectively.

Chlorinated Ethene Area

This area consists of PCE and its degradation products TCE, cis-DCE, and vinyl chloride originating from properties located north of the Terminals facility. The primary source areas for the chlorinated ethenes appear to occur along the railroad tracks on the City property. The estimated extent of the chlorinated ethene occurrences in groundwater is shown on Figure 7.

Soil

The original source of the detected chlorinated ethene occurrences on the Terminals property is not known. Low soil concentrations of PCE and TCE were detected at BR-1 and BR-2 (maximums of 0.96 and 0.62 mg/kg, respectively), but no significant soil source of PCE or TCE has been identified. Soil occurrences were co-located with groundwater occurrences at depths below 20 feet, above the silt confining layer. The limited extent suggests a one-time historical release of a small quantity of contaminated material, which migrated down to the silt confining layer (Aspect 2003 and Hart Crowser 2002).

Groundwater

The depth of affected groundwater within the chlorinated ethene source area is approximately 20 to 22 feet; below this depth is a confining layer of very dense, sandy silt. The maximum detected concentrations of PCE and TCE within the City property source area (both detected at BR-1) were 900 and 1,500 ug/L, respectively. Downgradient of the chlorinated ethene source area, PCE and TCE are typically not detected, but relatively high concentrations of vinyl chloride (maximum of 650 ug/L, at IP-6) and somewhat lower concentrations of cis-DCE have been detected during past monitoring events.

Some of these concentrations may be residual levels from the Market Street property plume before the treatment wall was installed. Groundwater concentrations of chlorinated ethenes exiting the treatment wall have been very low or non-detect since it was installed in 1999. Vinyl chloride concentrations have declined steadily since installing the Market Street property iron wall and performing *in situ* oxidation on the Terminals property (Aspect 2003).

During the most recent groundwater sampling event conducted in April 2013, chlorinated ethenes were still present at concentrations exceeding screening levels in several wells upgradient of the Terminals property (including wells IW-9I and BR-2) but were generally not detected in wells sampled on the property (Figure 9).

Vapor

No VOCs were detected in vapor samples collected from sanitary sewer manholes hydraulically upgradient or downgradient of the chlorinated ethene source area and the vinyl chloride plume (Hart Crowser 2002).

PCB/Chlorinated Benzene Area

The northern portion of the Terminals property was impacted by a historical release of transformer oil containing PCBs and chlorobenzenes (Figure 2). Soils in this area contain elevated concentrations of PCBs, 1,2,4-trichlorobenzene, and other chlorobenzene compounds. Chlorinated ethenes have also been detected in soil and groundwater in this area, but have been attributed to upgradient sources.

The original source is not known, but PCB and trichlorobenzene mixtures were historically used as dielectric fluids in transformers. The shape and location of the contaminated area imply a historical release near IP-1, -4, and -5, which migrated downward until reaching the silt confining layer at an approximate depth of 16 to 18 feet. Contaminant concentrations in the PCB/chlorinated benzene source area are highest just above the silt confining layer, while occurrences in the unsaturated zone are limited and generally at much lower concentrations. No evidence of free product has been observed in wells and injection points installed in the source area, and no contamination above cleanup levels has been observed in the soil or groundwater beneath the confining silt and clay layer.

Contaminant migration along the top of the confining layer in the direction of groundwater flow may account for the southeastern lobe of the source area. The elongation along the sewer line might be from either contaminant migration toward the line or from spreading of contaminated material during installation and backfilling of the sewer line in 1974, if the release occurred earlier (Aspect 2003 and Hart Crowser 2002).

Soil

PCBs. PCBs have been detected in unsaturated zone soils in the source area at concentrations up to 18 mg/kg Concentrations exceeding the industrial direct contact soil screening level of 10 mg/kg were detected in two locations in the unsaturated zone: 17 mg/kg at SP-24 and 18 mg/kg at SP-5. Multiple PCB detections above the practical quantification limit (PQL) have also been detected in unsaturated zone soils. In the saturated zone (below 8 feet deep), PCB occurrences are more widespread at concentrations up to 880 mg/kg. The approximate area of PCB occurrences is shown on Figure 10 and includes pre- and post-Interim Action detections. Following the Interim Action, the estimated PCB hotspot area (PCB concentrations greater than 100 mg/kg) reportedly decreased by approximately 40 percent; however, PCB concentrations as high as 690 mg/kg were still detected in soil following the final injection round (Aspect 2003 and Hart Crowser 2002).

1,2,4-Trichlorobenzene. This analyte has generally not been detected in unsaturated zone soils in the source area. In the saturated zone of the source area, 1,2,4-trichlorobenzene was detected at concentrations up to 560 mg/kg before the Interim Action and at concentrations up to 360 mg/kg after the Interim Action. The approximate area of 1,2,4-trichlorobenzene occurrences is shown on Figure 11 and includes pre- and post-Interim Action detections. The distribution of 1,2,4-trichlorobenzene generally correlates with PCB occurrences shown on Figure 10 (Hart Crowser 2002).

1,4-Dichlorobenzene. This analyte has been detected in unsaturated zone source area soils at concentrations up to 0.28 mg/kg. In the saturated zone, 1,4-dichlorobenzene was been detected at concentrations up to 11 mg/kg before the Interim Action and at concentrations up to 15 mg/kg after the Interim Action. 1,4-dichlorobenzene is generally collocated with 1,2,4-trichlorobenzene but usually at concentrations 1 to 2 orders of magnitude lower (Hart Crowser 2002).

Groundwater

Groundwater monitoring data indicate that the 1,4-dichlorobenzene plume in groundwater extends from the source area southeast toward the Ship Canal. Concentrations have historically been highest in groundwater at approximate depths of 14 to 17 feet, just above the silt confining layer.

Groundwater sampling results are presented in Tables 2 and 3 and groundwater quality data collected from the most recent sampling event (April 2013) are shown on Figure 9. The estimated extent of chlorinated ethene and chlorinated benzene groundwater exceedances are presented on Figures 7 and 8, respectively.

PCBs. Before and during the Interim Action, PCBs were not detected in groundwater at wells JT-3 or JT-6, which are located downgradient of the source area. PCBs were detected in groundwater following the Interim Action at concentrations of 1.5 ug/L at JT-3 and 0.2 ug/L at JT-6 in 2002. Following construction of the treatment wall, PCBs were generally not detected in JT-6 and JT-12. PCB groundwater sampling results are presented in Table 3.

1,2,4-Trichlorobenzene. Before the Interim Action, 1,2,4-trichlorobenzene was encountered in the source area (IP-2) at a concentration of 4,700 ug/L but was not detected in groundwater downgradient. A low concentration (54 ug/L) was detected at well JT-6 in 2002, downgradient of the source area. During the 2013 groundwater sampling event, 1,2,4-trichlorobenzene was not detected above laboratory reporting limits in downgradient wells (Aspect 2013). Concentrations of 1,2,4-trichlorobenzene have been below screening levels since 2004 and are plotted on Figure 12.

1,4-Dichlorobenzene. Before the Interim Action, 1,4-dichlorobenzene was intermittently detected at well JT-3 at concentrations up to 44 ug/L, and was regularly detected at well JT-6 at concentrations up to 360 ug/L. 1,4-dichlorobenzene was also detected in the source area at concentrations up to 1,300 ug/L (at IP-1). After the Interim Action, 1,4-dichlorobenzene concentrations were generally lower, except at IP-7 and IP-8. In June 2002, the highest concentration of 1,4-dichlorobenzene detected in the Source Area was 450 ug/L at IP-8, and the 1,4-dichlorobenzene concentration detected at JT-6 was 68 ug/L. Concentrations of 1,4-dichlorobenzene in compliance monitoring wells have decreased following the Interim Action and have been below cleanup levels in long-term monitoring wells since 2007 (Aspect 2013). Concentrations of 1,4-dichlorobenzene have been below screening levels since 2001 and are plotted on Figure 13.

Vinyl Chloride. Before the Interim Action, vinyl chloride was detected across the northwestern area of the Terminals property at concentrations up to 620 ug/L. Elevated concentrations were generally detected north of the sewer line at injection points IP-6, IP-10, and IP-13, where vinyl chloride was detected at concentrations up to 650 ug/L. Vinyl chloride concentrations in groundwater downgradient of injection points decreased significantly during the Interim Action, with concentrations at injection points and wells south of the sewer line less than 100 ug/L and often below detection limits. Concentrations of vinyl chloride in downgradient wells have not been detected above cleanup levels since 2010. Concentrations near the source area have decreased but remain above cleanup levels. Concentrations of chlorinated solvents over time are plotted on Figure 14.

Sediment

On behalf of A & B Jacobson, LLC, in 1998, Hart Crowser collected two grab sediment samples, from approximately 0 to 10 centimeters bgs in the Ship Canal adjacent to monitoring wells JT-12 and JT-6. Samples were reportedly collected from behind the pier bulkhead. Sediment samples were analyzed for metals (including arsenic, cadmium, chromium, copper, lead, tin, and zinc), toluene, and trichlorofluoromethane. Arsenic was reportedly detected at 17 and 24 mg/kg, above the current Washington State Freshwater Sediment Cleanup Objective criteria of 14 mg/kg, but below the Freshwater Sediment Screening Level of 120 mg/kg. Other metal concentrations were either below applicable screening levels or not detected. These sediment samples were not analyzed for PCBs or chlorinated benzenes.

No report documenting sediment sample collection was located in Ecology or Hart Crowser files. Field notes, hand sketches, and a table were located in the Hart Crowser archive file.

Petroleum-Contaminated Soil Area

This area contained petroleum- and PCB-impacted soil originally identified during construction activities in 1993. The contamination was located east of the equipment storage building on the Corps property, in the alley between the Jacobson transformer building and the Pirelli-Jacobson Marine Storage Building (Figure 2). A remedial excavation was completed to remove the impacted soil in 1996.

Soil

Oil- and diesel-range petroleum hydrocarbons remain in soil in the western portion of the property, adjacent to the Corps property. Excavation sidewall samples contained diesel- and oil-range petroleum hydrocarbon concentrations ranging from 48 mg/kg to 22,000 mg/kg, but physical site constraints prevented further soil removal. All verification soil samples had PCB concentrations below the MTCA Method A industrial soil cleanup level of 10 mg/kg (Hart Crowser 1997).

Groundwater

Groundwater samples were collected from monitoring wells HC-MW-1 through -3 following the excavation. Oil- and diesel-range petroleum hydrocarbons and PCBs were either detected below cleanup levels or below laboratory detection limits following the cleanup action. A "No Further Action" letter was issued for the cleanup by Ecology in 1998. However, during a 2010 periodic review, Ecology indicated that the cleanup may not be protective of groundwater quality.

In 2010, Aspect installed a monitoring well (MW-4) in the area where the residual contamination was left in place (Figure 2). Groundwater samples were collected from this well and two existing wells (MW-2 and MW-3). PCBs were detected in all three wells. The total PCBs concentration measured in well MW-4 (0.6 ug/L) exceeded the surface water protection screening level, as well as the MTCA Method A cleanup level of 0.1 ug/L PCBs. Diesel was not detected in any of the wells.

Residual PCB- and petroleum-impacted soil and groundwater in this area are likely unrelated to contamination in the PCB/Chlorinated Benzene Area.

PRELIMINARY CONCEPTUAL SITE MODEL FOR SOURCES, PATHWAYS, AND EXPOSURES

A conceptual site model (CSM) presents the links between contaminant sources, release mechanisms, exposure pathways and routes, and receptors to summarize the current understanding of the risk to human health and the environment. The CSM is dynamic and may be refined throughout the cleanup action process as additional information becomes available. Figure 15 graphically illustrates the preliminary CSM developed for the PCB/chlorinated benzene area.

A historical release of transformer oil resulted in introduction of PCBs and chlorinated benzenes to Terminals property soil, creating a secondary source. Secondary release mechanisms include fugitive dust, plant uptake, infiltration and leaching to groundwater, and volatilization. Groundwater can also potentially impact surface water. Exposure routes potentially include inhalation, ingestion, and dermal contact.

Potential human receptors include workers inside the Terminals property buildings, potential workers during future development of the site, and utility workers. Terrestrial ecological receptors include plants and animals exposed to impacted media, as well as secondary food chain consumers such as birds and mammals.

A Terrestrial Ecological Evaluation (TEE) was not completed for the Terminals Property because it qualifies for a TEE exemption. As detailed in WAC 173-340-7491, the property is covered by asphalt, creating a physical barrier between contaminated media and plants and wildlife, qualifying the property for exemption from TEE requirements. To formally qualify for this exemption, institutional controls to maintain the asphalt will need to be put in place, requiring a formal written agreement between the property owner and Ecology. Assuming these steps are taken, a TEE is not required for the Terminals Property.

For a contaminant to present a risk to human health and/or the environment, the pathway from the contaminant to the receptor must be complete. The potential exposure pathways and whether they are considered complete are summarized below.

Soil. On-site soil may contain elevated concentrations of PCBs, chlorinated benzenes, and oil-range hydrocarbons. The site is paved and, therefore, there is no exposure pathway unless the pavement is removed. Workers digging in the soil for future development or utility work may be exposed to elevated concentrations without adequate personal protective equipment and safety procedures. Routes of exposure include incidental ingestion and direct contact. Available data indicate that soil contamination does not extend off-property.

Groundwater. Three potential exposure routes exist for groundwater: inhalation of vapors, incidental ingestion, and direct contact. Complete pathways for incidental ingestion and direct contact only exist if workers are digging in soil below the water table. Volatile aromatic compounds dissolved in Terminals property groundwater may volatilize out of the liquid phase and migrate upward into unsaturated soil pore spaces. Given that the nearest Terminal buildings are located over 80 feet upgradient of the PCB/chlorinated benzene plume, indoor air impacts are unlikely. There is a potential for on-site and off-site utility workers to be exposed to vapors.

Surface Water. Shallow groundwater beneath the property migrates to the Lake Washington Ship Canal. There is a potential for dissolved contaminants to impact the aquatic environment.

Soil Gas. Volatilization of chlorinated benzenes in the soil can lead to concentrations in the soil gas that may migrate to the surface. Impacts to indoor air within existing Terminal buildings is unlikely given their distance from the plume. However, this pathway may exist for utility workers.

Fugitive Dust. The fugitive dust pathway does not exist while the site it paved. Fugitive dust could be a potential pathway if the pavement is removed and workers are digging in the soil.

Plant Uptake. The PCB/chlorinated benzene area and surrounding Terminals property are predominantly paved or covered by building foundations. Plants are not grown for human consumption within the impacted areas and, therefore, the pathway is incomplete.

The main exposure pathways that exist at the site that are not currently mediated are migration of dissolved contaminants to adjacent surface water and the inhalation risk to utility workers. Several pathways are potentially complete only if property or utility work includes digging in the soil or groundwater.

ESTABLISHMENT OF SCREENING LEVELS

Preliminary soil screening levels are presented in Table 1 and groundwater screening levels are presented in Tables 2 and 3.

Soil, Groundwater, and Sediment Screening Criteria

Groundwater

Groundwater screening levels have historically been compared to surface water protection criteria. Depending on the COC, either MTCA Method B freshwater screening criteria or State freshwater screening criteria as defined in WAC 173-201A were used (Hart Crowser 1999).

For this report, screening levels were updated based on the most conservative freshwater screening levels for consumption of organisms: Federal Clean Water

Act Section 304, National Toxics Rule 40 CFR 131, or MTCA Method B surface water criteria, whichever is lower. Groundwater screening levels can be found in Table 2.

Soil

Soil screening levels have historically been compared to MTCA Method A Industrial screening levels or MTCA Method C Direct Contact Levels for Industrial Sites (Hart Crowser 1999).

To evaluate whether COC concentrations in soil are protective of adjacent surface waters, screening levels were calculated using Ecology's Three-Phase Partitioning Model (WAC 173-340-474). This model provides a conservative estimate for establishing a soil concentration that will not cause groundwater contamination above an acceptable level. Surface water screening values presented in Table 2 were used to compute soil screening levels protective of the groundwater exposure pathway. Soil screening levels can be found in Table 1.

Sediment

Sediment data collect during the RI will be compared to the Washington State Freshwater Sediment Cleanup Objective Criteria and Freshwater Sediment Screening Levels as defined in WAC 173-204.

ENVIRONMENTAL DATA GAPS

The focus of this interim action will be to remove PCB- and chlorinated benzene-impacted soil on the Terminals property. The data gaps to be addressed during the RI are listed by media below and are limited to contamination on the Terminals property.

Soil

Numerous soil investigations have been completed at the Site to delineate PCB- and chlorinated benzene-contaminated soil. To support development of the RI and IAWP, additional contaminant delineation will be needed within and around the source area. Current soil analytical data will be needed to assess contaminant concentrations and distribution to evaluate remedial options. The extent of PCB detections above screening levels is shown on Figure 10, covering approximately 2,500 square feet and extending approximately 18 feet bgs. The approximate vertical distribution of PCB detections above screening levels is shown on Cross Sections A-A′ and B-B′ (Figures 4 and 5).

Site soil data from within and around the source area was collected prior to or immediately following the previous interim actions completed in 2002 and 2003. The vertical and horizontal extent of the contamination has likely been altered by the previous interim actions. Collection of soil samples from borings installed within and around the source area will be needed to refine the current vertical and horizontal extent of the PCB, chlorinated benzene, and chlorinated ethene contamination. Metals data will be need for remediation planning and waste profiling. Soil samples should be analyzed for VOCs, PCBs, and metals. Additional soil sample analysis to assess potential *in situ* remediation options should include extended diesel-range petroleum hydrocarbons and total organic carbon (TOC) analysis.

Groundwater

Groundwater conditions have been monitored in several wells located downgradient of the PCB/chlorinated benzene source area since the 2003 Interim Action. Results of this long-term groundwater monitoring indicate that 1-4-dichlorobenzene concentrations have historically been below screening levels in compliance monitoring wells JT-6 and JT-12. However, groundwater samples have not been collected recently from within and adjacent to the source area. In general, groundwater samples from this area were last collected immediately before or after the Interim Actions. Additional sampling in and around the source area will be needed to assess current groundwater conditions.

In 2010, PCBs were detected in groundwater at the Terminals property at MW-4, located within the petroleum-contaminated soil area. Wells in this area should also be sampled to assess current groundwater PCB concentrations associated with the residual soil contamination left in place following the 1996 remedial excavation.

On October 3, 2013, Hart Crowser personnel completed a site walk and observed the condition of groundwater monitoring wells on the Terminals property. Monitoring and injection wells were determined to be in acceptable condition, but many well monuments were missing bolts and full of water. Well caps were generally in good condition and it appeared that surface water was likely not entering the wells. We recommend that all monitoring wells sampled during the RI be repaired and developed before sampling.

Groundwater samples should be analyzed for VOCs and PCBs. Analysis for total and dissolved metals will be needed to assess potential groundwater treatment options if contaminant excavation is the selected remedial action. Additional analysis, including total organic carbon, alkalinity, nitrates, sulfates, and chloride should also be analyzed to assess subsurface conditions for potential *in situ* bioremediation remediation.

Sediment

No data has been collected to determine whether COCs from the Terminals and Market Street properties have impacted adjacent sediment in the Lake Washington Ship Canal. Sediment sampling will be needed to determine if sediment has been impacted by historical contaminant releases discussed in this report.

Sediment adjacent to the Terminals property dock should be sampled using boat-mounted vibracore equipment to depths of 5 feet below the mudline. Samples should be analyzed for volatiles (including dichlorobenzenes and 1,2,4-trichlorobenzene), PCBs, total metals, and total organic carbon analysis.

REFERENCES

Aspect 2003. Draft Cleanup Action Plan, Jacobson Terminals. Prepared for A&B Jacobson, LLC, by Aspect, LLC. August 27, 2003.

Aspect 2004. Construction Report, Reactive/Sorptive Wall Groundwater Treatment System, Jacobson Terminals Site Memorandum. Prepared for A&B Jacobson, LLC, by Aspect Consulting. February 17, 2004.

Aspect 2010. Re: Comments on Periodic Review Draft Report Jacobson Terminals, Inc. Prepared for Ecology on behalf of Jacobson Terminals, Inc. by Aspect Consulting. April 9, 2010.

Aspect 2013. Analytical data and CAD files provided by Aspect. July and September 2013.

EMCON 1996. Interim Report on Independent Cleanup, 2801 Northwest Market Street, Seattle Washington. Prepared for Fentron Building Products, Inc., by EMCON. December 1996.

Hart Crowser 1997. Petroleum-Contaminated Soil Removal, Lake Washington Ship Canal, Seattle, Washington. Prepared for Seattle District Army Corps of Engineers and Jacobson Terminals, Inc. March 1997.

Hart Crowser 1999. Cleanup Action Plan Market Street Property, Seattle, Washington. Prepared for A&B Jacobson, LLC, by Hart Crowser. June 22, 1999.

Hart Crowser 2000. Construction Report, Zero-Valent Iron Groundwater Treatment Wall, prepared by Hart Crowser. January 14, 2000.

Hart Crowser 2002. Jacobson Terminals Interim Cleanup Action Summary Report Seattle, Washington. Prepared for A&B Jacobson, LLC, by Hart Crowser. July 18, 2002.

L:\Jobs\1780043\Data Gaps Report\Final\Jacobson Data Gaps Report Update.doc

Table 1 - Historical Soil Sampling Analytical Results

			PCB Concentration in mg/kg	Concentration of Chlorinated Aliphatic Compounds in ug/kg						Concentration of Chlorinated Benzenes in ug/kg						Concentration of Other Detected VOCs in ug/kg								
Location	Date	Sample Depth in Feet	Aroclor 1260	Vinyl Chloride	1,1-DCE	trans-DCE	cis-DCE	TCE	PCE	CB	1,3-DCB	1,4-DCB	1,2-DCB	1,2,4-TCB	1,2,3-TCB	Chloroform	Benzene	Toluene	Xylenes	1,2,4-TMB	1,3,5-TMB	n-Butylbenzene	HCB	Naphthalene
Screening Levels Protective of Surface Water(A)			***0.0000787***	***0.76***	***1.14***	***2,713***	***na***	***4.2***	***1.75***	***869***	***1,062***	***na***	***1,010***	***5.40***	***na***	***125***	***6.38***	***5,453***	***na***	***5.40***	***na***	***na***	***na***	***6,877***
October 2000 p-Dichlorobenzene Assessment																								
HC-31	10/24/2000	11 to 14	--	50 U	50 U	50 U	50 U	50 U	50 U	580	210	380	**4,000**	--	--	50 U	50 U	50 U	50 U	--	--	--	--	--
HC-31	10/24/2000	14 to 17	--	50 U	50 U	50 U	50 U	50 U	50 U	250 U	230	320	430	--	--	50 U	50 U	50 U	50 U	--	--	--	--	--
February 2001 Injection Point Installation																								
IP-1	2/20/2001	Drill Cuttings	**360** TIC	50 U	50 U	50 U	50 U	50 U	50 U	500 U	660	2,700	**3,200**	**230** TIC	17 TIC	50 U	50 U	560	50 U	--	--	--	--	--
IP-2	4/11/2001	Drill Cuttings	**110**	50 U	50 U	50 U	50 U	50 U	50 U	260	920	2,900	**4,700**	**560,000**	13,000	50 U	50 U	50 U	50 U	--	--	--	--	--
IP-3	4/11/2001	Drill Cuttings	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	120	170	330	50 U	**2,800**	450	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
JT-8	2/20/2001	Drill Cuttings	--	50 U	50 U	50 U	50 U	50 U	50 U	250 U	50 U	370	50 U	--	--	50 U	50 U	180	50 U	50 U	50 U	50 U	50 U	50 U
JT-8	4/11/2001	Drill Cuttings	**2.5**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May 2001 PCB/TCB Assessment																								
SP-1	5/23/2001	12 to 16	**2.7**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-2	5/22/2001	12 to 16	**550**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	840	620	50 U	**11,000**	790	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-2	5/22/2001	16 to 20	**0.31**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	**520**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-3	5/22/2001	12 to 16	**14**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	**5,800**	450	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-4	5/23/2001	8 to 12	**530**	50 U	50 U	50 U	50 U	50 U	50 U	790	250	550	50 U	**28,000**	2,000	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-4	5/23/2001	12 to 16	**3.4**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	**840**	210	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-5	5/22/2001	0 to 4	**18**	50 U	50 U	50 U	50 U	50 U	50 U	570	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-5	5/22/2001	4 to 8	**3.6**	50 U	50 U	50 U	50 U	50 U	50 U	**5,800**	50 U	210	50 U	50 U	50 U	50 U	50 U	50 U	50 U	**220**	**100**	50 U	50 U	210
SP-5	5/22/2001	16 to 20	**0.43**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	**900**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-6	5/23/2001	0 to 4	**0.35**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-6	5/23/2001	8 to 12	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	170	50 U	150	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-6	5/23/2001	12 to 16	**25**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	930	860	180	**45,000**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-6	5/23/2001	16 to 20	**1.2**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	680	560	50 U	**2,700**	2,500	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-7	5/22/2001	12 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	410	50 U	50 U	**1,600**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-8	5/22/2001	4 to 8	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	310	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-8	5/22/2001	12 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-9	5/22/2001	12 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	140	450	150	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	140
SP-10	5/22/2001	16 to 20	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-11	5/21/2001	12 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-12	5/22/2001	4 to 8	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-12	5/22/2001	16 to 20	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	240	50 U	180	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-13	5/21/2001	12 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-14	5/21/2001	4 to 8	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-14	5/21/2001	16 to 20	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-15	5/21/2001	16 to 20	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-15	5/21/2001	24 to 28	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-16	5/21/2001	0 to 4	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-16	5/21/2001	16 to 20	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-17	5/21/2001	0 to 4	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-17	5/21/2001	16 to 20	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-17	5/21/2001	20 to 24	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-18	5/21/2001	0 to 4	**0.22**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	260	50 U	50 U	50 U	50 U	**360**	50 U	**250**	440	820
SP-18	5/21/2001	4 to 8	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-18	5/21/2001	16 to 20	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-19	5/23/2001	8 to 12	**820**	50 U	50 U	50 U	50 U	50 U	50 U	**15,000**	320	1,400	50 U	**900**	50 U	50 U	**450**	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-19	5/23/2001	12 to 16	**0.5**	50 U	50 U	50 U	50 U	50 U	50 U	710	50 U	50 U	50 U	**190**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-20	6/6/2001	16 to 20	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-20	6/6/2001	20 to 24	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	130
SP-21	6/6/2001	8 to 12	**0.12** J	50 U	50 U	50 U	1,400	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-21	6/6/2001	12 to 16	**0.16** J	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-22	6/6/2001	8 to 12	**0.16** J	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-22	6/6/2001	16 to 20	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-23	6/6/2001	12 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-24	6/6/2001	4 to 8	**17**	50 U	50 U	50 U	50 U	50 U	50 U	280	50 U	170	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-24	6/6/2001	12 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-25	6/6/2001	0 to 4	**9.5**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	1,000
SP-25	6/6/2001	12 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-26	6/6/2001	4 to 8	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	**4,400**	50 U	280	50 U	50 U	1,800	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	170
SP-26	6/6/2001	12 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	340	620	530	50 U	**26,000**	280	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-27	6/6/2001	12 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	380	280	50 U	**3,200**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-28	6/6/2001	12 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	**160**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-29	6/6/2001	0 to 4	**0.6**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	210	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-29	6/6/2001	12 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	490	250	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
August 2001 Injection Point Installation																								
IP-4 S1	8/22/2001	2.5 to 4	**4.7**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
IP-4 S2	8/22/2001	10 to 11.5	**96**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
IP-5 S1	8/22/2001	10 to 11.5	**0.97**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
IP-6 S1	8/22/2001	10 to 11.5	**280**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
IP-7 S1	8/23/2001	2.5 to 4	0.2 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
IP-7 S2	8/23/2001	10 to 11.5	**0.41**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
IP-8 S1	8/22/2001	15 to 16.5	**32**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
IP-9 S1	8/21/2001	15 to 16.5	**400**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
IP-10 S1	8/24/2001	15 to 16.5	0.2 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
IP-11 S1	8/21/2001	14.5 to 16	**4.6**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
IP-12 S1	8/22/2001	10 to 11.5	**0.19** J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
IP-13 S1	8/23/2001	12.5 to 14	**0.28**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--

Table 1 - Historical Soil Sampling Analytical Results

			PCB Concentration in mg/kg	Concentration of Chlorinated Aliphatic Compounds in ug/kg						Concentration of Chlorinated Benzenes in ug/kg						Concentration of Other Detected VOCs in ug/kg								
Location	Date	Sample Depth in Feet	Aroclor 1260	Vinyl Chloride	1,1-DCE	trans-DCE	cis-DCE	TCE	PCE	CB	1,3-DCB	1,4-DCB	1,2-DCB	1,2,4-TCB	1,2,3-TCB	Chloroform	Benzene	Toluene	Xylenes	1,2,4-TMB	1,3,5-TMB	n-Butylbenzene	HCB	Naphthalene
January 2002 Railroad Track Investigation																								
SP-32	1/15/2002	16 to 20	--	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-35	1/30/2002	16 to 20	--	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	20 U	50 U	50 U	**330**	50 U	50 U	50 U	50 U
SP-35	1/30/2002	20 to 23	--	50 U	50 U	50 U	50 U	50 U	6.7 J	50 U	50 U	50 U	50 U	50 U	50 U	50 U	20 U	50 U	50 U	**160**	50 U	50 U	50 U	50 U
January 2002 Performance Monitoring																								
IP-1(B)	1/15/2002	8 to 12	**0.2**	50 U	50 U	50 U	50 U	50 U	50 U	**950**	280	790	100	**420**	50 U	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
IP-1(B)	1/15/2002	12 to 16	**0.2**	50 U	50 U	50 U	50 U	50 U	50 U	50	200	170	50 U	**200**	50 U	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
IP-6(B)	1/15/2002	8 to 12	**6**	50 U	50 U	50 U	50 U	50 U	50 U	**3,400**	650	1,300	120	**1,200**	50 U	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-2(B)	1/15/2002	12 to 16	**410**	50 U	50 U	50 U	50 U	350	1,400	50 U	50 U	50 U	50 U	**200**	300	50 U	20 U	50 U	50 U	50 U	50 U	50 U	500	350
SP-4(B)	1/15/2002	8 to 12	**210**	50 U	50 U	50 U	50 U	50 U	330	**2,000**	**2,600**	11,000	**1,500**	**270,000**	12,000	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-6(B)	1/15/2002	12 to 16	**800**	50 U	50 U	50 U	50 U	50 U	6.7 J	210	**1,900**	2,000	500	**130,000**	5,900	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-19(B)	1/15/2002	12 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	6.7 J	50 U	120	140	50 U	**7,800**	690	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-26(B)	1/15/2002	12 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	6.7 J	220	350	290	50 U	**2,100**	140	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-36	1/29/2002	12 to 16	**210**	50 U	50 U	50 U	50 U	50 U	6.7 J	150	**1,500**	1,200	280	**240,000**	4,500	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	110
SP-37	1/29/2002	13.5 to 15.5	0.2 U	50 U	50 U	50 U	50 U	50 U	6.7 J	50 U	**1,100**	1,000	140	**8,200**	250	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	68
SP-38	1/29/2002	13 to 16	**880**	50 U	50 U	50 U	50 U	50 U	6.7 J	420	**13,000**	11,000	**3,200**	**310,000**	2,400	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-39	1/29/2002	10 to 13	0.2 U	50 U	50 U	50 U	50 U	50 U	6.7 J	88	470	410	130	**1,900**	2,400	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-39	1/29/2002	13 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	6.7 J	50 U	300	260	50 U	**3,000**	190	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-40	1/29/2002	10 to 13	**0.2**	50 U	50 U	50 U	50 U	50 U	6.7 J	170	130	180	50 U	**710**	50 U	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-40	1/29/2002	13 to 16	0.2 U	50 U	50 U	50 U	50 U	50 U	6.7 J	50 U	160	120	50 U	**440**	50 U	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
March 2002 Railroad Monitoring Well Installation																								
BR-1	4/11/2002	21.5 to 23	--	50 U	50 U	50 U	380	20 U	330	50 U	50 U	50 U	50 U	50 U	50 U	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
BR-2	4/11/2002	22 to 23.5	--	8 U	50 U	50 U	470	620	960	50 U	50 U	50 U	50 U	50 U	50 U	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
June 2002 Confirmation Soil Sampling																								
SP-41	6/5/2002	12 to 16	**290**	50 U	50 U	50 U	50 U	20 U	20 U	**6,600**	**5,600**	15,000	**1,100**	**84,000**	7,200	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	200
SP-42	6/5/2002	8 to 12	**690**	50 U	50 U	50 U	1,500	130	20 U	**5,000**	**5,600**	14,000	820	**14,000**	7,800	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	710
SP-42	6/5/2002	12 to 16	**2.4**	50 U	50 U	50 U	50 U	20 U	20 U	610	970	2,500	130	**6,300**	180	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	180
SP-43	6/5/2002	8 to 12	**42**	50 U	50 U	50 U	50 U	20 U	20 U	**22,000**	**4,200**	4,800	640	**27,000**	1,000	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-43	6/5/2002	12 to 16	0.2 U	50 U	50 U	50 U	50 U	20 U	20 U	390	700	850	**180**	**6,600**	50 U	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-44	6/5/2002	8 to 12	**200**	50 U	50 U	50 U	50 U	20 U	20 U	**880**	**2,100**	7,800	**2,100**	**180,000**	26,000	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	690
SP-44	6/5/2002	12 to 16	**290**	50 U	50 U	50 U	50 U	20 U	20 U	190	**1,500**	1,000	430	**98,000**	9,000	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-45	6/5/2002	4 to 8	**0.33**	50 U	50 U	50 U	50 U	20 U	20 U	760	290	340	100	**3,500**	370	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-45	6/5/2002	8 to 12	0.2 U	50 U	50 U	50 U	400	20 U	20 U	110	50 U	210	50 U	**1,600**	220	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-45	6/5/2002	12 to 16	0.2 U	50 U	50 U	50 U	50 U	20 U	20 U	50 U	940	550	88	**3,200**	290	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-46	6/5/2002	12 to 16	0.2 U	50 U	50 U	50 U	50 U	20 U	20 U	50 U	**1,600**	1,200	190	**4,600**	190	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-47	6/5/2002	8 to 12	0.2 U	**830**	50 U	50 U	4,300	20 U	20 U	50 U	150	200	290	**14,000**	2,200	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-47	6/5/2002	12 to 16	**250**	50 U	50 U	50 U	50 U	20 U	20 U	50 U	**1,500**	2,000	**1,300**	**360,000**	18,000	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-48	6/5/2002	8 to 12	0.2 U	50 U	50 U	50 U	50 U	20 U	20 U	50 U	**1,400**	2,000	1,000	**170,000**	4,000	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-48	6/5/2002	12 to 16	**70**	50 U	50 U	50 U	50 U	20 U	20 U	50 U	**1,200**	1,400	790	**33,000**	3,000	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-49	6/5/2002	12 to 16	0.2 U	50 U	50 U	50 U	50 U	20 U	20 U	320	250	300	50 U	**2,500**	400	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
June 2003 Installation of Well JT-11																								
JT-11	6/3/2003	13 to 19	--	50 U	50 U	50 U	50 U	20 U	20 U	50 U	400	190	50 U	50 U	50 U	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
October 2003 Wall Design Investigation																								
SP-51	10/3/2003	18 to 21	0.2 U	50 U	50 U	50 U	50 U	20 U	20 U	50 U	110	95	50 U	50 U	50 U	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-53	10/3/2003	4 to 8	0.2 U	50 U	50 U	50 U	50 U	20 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
SP-53	10/3/2003	16 to 19	0.2 U	50 U	50 U	50 U	50 U	20 U	20 U	50 U	830	350	50 U	50 U	50 U	50 U	20 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U

Notes:
Data table compiled by Aspect Consulting, LLC.
A = Screening level based on soil concentrations protective of surface water (WAC 173-340-474) using the 3-Phase Partitiong Model based on groundwater migration to surface water.
PCB and many VOC screening levels for surface water protection are below the PQL.

J Estimated value
U Not detected at indicated detection limit
-- Not analyzed
Bold Exceeds screening level protective of surface water (A).

CB Chlorobenzene
1,3-DCB m-Dichlorobenzene
1,4-DCB p-Dichlorobenzene
1,2-DCB o-Dichlorobenzene
1,2,3-TCB 1,2,3-Trichlorobenzene
1,2,4-TCB 1,2,4-Trichlorobenzene
1,2,4-TMB 1,2,4-Trimethylbenzene
HCB Hexachlorobutadiene
TIC Quantified by TIC Scan

			Concentration of Chlorinated Ethene Compounds in ug/L						Concentration of Chlorinated Benzene Compounds in ug/L						Concentration of Other Detected Volatile Organic Compounds in ug/L													
Well	Location	Date	Vinyl Chloride	1,1-DCE	trans-DCE	cis-DCE	TCE	PCE	CB	1,3-DCB	1,4-DCB	1,2-DCB	1,2,4-TCB	1,2,3-TCB	Chloromethane	Dibromomethane	1,1-DCA	1,2-DCA	1,1,2-TCA	1,1,2,2,-TeCA	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	1,3,5-TMB	1,2,4-TMB	Chloroform
	Screening Level (A)		**2.40**	**3.2[B]**	**10,000**	**na**	**12.7[C]**	**3.3**	**1,600**	**960**	**190**	**1,300**	**1.96[C]**	**na**	**na**	**na**	**na**	**37**	**16**	**4**	**22.7[C]**	**15,000**	**2,100**	**na**	**4940[C]**		**na**	**470**
BR-1	City Property	4/15/2002	**59**	1 U	1 U	1300	**400**	**450**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	**36**	1.3	1 U	1 U	1 U	1 U	1 U	
		6/4/2002	**130**	1 U	9.3	1000	**420**	**400**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	**27**	1.2	3.7	1 U	1 U	1 U	1 U	
		3/13/2003	0.2 U	1 U	1 U	2200	**900**	**1,500**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
BR-2	City Property	4/15/2002	**41**	8.9	1 U	660	**620**	**1,400**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	**89**	1 U	1 U	8.7	1 U	1 U	1 U	
		4/15/2004	**11**	1.0	4.8	890	**400**	**700**	1 U	1 U	1 U	1 U	1 U	1 U	1.5	na	na	na	1 U	na	11	2.3	1 U	5.1	1.2	1 U	1 U	
		7/6/2004	**15**	1 U	1 U	2,400	**570**	**1,000**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	20	1 U	1 U	1 U	1 U	1 U	1 U	
		10/1/2004	**11**	1 U	1 U	950	**290**	**850**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	12	1 U	1 U	1 U	1 U	1 U	1 U	
		1/25/2005	**4**	1 U	1 U	740	**270**	**610**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	5.7	1 U	1 U	1 U	1 U	1 U	1 U	
		4/18/2005	0.22	1 U	1 U	140	35	**72**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1	1 U	1 U	1 U	1 U	1 U	1 U	
		10/19/2005	**11**	1 U	2.5	560	**160**	**550**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	4.4	2.6	2.9	2	1 U	1 U	1 U	
		4/21/2006	**5.6**	1 U	2.3	520	**81**	**210**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	2.9	1 U	1 U	1 U	1 U	1 U	1 U	
		4/24/2007	**8.9**	1 U	3.0	640	**59**	**110**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	4.5	1 U	1 U	1 U	1 U	1 U	1 U	
		4/22/2008	**10**	1 U	2.8	420	**31**	**27**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	4.2	1 U	1 U	1 U	1 U	1 U	1 U	
		4/27/2009	**33**	1 U	4.0	560	**29**	**21**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	9.2	1 U	1 U	1 U	1 U	1 U	1 U	
		4/27/2010	**22**	1 U	2.0	320	4.7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	5.4	1.2	1 U	1.6	1 U	1 U	1 U	
		4/13/2011	**7.1**	1 U	1.0	110	1.0	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	2.6	1 U	1 U	1 U	1 U	1 U	1 U	
		4/19/2012	**12**	1 U	1 U	87	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
		4/12/2013	**140**	1.2	1.8	190	1.1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	3.9	1 U	1 U	1.0	1 U	1 U	1 U	
HC-MW-3	Corps Property	12/11/1997	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	--	--	1 U	na	na	na	0.2 U	na	0.5 U	0.5 U	0.5 U	0.5 U	--	--	--	0.2 U
		4/8/1998	5 U	1 U	1 U	1 U	1 U	1 U	--	--	--	--	--	--	--	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/20/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/7/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/7/2000	5 U	5 U	5 U	5 U	16	1 U	5 U	1 U	1 U	1 U	--	--	5 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/10/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	na	na	na	5 U	na	5 U	1 U	5 U	1 U	1 U	1 U	1 U	5 U
		2/25/2003	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	na	na	na	5 U	na	5 U	1 U	5 U	1 U	1 U	1 U	1 U	5 U
		5/1/2003	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/1/2003	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		12/18/2003	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/15/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/18/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/24/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/23/2008	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2009	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2010	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/13/2011	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/19/2012	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/11/2013	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IG-1A	West Treatment Gate	1/27/2005	**2.7**	1 U	1 U	33	2.6	**14**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/18/2005	0.2 U	1 U	1 U	18	2.0	**9.6**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	1.1	1 U	1 U	16	1.1	**5.2**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/24/2007	0.5	1 U	1 U	57	1 U	3.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.0	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/23/2008	1.7	1 U	1 U	11	1 U	2.9	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/25/2009	2.1	1 U	1 U	3.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2010	0.2 U	1 U	1 U	1.6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/12/2011	0.92	1 U	1 U	9.9	1 U	1.9	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/19/2012	**3.2**	1 U	1 U	11	1 U	1.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.6	1 U	1 U	1 U	1 U	1 U	1 U
		4/12/2013	1.5	1 U	1 U	8.1	8.2	**35**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IG-2	West Treatment Gate	1/20/2000	**67**	5 U	5 U	130	**14**	**42**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/7/2000	**44**	5 U	5 U	79	**17**	**54**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/6/2000	**16**	5 U	5 U	75	11	**38**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/10/2000	**16**	5 U	5 U	60	8.9	**32**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	**15**	5 U	5 U	41	**13**	**40**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/9/2001	5 U	5 U	5 U	18	12	**50**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/9/2001	5 U	5 U	5 U	21	**14**	**45**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	**4**	5 U	5 U	7	1 U	**4.5**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/15/2002	5 U	5 U	1 U	8.1	1 U	**13**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/1/2002	5 U	5 U	5 U	15	3.2	**20**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		5/1/2003	1 U	1 U	1 U	1 U	1 U	3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	5 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		11/3/2003	5 U	5 U	5 U	2.3	1 U	**4.0**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/27/2004	**3.6**	1 U	1 U	5.2	1 U	**4.5**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	5 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2004	**4.5**	1 U	1 U	4.3	1 U	3.9	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/18/2005	**2.8**	1 U	1 U	5.0	1 U	4.1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	**5.8**	1 U	1 U	35	1 U	2.7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.3	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/24/2007	**6.8**	1 U	1 U	57	1 U	3.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	3.6	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/23/2008	**10**	1 U	1 U	27	1 U	2.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	4.3	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/25/2009	**52**	1 U	1 U	180	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	4.3	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2010	**120**	1 U	1 U	300	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5.1	1.6	1 U	1 U	1 U	1 U	1 U	1 U
		4/12/2011	**85**	1 U	1 U	350	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/19/2012	**220**	9.2	1 U	1100	4.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/12/2013	**43**	1 U	1 U	110	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Table 2 - Historical Groundwater Monitoring Analytical Results

			Concentration of Chlorinated Ethene Compounds in ug/L						Concentration of Chlorinated Benzene Compounds in ug/L						Concentration of Other Detected Volatile Organic Compounds in ug/L													
Well	**Location**	**Date**	**Vinyl Chloride**	**1,1-DCE**	**trans-DCE**	**cis-DCE**	**TCE**	**PCE**	**CB**	**1,3-DCB**	**1,4-DCB**	**1,2-DCB**	**1,2,4-TCB**	**1,2,3-TCB**	**Chloromethane**	**Dibromomethane**	**1,1-DCA**	**1,2-DCA**	**1,1,2-TCA**	**1,1,2,2,-TeCA**	**Benzene**	**Toluene**	**Ethylbenzene**	**Xylenes**	**Naphthalene**	**1,3,5-TMB**	**1,2,4-TMB**	**Chloroform**
	Screening Level (A)		**2.40**	**3.2[B]**	**10,000**	**na**	**12.7[C]**	**3.3**	**1,600**	**960**	**190**	**1,300**	**1.96[C]**	**na**	**na**	**na**	**na**	**37**	**16**	**4**	**22.7[C]**	**15,000**	**2,100**	**na**	**4940[C]**		**na**	**470**
IG-3	East Treatment Gate	1/20/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/7/2000	5 U	5 U	5 U	5 U	5.8	3.2	5 U	4.5 C	4.7 C	4.7 C	--	--	5 U	5.1	5 U	5 U	1 U	5 U	1 U	1 U	1 U	4.2	--	--	--	1 U
		7/6/2000	5 U	5 U	5 U	3.0 J	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/10/2000	5 U	5 U	5 U	5 U	4.8	**13**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/9/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/10/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	5 U	5 U	5 U	5 U	1 U	**19**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/15/2002	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/1/2002	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		5/1/2003	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		11/3/2003	5 U	5 U	5 U	3.5	1 U	**3.6**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/27/2004	0.2 U	1 U	1 U	1.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/18/2005	0.2 U	1 U	1 U	1 U	1 U	**3.4**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/24/2007	0.2 U	1 U	1 U	1.3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/23/2008	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/25/2009	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/28/2010	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/12/2011	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/19/2012	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/12/2013	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IG-4	East Treatment Gate	1/20/2000	**15**	5 U	5 U	25	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/7/2000	5 U	5 U	5 U	5 U	1 U	3.2	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/6/2000	**21**	5 U	5 U	2.6 J	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/10/2000	5 U	5 U	5 U	5 U	1 U	2.6	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/9/2001	5 U	5 U	5 U	5 U	5.1	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/9/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/15/2002	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/1/2002	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		5/1/2003	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		11/3/2003	5 U	5 U	5 U	5 U	1 U	1.2	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/27/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/18/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/24/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/23/2008	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/25/2009	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/28/2010	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/12/2011	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/19/2012	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/11/2013	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IP-1	Terminals Property	2/20/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	140	**1300**	670	--	--	5 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/10/2001	**4.8**	1 U	1 U	7	1 U	1 U	55	100	140	59	**850**	110	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		7/10/2001	0.2 U	1 U	1 U	1 U	1 U	1 U	16	44	**330**	580	**1200**	1300	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/22/2001	0.2 U	1 U	1 U	2.9	1 U	1 U	23	34	**300**	550	**9000**	850	1 U	na	na	na	1 U	na	3.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		12/17/2001	**5.5**	1 U	1 U	11	1 U	1 U	16	17	**200**	230	**11000**	2500	14	na	na	na	1 U	na	4.7	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		6/3/2002	0.2 U	1 U	1 U	1 U	1 U	1 U	6.9	11	160	310	**4000**	92	1 U	na	na	na	1 U	na	3.1	1 U	1 U	1 U	1 U	1 U	1 U	
IP-2	Terminals Property	2/20/2001	5 U	5 U	5 U	15	1 U	1 U	120	140	**200**	54	--	--	5 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/10/2001	1 U	1 U	1 U	1 U	1 U	1 U	5	14	110	210	**4000**	590	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		7/10/2001	**16**	1 U	1 U	9.3	1 U	1 U	280	200	**280**	120	**2300**	300	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/22/2001	2.4	1 U	1 U	1.5	1 U	1 U	3.1	13	33	36	**1100**	91	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		12/17/2001							37	190	**190**	100	**1800**	140	1 U	na	na	na		na	1.7	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		6/3/2002	0.2 U	1 U	1 U	1 U	1 U	1 U	23	47	56	80	**4700**	270	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
IP-3	Terminals Property	2/20/2001	5 U	5 U	5 U	5 U	1 U	1 U	88	19	**30**	1 U	--	--	5 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/10/2001	1 U	1 U	1 U	1.2	1 U	1 U	47	7.7	9.4	1.4	19	3.1	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		7/10/2001	**6.7**	1 U	1 U	4.7	1 U	1 U	200	23.0	27.0	2.6	16	2.4	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/22/2001	0.2 U	1 U	1 U	1.1	1 U	1 U	11	1.4	2.1	1.0 U	12	1.0 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		6/3/2002	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	10	1.0 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IP-4	Terminals Property	10/22/2001	**81**	1 U	1 U	28	1 U	1 U	97	1	4	1 U	4.4	1.0 U	1 U	na	na	na	1 U	na	14	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		6/3/2002	**74**	1 U	1 U	25	1 U	1 U	50	1 U	2.5	1 U	1.0 U	1.0 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		3/13/2003	**52**	1 U	1 U	22	1 U	1 U	65	1 U	2.6	1 U	9.2	1.0 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IP-5	Terminals Property	1/30/2002	**59**	1 U	1 U	43	1 U	1 U	75	120	**220**	24	**550**	37	1 U	na	na	na	1 U	na	3.8	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		6/3/2002	**17**	1 U	1 U	1 U	1 U	1 U	250	23	62	1 U	**300**	25	1 U	na	na	na	1 U	na	11	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IP-6	Terminals Property	1/30/2002	**410**	1 U	1 U	170	1 U	1 U	15	4.6	**6**	1 U	**190**	21	3.1	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		6/3/2002	**650**	1 U	1 U	62	1 U	1 U	600	28.0	53	7.2	16	1 U	1 U	na	na	na	1 U	na	4.7	1 U	1 U	1 U	1 U	1 U	1 U	
IP-7	Terminals Property	1/30/2002	**370**	1 U	1 U	120	1 U	1 U	140	170.0	**150**	75	**7500**	650	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		6/3/2002	**42**	1 U	1 U	17	1 U	1 U	180	180.0	**330**	37	**780**	42	1 U	na	na	na	1 U	na	3.9	1 U	1 U	1 U	1 U	1 U	1 U	
IP-8	Terminals Property	10/22/2001	**32**	1 U	1 U	14	1 U	1 U	400	160	**140**	31	200	6.2	1 U	na	na	na	1 U	na	5	1	1 U	1 U	1 U	1 U	1 U	1 U
		12/17/2001	**500**	1 U	1 U	190	1 U	1 U	190	400	**320**	96	**2600**	13	4.3	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		6/3/2002	**23**	1 U	1 U	21	2.2	1 U	120	350	**450**	1 U	**250**	16	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	

Table 2 - Historical Groundwater Monitoring Analytical Results

			Concentration of Chlorinated Ethene Compounds in ug/L						Concentration of Chlorinated Benzene Compounds in ug/L						Concentration of Other Detected Volatile Organic Compounds in ug/L													
Well	**Location**	**Date**	**Vinyl Chloride**	**1,1-DCE**	**trans-DCE**	**cis-DCE**	**TCE**	**PCE**	**CB**	**1,3-DCB**	**1,4-DCB**	**1,2-DCB**	**1,2,4-TCB**	**1,2,3-TCB**	**Chloromethane**	**Dibromomethane**	**1,1-DCA**	**1,2-DCA**	**1,1,2-TCA**	**1,1,2,2,-TeCA**	**Benzene**	**Toluene**	**Ethylbenzene**	**Xylenes**	**Naphthalene**	**1,3,5-TMB**	**1,2,4-TMB**	**Chloroform**
	Screening Level (A)		**2.40**	**3.2[B]**	**10,000**	**na**	**12.7[C]**	**3.3**	**1,600**	**960**	**190**	**1,300**	**1.96[C]**	**na**	**na**	**na**	**na**	**37**	**16**	**4**	**22.7[C]**	**15,000**	**2,100**	**na**	**4940[C]**		**na**	**470**
IP-10	Terminals Property	10/22/2001	**340**	1 U	1 U	96	1.3	1 U	370	32	55	7.3	**88**	6.6	1 U	na	na	na	1 U	na	11	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		12/17/2001	**300**	1 U	1 U	120	4.7	1 U	31	6	15	1.1	13	1 U	25	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		6/3/2002	**300**	1 U	1 U	62	1 U	1 U	230	27	54	6.0	65	5.5	1 U	na	na	na	1 U	na	11	1 U	1 U	1 U	1 U	1 U	1 U	
		3/13/2003	**140**	1 U	1 U	29	1 U	1 U	260	41	83	7.7	9	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
IP-11	Terminals Property	10/22/2001	**68**	1 U	1 U	3.4	1 U	1 U	440	160	100	7.4	3	1 U	1 U	na	na	na	1 U	na	17	1	1 U	1 U	1 U	1 U	1 U	1 U
		12/17/2001	**160**	1 U	1 U	31	1 U	1 U	210	74	82	6.1	62	4.9	32	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		6/3/2002	**55**	1 U	1 U	1 U	1 U	1 U	150	82	66	12.0	4.4	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
IP-12	Terminals Property	6/3/2002	**32**	1 U	1 U	5	1 U	1 U	250	12	24	3.0	4.9	1 U	1 U	na	na	na	1 U	na	4.7	1 U	1 U	1 U	1 U	1 U	1 U	
IP-13	Terminals Property	1/30/2002	**650**	1 U	1 U	240	1 U	1 U	1 U	1 U	1 U	1 U	**1800**	37	5	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		6/3/2002	**380**	1 U	1 U	120	1 U	1 U	170	8.6	15	1 U	23	1 U	1 U	na	na	na	1 U	na	3.8	1 U	1 U	1 U	1 U	1 U	1 U	
IP-14	Terminals Property	6/3/2002	0.2 U	1 U	1 U	1 U	1 U	1 U	5.9	90	100	25	**2300**	32	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IP-15	Terminals Property	6/3/2002	0.2 U	1 U	1 U	13	1 U	1 U	18.0	120	98	43	**950**	72	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IP-16	Terminals Property	6/3/2002	0.2 U	1 U	1 U	1 U	1 U	1 U	32.0	14	87	120	**4600**	450	1 U	na	na	na	1 U	na	4.5	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IP-17	Terminals Property	6/3/2002	0.2 U	1 U	1 U	1 U	1 U	1 U	38.0	68	26	10	45	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IW-1I	Intermediate Zone - West End of Wall	1/20/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/7/2000	5 U	5 U	5 U	5 U	1.6	1.3	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/6/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/10/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
IW-2I	Intermediate Zone - West End of Wall	1/20/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/7/2000	**6.2**	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/6/2000	5 U	5 U	5 U	2 J	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/10/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	5 U	5 U	5 U	5 U	1 U	2.0	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	7.2	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/9/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/9/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/15/2002	1 U	1 U	1 U	7.1	1 U	1 U	5 U	1 U	1 U	1 U	--	--	1 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/1/2002	5 U	5 U	5 U	13	1 U	1 U	5 U	1 U	1 U	1 U	--	--	1 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		5/1/2003	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		11/3/2003	5 U	5 U	5 U	3.1	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/15/2004 [1]	5 U	1 U	1 U	1 U	1 U	1 U	--	--	--	--	--	--	--	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/18/2005	0.63	1 U	1 U	2.0	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	**6.4**	1 U	1 U	6.3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/24/2007	**5.1**	1 U	1 U	6.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/22/2008	**6.7**	1 U	1 U	3.8	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/25/2009	**3.8**	1 U	1 U	2.1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2010	**10**	1 U	1 U	3.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/12/2011	2.1	1 U	1 U	1.0	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/19/2012	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/11/2013	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IW-2S	Shallow Zone - West End of Wall	1/20/2000	**6.3**	5 U	5 U	22	2.2	**35**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/7/2000	5 U	5 U	5 U	21	1.9	**28**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/6/2000	5 U	5 U	5 U	6.9	2.0	**23**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/10/2000	5 U	5 U	5 U	5 U	1 U	**11**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
IW-3I	Intermediate Zone - Downgradient of West Gate	1/20/2000	**11**	5 U	5 U	1,600	**45**	11	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U		1 U	1 U	1 U	1 U	--	--	--	1 U
		4/7/2000	**64**	5 U	5 U	1,200	**18**	**4.6**	5 U	1 U	1 U	1 U	--	--	5 U	8.9	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/6/2000	**70**	50 U	50 U	890	10 U	10 U	50 U	10 U	10 U	10 U	--	--	50 U	50 U	50 U	12	10 U	50 U	10 U	10 U	10 U	10 U	--	--	--	10 U
		10/10/2000	**110**	5 U	5 U	470	3.4	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	2.6	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	**2,300**	5 U	5 U	1,200	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/24/2001	**2,400**	5 U	5 U	1,800	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/9/2001	**1,000**	5 U	5 U	900	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/9/2001	**190**	5 U	5 U	180	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	**170**	5 U	5 U	54	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/1/2002	**13**	5 U	5 U	28	1 U	**4.8**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/18/2005	**3.4**	1 U	1 U	7.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.5	1.0	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	**11**	1 U	1 U	28	2.1	1.1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.1	1.0	1 U	1 U	1 U	1 U	1 U	1 U
		4/24/2007	**4.0**	1 U	1 U	31	2.7	1.3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.3	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/23/2008	**7.5**	1 U	1 U	22	2.9	**4.4**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.1	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/25/2009	**7.5**	1 U	1 U	22	2.9	**4.4**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.1	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2010	**7.7**	1 U	1 U	24	2.7	1.8	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.7	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/12/2011	**4.3**	1 U	1 U	21	3.7	1.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.8	1.3	1 U	1 U	1 U	1 U	1 U	1 U
		4/19/2012	**5.3**	1 U	1 U	30	1.0	1.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/11/2013	**4.9**	1 U	1 U	34	3.0	1.8	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IW-3S	Shallow Zone - Downgradient of West Treatment Gate	1/20/2000	**19**	5 U	5 U	130	4.1	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1.6
		4/7/2000	**41**	5 U	5 U	91	2.6	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/6/2000	5 U	2 J	5 U	41	1 U	**7**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/10/2000	**11**	5 U	5 U	7.6	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/9/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/9/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U

Table 2 - Historical Groundwater Monitoring Analytical Results

			Concentration of Chlorinated Ethene Compounds in ug/L						Concentration of Chlorinated Benzene Compounds in ug/L						Concentration of Other Detected Volatile Organic Compounds in ug/L													
Well	**Location**	**Date**	**Vinyl Chloride**	**1,1-DCE**	**trans-DCE**	**cis-DCE**	**TCE**	**PCE**	**CB**	**1,3-DCB**	**1,4-DCB**	**1,2-DCB**	**1,2,4-TCB**	**1,2,3-TCB**	**Chloromethane**	**Dibromomethane**	**1,1-DCA**	**1,2-DCA**	**1,1,2-TCA**	**1,1,2,2,-TeCA**	**Benzene**	**Toluene**	**Ethylbenzene**	**Xylenes**	**Naphthalene**	**1,3,5-TMB**	**1,2,4-TMB**	**Chloroform**
	Screening Level (A)		**2.40**	**3.2[B]**	**10,000**	**na**	**12.7[C]**	**3.3**	**1,600**	**960**	**190**	**1,300**	**1.96[C]**	**na**	**na**	**na**	**na**	**37**	**16**	**4**	**22.7[C]**	**15,000**	**2,100**	**na**	**4940[C]**		**na**	**470**
IW-4I	Intermediate Zone -	1/20/2000	**930**	43	11	2,600	**2,500**	**22,000**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Upgradient of West	4/7/2000	**1,100**	5 U	13	3,700	**4,500**	**21,000**	5 U	1 U	1 U	1 U	--	--	5 U	82	50	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Gate	7/6/2000	**610**	140	50	8,000	**5,200**	**24,000**	500 U	100 U	100 U	100 U	--	--	500 U	500 U	500 U	500 U	100 U	500 U	100 U	100 U	100 U	100 U	--	--	--	100 U
		10/10/2000	**13**	5 U	5 U	86	**100**	**410**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	**1,900**	5 U	5 U	11,000	**10,000**	**48,000**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/9/2001	5 U	5 U	5 U	10,000	**9,800**	**62,000**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/9/2001	**1,400**	5 U	5 U	9,500	**10,000**	**74,000**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	**790**	5 U	5 U	8,000	**10,000**	**70,000**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/15/2002	**13,000**	500 U	500 U	20,000	**9,000**	**102,000**	500 U	500 U	500 U	500 U	--	--	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	--	--	--	500 U
		10/1/2002	**3,500**	5 U	5 U	18,000	**15,000**	**130,000**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		5/2/2003	**3,700**	75	25	23,000	**14,000**	**28,000**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		11/3/2003	**1,800**	62	35	14,000	**13,000**	**59,000**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/15/2004 [1]	**610**	35	16	2,400	**1,200**	**4,500**	--	--	--	--	--	--	--	--	5 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/18/2005	**220**	8.1	5.5	3,300	**7,900**	**42,000**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	**3,500**	1 U	1 U	11,000	**12,000**	**75,000**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/24/2007	**3,400**	1 U	1 U	13,000	**11,000**	**60,000**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/23/2008	**2,400**	1 U	1 U	8,500	**12,000**	**45,000**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/25/2009	**700**	1 U	1 U	4,500	**7,500**	**27,000**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2010	**3,100**	1 U	1 U	9,300	**13,000**	**90,000**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/13/2011	**2,100**	1 U	1 U	6,500	**11,000**	**110,000**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/19/2012	**800**	1 U	1 U	7,700	**11,000**	**90,000**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/12/2013	**2,200**	1 U	1 U	11,000	**12,000**	**120,000**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IW-4S	Shallow Zone -	1/20/2000	5 U	5 U	5 U	65	**32**	**230**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Upgradient of West	4/7/2000	5 U	5 U	5 U	100	**39**	**300**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Gate	7/6/2000	10 U	10 U	10 U	160	**34**	**280**	10 U	2 U	2 U	2 U	--	--	10 U	10 U	10 U	10 U	2 U	10 U	2 U	2 U	2 U	2 U	--	--	--	2 U
		10/10/2000	5 U	5 U	5 U	84	**32**	**230**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	**81**	5 U	5 U	76	**100**	**240**	61	1 U	1 U	1 U			5 U	5 U	5 U	5 U	1 U	5 U	**46**	41	1 U	1 U	--	--	--	1 U
		4/9/2001	5 U	5 U	5 U	25	**23**	**170**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/9/2001	5 U	5 U	5 U	51	**32**	**180**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	5 U	5 U	5 U	80	**31**	**210**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
IW-5D	Deep Zone -	1/20/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Downgradient of	4/10/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Wall	7/6/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/10/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/9/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/9/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
IW-5S	Shallow Zone -	1/20/2000	5 U	5 U	5 U	6.6	1 U	1.4	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	7.4	6.7	5.7	--	--	--	1 U
	Downgradient of	4/10/2000	5 U	5 U	5 U	5.3	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	5.8	14	--	--	--	1 U
	Wall	7/6/2000	5 U	5 U	5 U	7.2	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	5.4	2.0	--	--	--	1 U
		10/10/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/24/2001	5 U	5 U	5 U	15	2.8	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	3.5	3.3	--	--	--	1 U
		4/9/2001	5 U	5 U	5 U	8.9	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	4.4	5.3	--	--	--	1 U
		7/9/2001	5 U	5 U	5 U	5 U	**190**	**1,200**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/19/2001	5 U	5 U	5 U	5 U	1 U	**440**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	5 U	5 U	5 U	5 U	**360**	**1,000**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		11/2/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		12/18/2001	5 U	5 U	5 U	5.7	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/15/2002	5 U	5 U	5 U	9.8	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1.8	1.3	--	--	--	1 U
IW-6I	Intermediate Zone -	1/20/2000	**90**	5 U	6.5	100	1.4	**19**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Downgradient of	4/7/2000	**49**	5 U	5 U	12	1 U	**3.6**	5 U	2.1	1.7	1 U	--	--	5 U	5.8	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	East Gate	7/6/2000	**40**	5 U	3.7 J	34	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/10/2000	**52**	5 U	5 U	8.9	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	**110**	5 U	5 U	33	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/9/2001	**43**	5 U	5 U	19	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/10/2001	**22**	5 U	5 U	12	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	**32**	5 U	5 U	5.3	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
IW-6S	Shallow Zone -	1/20/2000	**100**	5 U	7.9	140	1 U	**3.9**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Downgradient of	4/7/2000	5 U	5 U	5 U	5 U	1 U	**3.6**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	East Gate	7/6/2000	5 U	5 U	1.1 J	1.5 J	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	1.3 J	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/10/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/9/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/10/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U

Table 2 - Historical Groundwater Monitoring Analytical Results

			Concentration of Chlorinated Ethene Compounds in ug/L						Concentration of Chlorinated Benzene Compounds in ug/L						Concentration of Other Detected Volatile Organic Compounds in ug/L													
Well	Location	Date	Vinyl Chloride	1,1-DCE	trans-DCE	cis-DCE	TCE	PCE	CB	1,3-DCB	1,4-DCB	1,2-DCB	1,2,4-TCB	1,2,3-TCB	Chloromethane	Dibromomethane	1,1-DCA	1,2-DCA	1,1,2-TCA	1,1,2,2,-TeCA	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	1,3,5-TMB	1,2,4-TMB	Chloroform
	Screening Level (A)		**2.40**	**3.2[B]**	**10,000**	**na**	**12.7[C]**	**3.3**	**1,600**	**960**	**190**	**1,300**	**1.96[C]**	**na**	**na**	**na**	**na**	**37**	**16**	**4**	**22.7[C]**	**15,000**	**2,100**	**na**	**4940[C]**		**na**	**470**
IW-7I	Intermediate Zone -	1/20/2000	5 U	5 U	5 U	310	8.9	**18**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Upgradient of East	4/7/2000	**13**	5 U	5 U	230	11	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Gate	7/6/2000	15 U	15 U	3.9 J	260	15 U	5 U	15 U	5 U	5 U	5 U	--	--	15 U	15 U	3.2 J	15 U	5 U	5 U	5 U	5 U	5 U	5 U	--	--	--	5 U
		10/10/2000	**12**	5 U	5 U	160	5.2	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	**22**	5 U	5 U	260	7.5	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/9/2001	5 U	5 U	5 U	150	5.6	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/9/2001	**11**	5 U	5 U	170	6.2	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	1.9	5 U	5 U	190	2.2	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/15/2002	5 U	5 U	5 U	220	4.6	1.9	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1.8	1 U	1 U	--	--	--	1 U
		10/1/2002	**14**	5 U	5 U	230	4.1	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		5/2/2003	0.2 U	1 U	1 U	100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		11/3/2003	**5.2**	5 U	1.2	140	1.3	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/18/2005	0.2	1 U	1 U	27	1.1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	0.2 U	1 U	1 U	32	1.1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/24/2007	0.2 U	1 U	1 U	36	1.5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/23/2008	**3.1**	1 U	1 U	22	1 U	1.1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/25/2009	1.1	1 U	1 U	20	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/28/2010	2.1	1 U	1 U	14	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/12/2011	0.34	1 U	1 U	11	1.0	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/18/2012	0.6	1 U	1 U	10	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/11/2013	0.8	1 U	1 U	16	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
IW-7S	Shallow Zone -	1/20/2000	**23**	5 U	5 U	200	10	**8.8**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Upgradient of East	4/7/2000	5 U	5 U	5 U	250	11	**12**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Gate	7/6/2000	15 U	15 U	5.4	440	2	5 U	15 U	5 U	5 U	5 U	--	--	15 U	15 U	15 U	15 U	5 U	15 U	5 U	5 U	5 U	5 U	--	--	--	5 U
		10/10/2000	5 U	5 U	5 U	330	7.6	3.2	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	5 U	5 U	5 U	210	**17**	**23**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	6.5	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/9/2001	5 U	5 U	5 U	180	**12**	**17**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/9/2001	5 U	5 U	5 U	430	**26**	**22**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	3.2	--	--	--	1 U
		10/22/2001	5 U	5 U	5 U	450	1 U	**300**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
IW-8D	Deep Zone -	1/20/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Downgradient of	4/7/2000	5 U	5 U	5 U	5 U	1.2	**17**	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Treatment Wall	7/6/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/10/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	5 U	5 U	5 U	5 U	**22**	2.3	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	6.2	7.4	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/24/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/9/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/10/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
IW-9I	Intermediate Zone -	1/20/2000	**66**	5 U	5 U	16	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	East End of	4/10/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
	Treatment Wall	7/6/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/10/2000	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		1/15/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/9/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/9/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/15/2002	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/1/2002	**5.0**	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		5/1/2003	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		11/3/2003	**56**	5 U	5 U	20	1 U	1.4	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/27/2004	**3.3**	1 U	1 U	1.6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/18/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	**4.1**	1 U	1 U	8.7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/24/2007	**6.1**	1 U	1 U	14	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/23/2008	**9.4**	1 U	1 U	14	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/25/2009	**3.3**	1 U	1 U	8	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2010	**2.9**	1 U	1 U	6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/12/2011	**3.5**	1 U	1 U	5.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/18/2012	**3.8**	1 U	1 U	6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/11/2013	**7.3**	1 U	1 U	4.1	1 U	**11**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Table 2 - Historical Groundwater Monitoring Analytical Results

			Concentration of Chlorinated Ethene Compounds in ug/L						Concentration of Chlorinated Benzene Compounds in ug/L						Concentration of Other Detected Volatile Organic Compounds in ug/L													
Well	**Location**	**Date**	**Vinyl Chloride**	**1,1-DCE**	**trans-DCE**	**cis-DCE**	**TCE**	**PCE**	**CB**	**1,3-DCB**	**1,4-DCB**	**1,2-DCB**	**1,2,4-TCB**	**1,2,3-TCB**	**Chloromethane**	**Dibromomethane**	**1,1-DCA**	**1,2-DCA**	**1,1,2-TCA**	**1,1,2,2,-TeCA**	**Benzene**	**Toluene**	**Ethylbenzene**	**Xylenes**	**Naphthalene**	**1,3,5-TMB**	**1,2,4-TMB**	**Chloroform**
	Screening Level (A)		**2.40**	**3.2^B^**	**10,000**	**na**	**12.7^C^**	**3.3**	**1,600**	**960**	**190**	**1,300**	**1.96^C^**	**na**	**na**	**na**	**na**	**37**	**16**	**4**	**22.7^C^**	**15,000**	**2,100**	**na**	**4940^C^**		**na**	**470**
JT-3	Terminals Property	3/15/1996	**12**	4 U	4 U	10 U	4 U	10 U	4 U	5 U	5 U	5 U	--	--	--	na	na	na	--	na	--	--	--	--	--	--	--	
		3/22/1999	**88**	5 U	5 U	5 U	1 U	1 U	140	77	44	10	--	--	5 U	na	na	na	1 U	na	**41**	1.2	1 U	1.7	--	--	--	1 U
		7/30/1999	**6.4**	5 U	5 U	5 U	1 U	1 U	74	25	19	3.2	--	--	5 U	na	na	na	1 U	na	**61**	1 U	1 U	1 U	--	--	--	1 U
		10/15/1999	5 U	5 U	5 U	5 U	1 U	1 U	--	15	8.7	1.4	--	--	5 U	na	na	na	1 U	na	**29**	1 U	1 U	1 U	--	--	--	1 U
		1/20/2000	5 U	5 U	5 U	5 U	1 U	1 U	130	34	25	2.8	--	--	5 U	na	na	na	1 U	na	**47**	1.3	1 U	1 U	--	--	--	1 U
		4/7/2000	5 U	5 U	5 U	5 U	1.5	1 U	100	25	16	2.8	--	--	5 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/7/2000	5 U	5 U	1.7 J	5 U	1 U	1 U	56	12	10	2	--	--	5 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/11/2000	5 U	5 U	5 U	5 U	1 U	1 U	45	1 U	1 U	1 U	--	--	5 U	na	na	na	1 U	na	**32**	1 U	1 U	1 U	--	--	--	1 U
		1/16/2001	5 U	5 U	5 U	5 U	1 U	1 U	84	24	19	3.1	--	--	5 U	na	na	na	1 U	na	**33**	1	1 U	1 U	--	--	--	1 U
		4/10/2001	1 U	1 U	1 U	1 U	1 U	1 U	50	6.9	5.6	1 U	1 U	1 U	1 U	na	na	na	1 U	na	**27**	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		7/10/2001	5 U	5 U	5 U	5 U	1 U	1 U	85	1 U	1 U	1 U	--	--	5 U	na	na	na	1 U	na	**30**	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	5 U	5 U	5 U	5 U	1 U	1 U	43	1 U	1 U	1 U	--	--	5 U	na	na	na	1 U	na	**55**	1 U	1 U	1 U	--	--	--	1 U
		12/17/2001	0.2 U	1 U	1 U	1 U	1 U	1 U	100	2.1	3.1	1 U	1 U	1 U	1 U	na	na	na	1 U	na	**26**	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/15/2002	5 U	5 U	5 U	5 U	1 U	**5.9**	81	7.4	1 U	1 U	--	--	5 U	na	na	na	1 U	na	22	1 U	1 U	1 U	--	--	--	1 U
		6/4/2002	0.2 U	1 U	1 U	1 U	1 U	1 U	64	2.6	2.7	1 U	1 U	1 U	1 U	na	na	na	1 U	na	**24**	1 U	1 U	1 U	1 U	1 U	1 U	
		5/1/2003	0.2 U	1 U	1 U	1 U	1 U	1 U	44	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	14	1 U	1 U	1 U	1 U	1 U	1 U	
		11/3/2003	0.2 U	1 U	1 U	1 U	1.0	**7.8**	115	1.3	1.9	1 U	1 U	1 U	1 U	na	na	na	1 U	na	17	1 U	1 U	1 U	2.2	1 U	1 U	
		4/15/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	16	1 U	1.2	1 U	1 U	1 U	1 U	na	na	na	1 U	na	3.3	1 U	1 U	1 U	1 U	1 U	1 U	
		7/6/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	8.7	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1	1 U	1 U	1 U	1 U	1 U	1 U	
		10/1/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	7.2	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	2.4	1 U	1 U	1 U	1 U	1 U	1 U	
		1/25/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	15	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	2.4	1 U	1 U	1 U	1 U	1 U	1 U	
		4/18/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	5.5	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1.1	1 U	1 U	1 U	1 U	1 U	1 U	
		10/19/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	6.7	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1.3	1 U	1 U	1 U	1 U	1 U	1 U	
		4/21/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	4.7	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1.6	1 U	1 U	1 U	1 U	1 U	1 U	
		4/24/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	6.5	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1.8	1 U	1 U	1 U	1 U	1 U	1 U	
		4/23/2008	0.2 U	1 U	1 U	1 U	1 U	1 U	7.1	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
		4/27/2009	0.2 U	1 U	1 U	1 U	1 U	1 U	8.1	1 U	1.1	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
		4/27/2010	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.1	1 U	1 U	1 U	1 U	na	na	na	1 U	na	3.8	1 U	1 U	1 U	1 U	1 U	1 U	
		4/13/2011	0.2 U	1 U	1 U	1 U	1 U	1 U	37	1 U	2.2	1 U	1 U	1 U	1 U	na	na	na	1 U	na	3.7	1 U	1 U	1 U	1 U	1 U	1 U	
		4/19/2012	0.2 U	1 U	1 U	1 U	1 U	1 U	54	1 U	2.0	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
		4/11/2013	0.2 U	1 U	1 U	1 U	1 U	1 U	86	1.3	1.8	1 U	1 U	1 U	1 U	na	na	na	1 U	na	2.5	1 U	1 U	1 U	1 U	1 U	1 U	
JT-5	Terminals Property	3/22/1999	5 U	5 U	5 U	5 U	1 U	**5.3**	5 U	1 U	1 U	1 U	--	--	5 U	na	na	na	1 U	na	1 U	1.8	1 U	1 U	--	--	--	1 U
		7/30/1999	5 U	5 U	5 U	5 U	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/10/2001	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
JT-6	Terminals Property Adjacent to Ship Canal	3/22/1999	**390**	5 U	7	140	2.2	1.3	300	570	**360**	47	--	--	5 U	na	na	na	1 U	na	9	1.2	1 U	2.5	--	--	--	1 U
		6/17/1999	**430**	5 U	9.5	160	1.4	1.2	5 U	580	**300**	31	--	--	5 U	na	na	na	1 U	na	16	1.4	1 U	1	--	--	--	1 U
		7/30/1999	**400**	5 U	11	160	1.5	1 U	410	400	**270**	24	--	--	5 U	na	na	na	1 U	na	20	1.1	1 U	1	--	--	--	1 U
		10/15/1999	**24**	5 U	1 U	58	1 U	1 U	--	240	**120**	19	--	--	5 U	na	na	na	1 U	na	20	1 U	1 U	1 U	--	--	--	1 U
		10/18/1999	**41**	5 U	1 U	61	1 U	1 U	--	250	**130**	9.2	--	--	5 U	na	na	na	1 U	na	**24**	1.7	1 U	1 U	--	--	--	1 U
		1/21/2000	**150**	5 U	5 U	49	1 U	1 U	840	260	**180**	13	--	--	5 U	na	na	na	1 U	na	**37**	2.8	1 U	1 U	--	--	--	1 U
		4/7/2000	**230**	5 U	6.4	84	1 U	3.1	610	270	**170**	17	--	--	5 U	na	na	na	1 U	na	**29**	2.8	1 U	3	--	--	--	1 U
		7/7/2000	**52**	20 U	12	120	4 U	4 U	300	220	**190**	18	--	--	5 U	na	na	na	4 U	na	18	4 U	4 U	4 U	--	--	--	4 U
		10/11/2000	**78**	5 U	5 U	65	1 U	1 U	550	330	**250**	1 U	--	--	5 U	na	na	na	41	na	**29**	1 U	1 U	1 U	--	--	--	1 U
		1/16/2001	**94**	5 U	5 U	31	1 U	1 U	1100	230	**190**	18	--	--	5 U	na	na	na	1 U	na	**26**	2	1	5.9	--	--	--	1 U
		4/10/2001	**77**	1 U	1 U	54	1 U	1 U	660	260	**170**	16	1 U	1 U	1 U	na	na	na	1 U	na	**27**	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		7/10/2001	**20**	5	5 U	25	4.8	**62**	480	220	**260**	19	--	--	5 U	na	na	na	1 U	na	18	2.4	1 U	1 U	--	--	--	1 U
		7/17/2001	5 U	5 U	5 U	18	1 U	**6.8**	500	310	**220**	20	--	--	5 U	na	na	na	1 U	na	20	2.9	1 U	4.1	--	--	--	1 U
		10/22/2001	**8.6**	5 U	5 U	2.2 J	1 U	1 U	550	130	140	10	--	--	5 U	na	na	na	1 U	na	**36**	1 U	1 U	6.9	--	--	--	1 U
		12/17/2001	**9.4**	5 U	5 U	5 U	1 U	1 U	930	28	20	2.5	--	--	5 U	na	na	na	1 U	na	**26**	1.7	1 U	3.8	--	--	--	1 U
		1/30/2002	5 U	5 U	5 U	5 U	1 U	1 U	1000	28	32	1 U	--	--	5 U	na	na	na	1 U	na	**24**	2.6	1 U	1 U	--	--	--	1 U
		4/15/2002	5 U	5 U	5 U	5 U	1 U	1 U	720	55	40	1 U	--	--	5 U	na	na	na	1 U	na	18	1 U	1 U	1 U	--	--	--	1 U
		6/4/2002	**20**	1 U	1 U	1 U	1 U	1 U	650	100	68	5.5	54	8.4	1 U	na	na	na	1 U	na	**23**	2	1 U	1 U	1 U	1 U	1 U	
		3/13/2003	0.2 U	1 U	1 U	1 U	1 U	1 U	1100	36	25	1 U	1 U	1 U	1 U	na	na	na	1 U	na	22	1.3	1.9	2.6	1 U	1 U	2.6	
		5/1/2003	0.2 U	1 U	1 U	1 U	1 U	1 U	740	15	12	1 U	1 U	1 U	1 U	na	na	na	1 U	na	20	1 U	1.3	1 U	63	1 U	1.7	
		11/3/2003	0.2 U	1 U	1 U	1 U	1 U	1 U	580	11	10	1 U	1 U	1 U	1 U	na	na	na	1 U	na	17	1.3	2.2	4.5	170	1.4	3	
		4/15/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	700	18	14	1 U	1 U	1 U	1 U	na	na	na	1 U	na	**23**	1.6	3.4	4.7	240	2.1	4.9	
		7/6/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	660	5.2	6.5	1 U	1 U	1 U	1 U	na	na	na	1 U	na	18	1.4	3.7	10	450	1 U	7.1	
		10/1/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	640	5.5	6.9	1 U	1 U	1 U	1 U	na	na	na	1 U	na	17	1.8	4.3	12	460	1 U	7.3	
		1/25/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	360	3.8	7.5	1 U	1 U	1 U	1 U	na	na	na	1 U	na	14	1 U	1	3	20	1 U	1.8	
		4/18/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	490	11	16	1 U	1 U	1 U	1 U	na	na	na	1 U	na	9.7	1.2	2.7	6.9	120	1 U	7.2	
		7/22/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	500	4.1	6.6	1 U	1 U	1 U	1 U	na	na	na	1 U	na	7.6	1 U	3.9	11	6	1 U	1.4	
		10/19/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	450	3.0	4.3	1 U	1 U	1 U	1 U	na	na	na	1 U	na	13	1.0	3.3	8.2	130	1 U	4.6	
		1/31/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	330	2.0	2.0	1 U	1 U	1 U	1 U	na	na	na	1 U	na	10	1 U	1 U	1 U	15	1 U	1.0	
		4/21/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	320	3.2	5.0	1 U	1 U	1 U	1 U	na	na	na	1 U	na	7.6	1 U	1.0	2.1	17	1 U	1 U	
		7/27/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	350	4.1	5.7	1 U	1 U	1 U	1 U	na	na	na	1 U	na	14	1 U	2.4	1 U	55	1 U	2.0	
		10/30/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	390	2.5	4.6	1 U	1 U	1 U	1 U	na	na	na	1 U	na	17	1 U	1 U	1 U	40	1 U	3.0	
		1/25/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	410	1.8	2.8	1 U	1 U	1 U	1 U	na	na	na	1 U	na	18	1 U	1 U	1 U	8.6	1 U	1 U	
		4/24/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	300	3.2	5.2	1 U	1 U	1 U	1 U	na	na	na	1 U	na	11	1 U	1 U	1 U	1.0	1 U	1 U	
		7/30/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	350	4.6	6.3	1 U	1 U	1 U	1 U	na	na	na	1 U	na	12	1 U	1 U	1 U	1 U	1 U	1 U	
		10/31/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	360	1.6	3.4	1 U	1 U	1 U	1 U	na	na	na	1 U	na	14	1 U	1 U	1 U	1 U	1 U	1 U	
		4/22/2008	0.2 U	1 U	1 U	1 U	1 U	1 U	280	2.5	3.0	1 U	1 U	1 U	1 U	na	na	na	1 U	na	12	1 U	1 U	1 U	1 U	1 U	1 U	
		4/23/2009	0.2 U	1 U	1 U	1 U	1 U	1 U	370	2.5	2.8	1 U	1 U	1 U	1 U	na	na	na	1 U	na	14	1 U	1 U	1 U	1 U	1 U	1 U	
		4/27/2010	0.2 U	1 U	1 U	1 U	1 U	1 U	350	2.1	3.2	1.1	1 U	1 U	1 U	na	na	na	1 U	na	12	1 U	1 U	1 U	1 U	1 U	1 U	
		4/13/2011	0.2 U	1 U	1 U	1 U	1 U	1 U	350	1.3	2.1	1 U	1 U	1 U	1 U	na	na	na	1 U	na	8.5	1 U	1 U	1 U	1 U	1 U	1 U	
		4/19/2012	0.2 U	1 U	1 U	1 U	1 U	1 U	280	1.0	1.9	1 U	1 U	1 U	1 U	na	na	na	1 U	na	5.4	1 U	1 U	1 U	1 U	1 U	1 U	
		4/11/2013	0.2 U	1 U	1 U	1 U	1 U	1 U	340	1.1	2.5	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	

			Concentration of Chlorinated Ethene Compounds in ug/L						Concentration of Chlorinated Benzene Compounds in ug/L						Concentration of Other Detected Volatile Organic Compounds in ug/L													
Well	Location	Date	Vinyl Chloride	1,1-DCE	trans-DCE	cis-DCE	TCE	PCE	CB	1,3-DCB	1,4-DCB	1,2-DCB	1,2,4-TCB	1,2,3-TCB	Chloromethane	Dibromomethane	1,1-DCA	1,2-DCA	1,1,2-TCA	1,1,2,2,-TeCA	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	1,3,5-TMB	1,2,4-TMB	Chloroform
	Screening Level (A)		2.40	3.2^B	10,000	na	12.7^C	3.3	1,600	960	190	1,300	1.96^C	na	na	na	na	37	16	4	22.7^C	15,000	2,100	na	4940^C		na	470
JT-7	Terminals Property	3/22/1999	**64**	5 U	5 U	7.2	1 U	1 U	160	190	180	16	--	--	5 U	na	na	na	1 U	na	2.6	4	1 U	2.7	--	--	--	1 U
		7/30/1999	**51**	5 U	5 U	5 U	1	1 U	240	140	140	16	--	--	5 U	na	na	na	1 U	na	3.4	1 U	1 U	1.4	--	--	--	1 U
		10/15/1999	**7**	5 U	5 U	3	1 U	1 U	--	110	93	6.8	--	--	5 U	na	na	na	1 U	na	2.7	2	1 U	1 U	--	--	--	1 U
		10/18/1999	**10**	5 U	5 U	2.1	1 U	1 U	--	97	88	3.3	--	--	5 U	na	na	na	1 U	na	2.1	1 U	1 U	1 U	--	--	--	1 U
		1/21/2000	**69**	5 U	5 U	6.5	1 U	1 U	140	150	150	9.1	--	--	5 U	na	na	na	1 U	na	2	1.6	1.3	1.9	--	--	--	1 U
		4/7/2000	**48**	5 U	5 U	5 U	1 U	1 U	140	120	110	6.7	--	--	5 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/7/2000	**14**	10 U	10 U	6.7	2 U	2 U	200	140	**200**	10	--	--	5 U	na	na	na	2 U	na	4.6	2 U	2 U	2 U	--	--	--	2 U
		10/11/2000	**31**	5 U	5 U	5 U	1 U	1 U	190	90	110	5.3	--	--	5 U	na	na	na	1 U	na	2.4	1 U	1 U	1 U	--	--	--	1 U
		1/16/2001	5 U	5 U	5 U	5 U	1 U	1 U	26	20	22	1 U	--	--	5 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/10/2001	**50**	1 U	1 U	2.3	1 U	1 U	180	77	82	4.1	1 U	1 U	1 U	na	na	na	1 U	na	1.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		7/10/2001	**45**	5 U	5 U	16	1 U	**9.6**	240	98	130	7.8	--	--	5 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		10/22/2001	**32**	5 U	5 U	5 U	1 U	1 U	150	42	74	5.0	--	--	5 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		12/17/2001	**30**	1 U	1 U	1 U	1 U	1 U	170	86	91	4.7	2.8	1 U	15	na	na	na	1 U	na	2	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/15/2002	**90**	5 U	5 U	5 U	1 U	1 U	140	140	170	5.6	--	--	5 U	na	na	na	1 U	na	1 U	1.4	1.3	1 U	1 U	1 U	1 U	1 U
		6/4/2002	**37**	1 U	1 U	1 U	1 U	1 U	150	73	82	3.7	**85**	17	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
		10/1/2002	**29**	1 U	1 U	1 U	1 U	1 U	200	57	71	6.5	--	--	5 U	na	na	na	1 U	na	1.8	3.2	1.7	6.3	--	--	--	
		5/1/2003	**25**	1 U	1 U	1 U	1 U	1 U	113	33	40	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
		11/3/2003	**32**	1 U	1 U	1 U	1 U	1 U	160	49	64	1 U	1.1	1 U	1 U	na	na	na	1 U	na	1.6	1 U	1 U	1 U	1 U	1 U	1 U	
		4/15/2004	**28**	1 U	1 U	1 U	1 U	1 U	120	44	58	2.9	1 U	1 U	1 U	na	na	na	1 U	na	1	1 U	1 U	1 U	1 U	1 U	1 U	
		7/6/2004	**12**	1 U	1 U	1 U	1 U	1 U	170	21	28	5.8	1 U	1 U	1 U	na	na	na	1 U	na	1.4	1 U	1 U	2.7	1 U	1 U	1.3	
		10/1/2004	1.2	1 U	1 U	1 U	1 U	1 U	190	2.8	4.5	1 U	1 U	1 U	1 U	na	na	na	1.0 U	na	1.6	1 U	1 U	1.0	1 U	1 U	1 U	
		1/27/2005	0.5	1 U	1 U	1 U	1 U	1 U	30	2.0	2.4	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1.5	1 U	1 U	1 U	1 U	1 U	1 U	
		4/18/2005	0.21	1 U	1 U	1 U	1 U	1 U	76	7.6	7.9	1.0	1 U	1 U	1 U	na	na	na	1.0 U	na	1	1 U	1 U	1.1	1 U	1 U	1 U	
		10/19/2005	0.2 U	1 U	1 U	1 U	5.1	1 U	170	33	37	2.7	1 U	1 U	1 U	na	na	na	1.0 U	na	1	1 U	1 U	1.1	1 U	1 U	1 U	
		4/21/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	76	38	49.0	1.9	1 U	1 U	1 U	na	na	na	1 U	na	1	1 U	1 U	1 U	1 U	1 U	1 U	
		4/24/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	100	44	66	3.1	1 U	1 U	1 U	na	na	na	1 U	na	1	1 U	1 U	1 U	1 U	1 U	1 U	
		4/22/2008	0.2 U	1 U	1 U	1 U	1 U	1 U	82	16	24	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
		4/27/2009	0.2 U	1 U	1 U	1 U	1 U	1 U	61	3.6	5.2	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
		4/27/2010	0.2 U	1 U	1 U	1 U	1 U	1 U	100	2.3	4.3	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
		4/13/2011	0.2 U	1 U	1 U	1 U	1 U	1 U	130	1.0	1.8	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
		4/19/2012	0.2 U	1 U	1 U	1 U	1 U	1 U	81	1.0	2.2	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
		4/11/2013	0.2 U	1 U	1 U	1 U	1 U	1 U	98	1.1	1.8	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1.1	1 U	1 U	1 U	1 U	1 U	1 U	
JT-8	Terminals Property -	1/11/2001	**86**	5 U	5 U	19	1 U	1 U	630	260	160	21	--	--	5 U	na	na	na	1 U	na	4.4	2	1 U	2.7	--	--	--	1 U
	TCB Source Area	2/20/2001	5 U	5 U	5 U	5 U	1 U	1 U	530	210	**200**	1 U	--	--	5 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/10/2001	**20**	5.8	1 U	1 U	1 U	1 U	150	660	**670**	18	**250**	26	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		7/10/2001	**42**	1 U	1 U	8.7	1 U	1 U	370	210	**210**	67	**1,300**	87	1 U	na	na	na	1 U	na	3.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/22/2001	0.2 U	1 U	1 U	1 U	1 U	1 U	46	82	150	120	**1,300**	180	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		12/17/2001	0.2 U	1 U	1 U	1 U	1 U	1 U	53	110	**340**	290	**4,500**	470	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		6/4/2002	**11**	1 U	1 U	1 U	1 U	1 U	260	79	**240**	220	**3,900**	420	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	8.9	1 U	1 U	
		3/13/2003	0.2 U	1 U	1 U	1 U	1 U	2.1	220	82	**450**	560	**9,100**	650	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
		4/15/2004	**35**	1 U	1 U	6.4	1 U	1 U	240	180	**660**	750	**8,400**	910	1 U	na	na	na	1 U	na	3.8	1 U	1 U	1 U	1 U	1 U	1 U	
		7/6/2004	**15**	1 U	1 U	5.7	1.2	2.4	130	150	**720**	1,000	**17,000**	1 U	1 U	na	na	na	1 U	na	4.6	1.2	1 U	1 U	10	1 U	1 U	
		4/25/2007	0.4	1 U	1 U	1 U	1 U	1 U	58	140	**610**	740	**5,200**	680	1 U	na	na	na	1 U	na	1.1	1 U	1 U	1 U	1 U	1 U	1 U	
JT-9	Terminals Property	3/13/2003	**7.4**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	**44**	1 U	1 U	1 U	1 U	1 U	1 U	1 U
JT-10	Terminals Property	11/3/2003	**13**	1 U	1 U	28	1 U	1 U	580	53	38	4.5	1.4	1 U	1 U	na	na	na	1.0 U	na	17	1 U	2.4	3.0	250	1 U	3.1	1 U
		4/15/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	24	10	6.3	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	3.9	1 U	1 U	1 U
		7/6/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	7.1	5.8	5.0	1.1	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/1/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	9.0	5.8	4.5	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		1/25/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	13	7.1	7.2	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/18/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	4.6	7.9	8.1	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	14	7.4	6.6	1 U	1 U	1 U	1 U	na	na	na	1.0 U	na	1.1	3.2	1 U	2.0	1 U	1 U	1 U	1 U
		4/24/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	11	4.6	4.1	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/22/2008	0.2 U	1 U	1 U	1 U	1 U	1 U	5.5	3.2	2.7	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2009	0.3	1 U	1 U	1 U	1 U	1 U	4.6	3.5	2.5	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/28/2010	0.4	1 U	1 U	1.0	1 U	1 U	21	5.6	4.3	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1.3	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/13/2011	0.2 U	1 U	1 U	1 U	1 U	1 U	55	4.3	4.1	1 U	1 U	1 U	1 U	na	na	na	1 U	na	2	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/19/2012	0.2 U	1 U	1 U	1 U	1 U	1 U	62	3.8	4.1	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/11/2013	0.2 U	1 U	1 U	1 U	1 U	1 U	98	2.3	3.2	1 U	1 U	1 U	1 U	na	na	na	1 U	na	3.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U
JT-11	Terminals Property	6/5/2003	**38**	1 U	1 U	57	1 U	1 U	360	90	50	4.8	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
JT-12	Terminals Property	11/3/2003	0.2 U	1 U	1 U	1 U	1 U	1 U	9.4	4.0	2.3	1 U	1 U	1 U	1 U	na	na	na	1 U	na	2.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U
	Adjacent to Ship	4/15/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	6.8	2.5	1.5	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U
	Canal	7/6/2004	0.2 U	1 U	1 U	1 U	1 U	1.3	5.8	2.7	2.3	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/1/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	7.7	3.6	2.2	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		1/25/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	5.8	2.9	2.0	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/18/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	9.2	2.6	1.9	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		7/27/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	4.9	3.4	2.1	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/19/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	6.5	3.3	2.3	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		1/31/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	7.8	3.4	1.0	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	4.8	2.0	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		7/27/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	6.0	2.4	1.5	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/30/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	6.1	3.7	2.4	1.5	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		1/25/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	9.3	3.9	2.4	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/24/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	5.2	1.8	1.2	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		7/30/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	6.5	2.9	1.8	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/31/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	6.3	2.6	1.7	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/22/2008	0.2 U	1 U	1 U	1 U	1 U	1 U	5.6	1.8	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/23/2009	0.2 U	1 U	1 U	1 U	1 U	1 U	6.0	1.8	1.3	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/28/2010	0.2 U	1 U	1 U	1 U	1 U	1 U	9.1	1.4	1.2	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/13/2011	0.2 U	1 U	1 U	1 U	1 U	1 U	28	2.3	2.5	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/19/2012	0.2 U	1 U	1 U	1 U	1 U	1 U	43	1.0	2.5	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/11/2013	0.2 U	1 U	1 U	1 U	1 U	1 U	55	1 U	1.6	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Table 2 - Historical Groundwater Monitoring Analytical Results

Well	Location	Date	Concentration of Chlorinated Ethene Compounds in ug/L						Concentration of Chlorinated Benzene Compounds in ug/L						Concentration of Other Detected Volatile Organic Compounds in ug/L													
			Vinyl Chloride	1,1-DCE	trans-DCE	cis-DCE	TCE	PCE	CB	1,3-DCB	1,4-DCB	1,2-DCB	1,2,4-TCB	1,2,3-TCB	Chloromethane	Dibromomethane	1,1-DCA	1,2-DCA	1,1,2-TCA	1,1,2,2,-TeCA	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	1,3,5-TMB	1,2,4-TMB	Chloroform
	Screening Level (A)		**2.40**	**3.2B**	**10,000**	**na**	**12.7C**	**3.3**	**1,600**	**960**	**190**	**1,300**	**1.96C**	**na**	**na**	**na**	**na**	**37**	**16**	**4**	**22.7C**	**15,000**	**2,100**	**na**	**4940C**		**na**	**470**
MW-15I	Intermediate Zone - Upgradient of Wall	3/18/1999	**3,500**	24	15	17,000	5.4	**4.8**	5 U	4.0	3.6	4.0	--	--	5 U	5 U	5 U	5 U	5 U	5 U	1 U	1.4	1.3	4.6	--	--	--	1 U
		1/20/2000	**1,100**	28	9.7	7,200	3.0	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		4/10/2000	**930**	21	9.8	6,300	**18**	**3.9**	5 U	1 U	1 U	1 U	--	--	5 U	13	5 U	5 U	1 U	5 U	1 U	1 U	1 U	1 U	--	--	--	1 U
		7/7/2000	**1,500**	500 U	500 U	18,000	**170**	100 U	500 U	100 U	100.0 U	100 U	--	--	500 U	500 U	500 U	500 U	100 U	500 U	100 U	100 U	100 U	100 U	--	--	--	100 U
		10/10/2000	**26**	5 U	5 U	210	1 U	1 U	5 U	1 U	1 U	1 U	--	--	5 U	5 U	5 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	--	--	--	1 U
SRW-1	Terminals Wall	4/15/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		7/6/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/1/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		1/25/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/18/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/19/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/24/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/22/2008	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2009	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/30/2010	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/13/2011	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/19/2012	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/11/2013	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
SRW-2	Terminals Wall	4/15/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		7/6/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/1/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		1/25/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/18/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/19/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	1.6	1.5	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/24/2007	0.2 U	1 U	1 U	1 U	1 U	1 U	1.6	1.5	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/22/2008	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2009	0.9	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2010	0.3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/13/2011	0.7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/19/2012	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/11/2013	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
SRW-3	Terminals Wall	4/15/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		7/6/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/1/2004	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		1/25/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/18/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		10/19/2005	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/21/2006	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/24/2007	0.2 U	1 U	1 U	1.1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/22/2008	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2009	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/27/2010	0.2 U	1 U	1 U	1 U	1 U	1 U	17	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	2.5	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/13/2011	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/19/2012	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
		4/11/2013	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	na	na	na	1 U	na	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Notes:

VOCs analyzed by either EPA Method 8021B or 8260B.

(1) Water samples were collected from wells IW-2I, IW-4I, IW-7I, IG-3, IG-4, IW-9I on April 15, 2004. Due to laboratory error only data from IW-2I and IW-4I were deemed acceptable. Wells IG-3, IG-4, and IW-9I were resampled April 27, 2004.

A Clean Water Act S304 Freshwater Screening Level for Consumption of Organisms based on groundwater migration to surface water.

B National Toxics Rule 40 CFR 131 Freshwater Screening Level for Consumption of Organisms based on groundwater migration to surface water.

C MTCA Method B Surface Water Screening Level.

Bold Exceeds screening level.

J Estimated value
U Not detected at indicated detection limit
C Suspected lab analysis carry-over causing column contamination.
na Not analyzed or not provided.
-- Not analyzed

1,1-DCE 1,1-Dichloroethene
trans-DCE trans-1,2-Dichloroethene
cis-DCE cis-1,2-Dichloroethene
TCE Trichloroethene
PCE Tetrachloroethene

CB Chlorobenzene
1,3-DCB m-Dichlorobenzene
,1,4-DCB p-Dichlorobenzene
1,2-DCB o-Dichlorobenzene
1,2,3-TCB 1,2,3-Trichlorobenzene
1,2,4-TCB 1,2,4-Trichlorobenzene

1,1-DCA 1,1-Dichloroethane
1,2-DCA 1,2-Dichloroethane
1,1,2-TCA 1,1,2-Trichloroethane
1,1,2,2-TeCA 1,1,2,2-Tetrachloroethane
1,3,5-TMB 1,3,5-Trimethylbenzene
1,2,4-TMB 1,2,4-Trimethylbenzene

Table 3 - PCB Concentrations in Groundwater

Sample Location	Sampling Date	Total Suspended Solids in mg/L	PCB Concentration in ug/L (Aroclor 1260)
Screening Levels Protective of Surface Water(A)			6.400E-05
JT-3			
	4/10/2001	--	0.4 U
	12/17/2001	--	0.017 U
	6/4/2002	7.4	1.5
	10/1/2002	1 U	0.033 U
JT-6			
	4/10/2001	--	0.4 U
	12/17/2001	1.4	0.017 U
	6/4/2002	23	0.2
	10/1/2002	3.1	0.056
	6/12/2003	25	0.089
	11/3/2003	5.2	0.03 U
	1/25/2005	51	0.05 U
	7/22/2005	68.2	0.03 U
JT-12			
	11/3/2003	3.8	0.03 U
	1/25/2005	6.0	0.015 U
	8/26/2005	2.2	0.01 U
MW-4			
	3/10/2010	NA	0.6 [1]

Notes:

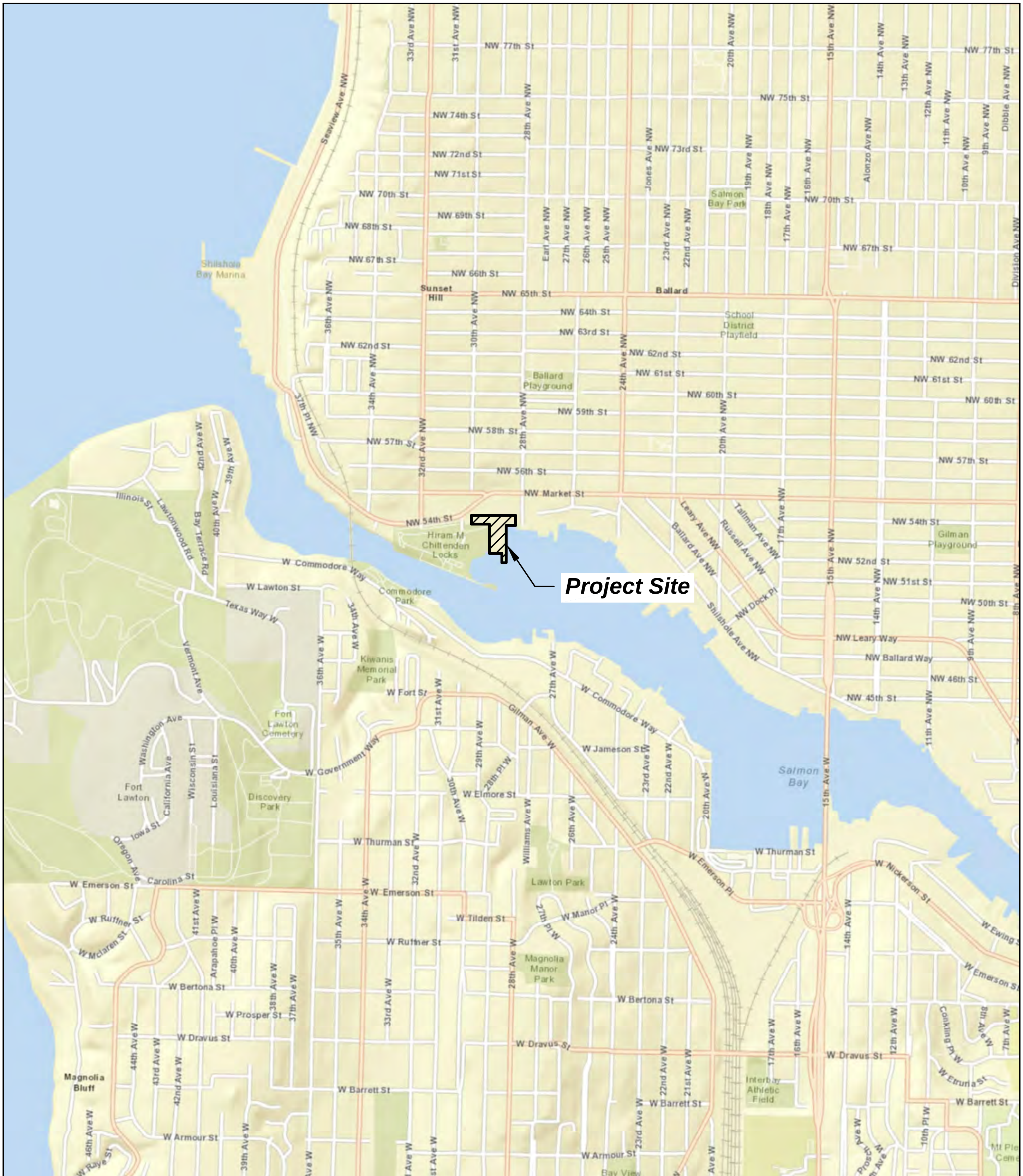
A - Clean Water Act S304 Freshwater Screening Level for Consumption of Organisms based on groundwat
Screening Level below PQL.

1 - Not known whether concentration is for PCB mixture or Aroclor 1260. (Aspect 2010)

NA - Not Available.

-- Not analyzed

U Not detected at indicated detection limit



Source: Base map prepared from ArcGIS Online, 2013.

N

0 2000 4000
Approximate Scale in Feet

Jacobson Terminals
Seattle, Washington

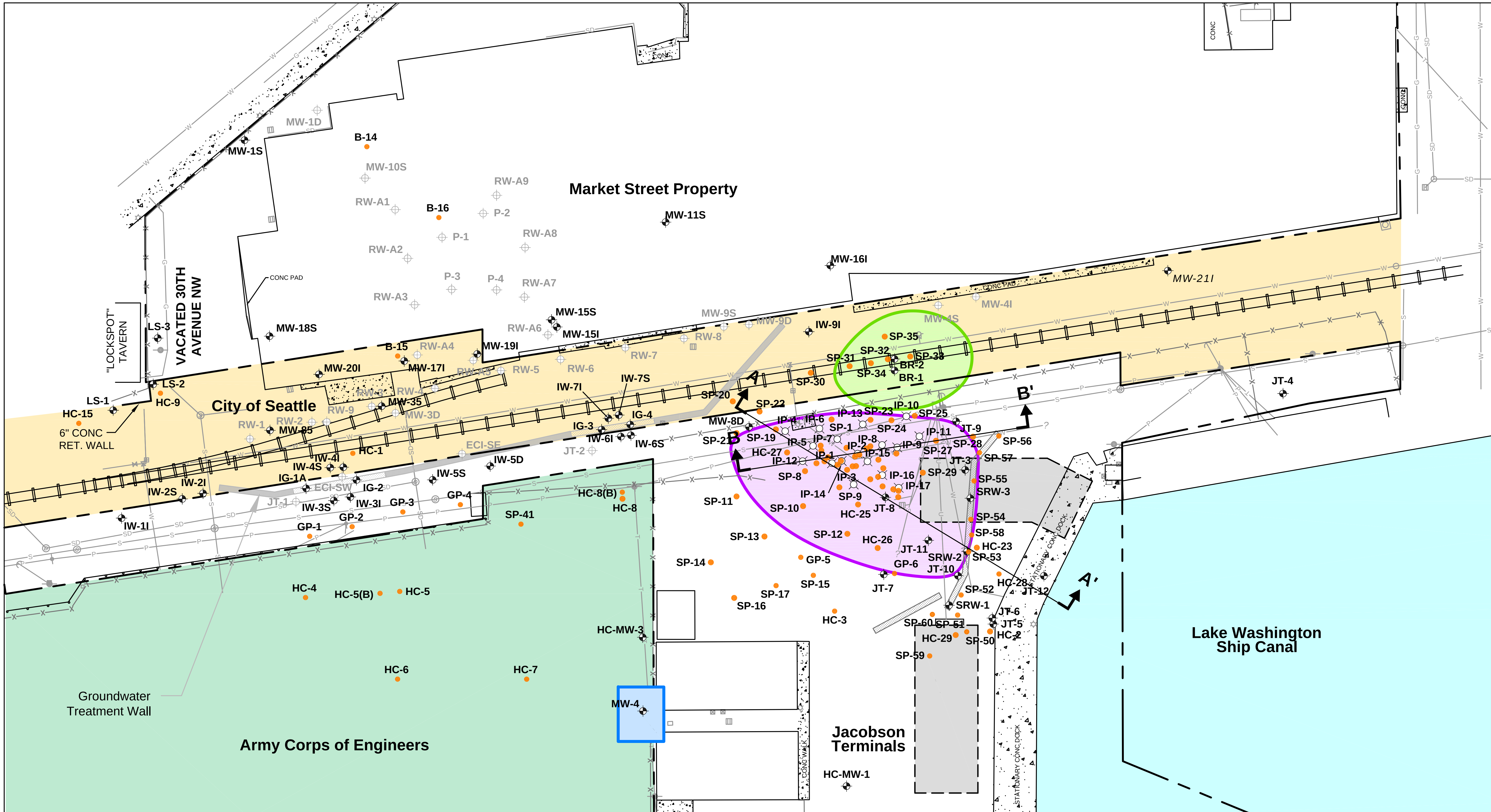
Vicinity Map

17800-43 10/13

HARTCROWSER

Figure
1

EAL 10/18/13 1780043-001.dwg



MW-18S		Existing Monitoring Well
RW-2		Former Monitoring Well, Recovery Well, or Piezometer (Abandoned)
IP-5		Injection Well
SP-41		Soil Boring Note: Labels removed from several borings in "IP" area for clarity. Refer to "Interim Cleanup Action Summary", Hart Crowser, July 18, 2002.
		Property Boundary

Concrete Surface
Cement-Bentonite Groundwater Treatment Wall
Permeable Iron/Sand Gate
Overhead Power
Sanitary Sewer Line
Water Line
Utility Line

City of Seattle Property
Iron/GAC Groundwater Treatment Wall
Boat Storage Rack
A A' Cross Section Location and Designation

Notes:
1. Base map prepared from AutoCAD file "020030-02.dwg," provide by Aspect Consulting, 10/08/13.
2. Utility locations are approximate.

Jacobson Terminal COC Areas
Petroleum Area
Chlorinated Ethene Area
PCB and Chlorinated Benzene Area

0 50 100
Scale in Feet

N

Jacobson Terminals
Seattle, Washington

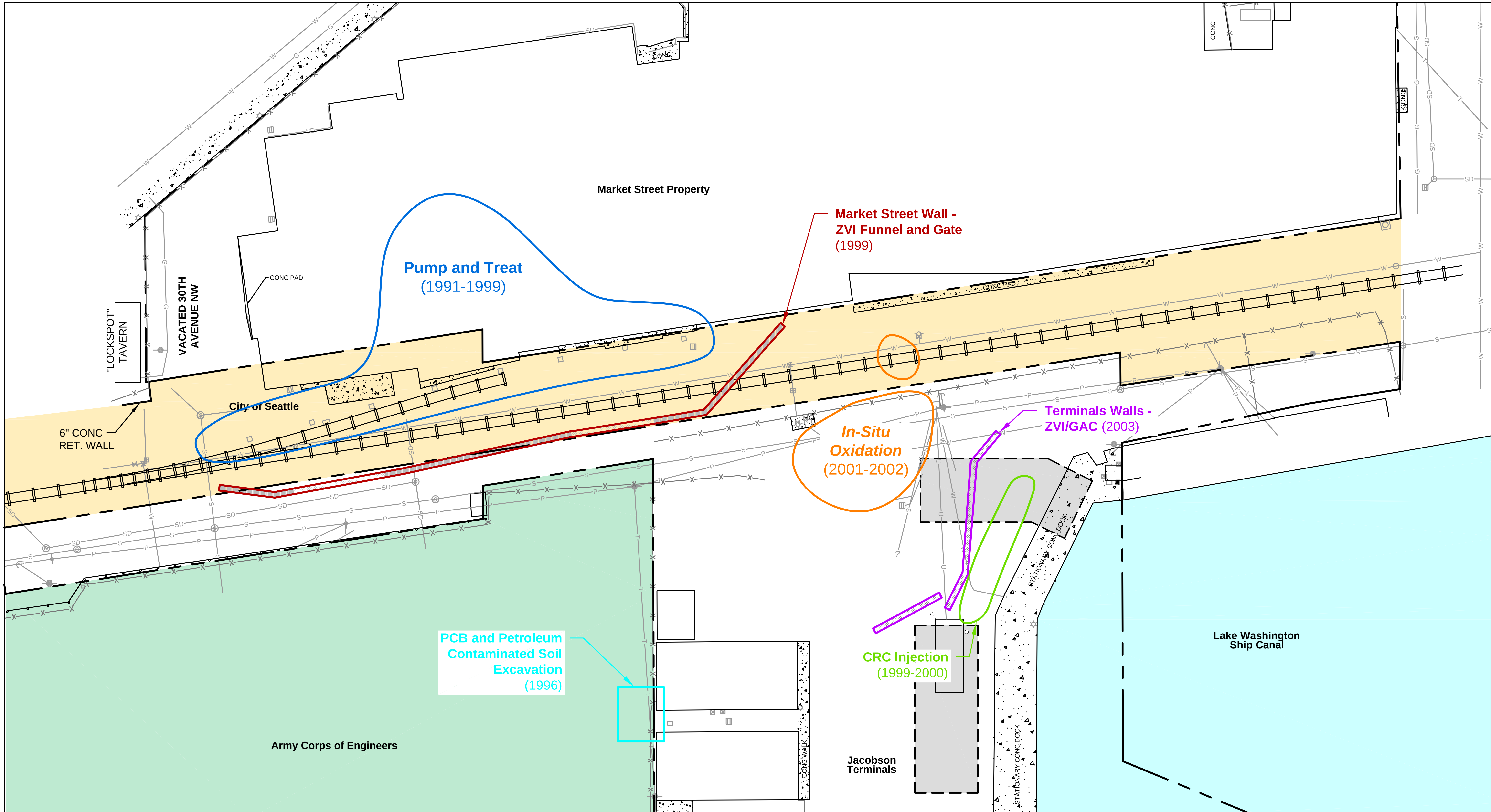
Site Plan

17800-43 11/13

HartCrowser

Figure 2

EAL 11/8/13 1780043-004.dwg



Property Boundary

Concrete Surface

Cement-Bentonite Groundwater Treatment Wall

Permeable Iron/Sand Gate

Overhead Power

Sanitary Sewer Line

Water Line

Utility Line

City of Seattle Property

Iron/GAC Groundwater Treatment Wall

Boat Storage Rack

Notes:

1. Base map prepared from AutoCAD file "020030-02.dwg," provide by Aspect Consulting, 10/08/13.
2. Utility locations are approximate.

0 50 100

Scale in Feet

N

Jacobson Terminals
Seattle, Washington

Remediation Areas

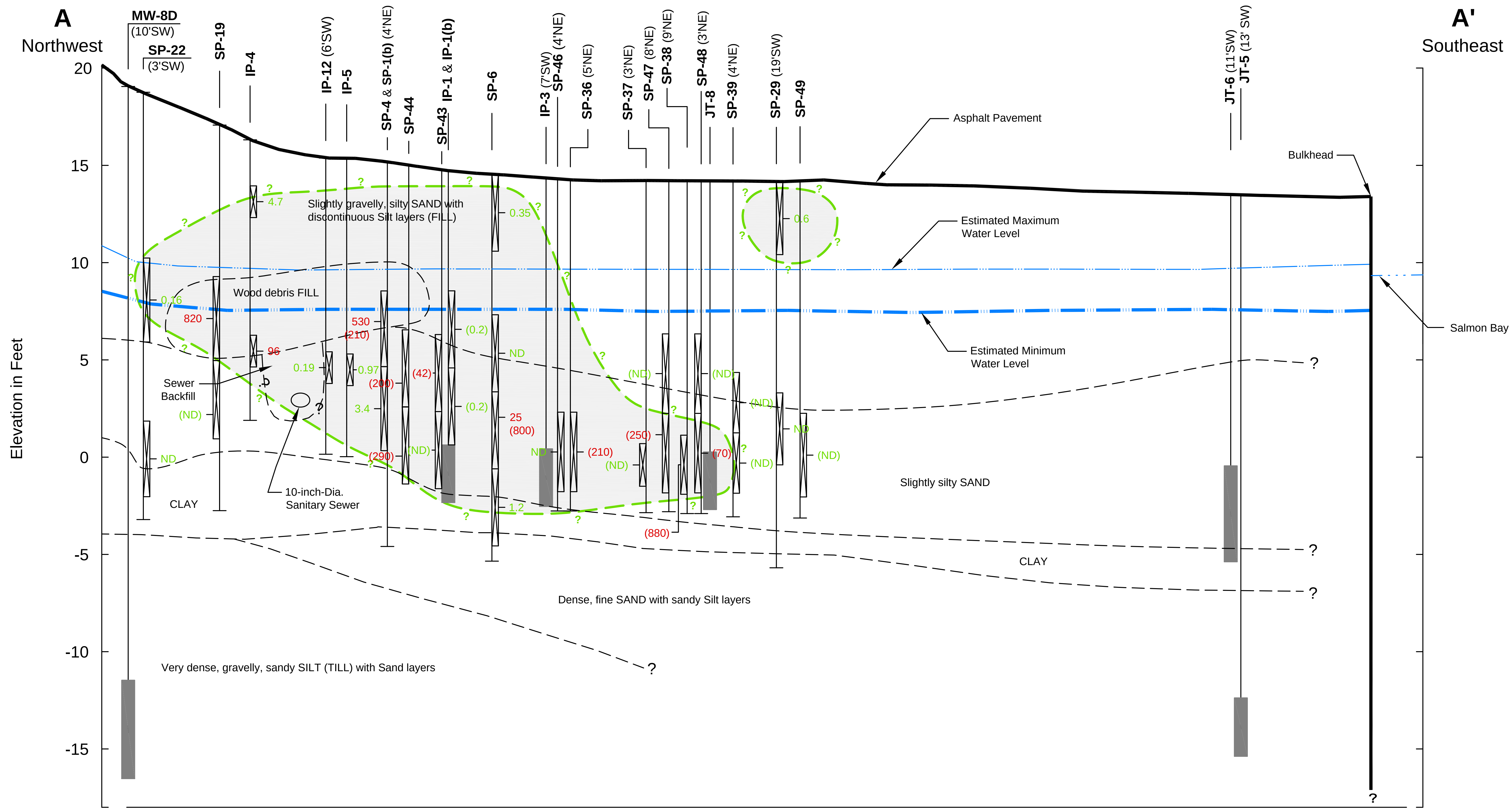
17800-43 10/13

HARTCROWSER

Figure

3

EAL 10/18/13 1780043-007.dwg



MW-8D (10' S) — Exploration Number (Offset Distance and Direction) Exploration Location

0.43 — PCB Concentration in mg/kg (ND=Not Detected)

(210) — Performance Monitoring or Confirmation Sample

Screened Interval

? — Geologic Contact (Approximate)

820 — Exceed MTCA Method A Industrial Screening Level

0.43 — Below MTCA Method A Industrial Screening Level

? — Approximate Area of PCB Concentrations above Screening Level (0.000079 mg/kg)

Horizontal Scale in Feet: 0, 15, 30

Vertical Scale in Feet: 0, 5, 10

Vertical Exaggeration x 3

Notes:

1. Contacts between soil units are based upon interpolation between borings and represent our interpretation of subsurface conditions based on currently available data.
2. Cross section developed from AutoCAD files provided by Aspect, dated 12/2005.

Jacobson Terminals
Seattle, Washington

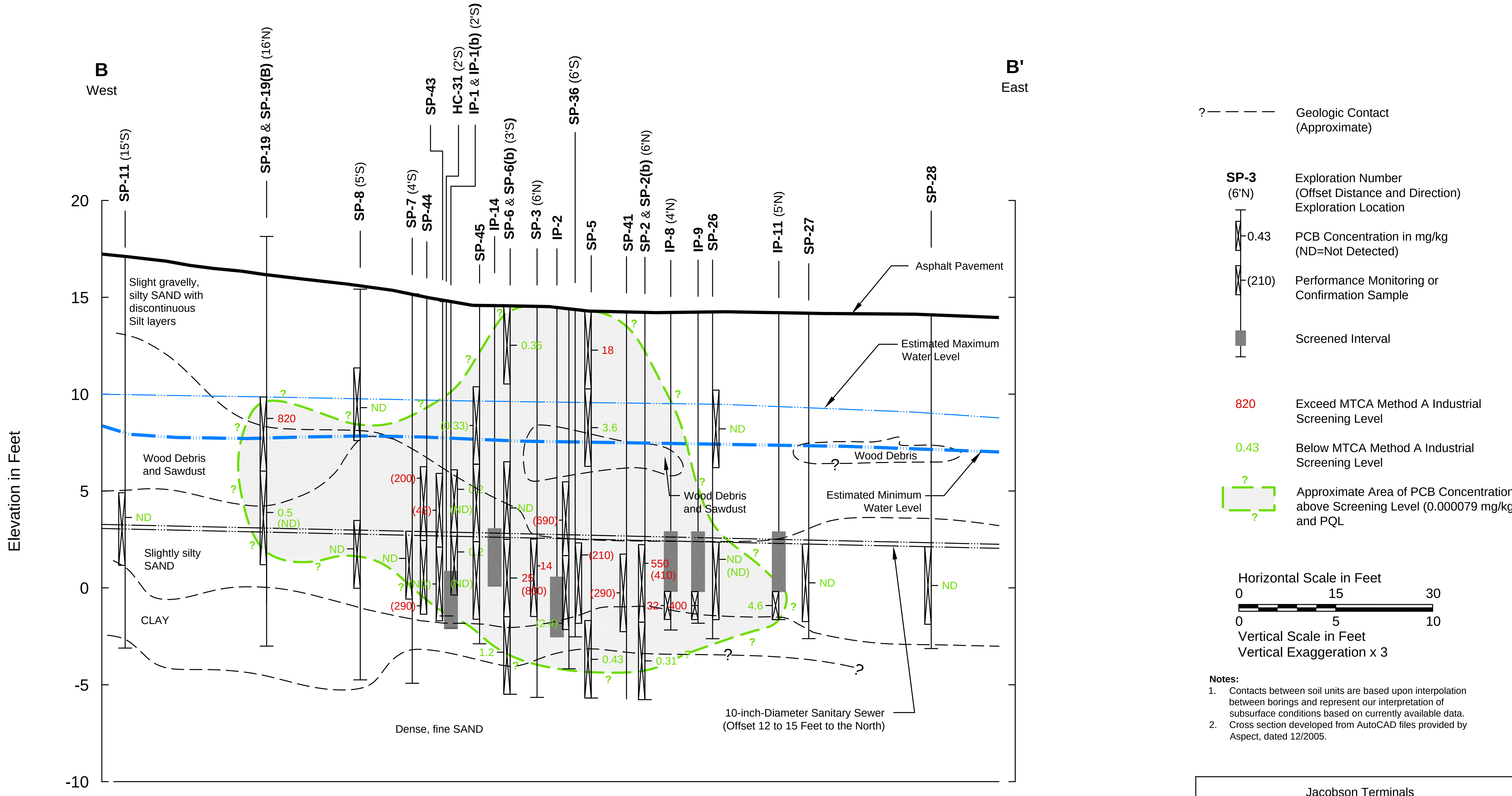
Generalized Geologic Cross Section A-A'

17800-43 11/13

HARTCROWSER

Figure **4**

EAL 11/8/13 1780043-002.dwg



Notes:

1. Contacts between soil units are based upon interpolation between borings and represent our interpretation of subsurface conditions based on currently available data.
2. Cross section developed from AutoCAD files provided by Aspect, dated 12/2005.

Jacobson Terminals
Seattle, Washington

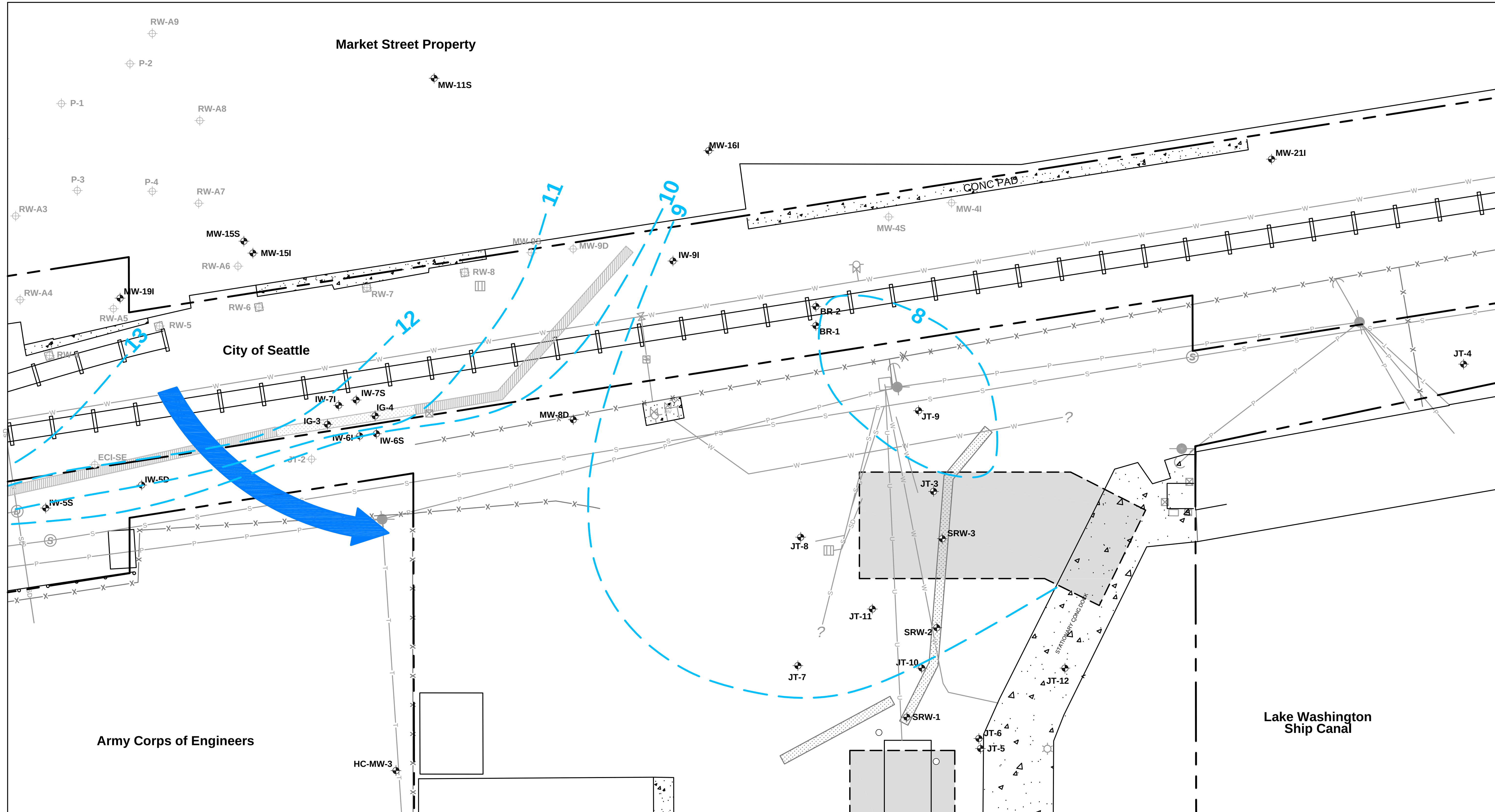
Generalized Geologic Cross Section B-B'

17800-43 11/13

HARTCROWSER

Figure
5

EAL 11/9/13 1780043-003.dwg



MW-18S Existing Monitoring Well

RW-2 Former Monitoring Well, Recovery Well, or Piezometer (Abandoned)

Property Boundary

Concrete Surface

Cement-Bentonite Groundwater Treatment Wall

Permeable Iron/Sand Gate

Overhead Power

Sanitary Sewer Line

Water Line

Utility Line

Iron/GAC Groundwater Treatment Wall

Boat Storage Rack

11 Groundwater Elevation Contour

Inferred Groundwater Gradient

Notes:

1. Base map prepared from AutoCAD file "020030-02.dwg," provided by Aspect Consulting, 10/08/13.
2. Utility locations are approximate.
3. Groundwater data from VCP Cleanup Status Report Memorandum prepared by Aspect Consulting, 12/12/05.

0 30 60

Scale in Feet

N

Jacobson Terminals
Seattle, Washington

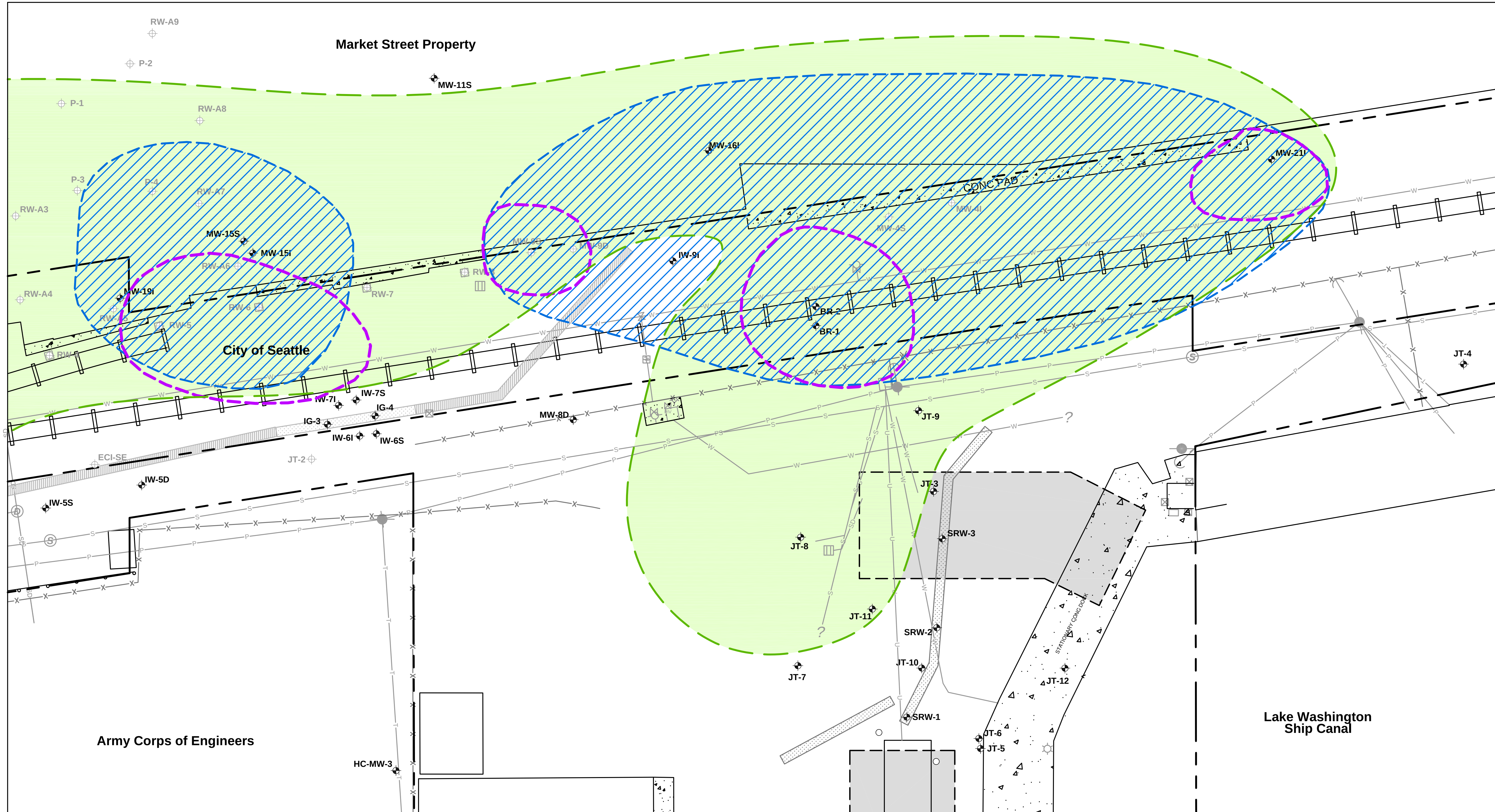
Groundwater Elevation Contours
April 2005

17800-43 10/13

HARTCROWSER

Figure
6

EAL 10/18/13 1780043-012.dwg



MW-18S Existing Monitoring Well

RW-2 Former Monitoring Well, Recovery Well, or Piezometer (Abandoned)

Property Boundary

Concrete Surface

Cement-Bentonite Groundwater Treatment Wall

Permeable Iron/Sand Gate

P Overhead Power

S Sanitary Sewer Line

W Water Line

U Utility Line

Iron/GAC Groundwater Treatment Wall

Boat Storage Rack

Notes:

1. Base map prepared from AutoCAD file "020030-02.dwg," provided by Aspect Consulting, 10/08/13.
2. Utility locations are approximate.

Estimated Extent of TCE

Estimated Extent of PCE

Estimated Extent of Vinyl Chloride

Based on 2005 estimates and 2013 groundwater sampling data

N

0 30 60

Scale in Feet

Jacobson Terminals
Seattle, Washington

Estimated Extent of Chlorinated Ethenes in Groundwater

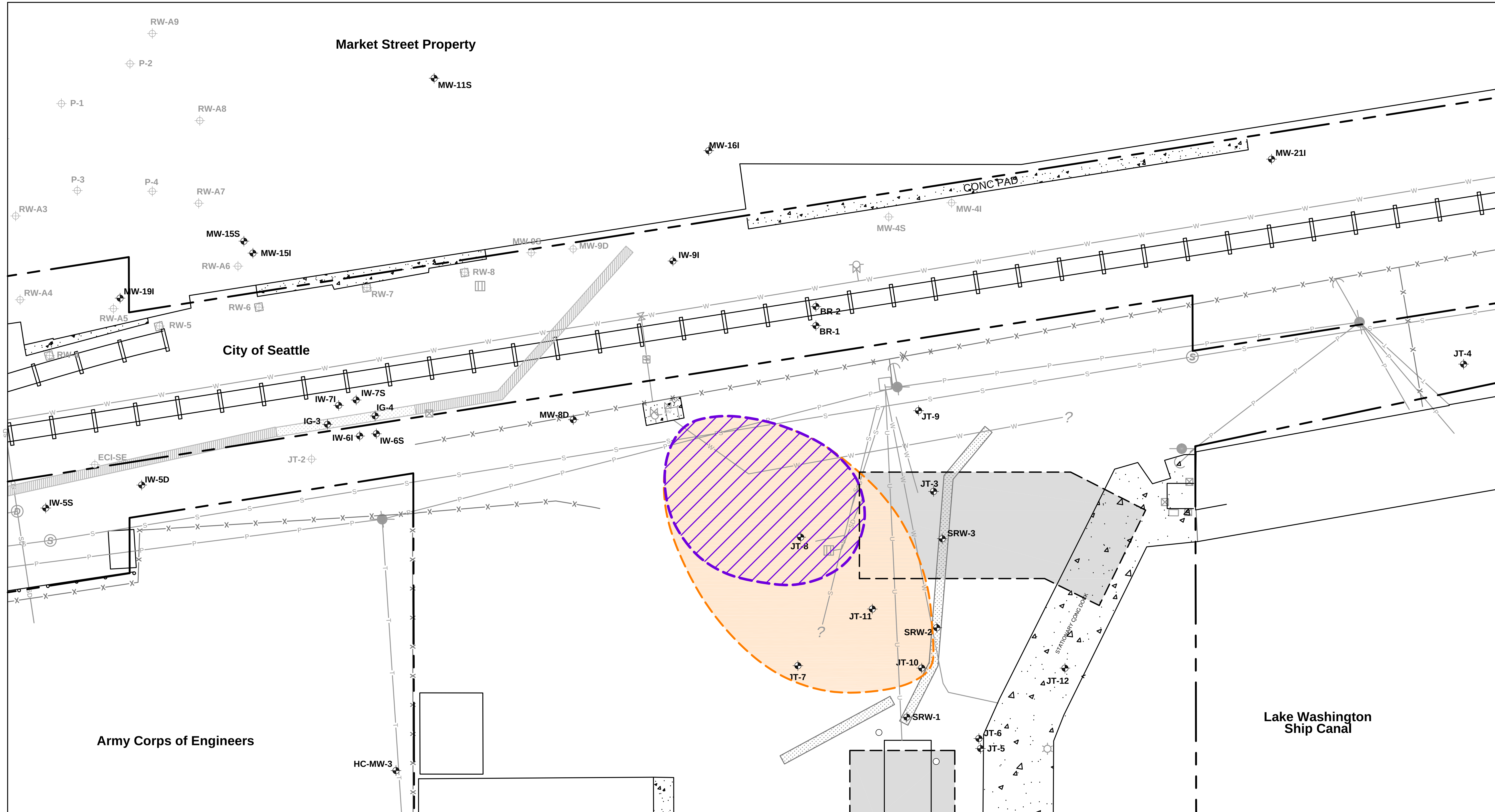
17800-43 10/13

HARTCROWSER

Figure

7

EAL 10/18/13 1780043-009.dwg



MW-18S Existing Monitoring Well

RW-2 Former Monitoring Well, Recovery Well, or Piezometer (Abandoned)

Property Boundary

Concrete Surface

Cement-Bentonite Groundwater Treatment Wall

Permeable Iron/Sand Gate

Overhead Power

Sanitary Sewer Line

Water Line

Utility Line

Iron/GAC Groundwater Treatment Wall

Boat Storage Rack

Notes:

1. Base map prepared from AutoCAD file "020030-02.dwg," provided by Aspect Consulting, 10/08/13.
2. Utility locations are approximate.

Estimated Extent of 1,2,4-Trichlorobenzene

Estimated Extent of 1,2,4-Dichlorobenzene

Based on 2005 estimates and 2013 groundwater sampling data

N

0 30 60

Scale in Feet

Jacobson Terminals
Seattle, Washington

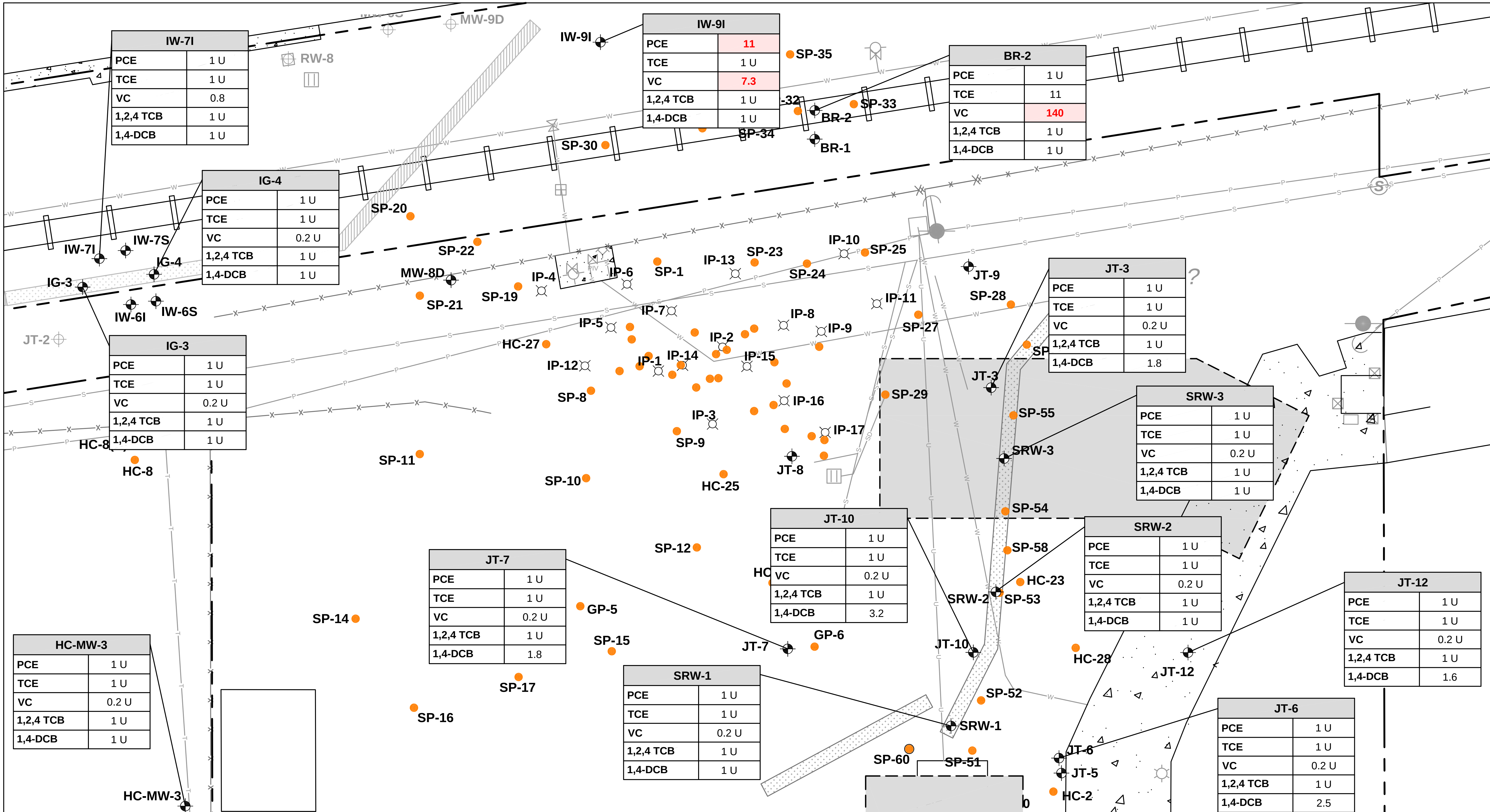
Estimated Extent of Chlorinated Benzenes in Groundwater

17800-43 11/13

HARTCROWSER

Figure 8

EAL 11/12/13 1780043-010.dwg



IW-7I	
PCE	1 U
TCE	1 U
VC	0.8
1,2,4 TCB	1 U
1,4-DCB	1 U

IW-9I	
PCE	**11**
TCE	1 U
VC	**7.3**
1,2,4 TCB	1 U
1,4-DCB	1 U

BR-2	
PCE	1 U
TCE	11
VC	**140**
1,2,4 TCB	1 U
1,4-DCB	1 U

IG-4	
PCE	1 U
TCE	1 U
VC	0.2 U
1,2,4 TCB	1 U
1,4-DCB	1 U

IG-3	
PCE	1 U
TCE	1 U
VC	0.2 U
1,2,4 TCB	1 U
1,4-DCB	1 U

JT-3	
PCE	1 U
TCE	1 U
VC	0.2 U
1,2,4 TCB	1 U
1,4-DCB	1.8

SRW-3	
PCE	1 U
TCE	1 U
VC	0.2 U
1,2,4 TCB	1 U
1,4-DCB	1 U

JT-10	
PCE	1 U
TCE	1 U
VC	0.2 U
1,2,4 TCB	1 U
1,4-DCB	3.2

SRW-2	
PCE	1 U
TCE	1 U
VC	0.2 U
1,2,4 TCB	1 U
1,4-DCB	1 U

JT-7	
PCE	1 U
TCE	1 U
VC	0.2 U
1,2,4 TCB	1 U
1,4-DCB	1.8

HC-MW-3	
PCE	1 U
TCE	1 U
VC	0.2 U
1,2,4 TCB	1 U
1,4-DCB	1 U

SRW-1	
PCE	1 U
TCE	1 U
VC	0.2 U
1,2,4 TCB	1 U
1,4-DCB	1 U

JT-12	
PCE	1 U
TCE	1 U
VC	0.2 U
1,2,4 TCB	1 U
1,4-DCB	1.6

JT-6	
PCE	1 U
TCE	1 U
VC	0.2 U
1,2,4 TCB	1 U
1,4-DCB	2.5

MW-18S Existing Monitoring Well

RW-2 Former Monitoring Well, Recovery Well, or Piezometer (Abandoned)

IP-5 Injection Well

SP-41 Soil Boring

Note: Labels removed from several borings in "IP" area for clarity. Refer to "Interim Cleanup Action Summary", Hart Crowser, July 18, 2002.

Property Boundary

Concrete Surface

Cement-Bentonite Groundwater Treatment Wall

Permeable Iron/Sand Gate

Overhead Power

Sanitary Sewer Line

Water Line

Utility Line

City of Seattle Property

Iron/GAC Groundwater Treatment Wall

Boat Storage Rack

	Well Name		
Tetrachloroethylene	PCE	1 U	Concentrations in µg/kg
Trichloroethylene	TCE	1 U	
Vinyl Chloride	VC	0.2 U	
1,2,4-Trichlorobenzene	1,2,4 TCB	1 U	
1,4-dichlorobenzene	1,4-DCB	**3.0**	

Bold, Shaded Value Exceeds Applicable MTCA Level

Notes:

1. Base map prepared from AutoCAD file "020030-02.dwg," provided by Aspect Consulting, 10/08/13.
2. Utility locations are approximate.

0 20 40

Scale in Feet

Jacobson Terminals
Seattle, Washington

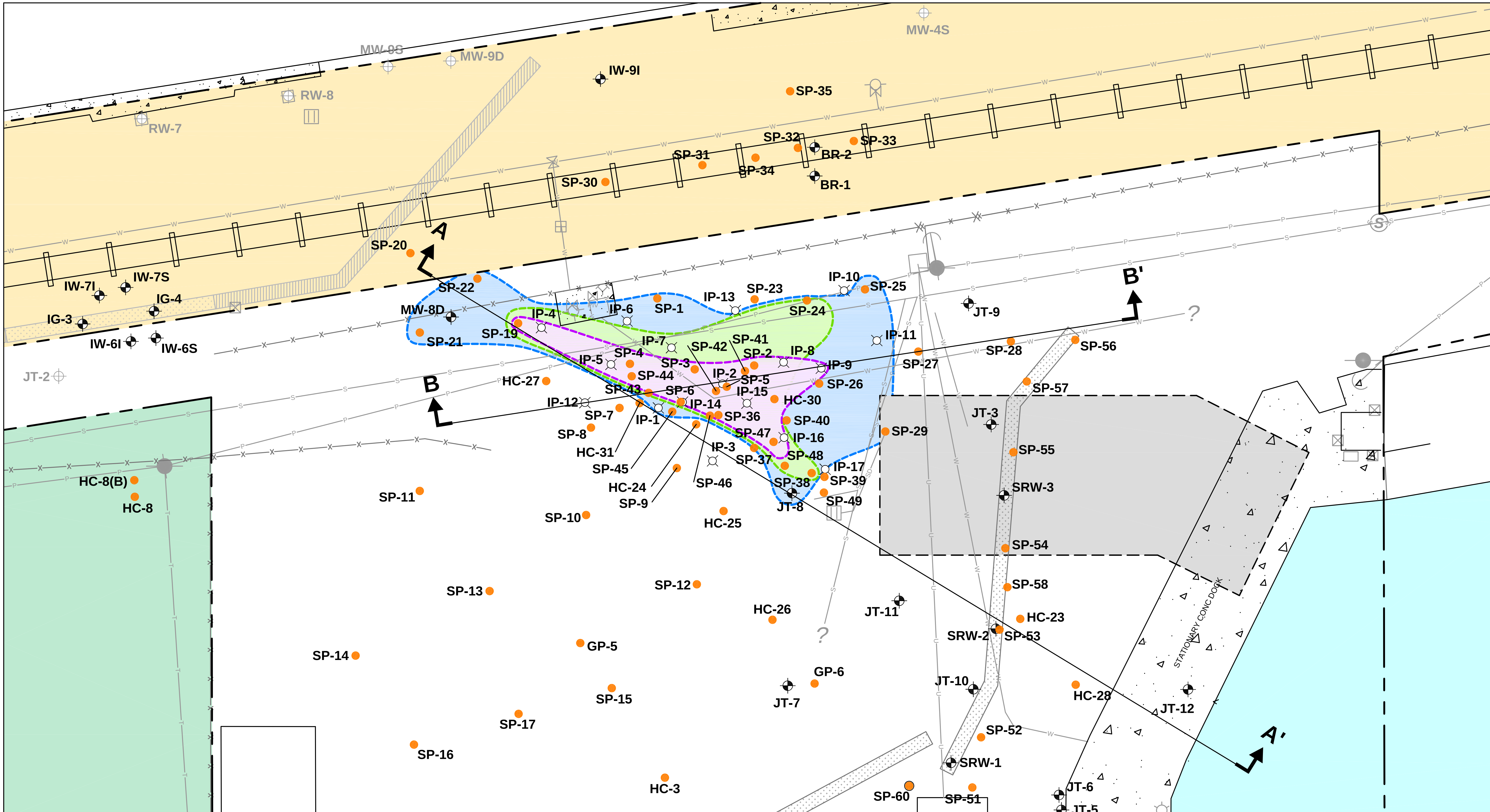
2013 Groundwater COC Concentrations

17800-43 11/13

HARTCROWSER

Figure 9

EAL 11/12/13 1780043-011.dwg



MW-18S Existing Monitoring Well

RW-2 Former Monitoring Well, Recovery Well, or Piezometer (Abandoned)

IP-5 Injection Well

SP-41 Soil Boring

Note: Labels removed from several borings in "IP" area for clarity. Refer to "Interim Cleanup Action Summary", Hart Crowser, July 18, 2002.

Property Boundary

Concrete Surface

Cement-Bentonite Ground-water Treatment Wall

Permeable Iron/Sand Gate

Overhead Power

Sanitary Sewer Line

Water Line

Utility Line

City of Seattle Property

Iron/GAC Groundwater Treatment Wall

Boat Storage Rack

A A' Cross Section Location and Designation

Estimated Extent of PCB Occurrences

PCB Concentration and/or 1,2,4-TCB Concentration > 100 mg/kg

PCB Concentration > 10 mg/kg

PCB Concentration > Screening Level (0.000076 mg/kg)

Notes:

1. Base map prepared from AutoCAD file "020030-02.dwg," provided by Aspect Consulting, 10/08/13.
2. Utility locations are approximate.
3. PCB occurrences include pre- and post-interim action detections.

N

0 20 40

Scale in Feet

Jacobson Terminals
Seattle, Washington

PCB Occurrences in Soil

17800-43

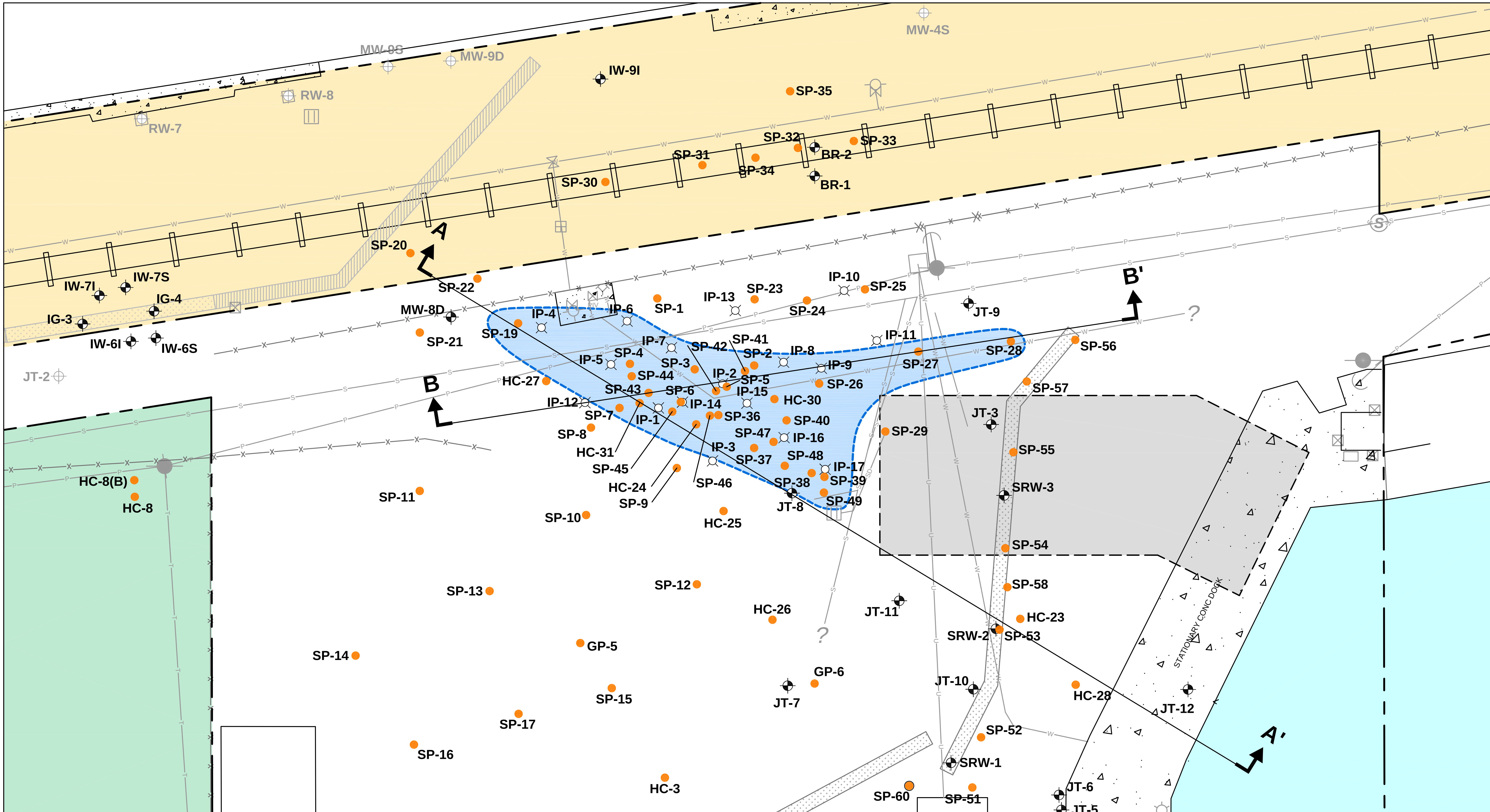
11/13

HARTCROWSER

Figure

10

EAL 11/12/13 1780043-008.dwg



MW-18S Existing Monitoring Well

RW-2 Former Monitoring Well, Recovery Well, or Piezometer (Abandoned)

IP-5 Injection Well

SP-41 Soil Boring
Note: Labels removed from several borings in "IP" area for clarity. Refer to "Interim Cleanup Action Summary", Hart Crowser, July 18, 2002.

Property Boundary

Concrete Surface

Cement-Bentonite Groundwater Treatment Wall

Permeable Iron/Sand Gate

Overhead Power

Sanitary Sewer Line

Water Line

Utility Line

City of Seattle Property

Iron/GAC Groundwater Treatment Wall

Boat Storage Rack

A A' Cross Section Location and Designation

Estimated extent of 1,2,4-TCB concentration above screening level (5.4 mg/kg) and PQL

Notes:
1. Base map prepared from AutoCAD file "020030-02.dwg," provided by Aspect Consulting, 10/08/13.
2. Utility locations are approximate.
3. 1,2,4-TCB occurrences include pre- and post-interim action detections.

N

0 20 40
Scale in Feet

Jacobson Terminals
Seattle, Washington

1,2,4-Trichlorobenzene Occurrences in Soil

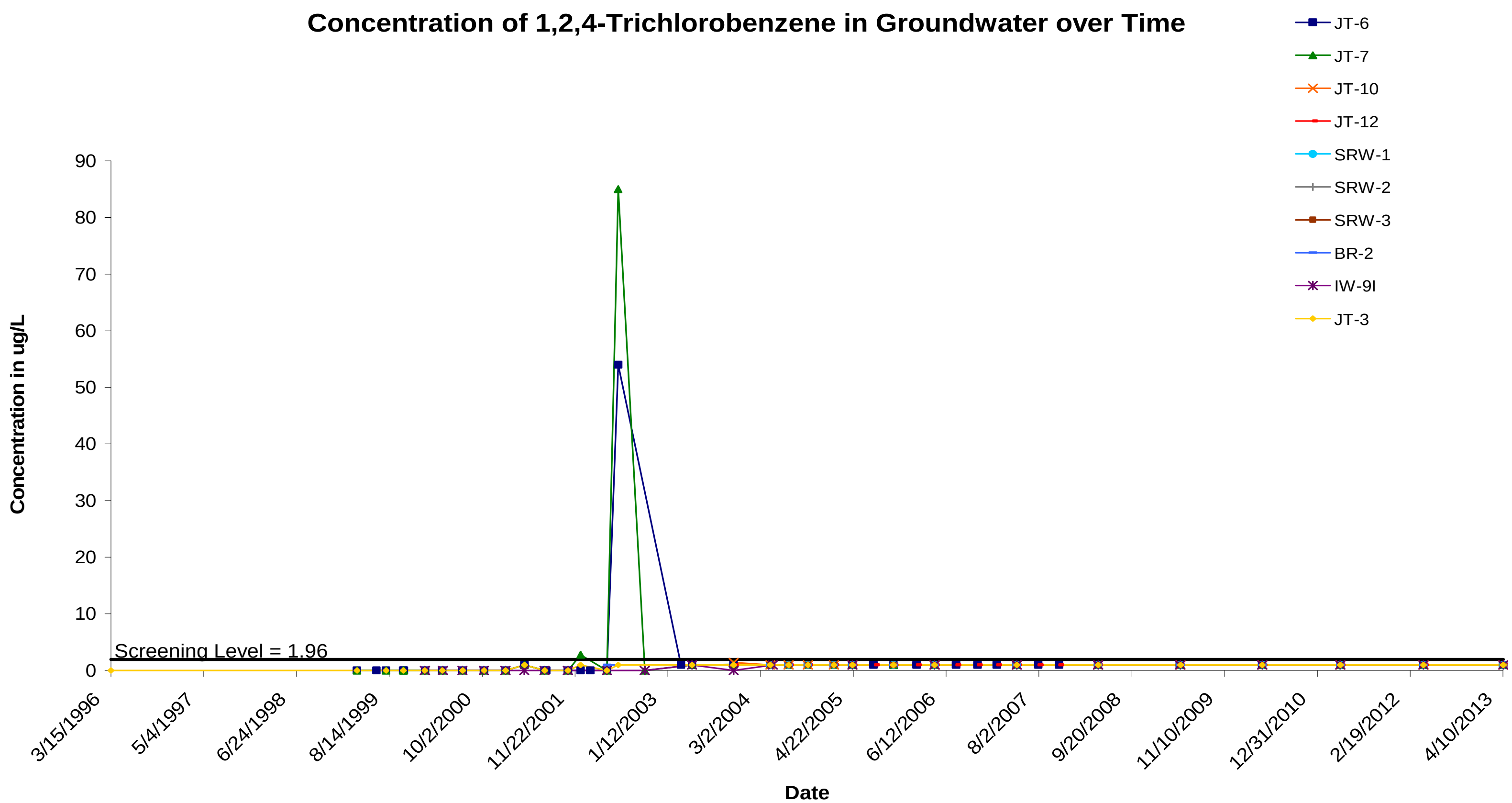
17800-43 11/13

HARTCROWSER

Figure
11

EAL 11/12/13 1780043-014.dwg

initials MM/DD/YY   location\filename.xls



Jacobson Terminals
Seattle, Washington

Concentration of 1,2,4-Trichlorobenzene in Groundwater over Time

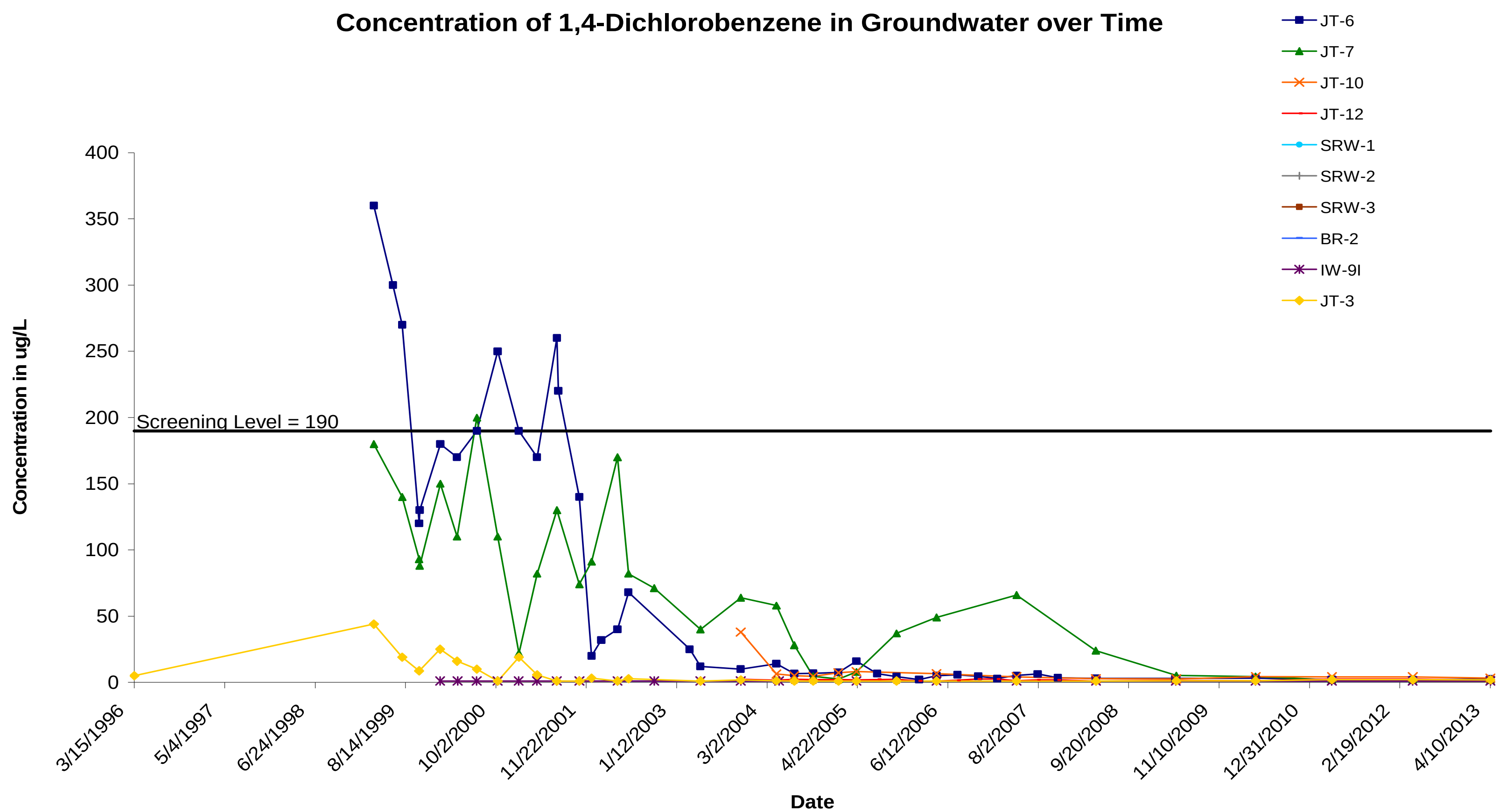
17800-43

13-Nov

Figure

12

initials MM/DD/YY location\filename.xls



Jacobson Terminals
Seattle, Washington

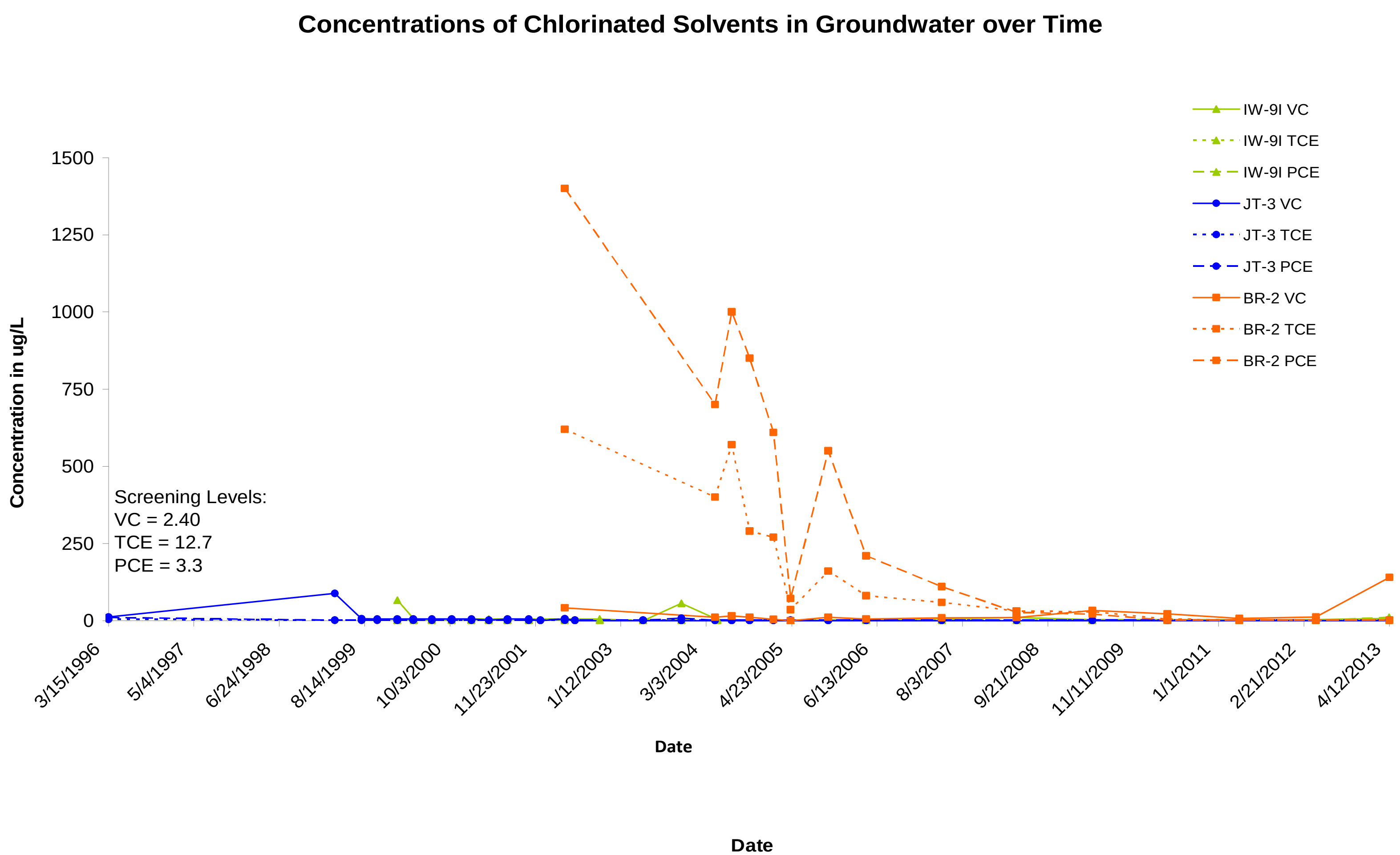
Concentration of 1,4-Dichlorobenzene in Groundwater over Time

17800-43 13-Nov

HARTCROWSER

Figure **13**

initials MM/DD/YY location\filename.xls



Jacobson Terminals
Seattle, Washington

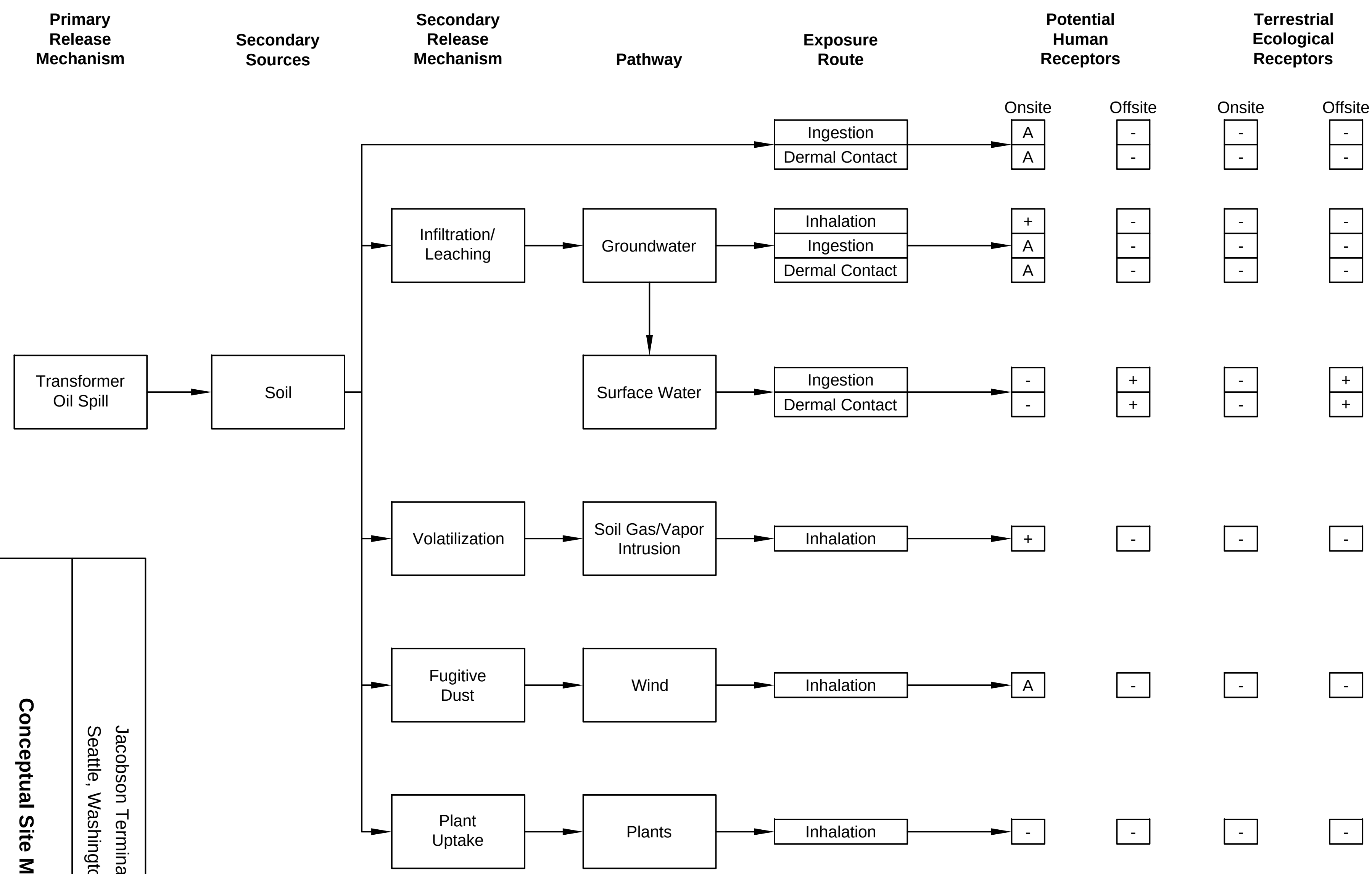
Concentrations of Chlorinated Solvents in Groundwater over Time

17800-43

13-Nov

Figure

14



\+ Potentially Complete Pathway

\- Incomplete Pathway

A Pathway Potentially Complete when digging in soil or groundwater

HARTCROWSER

17800-43

11/13

Conceptual Site Model

Jacobson Terminals
Seattle, Washington

Figure
15

A04
Groundwater Monitoring Well and Injection Point Installation Logs

IFB XXXX TCP
JACOBSON TERMINALS PROPERTY
INTERIM REMEDIAL ACTION
[MONTH] 20XX

Boring Log IW-8D

Soil Descriptions
Approx. Ground Surface Elevation in Feet:

Asphalt.

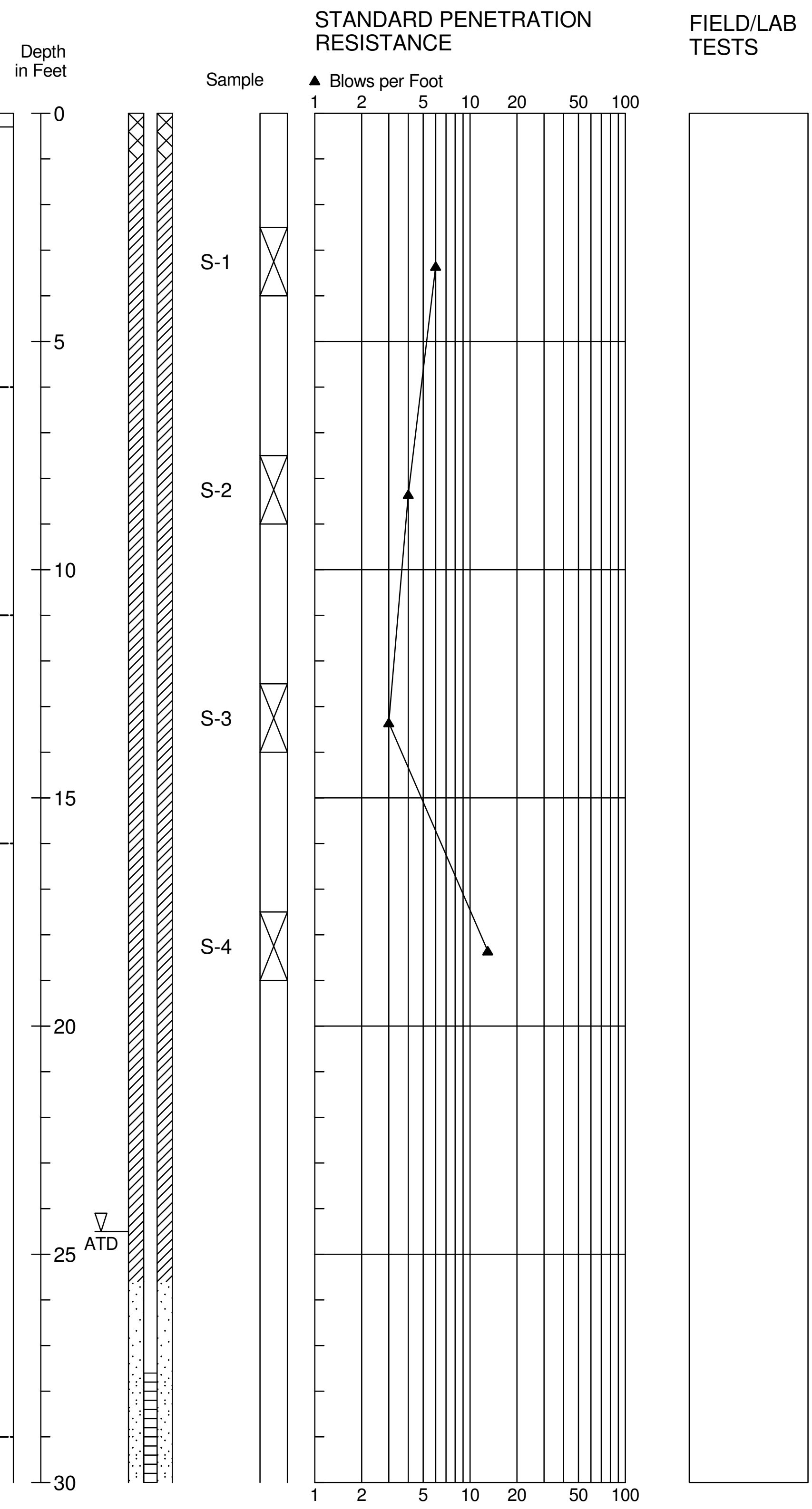
Loose, moist, brown to gray, silty, fine SAND with scattered organic material.

Soft, moist, brown to dark brown, organic SILT.

Loose, wet, gray, silty, fine SAND.

Stiff, very moist, gray, fine, sandy SILT.

Grades to hard SILT and fine, sandy SILT.



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

HARTCROWSER

J-4063-10 **12/99**

Figure A-15 **1/2**

Boring Log IW-8D

Soil Descriptions Approx. Ground Surface Elevation in Feet:	Depth in Feet	Sample	STANDARD PENETRATION RESISTANCE ▲ Blows per Foot	FIELD/LAB TESTS
Very dense, moist to wet, very silty, gravelly, fine SAND with wet, interbedded GRAVEL layers.	30			
Bottom of Boring at 34.0 Feet. Completed 12/30/99.	35			
	40			
	45			
	50			
	55			
	60			

Blows per Foot scale: 1 2 5 10 20 50 100

BORING LOG 406310.GPJ HC_CORP.GDT 6/22/15

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

HARTCROWSER

J-4063-10 ***12/99***

Figure A-15 ***2/2***

Injection Point Log IP-10

Soil Descriptions

Depth in Feet

Sample

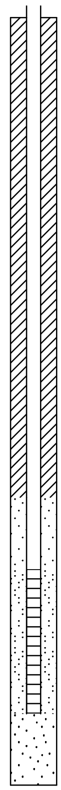
STANDARD PENETRATION RESISTANCE

▲ Blows per Foot

1 2 5 10 20 50 100

FIELD/LAB TESTS

Soil Descriptions	Depth in Feet	Sample
Dark gray, silty, gravelly SAND with scattered wood fragments. Sampled from cuttings.	0	
Dense, wet, gray, silty, fine SAND to stiff, fine sandy SILT.	15	S-1
Bottom of Boring at 16.0 Feet. Completed 08/24/01.		



Depth scale: 0, 5, 10, 15, 20, 25, 30

1 2 5 10 20 50 100

BORING LOG 406312W.GPJ HC_CORP.GDT 6/22/15

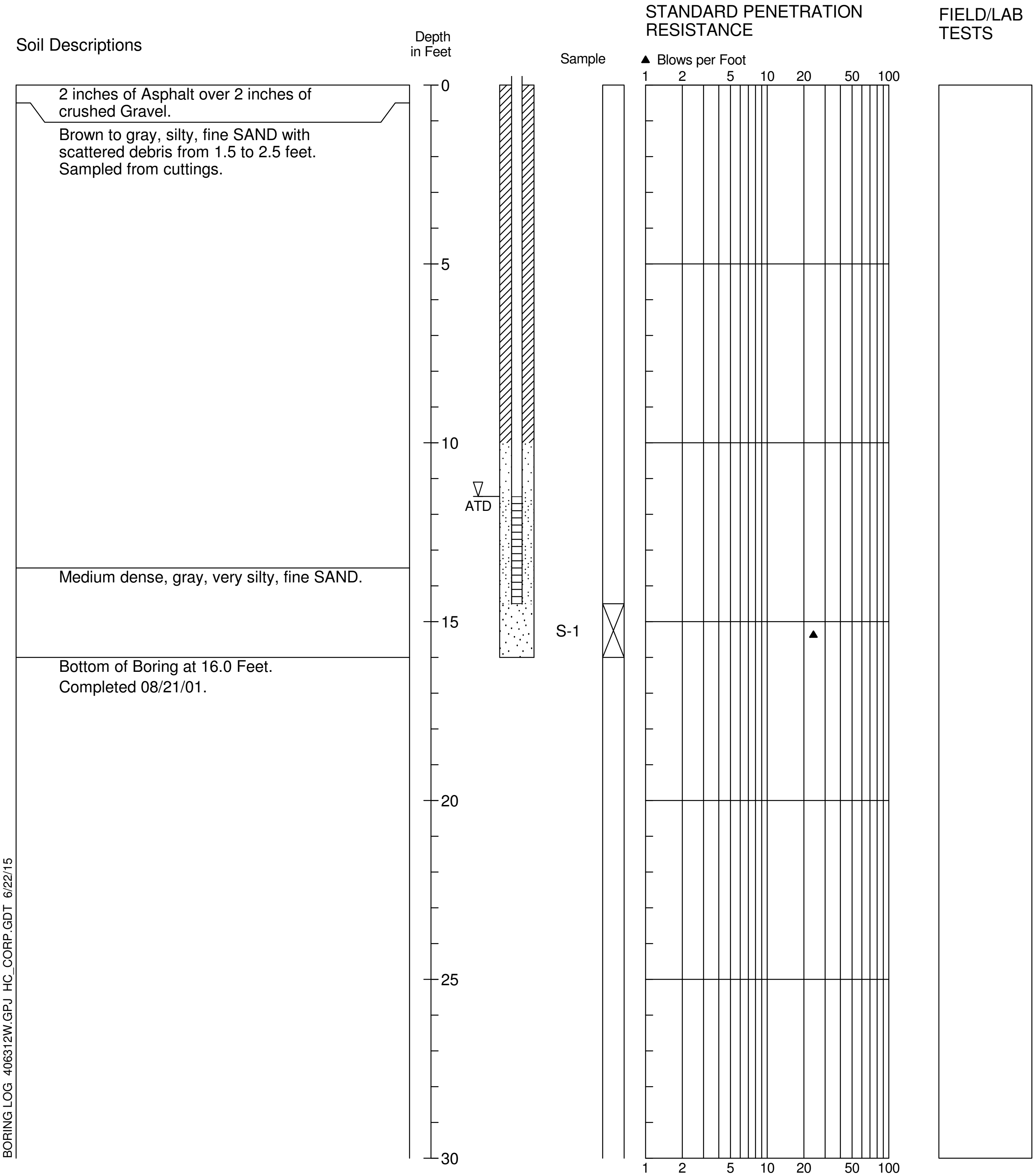
HARTCROWSER

4063-12 08/01

Figure A-23

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

Injection Point Log IP-11



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

HARTCROWSER

4063-12 **08/01**

Figure A-24

Please print, sign and return by mail to Department of Ecology

RESOURCE PROTECTION WELL REPORT

CURRENT Notice of Intent No. RE09661

(SUBMIT ONE WELL REPORT PER WELL INSTALLED)

Construction/Decommission (*select one*)
☒ Construction
☐ Decommission *ORIGINAL INSTALLATION Notice of Intent Number* ______

Type of Well (*select one*)
☒ Resource Protection
☐ Geotech Soil Boring

Consulting Firm: Hart Crowser
Unique Ecology Well ID Tag No.: BIH-194

Property Owner: Al Jacobson
Site Address: Jacobson Terminals
City: Seattle County: King
Location: NW 1/4-1/4 SW 1/4 Sec 11 Twn 25 R 3 Select One ☒ EWM ☐ WWM

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☒ Driller ☐ Engineer ☐ Trainee Name (Print): Larry Inselman
Driller/Engineer /Trainee Signature: Larry Inselman
Driller or Trainee License No. 2463

If trainee, licensed driller's Signature and License No. ______

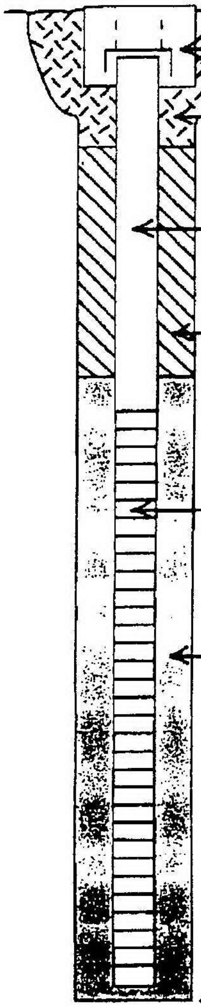
Lat/Long (s, t, r still REQUIRED) Lat Deg ______ Lat Min/Sec ______
Long Deg ______ Long Min/Sec ______

Tax Parcel No. ______

Cased or Uncased Diameter: 8" Static Level: NA

Work/Decommission Start Date: 3-11-14
Work/Decommission Completed Date: 3-14-14

Construction/Design	Well Data	Formation Description



MONUMENT TYPE: FLUSH

CONCRETE SURFACE SEAL: 1 ft.

PVC BLANK: 2 "x 25'

BACKFILL: 23 ft.
TYPE: Bentonite chips

PVC SCREEN: 2 "x 5'
SLOT SIZE: 020
TYPE: machined

GRAVEL PACK: 6 ft.
MATERIAL: 10-20 Silica Sand

WELL DEPTH: 30'

0 - 20 ft. Sandy some gravel

- ft.

20-30 Clean sand fine to medium ft.

- ft.

- ft.

REMARKS

RECEIVED

JUL 31 2014

DEPT OF ECOLOGY
NWRO - WR

APPENDIX B
Permits and Exemptions
(Pending)

IFB XXXX TCP
JACOBSON TERMINALS PROPERTY
INTERIM REMEDIAL ACTION
[MONTH] 20XX

B01

Hydraulic Project Approval

IFB XXXX TCP
JACOBSON TERMINALS PROPERTY
INTERIM REMEDIAL ACTION
[MONTH] 20XX

APPENDIX C
Cultural Resources
(Pending)

IFB XXXX TCP
JACOBSON TERMINALS PROPERTY
INTERIM REMEDIAL ACTION
[MONTH] 20XX

C01
Archaeological Monitoring and Inadvertent Discovery Plan

IFB XXXX TCP
JACOBSON TERMINALS PROPERTY
INTERIM REMEDIAL ACTION
[MONTH] 20XX

APPENDIX D
Construction Drawings

IFB XXXX TCP
JACOBSON TERMINALS PROPERTY
INTERIM REMEDIAL ACTION
[MONTH] 20XX

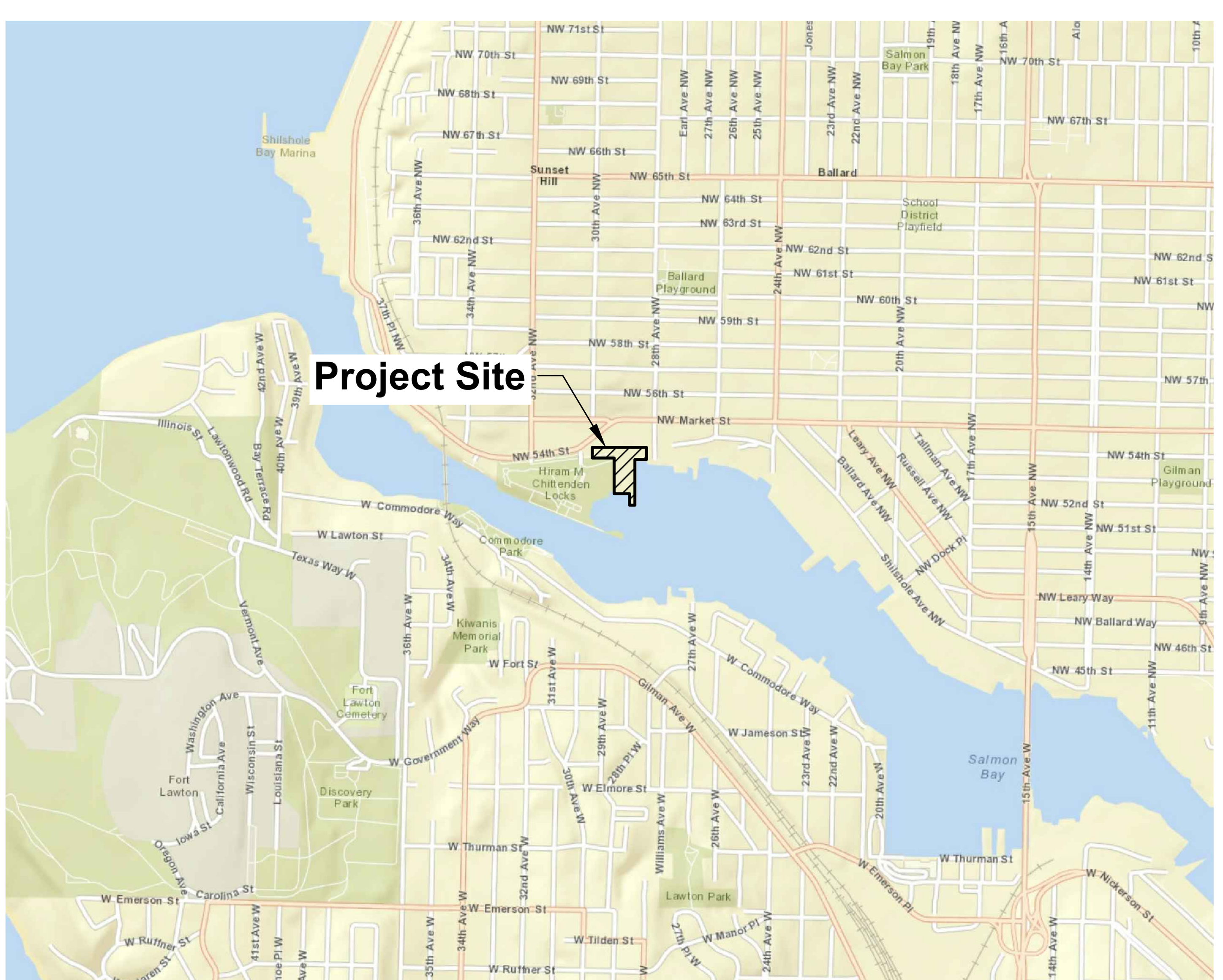
D01
Construction Drawings

IFB XXXX TCP
JACOBSON TERMINALS PROPERTY
INTERIM REMEDIAL ACTION
[MONTH] 20XX

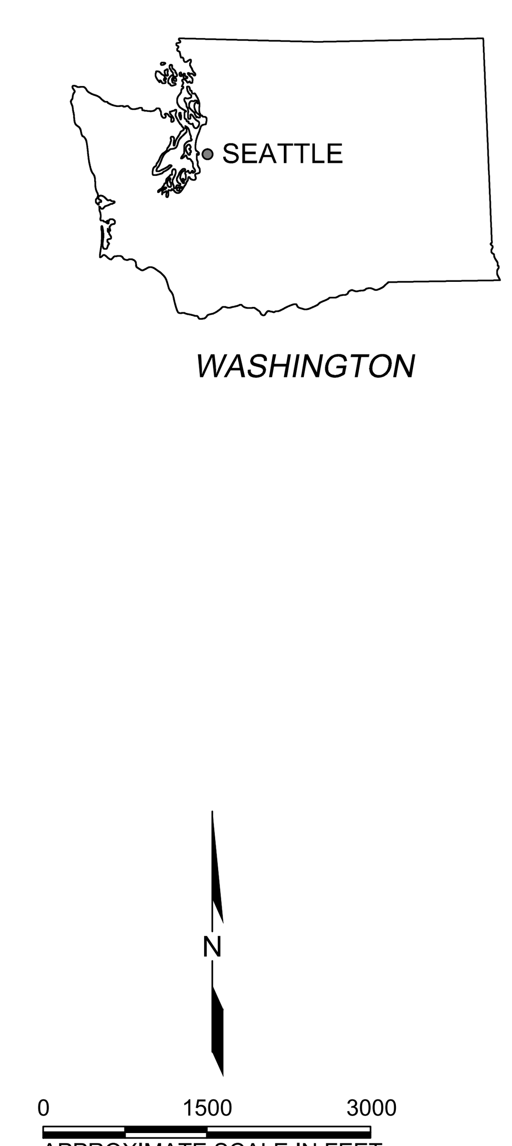
JACOBSON TERMINALS
SEATTLE, WASHINGTON
INTERIM REMEDIAL ACTION

JUNE 2016

VICINITY MAP



REGIONAL MAP



SHEET INDEX

G1.0 COVER SHEET AND INDEX

G1.1 SITE PLAN

G1.2 SITE SURVEY

G1.3 SITE ACCESS PLAN

G1.4 TEMPORARY EROSION AND SEDIMENTATION CONTROL DETAILS

G1.5 DEMOLITION PLAN

C1.0 EXCAVATION PLAN

C1.1 TYPICAL EXCAVATION SECTIONS

C1.2 TYPICAL EXCAVATION BACKFILL SECTION

HARTCROWSER

Mark	Description	Date	Appr.

Mark	Description	Date	Appr.

Designed by: PRS | Date: 04/03/15 | Rev. 0

Dwn by: EAL | Ckd by: XXX | Job Number: 17800-56

Reviewed by: XXX

Submitted by: HART CROWSER, INC.

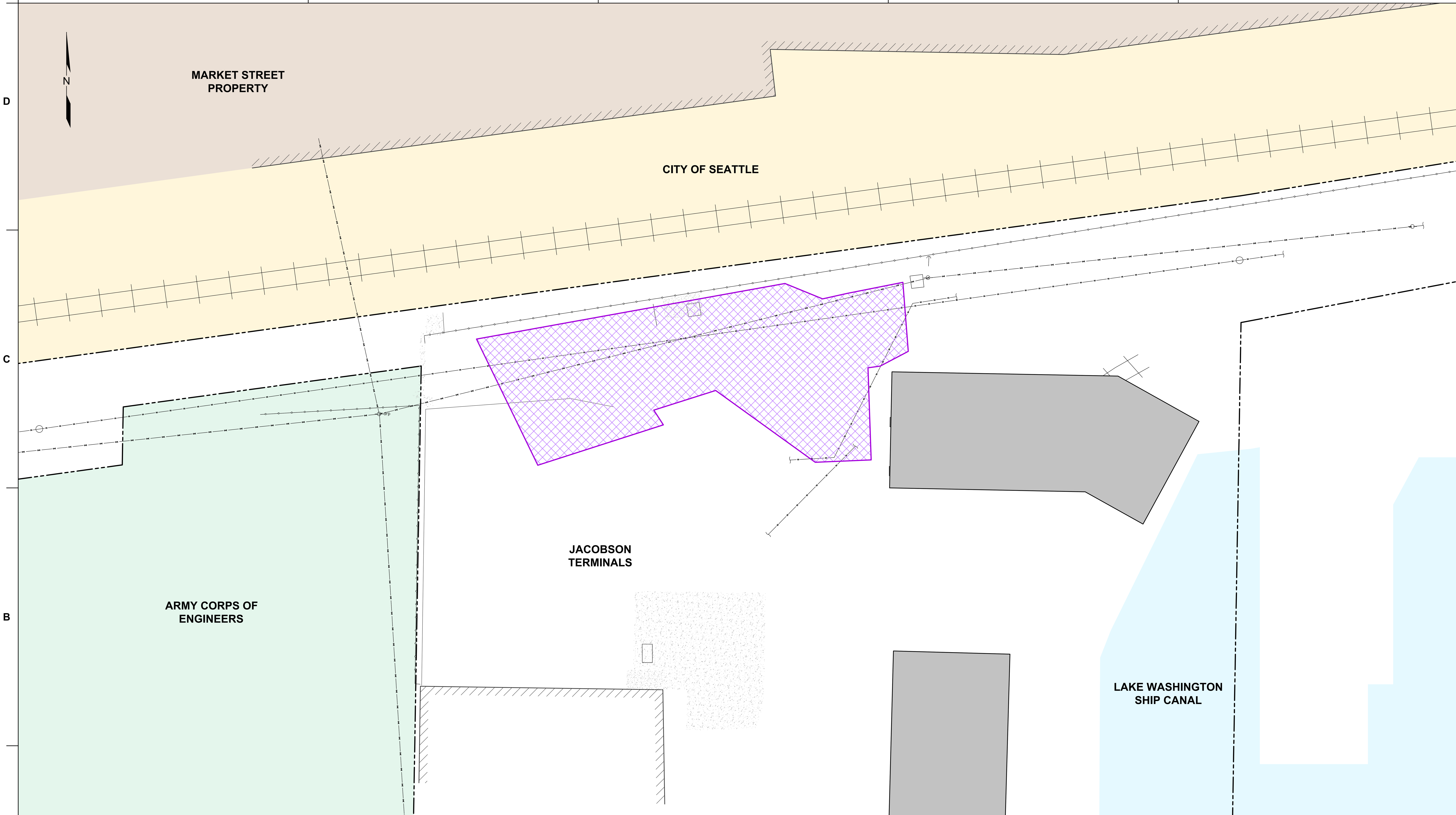
File name: 1780056-G1.0.dwg
Plot date:
Plot scale: SEE DRAWING

JACOBSON TERMINALS

SEATTLE, WASHINGTON

COVER SHEET AND INDEX

Drawing Reference Number:
G1.0
Sheet 1 of 9



LINE LEGEND

- = EXISTING EDGE OF ASPHALT
- = EXISTING EDGE OF CONCRETE
- = EXISTING CURB
- = EXISTING YELLOW STRIPE
- = EXISTING WHITE STRIPE
- = EXISTING STORM DRAIN LINE
- = EXISTING SANITARY SEWER LINE
- = EXISTING OVERHEAD ELECTRIC LINES
- = EXISTING TOP OF SLOPE LINE
- = EXISTING TOE OF SLOPE LINE
- 120 = EXISTING GRADE INDEX CONTOUR
- 118 = EXISTING GRADE INTERVAL CONTOUR
- = EXISTING CHAINLINK FENCE
- = EXISTING CONCRETE PAD

Excavation Area (See Drawing C1.0)

Boat Storage Rack

Property Boundary

Source: Survey base "2015013_svX_TB.dwg," created by Pacific Survey & Engineering Inc., dated 3/13/15.

NOTE:

1. BUILDINGS, STRUCTURES, UTILITIES, AND UNDERGROUND PIPING SHOWN AS REFERENCE ONLY. NOT ALL SITE FEATURES ARE SHOWN. CONTRACTOR SHALL VERIFY ACTUAL LOCATIONS BEFORE START OF CONSTRUCTION.

0 15 30
Scale in Feet

HARTCROWSER

Mark	Description	Date	Appr.

Mark	Description	Date	Appr.

Designed by: PRS | Date: 04/03/15 | Rev. 0

Dwn by: EAL | Ckd by: XXX | Job Number: 17800-56

Reviewed by: XXX

Submitted by: HART CROWSER, INC.

File name: 1780056-C1.0.dwg
Plot date:
Plot scale: SEE DRAWING

JACOBSON TERMINALS

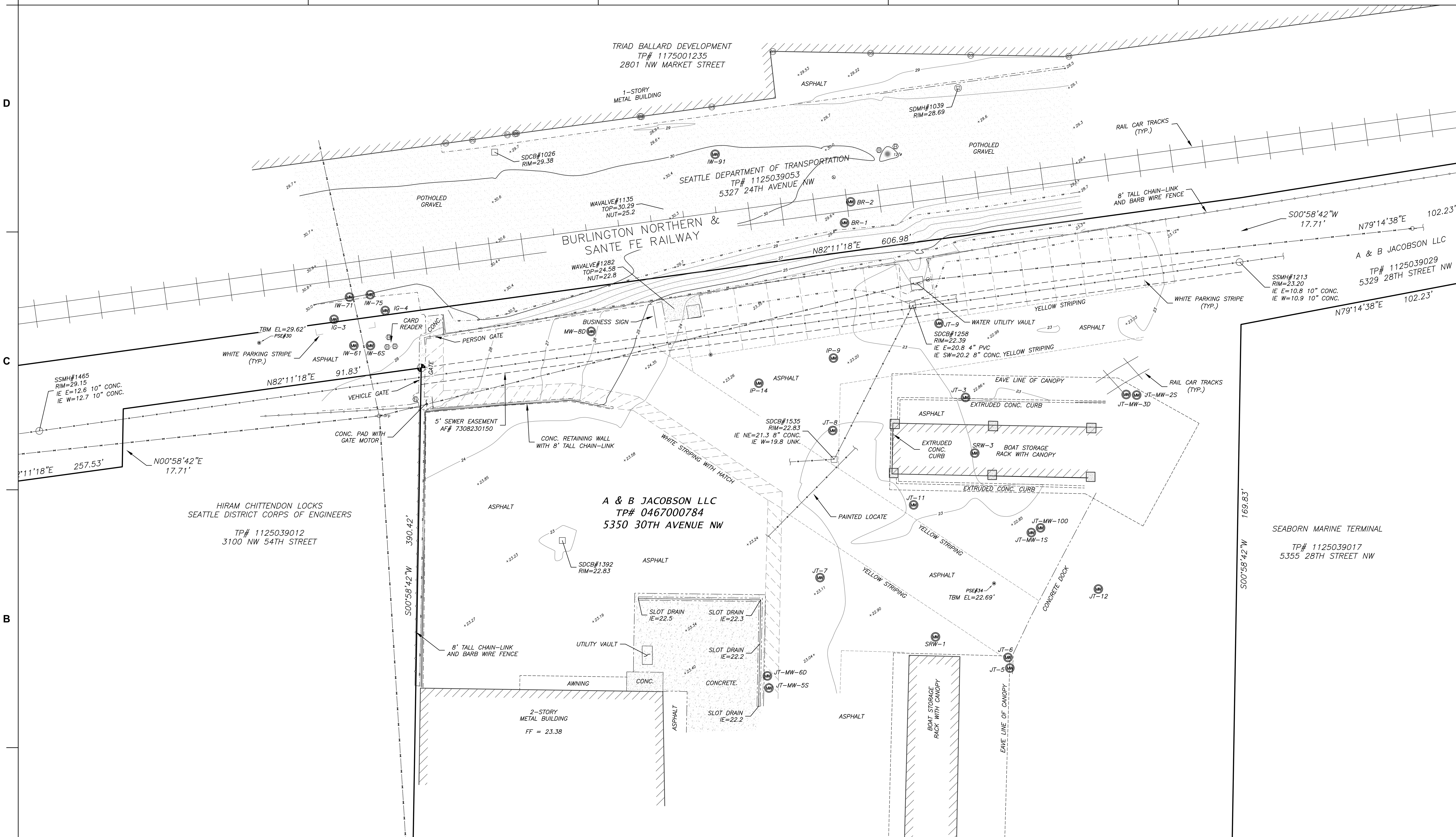
SEATTLE, WASHINGTON

SITE PLAN

Drawing Reference Number:

G1.1

Sheet 2 of 9



LINE LEGEND

- = EXISTING EDGE OF ASPHALT
- = EXISTING EDGE OF CONCRETE
- = EXISTING CURB
- = EXISTING YELLOW STRIPE
- = EXISTING WHITE STRIPE
- = EXISTING STORM DRAIN LINE
- = EXISTING SANITARY SEWER LINE
- = EXISTING OVERHEAD ELECTRIC LINES
- = EXISTING TOP OF SLOPE LINE
- = EXISTING TOE OF SLOPE LINE
- 120 = EXISTING GRADE INDEX CONTOUR
- 118 = EXISTING GRADE INTERVAL CONTOUR
- = EXISTING CHAINLINK FENCE
- = EXISTING CONCRETE PAD

SYMBOL LEGEND

- = EXISTING MONUMENT
- = EXISTING NAIL/FLASHER
- = EXISTING STORM DRAIN MANHOLE
- = EXISTING CATCH BASIN
- = EXISTING DOWNSPOUT
- = EXISTING SANITARY SEWER MANHOLE
- = EXISTING GATE VALVE
- = EXISTING WATER METER
- = EXISTING WATER WELL
- = EXISTING FIRE HYDRANT
- = EXISTING MONITORING WELL
- = EXISTING FIRE STANDPIPE
- PIV = EXISTING POST INDICATOR VALVE
- = EXISTING BOLLARD
- = EXISTING POWER POLE
- = EXISTING POWER POLE W/DROP
- = EXISTING GROUND GUY
- 123.45 = SPOT ELEVATION ON EXISTING GROUND

NOTE:

1. BUILDINGS, STRUCTURES, UTILITIES, AND UNDERGROUND PIPING SHOWN AS REFERENCE ONLY. NOT ALL SITE FEATURES ARE SHOWN. CONTRACTOR SHALL VERIFY ACTUAL LOCATIONS BEFORE START OF CONSTRUCTION.

Source: Survey base "2015013_svX_TB.dwg," created by Pacific Survey & Engineering Inc., dated 3/13/15.

0 15 30
Scale in Feet

N

HARTCROWSER

Mark	Description	Date	Appr.

Mark	Description	Date	Appr.

Designed by: PRS | Date: 04/03/15 | Rev. 0
Dwn by: EAL | Ckd by: XXX | Job Number: 17800-56
Reviewed by: XXX
Submitted by: HART CROWSER, INC.
File name: 1780056-G1.2.dwg
Plot date:
Plot scale: SEE DRAWING

JACOBSON TERMINALS

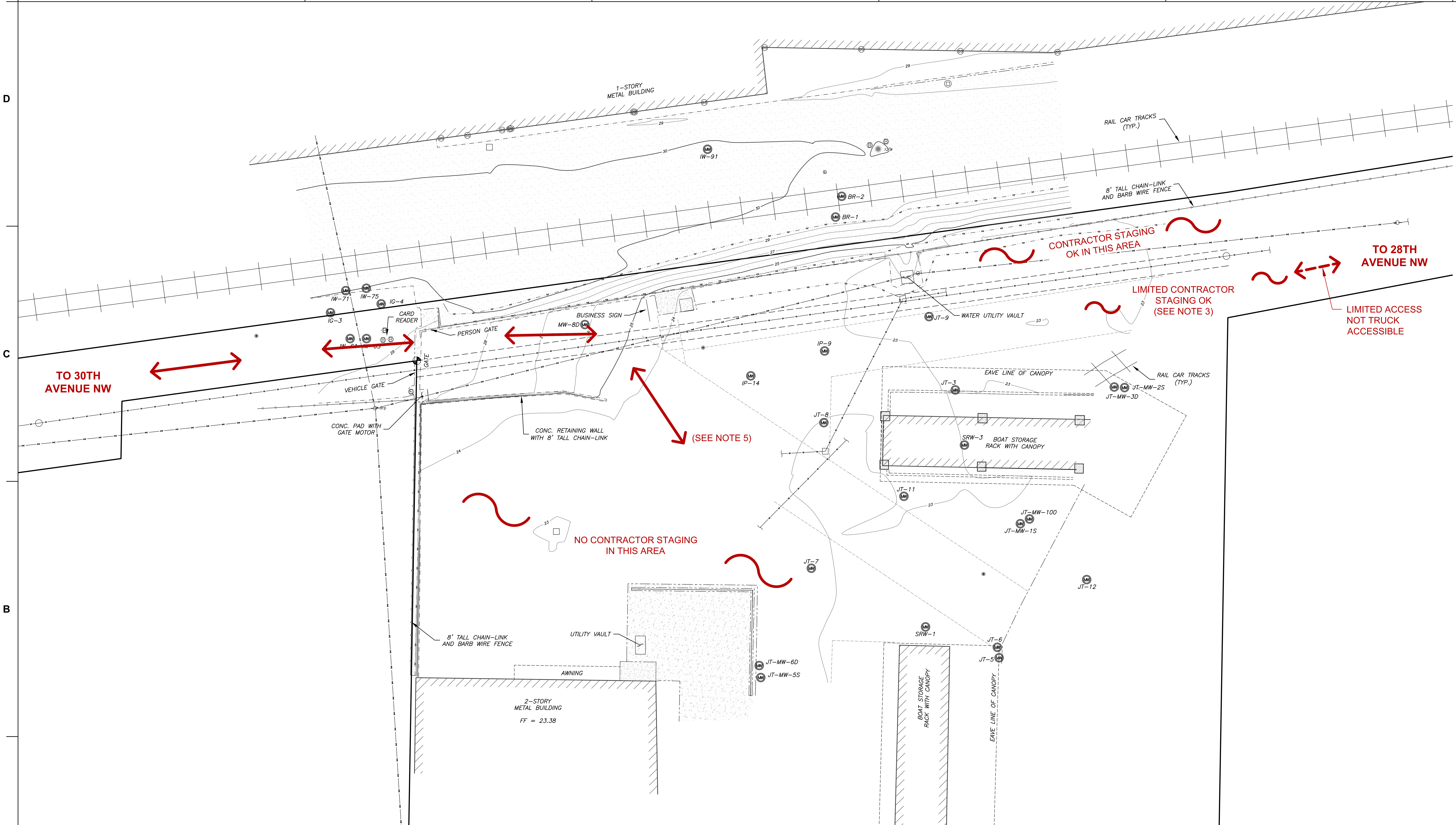
SEATTLE, WASHINGTON

SITE SURVEY

Drawing Reference Number:

G1.2

Sheet 3 of 9



LINE LEGEND

- = EXISTING EDGE OF ASPHALT
- = EXISTING EDGE OF CONCRETE
- = EXISTING CURB
- = EXISTING YELLOW STRIPE
- = EXISTING WHITE STRIPE
- SD = EXISTING STORM DRAIN LINE
- SS = EXISTING SANITARY SEWER LINE
- OHE = EXISTING OVERHEAD ELECTRIC LINES
- TOP = EXISTING TOP OF SLOPE LINE
- TOE = EXISTING TOE OF SLOPE LINE
- 120 = EXISTING GRADE INDEX CONTOUR
- 118 = EXISTING GRADE INTERVAL CONTOUR
- = EXISTING CHAINLINK FENCE
- = EXISTING CONCRETE PAD

SYMBOL LEGEND

- = EXISTING MONUMENT
- = EXISTING NAIL/FLASHER
- = EXISTING STORM DRAIN MANHOLE
- = EXISTING CATCH BASIN
- DS = EXISTING DOWNSPOUT
- = EXISTING SANITARY SEWER MANHOLE
- = EXISTING GATE VALVE
- = EXISTING WATER METER
- W = EXISTING WATER WELL
- = EXISTING FIRE HYDRANT
- WM = EXISTING MONITORING WELL
- fs = EXISTING FIRE STANDPIPE
- PIV = EXISTING POST INDICATOR VALVE
- B = EXISTING BOLLARD
- = EXISTING POWER POLE
- drp = EXISTING POWER POLE W/DROP
- = EXISTING GROUND GUY
- 123.45 = SPOT ELEVATION ON EXISTING GROUND

ACCESS ROUTE

Source: Survey base "2015013_svX_TB.dwg," created by Pacific Survey & Engineering Inc., dated 3/13/15.

NOTES:

1. CONTRACTOR SHALL STOCKPILE AND STAGE ALL EQUIPMENT, SUPPLIES, AND MATERIALS WITHIN THE WORK LIMITS SHOWN. CONTRACTOR SHALL COORDINATE TRUCK TRAFFIC ROUTING WITHIN THE SITE WITH STOCKPILE AND EXCAVATION LOCATIONS DURING ALL STAGES OF CONSTRUCTION.
2. EXCAVATION AREA ACCESS IS LIMITED BY OVERHEAD POWER, THE BOAT STORAGE RACK TO THE EAST, AND THE FENCE AND RAILWAY LINE TO THE NORTH.
3. SEE SPECIFICATIONS FOR TRAFFIC CONTROL REQUIREMENTS. THE CONTRACTOR SHALL MAINTAIN ACCESS AND NOT RESTRICT TRAFFIC/OPERATIONS OF THE TERMINAL OR ADJACENT BUSINESSES. CONTRACTOR SHALL MAINTAIN ACCESS AND NOT RESTRICT FIRE LANE ACCESS. SEE SPECIFICATIONS FOR STREET USE REQUIREMENTS.
4. CONTRACTOR SHALL NOT TRACK SOIL ONTO PUBLIC ROADS. SEE THE SPECIFICATIONS FOR CONSTRUCTION ENTRANCE, DECONTAMINATION FACILITY, AND CONTAMINATION EXCLUSION ZONE REQUIREMENTS.
5. TEMPORARY BY-PASS RAMP MAY BE CONSTRUCTED AT SITE ENTRANCE IF EXISTING RAMP ACCESS BECOMES IMPEDED BY THE EXCAVATION.
6. SEE SECTION 01 05 00 (TEMPORARY FACILITIES AND CONTROLS) AND OTHER SECTIONS OF THE SPECIFICATIONS FOR SPECIFIC APPLICABLE REQUIREMENTS.

N

0 15 30
Scale in Feet

HARTCROWSER

Mark	Description	Date	Appr.

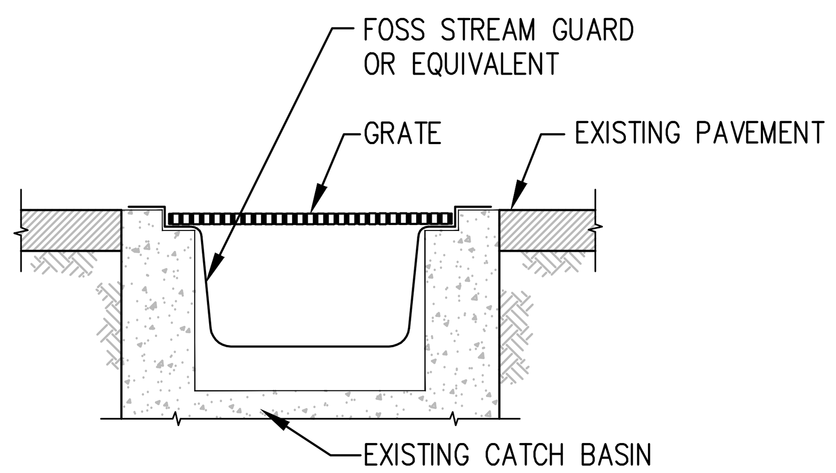
Mark	Description	Date	Appr.

Designed by: PRS
Date: 04/03/15
Rev. 0
Dwn by: EAL
Ckd by: XXX
Job Number: 17800-56
Reviewed by: XXX
Submitted by: HART CROWSER, INC.
File name: 1780056-G1.3.dwg
Plot date:
Plot scale: SEE DRAWING

JACOBSON TERMINALS
SEATTLE, WASHINGTON

SITE ACCESS PLAN

Drawing Reference Number:
G1.3
Sheet 4 of 9

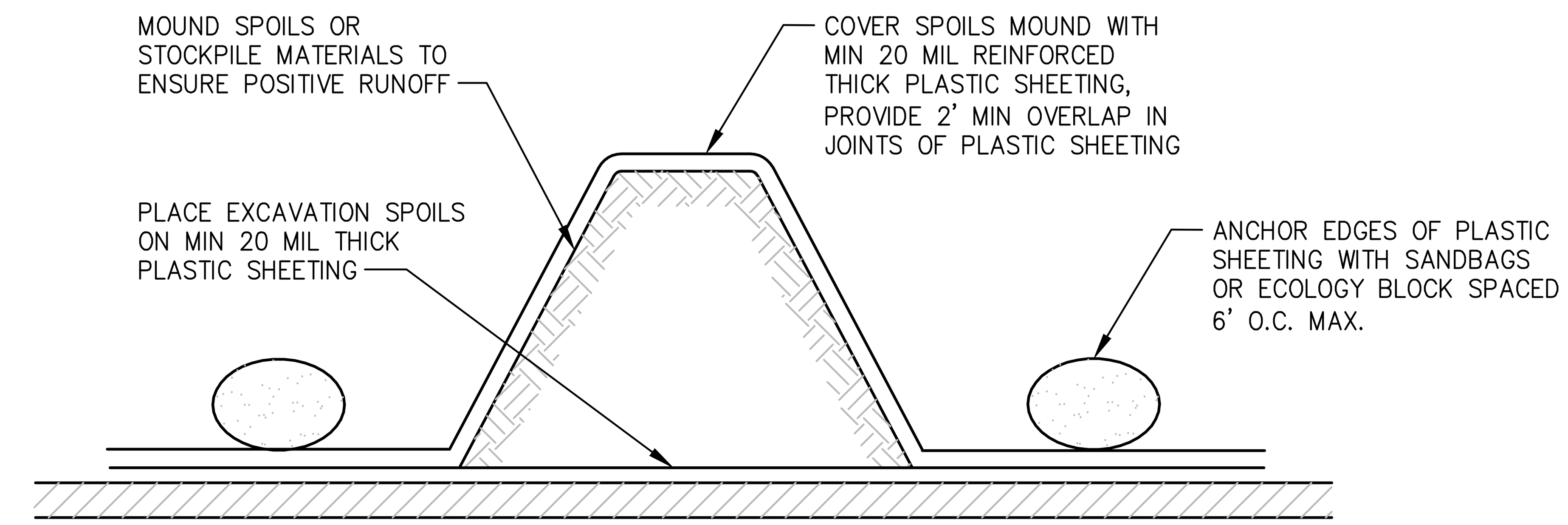


MAINTENANCE STANDARDS:

ANY ACCUMULATED SEDIMENT ON OR AROUND THE FILTER FABRIC SHALL BE REMOVED IMMEDIATELY. SEDIMENT SHALL NOT BE REMOVED BY FLUSHING W/WATER. ALL SEDIMENT MUST BE DISPOSED OF AND HAULED OFF-SITE.

A CX CX CATCH BASIN INLET CONTROL

NTS



B CX CX STOCKPILE PROTECTION

NTS

NOTES:

1. THE CONTRACTOR SHALL DEVELOP, IMPLEMENT, AND UPDATE A SWPP IN ACCORDANCE WITH THE SUBSTANTIVE REQUIREMENTS OF THE CONSTRUCTION STORMWATER GENERAL PERMIT (CSGP). THE IMPLEMENTATION OF TESC MEASURES AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND MODIFYING OF THE TESC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED AND APPROVED.
2. ALL REQUIRED BMP'S AND WATER QUALITY REQUIREMENTS ARE FOUND IN SPECIFICATION SECTION 01 57 13 (TEMPORARY EROSION AND SEDIMENT CONTROL).
3. THAT PORTION OF PRECIPITATION OR STORMWATER THAT FALLS ON THE SITE THAT DOES NOT NATURALLY PERCOLATE INTO THE GROUNDWATER SHALL BE MANAGED IN ACCORDANCE WITH THE REQUIREMENTS OF THE CONSTRUCTION STORMWATER GENERAL PERMIT. SEE SPECIFICATIONS FOR FURTHER REQUIREMENTS.
4. CONTRACTOR SHALL ANTICIPATE ENCOUNTERING WATER IN REQUIRED EXCAVATIONS. CONSTRUCTION WATER THAT IS REMOVED FROM EXCAVATIONS OR RESULTS FROM THE DRAINING OF EXCAVATED SEDIMENT SHALL BE MANAGED. PER THE REQUIREMENTS OF THE CSGP, POTENTIALLY REQUIRING TREATMENT AND/OR DISPOSAL. SEE SPECIFICATIONS FOR SITE CONSTRUCTION WATER HANDLING REQUIREMENTS.
5. STABILIZED CONSTRUCTION ENTRANCE SHALL BE PROVIDED AT ALL VEHICLE ENTRANCE AND EXIT POINTS. SEE SPECIFICATIONS FOR REQUIREMENTS FOR SITE DECONTAMINATION FACILITY AND CONTAMINATION EXCLUSION ZONE.
6. THE TESC FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED PRIOR TO AND IN CONJUNCTION WITH ALL EXCAVATION BACKFILL, STAGING, AND STOCKPILING ACTIVITIES, AND IN SUCH A MANNER AS TO ENSURE THAT SOIL AND CONSTRUCTION WATER DO NOT ENTER SURFACE WATER. ALL TESC MEASURES SHALL BE REMOVED AT THE APPROPRIATE TIME DURING CONSTRUCTION SUCH THAT NONE REMAIN AT THE END OF CONSTRUCTION. SEQUENCE AS REQUIRED TO MATCH THE WORK.
7. THE TESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE FACILITIES SHALL BE MODIFIED AS NEEDED FOR UNEXPECTED STORM EVENTS AND TO ENSURE THAT SEDIMENT AND SEDIMENT-LADEN WATER DO NOT LEAVE THE SITE.
8. THE TESC FACILITIES SHALL BE INSPECTED DAILY BY THE CONTRACTOR AND MAINTAINED AS NECESSARY OR AS DIRECTED BY THE CITY OF SEATTLE TO ENSURE THEIR CONTINUED FUNCTIONING.
9. ALL CONTRACTOR STOCKPILES AND LAYDOWN AREAS SHALL BE LOCATED WITHIN THE PROJECT LIMITS. CONTRACTOR SHALL COVER AND PROTECT STOCKPILES. SEE SPECIFICATIONS FOR FURTHER REQUIREMENTS.

Mark	Description	Date	Appr.

Mark	Description	Date	Appr.

Designed by: PRS | Date: 04/03/15 | Rev. 0

Dwn by: EAL | Ckd by: XXX | Job Number: 17800-56

Reviewed by: XXX

Submitted by: HART CROWSER, INC.

File name: 1780056-C1.4.dwg
Plot date:
Plot scale: SEE DRAWING

JACOBSON TERMINALS

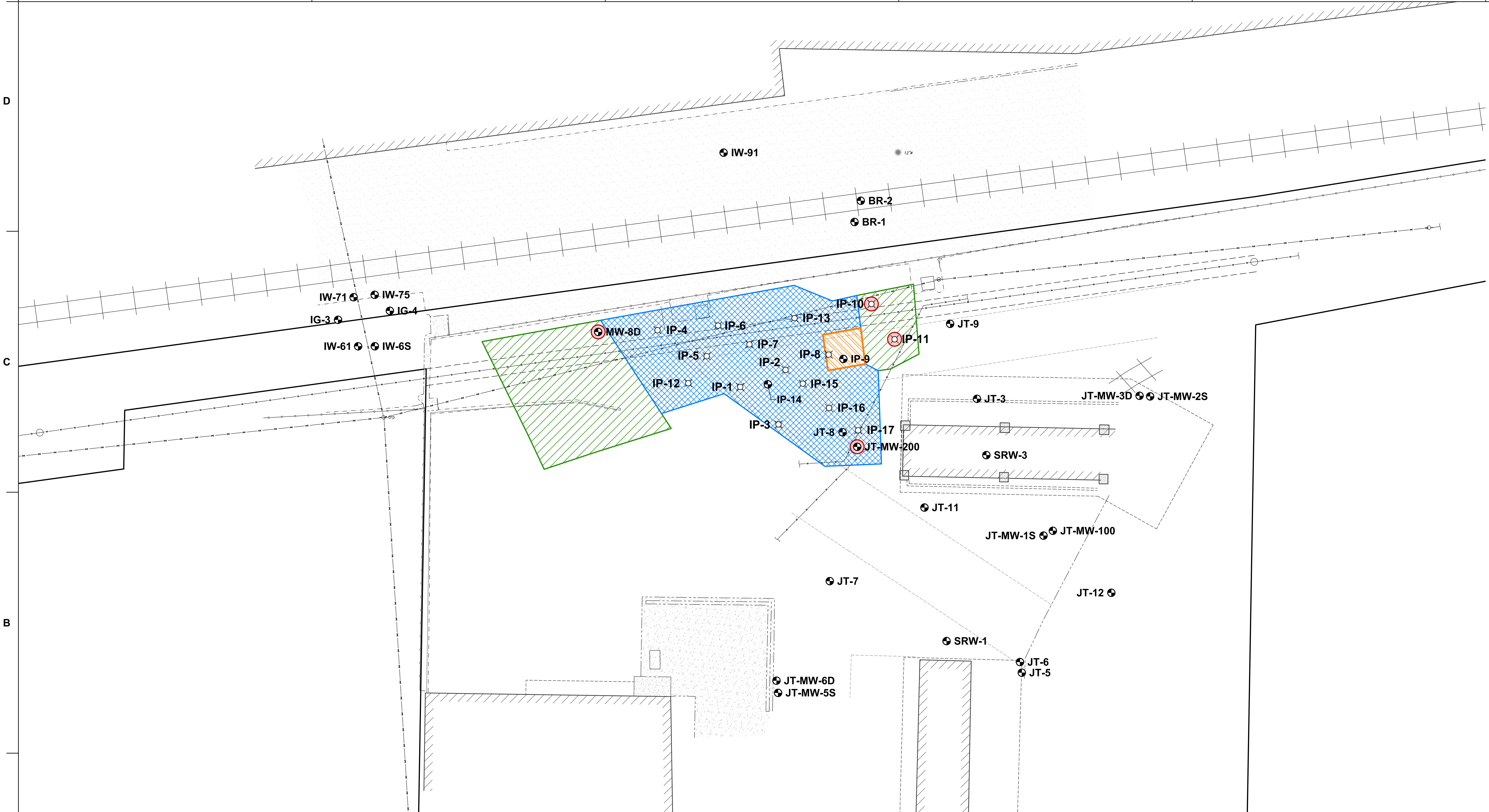
SEATTLE, WASHINGTON

TEMPORARY EROSION AND SEDIMENTATION CONTROL DETAILS

Drawing Reference Number:

G1.4

Sheet 5 of 9



LINE LEGEND

- = EXISTING EDGE OF ASPHALT
- = EXISTING EDGE OF CONCRETE
- = EXISTING CURB
- = EXISTING YELLOW STRIPE
- = EXISTING WHITE STRIPE
- = EXISTING STORM DRAIN LINE
- = EXISTING SANITARY SEWER LINE
- = EXISTING OVERHEAD ELECTRIC LINES
- = EXISTING TOP OF SLOPE LINE
- = EXISTING TOE OF SLOPE LINE
- = EXISTING GRADE INDEX CONTOUR
- = EXISTING GRADE INTERVAL CONTOUR
- = EXISTING CHAINLINK FENCE
- = EXISTING CONCRETE PAD

JT-3 Monitoring Well Location and Number

IP-2 Injection Well Location and Number

Well to be Abandoned

10 Feet Excavation below Existing Grade

19 Feet Excavation below Existing Grade

21 Feet Excavation below Existing Grade

Source: Survey base "2015013_svX_TB.dwg," created by Pacific Survey & Engineering Inc., dated 3/13/15.

NOTES:

1. WELLS RESIDING WITHIN EXCAVATION BOUNDARY TO BE ABANDONED PRIOR TO START OF EXCAVATION WORK AS SHOWN. OTHER WELLS WITHIN EXCAVATION AREA MAY BE REMOVED AS PART OF EXCAVATION WORK.
2. EXPLORATIONS NOT SURVEYED WERE SHIFTED BASED ON SURVEYED MONITORING WELL LOCATIONS. LOCATIONS SHOULD BE CONSIDERED APPROXIMATE AND FIELD VERIFIED BEFORE BEGINNING WORK.
3. CONTRACTOR SHALL PROTECT STRUCTURES AND UTILITIES IN PLACE UNLESS NOTED OTHERWISE. CONTRACTOR SHALL INSTALL TEMPORARY BYPASS FOR ALL UNDERGROUND UTILITIES WITHIN THE EXCAVATION LIMITS. CONTRACTOR SHALL RESTORE BYPASSED UNDERGROUND UTILITIES TO PRE-CONSTRUCTION CONDITION FOLLOWING COMPLETION OF EXCAVATION WORK. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION ON PROTECTION OF STRUCTURES AND UTILITIES.

0 15 30

Scale in Feet

N

HARTCROWSER

Mark	Description	Date	Appr.

Mark	Description	Date	Appr.

Rev. 0

Date: 04/03/15

Job Number: 17800-56

Designed by: PRS

Dwn by: EAL

Ckd by: XXX

Reviewed by: XXX

Submitted by: HART CROWSER, INC.

File name: 1780056-G1.5.dwg

Plot date:

Plot scale: SEE DRAWING

JACOBSON TERMINALS

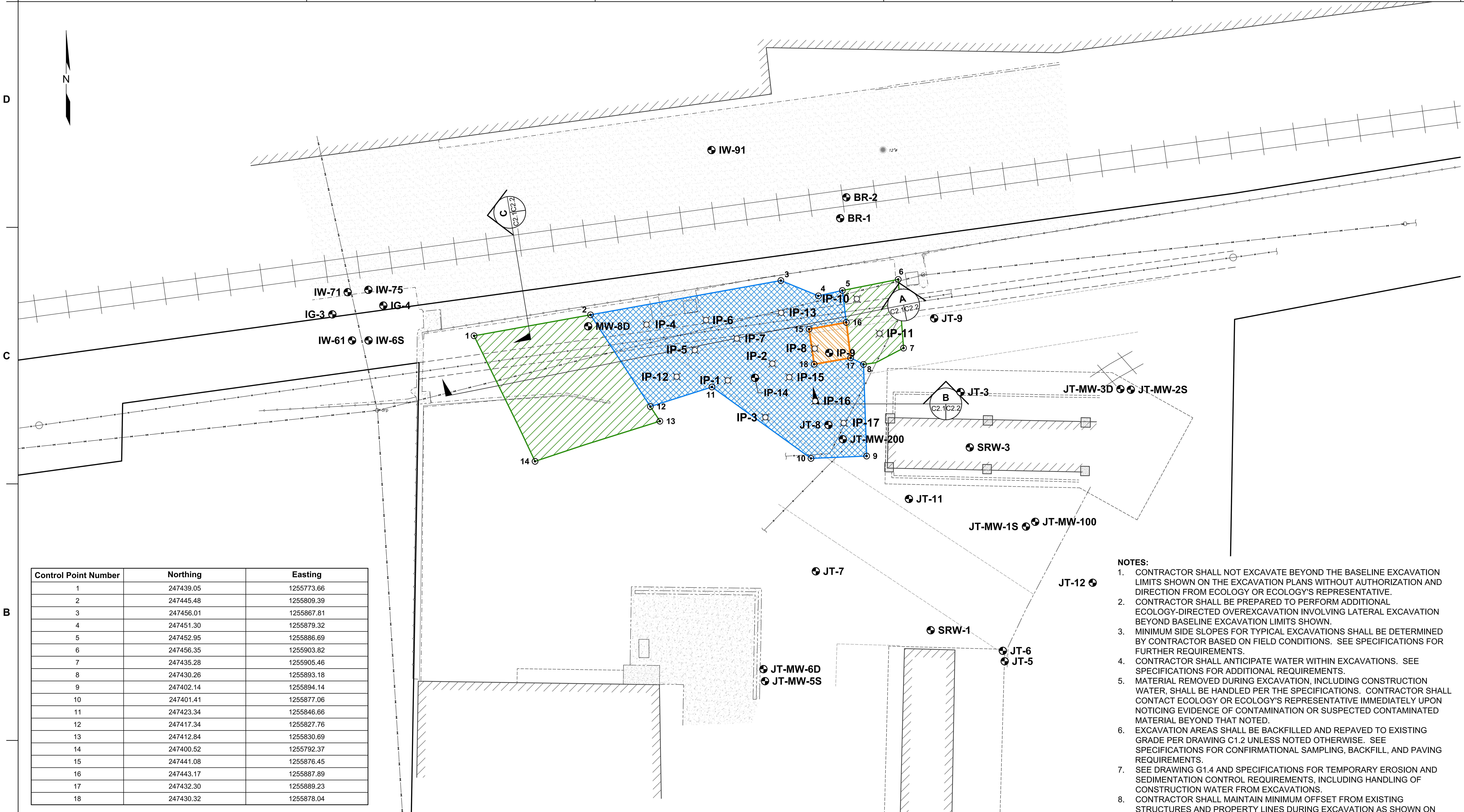
SEATTLE, WASHINGTON

DEMOLITION PLAN

Drawing Reference Number:

G1.5

Sheet 6 of 9



Control Point Number	Northing	Easting
1	247439.05	1255773.66
2	247445.48	1255809.39
3	247456.01	1255867.81
4	247451.30	1255879.32
5	247452.95	1255886.69
6	247456.35	1255903.82
7	247435.28	1255905.46
8	247430.26	1255893.18
9	247402.14	1255894.14
10	247401.41	1255877.06
11	247423.34	1255846.66
12	247417.34	1255827.76
13	247412.84	1255830.69
14	247400.52	1255792.37
15	247441.08	1255876.45
16	247443.17	1255887.89
17	247432.30	1255889.23
18	247430.32	1255878.04

LINE LEGEND

- = EXISTING EDGE OF ASPHALT
- = EXISTING EDGE OF CONCRETE
- = EXISTING CURB
- = EXISTING YELLOW STRIPE
- = EXISTING WHITE STRIPE
- = EXISTING STORM DRAIN LINE
- = EXISTING SANITARY SEWER LINE
- = EXISTING OVERHEAD ELECTRIC LINES
- = EXISTING TOP OF SLOPE LINE
- = EXISTING TOE OF SLOPE LINE
- 120 = EXISTING GRADE INDEX CONTOUR
- 118 = EXISTING GRADE INTERVAL CONTOUR
- = EXISTING CHAINLINK FENCE
- = EXISTING CONCRETE PAD

JT-3 Monitoring Well Location and Number

IP-2 Injection Well Location and Number

1 Control Point Location and Number

10 Feet Excavation below Existing Grade

19 Feet Excavation below Existing Grade

21 Feet Excavation below Existing Grade

Source: Survey base "2015013_svX_TB.dwg," created by Pacific Survey & Engineering Inc., dated 3/13/15.

NOTES:

1. CONTRACTOR SHALL NOT EXCAVATE BEYOND THE BASELINE EXCAVATION LIMITS SHOWN ON THE EXCAVATION PLANS WITHOUT AUTHORIZATION AND DIRECTION FROM ECOLOGY OR ECOLOGY'S REPRESENTATIVE.
2. CONTRACTOR SHALL BE PREPARED TO PERFORM ADDITIONAL ECOLOGY-DIRECTED OVEREXCAVATION INVOLVING LATERAL EXCAVATION BEYOND BASELINE EXCAVATION LIMITS SHOWN.
3. MINIMUM SIDE SLOPES FOR TYPICAL EXCAVATIONS SHALL BE DETERMINED BY CONTRACTOR BASED ON FIELD CONDITIONS. SEE SPECIFICATIONS FOR FURTHER REQUIREMENTS.
4. CONTRACTOR SHALL ANTICIPATE WATER WITHIN EXCAVATIONS. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
5. MATERIAL REMOVED DURING EXCAVATION, INCLUDING CONSTRUCTION WATER, SHALL BE HANDLED PER THE SPECIFICATIONS. CONTRACTOR SHALL CONTACT ECOLOGY OR ECOLOGY'S REPRESENTATIVE IMMEDIATELY UPON NOTICING EVIDENCE OF CONTAMINATION OR SUSPECTED CONTAMINATED MATERIAL BEYOND THAT NOTED.
6. EXCAVATION AREAS SHALL BE BACKFILLED AND REPAVED TO EXISTING GRADE PER DRAWING C1.2 UNLESS NOTED OTHERWISE. SEE SPECIFICATIONS FOR CONFIRMATIONAL SAMPLING, BACKFILL, AND PAVING REQUIREMENTS.
7. SEE DRAWING G1.4 AND SPECIFICATIONS FOR TEMPORARY EROSION AND SEDIMENTATION CONTROL REQUIREMENTS, INCLUDING HANDLING OF CONSTRUCTION WATER FROM EXCAVATIONS.
8. CONTRACTOR SHALL MAINTAIN MINIMUM OFFSET FROM EXISTING STRUCTURES AND PROPERTY LINES DURING EXCAVATION AS SHOWN ON DRAWING C1.1 UNLESS DIRECTED OTHERWISE BY ECOLOGY OR ECOLOGY'S REPRESENTATIVE.
9. CONTRACTOR SHALL PROTECT STRUCTURES AND UTILITIES IN PLACE UNLESS NOTED OTHERWISE. CONTRACTOR SHALL INSTALL TEMPORARY BYPASS FOR ALL UNDERGROUND UTILITIES WITHIN THE EXCAVATION LIMITS. CONTRACTOR SHALL RESTORE BYPASSED UNDERGROUND UTILITIES TO PRE-CONSTRUCTION CONDITION FOLLOWING COMPLETION OF EXCAVATION WORK. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION ON PROTECTION OF STRUCTURES AND UTILITIES. REFER TO DRAWING G1.5 FOR MONITORING WELLS TO BE ABANDONED PRIOR TO EXCAVATION.
10. EXPLORATIONS NOT SURVEYED WERE SHIFTED BASED ON SURVEYED MONITORING WELL LOCATIONS. LOCATIONS SHOULD BE CONSIDERED APPROXIMATE AND FIELD VERIFIED BEFORE BEGINNING WORK.

0 15 30
Scale in Feet

HARTCROWSER

Mark	Description	Date	Appr.

Mark	Description	Date	Appr.

Rev. 0
Date: 04/03/15
Job Number: 17800-56
File name: 1780056-C2.1.dwg
Plot date:
Plot scale: SEE DRAWING
Designed by: PRS
Dwn by: EAL
Ckd by: XXX
Reviewed by: XXX
Submitted by: HART CROWSER, INC.

JACOBSON TERMINALS

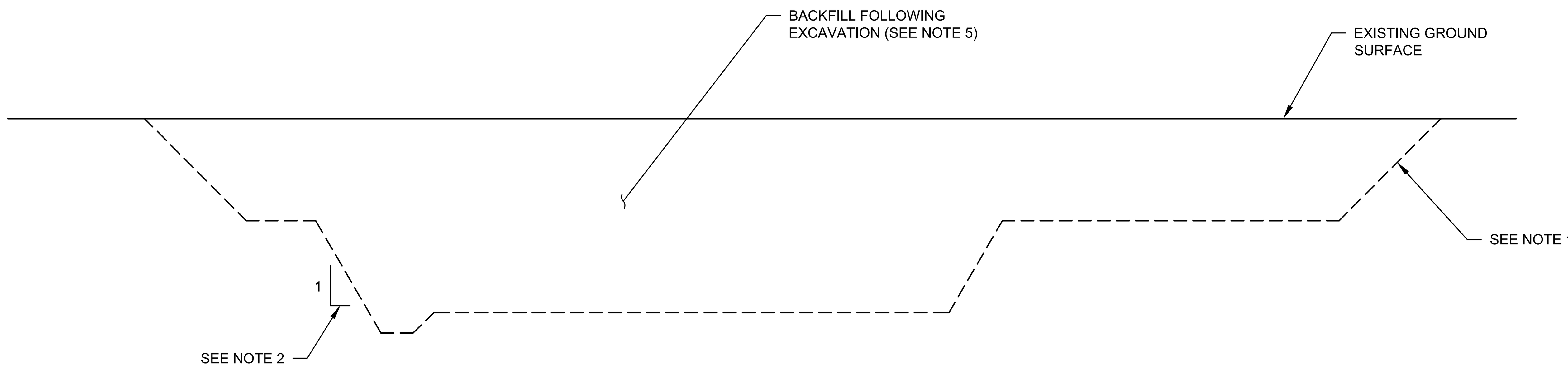
SEATTLE, WASHINGTON

EXCAVATION PLAN

Drawing Reference Number:

C1.0

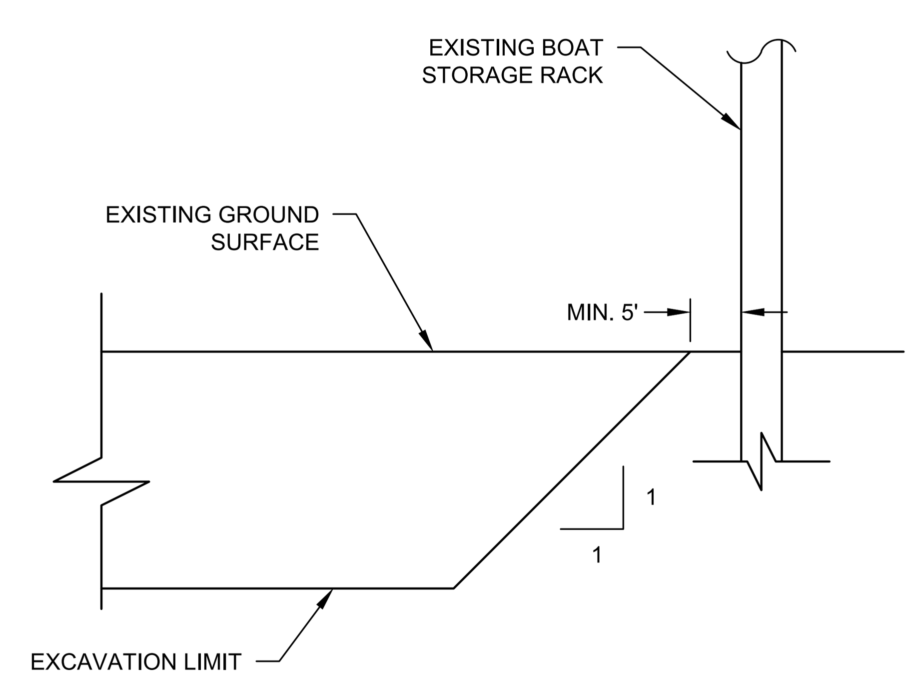
Sheet 7 of 9



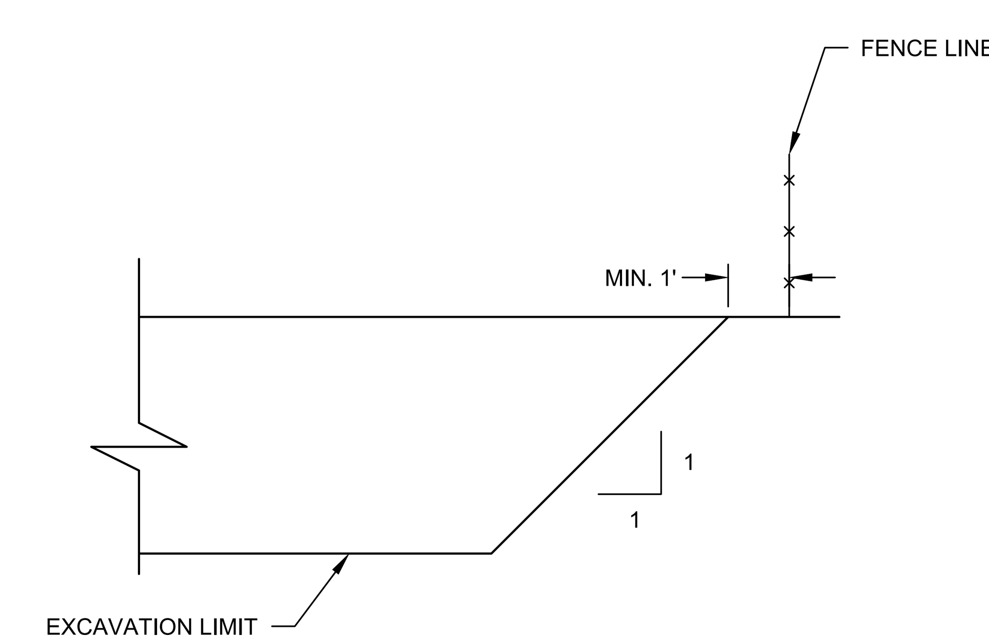
A EXCAVATION SECTION
C2.1 C2.2
NTS

NOTES:

1. CONTRACTOR SHALL NOT EXCAVATE BEYOND THE BASELINE EXCAVATION LIMITS SHOWN ON THE EXCAVATION PLANS WITHOUT AUTHORIZATION AND DIRECTION FROM ECOLOGY OR ECOLOGY'S REPRESENTATIVE.
2. MINIMUM SIDE SLOPES FOR TYPICAL EXCAVATIONS SHALL BE DETERMINED BY CONTRACTOR BASED ON FIELD CONDITIONS (MIN. 1H:1V). SEE SPECIFICATIONS FOR FURTHER REQUIREMENTS.
3. CONTRACTOR SHALL ANTICIPATE WATER WITHIN EXCAVATIONS. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
4. MATERIAL REMOVED DURING EXCAVATION, INCLUDING CONSTRUCTION WATER, SHALL BE HANDLED PER THE SPECIFICATIONS. CONTRACTOR SHALL CONTACT ECOLOGY OR ECOLOGY'S REPRESENTATIVE IMMEDIATELY UPON NOTICING EVIDENCE OF CONTAMINATION OR SUSPECTED CONTAMINATED MATERIAL BEYOND THAT NOTED.
5. EXCAVATION AREAS SHALL BE BACKFILLED AND REPAVED TO EXISTING GRADE PER DRAWING C1.2 UNLESS NOTED OTHERWISE. SEE SPECIFICATIONS FOR CONFIRMATIONAL SAMPLING, BACKFILL, AND PAVING REQUIREMENTS.
6. SEE DRAWING G1.4 AND SPECIFICATIONS FOR TEMPORARY EROSION AND SEDIMENTATION CONTROL REQUIREMENTS, INCLUDING HANDLING OF CONSTRUCTION WATER FROM EXCAVATIONS.
7. CONTRACTOR SHALL MAINTAIN MINIMUM OFFSET FROM EXISTING STRUCTURES AND PROPERTY LINES DURING EXCAVATION AS SHOWN UNLESS DIRECTED OTHERWISE BY ECOLOGY OR ECOLOGY'S REPRESENTATIVE.
8. CONTRACTOR SHALL PROTECT STRUCTURES AND UTILITIES IN PLACE UNLESS NOTED OTHERWISE. CONTRACTOR SHALL INSTALL TEMPORARY BYPASS FOR ALL UNDERGROUND UTILITIES WITHIN THE EXCAVATION LIMITS. CONTRACTOR SHALL RESTORE BYPASSED UNDERGROUND UTILITIES TO PRE-CONSTRUCTION CONDITION FOLLOWING COMPLETION OF EXCAVATION WORK. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION ON PROTECTION OF STRUCTURES AND UTILITIES. REFER TO DRAWING G1.5 FOR MONITORING WELLS TO BE ABANDONED PRIOR TO EXCAVATION.



B EXCAVATION AT BOAT STORAGE RACK
C2.1 C2.2
NTS



C EXCAVATION AT FENCE LINE
C2.1 C2.2
NTS

HARTCROWSER

Designed by: PRS	Date: 04/03/15
Rev. 0	
Dwn by: EAL	Ckd by: XXX
Job Number: 17800-56	
Reviewed by: XXX	
Submitted by: HART CROWSER, INC.	

JACOBSON TERMINALS

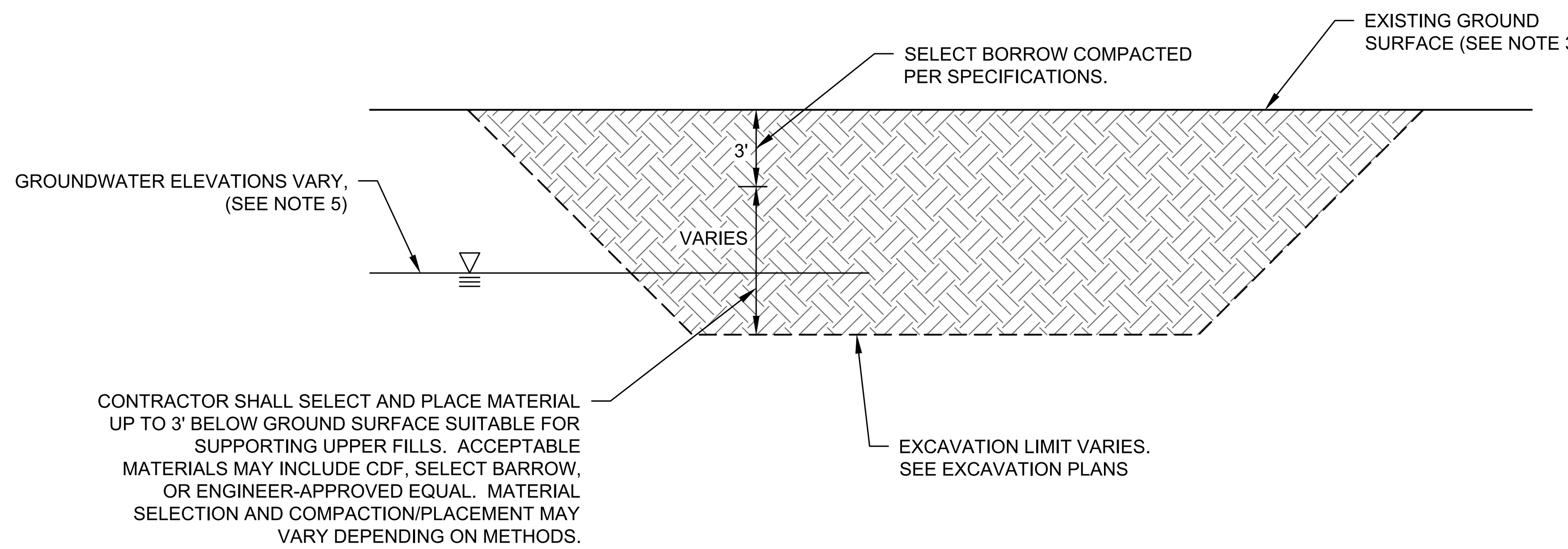
SEATTLE, WASHINGTON

TYPICAL EXCAVATION SECTIONS

Drawing Reference Number:

C1.1

Sheet 8 of 9



X C2.3 C2.3 **TYPICAL BACKFILL SECTION**
NTS

NOTES:

1. MINIMUM SIDE SLOPES FOR TYPICAL BACKFILL SHALL BE DETERMINED BY CONTRACTOR BASED UPON FIELD CONDITIONS. SEE SPECIFICATIONS FOR FURTHER REQUIREMENTS.
2. SEE SPECIFICATIONS FOR SOIL CONFIRMATIONAL SAMPLING AND BACKFILL TIMING REQUIREMENTS FOLLOWING EXCAVATION.
3. SEE SPECIFICATIONS FOR SITE FINISH GRADING FOLLOWING EXCAVATION BACKFILLING.
4. SEE SPECIFICATIONS FOR IMPORTED BACKFILL MATERIAL CLEANLINESS AND QUALITY REQUIREMENTS.
5. GROUNDWATER DEPTHS GENERALLY VARY BETWEEN APPROXIMATELY 4' TO 7' BELOW GROUND SURFACE.

HARTCROWSER

Mark	Description	Date	Appr.	Mark	Description	Date	Appr.

Designed by: PRS | Date: 04/03/15 | Rev. 0
Dwn by: EAL | Ckd by: XXX | Job Number: 17800-56
Reviewed by: XXX
Submitted by: HART CROWSER, INC. | File name: 1780056-C2.3.dwg | Plot date: | Plot scale: SEE DRAWING

JACOBSON TERMINALS
SEATTLE, WASHINGTON

TYPICAL EXCAVATION BACKFILL SECTION

Drawing Reference Number:
C1.2
Sheet 9 of 9