

February 17, 2016

Mr. John Rapp
Department of Ecology, Southwest Region
PO Box 47775
Olympia, WA 98504

and

Ms. Tanya Girouard – Regional Environmental Manager
Progress Rail Services Corporation
4012 SR 509 South Frontage Road
Tacoma, Washington 98421

Re: Work Plan for Additional Site Characterization Activities
Progress Rail Services
4012 State Route 509 South Frontage Road
Tacoma, Washington 98421
VCP Site ID SW1474
Terracon Project No. 81167031

Dear Mr. Rapp and Ms. Girouard:

Terracon Consultants, Inc. (Terracon) is pleased to present the Washington Department of Ecology (Ecology) and Progress Rail Services (PRS) with the following work plan for performing Additional Site Characterization Activities at the above-referenced site.

The proposed scope of work includes collecting shallow soil samples from seven (7) locations in the vicinity of historical grab groundwater sampling locations where diesel- or oil-range total petroleum hydrocarbons (TPH) were reported, as described below. This work plan was prepared to address a request for additional site characterization included in an Ecology Voluntary Cleanup Program (VCP) Opinion Letter addressed to PRS, dated September 11, 2015.

This work plan was developed in accordance with our proposal P81150331 dated October 21, 2015 and includes the collection of additional soil samples near previously advanced borings and/or groundwater monitoring well locations on the site.

1.0 PROJECT INFORMATION

The site is located at 4012 State Route 509 South Frontage Road in Tacoma, Washington (Pierce County Parcel No. 2001867000), on a portion of land owned by the Port of Tacoma (Pierce County



Parcel No. 0320021002). The site is currently used for painting and repairing railroad locomotives and railcars. A Topographic Map showing the site location is attached as Figure 1. Site features include a locomotive shop, locomotive wash pad, truck shop/blast and paint building with offices, paint shop office, car shop/welding building, car shop office, material storage building and material storage area, evaporator room, small engine wash pad, maintenance building, and paint storage building. A Site Diagram showing site features is attached as Figure 2.

PRS purchased the facility and assumed the property lease from Coastal Engine and Equipment Company (CEECO) in April 2009. In 2007, diesel- and oil-range TPH and lead were found in groundwater at the large parts washer at concentrations exceeding the Model Toxics Control Act (MTCA) Method A cleanup levels. Metals (arsenic, cadmium, chromium, and lead) were also found in the shallow soil at the sandblast bag house at concentrations exceeding the MTCA Method A or MTCA Method B cleanup levels. Based on these historical CEECO releases, the site was included on the Ecology Confirmed and Suspected Contaminated Sites List (CSCSL) and on the ranked Hazardous Sites List (HSL; Cleanup Site ID 4267). CEECO conducted remedial actions from 2007 to 2009 to address these reported releases.

PRS has reported three diesel fuel spills since beginning facility operations in 2009. A release of diesel to soil by the Locomotive Shop from an auxiliary locomotive fuel tank was reported in March 2012 (ERTS #632477). Oil leaching from soil and sheen on ponded water in the southeast area of the site was reported in November 2012 (ERTS #637544). A damaged railcar auxiliary fuel tank valve spilled diesel to the soil at the southwest property corner in February 2014 (ERTS #646894). Terracon, on behalf of PRS, has subsequently completed soil and groundwater remedial treatment and confirmation sampling related to these documented releases.

Following the discovery of the March 2012 diesel spill at the Locomotive Shop (ERTS #632477), PRS and Panhandle Geotechnical & Environmental, Inc. (Panhandle) conducted a limited remedial excavation of impacted soils between the locomotive shop and the locomotive wash pad in March 2012 (see Figure 3). An area measuring approximately 50 feet east-west and 10 feet wide was excavated to approximately 2 feet. Approximately 37 cubic yards (CY) of petroleum-contaminated soil (PCS) were removed for offsite disposal. Soil samples collected from the extent of the soil excavation included samples from the east end (East end sample), west end (West end sample), south sidewall (South side sample), and from the north side of the locomotive wash pad (North side sample) were analyzed for diesel- and oil-range TPH. The diesel-range TPH concentration in the East end sample (5,500 milligrams per kilogram [mg/kg]) exceeded the MTCA Method A cleanup level (2,000 mg/kg).

Panhandle advanced three direct-push soil borings (DP-1, DP-2, and DP-4) in and near the excavation area in May 2012. Grab groundwater samples collected from the borings contained concentrations of diesel- and/or oil-range TPH ranging from 560 micrograms per liter ($\mu\text{g/L}$) to 2,300 $\mu\text{g/L}$, exceeding the MTCA Method A cleanup levels (500 $\mu\text{g/L}$ for diesel- or oil-range TPH).

Terracon advanced nine (9) soil borings (B-1 through B-9) at the excavation area in November 2012. Soil samples (10 total) were collected from borings B-1 through B-3, B-7, and B-9. Soil samples were not collected from borings B-4 through B-6 and B-8 due to either drilling refusal or to a lack of sample recovery. Grab groundwater samples were collected from temporary monitoring wells installed in seven (7) of the soil borings (B-1 through B-5, B-7, and B-9). Grab groundwater samples collected from the temporary wells installed in soil borings B-5 and B-7 contained diesel- and oil-range TPH ranging from 760 µg/L to 9,800 µg/L, exceeding the MTCA Method A cleanup levels.

Terracon advanced two (2) additional soil borings (B-10 and B-11) to the east and west of the excavation area in August 2013 and completed the borings as groundwater monitoring wells MW-1 and MW-2. Soil and groundwater samples collected from the borings/wells did not contain diesel- or oil-range TPH above the laboratory method detection limits (MDLs).

In September 2013, PRS, Terracon, and NRC Environmental Services, Inc. (NRC) removed approximately 200 feet of railroad track between the Locomotive Shed and locomotive wash pad and excavated PCS for offsite removal. Multiple buried utilities were identified in the excavation area, including natural gas, telecommunications, and electrical. NRC excavated impacted soil to depths ranging from approximately 2 to 4 feet below the ground surface (bgs), and removed approximately 146 tons of PCS for offsite disposal. Terracon collected four (4) soil samples from the base of the excavation (samples EX-1 through EX-4) and three (3) soil samples from the south wall of the excavation (SW-1 through SW-3). Soil samples collected from the limits of the excavation did not contain diesel- or oil-range TPH above the laboratory MDLs. NRC excavated soil to approximately 7 feet bgs along the length of the PCS removal excavation, and 1,125 pound of Oxygen Release Compound (ORC) were subsequently mixed with the excavated soil and placed back into the trench. The PCS removal excavation was backfilled with clean imported fill, compacted, and the railroad track was re-installed.

Terracon advanced two (2) additional soil borings (B-12 and B-13) in the excavation area, and north of the excavation area, in February 2014 and completed the borings as groundwater monitoring wells MW-3 and MW-4 to further evaluate groundwater quality following PCS excavation and cleanup. Soil samples collected from the borings did not contain diesel- or oil-range TPH above the laboratory MDLs. Groundwater samples collected from monitoring wells MW-1 through MW-4 contained diesel- and oil-range TPH ranging from 74 µg/L to 410 µg/L, below the MTCA Method A cleanup levels. The measured depth to groundwater in the monitoring wells was approximately 2.5 feet below the top of the well casing (TOC).

Groundwater samples were collected from monitoring wells MW-1 through MW-4 in May, August, and November 2014. Groundwater samples were analyzed for diesel- and oil-range TPH, naphthalenes, and carcinogenic polycyclic aromatic hydrocarbons (cPAHs); and for benzene, toluene, ethylbenzene, and xylenes (BTEX). Diesel- and oil-range TPH results ranged from 120 µg/L to 400 µg/L, below the MTCA Method A cleanup levels. Results for BTEX, naphthalenes, and cPAHs were below the laboratory MDLs.

At the request of PRS, Terracon submitted a VCP application for the site to Ecology in May 2015, and requested an NFA determination for the site. Ecology enrolled the site into the VCP in June 2015 (VCP Project No. SW1474) and issued an Opinion Letter on September 3, 2015. In particular, Ecology provided the following comments/requests regarding the March 2012 reported release (ERTS #632477):

1. Based on the groundwater concentrations of oil-range TPH at soil borings B-4, B-5, B-7 and groundwater monitoring well MW-4, more characterization is required to determine the source of the elevated concentrations in this area of the site.
2. Please provide a work plan for additional site characterization activities at the site to ensure that Ecology can make recommendations, if necessary.

In response, Terracon has prepared this work plan for performing additional site soil characterization activities in the area of soil borings B-4, B-5, B-7 and groundwater monitoring well MW-4.

1.1 Conceptual Site Model

A conceptual model of hydrogeologic and environmental conditions was developed based on the results of Terracon's previous reports, previously completed assessments performed by others at the Site, and work performed by Terracon on other projects in this area of Tacoma. The conceptual model is based on the following key assumptions:

- Subsurface conditions consist of 2 to 3 feet of fill material consisting of sand with gravel, underlain by silty sand and sand with silt to approximately 16 feet bgs.
- Groundwater is located at approximately 2.5 feet bgs. Based on historical groundwater depth measurements and elevation data, groundwater flow is towards the west-southwest.
- The contaminants of concern (COCs) are TPH in the diesel-range and oil-range.

For the purposes of this evaluation, the conceptual hydrogeologic model is limited to the shallow groundwater. The purpose of the model is to aid the evaluation of potential contaminant migration over time, particularly with regard to evaluating remedial action alternatives that include long-term components.

Primary elements of the conceptual hydrogeologic model are groundwater recharge and groundwater discharge areas for shallow groundwater beneath the Site. The spatial relationship between groundwater recharge, discharge, lithology, and topography typically control groundwater flow directions in perched and shallow groundwater scenarios.

It is assumed that the local groundwater system is seasonally recharged by direct infiltration of precipitation, with additional contributions from urban run-off directed through storm water discharge systems associated with surrounding development. Given this conceptual hydrogeologic model, petroleum impacts to soil would most likely be present at depths where shallow groundwater interacts with any residual petroleum impacts in the vicinity of the March 2012 spill area (approximately 2 to 2.5 feet bgs). Further, groundwater flow may dictate where petroleum impacts in groundwater would likely migrate to down-gradient locations, which could result in re-contamination of soils in the phreatic zone.

The nearest surface water to the site is Wapato Creek, which lies approximately 175 feet east of the site and flows into Commencement Bay.

1.2 Potential Exposure Pathways

In addition to the elements of MTCA cleanup standards, potential exposure pathways were evaluated for the site and potential downstream receptors for COCs detected at the site as part of preparation of this work plan. A discussion of potential exposure pathways is included below.

1.2.1 Soil-to-Groundwater Pathway

Results from previous investigations indicate that soil contamination at the site has been cleaned up. Residual soil contamination may remain in shallow soils at concentrations below MTCA cleanup levels. Based on quarterly groundwater sampling events, seasonal fluctuation of the groundwater level appears to be minimal, ranging from approximately 2.5 feet bgs in February to 5.5 feet bgs in August. As a result, soil contamination does not appear to represent a potential continuing source to groundwater contamination at the site, as residual soil impacts, if present, are present only locally at depths above the seasonally high groundwater interface.

Although the March 2012 diesel release at the site appears to have resulted in impacts to shallow groundwater, Terracon understands that shallow groundwater in the vicinity of the site and throughout the Port of Tacoma area is not currently utilized for drinking water. Furthermore, Terracon reviewed Ecology's Online Well Log Database for registered water wells in the vicinity of the site. Based on available information, no water supply wells are located within 0.5 miles of the site. As a result, the potential for adverse impacts to drinking water due to contaminants at the site is low.

1.2.2 Direct-Contact Pathway

Direct contact with soil and groundwater exhibiting concentrations of petroleum hydrocarbons in excess of MTCA cleanup levels is limited to human receptors that may come into dermal contact or ingest excavated soil or groundwater. The direct-contact pathway may represent a potential

exposure pathway at the site because there potentially are residual concentrations of COCs in soil and/or groundwater.

1.3 MTCA Cleanup Levels

MTCA cleanup levels are concentrations of hazardous substances that have been determined to be protective of human health and the environment under specific exposure conditions. Applicable cleanup levels under MTCA can be developed using either default Method A tabulated values or using Method B site-specific, risk-based formulations. Although both Method A and Method B cleanup levels allow for unrestricted land use (including residential use), Method A cleanup levels are the most conservative and protective of human health and the environment.

Method C is used for industrial properties that meet the MTCA qualifying criteria (WAC 173-340-745). Method C cleanup levels are applicable to the site based on site use for industrial purposes, and designation as a port property.

For the purposes of this Work Plan, MTCA Method A cleanup levels for metals for soil and groundwater have been selected.

Following additional site characterization activities proposed herein, Method C or site specific Method B cleanup levels may be established for the contaminants of concern.

2.0 COMMITMENT TO SAFETY

Terracon has a 100% commitment to the safety of all its employees. As such, and in accordance with our *Incident and Injury Free*® safety culture, Terracon will develop a safety plan to be used by our personnel during field services. Prior to commencement of on-site activities, Terracon will hold a meeting to review health and safety needs for this specific project. At this time, we anticipate performing fieldwork in an OSHA Level D work uniform consisting of hard hats, safety glasses, protective gloves, and steel-toed boots. It may become necessary to upgrade this level of protection while sampling activities are being conducted in the event that petroleum or chemical constituents are encountered in soils or groundwater that present an increased risk for personal exposure.

3.0 SCOPE OF SERVICES

The proposed scope of work consists of collecting additional shallow soil samples from the historical March 2012 diesel spill and subsequent remedial excavation and cleanup area. Seven (7) soil samples will be collected from the area between the Locomotive Shop and the locomotive wash pad using hand tools.

3.1 Utility Locates in Work Area

In an effort to locate utilities in the work area, Terracon will review any site plans provided to us, and no later than 72 hours prior to intrusive activities, will contact the public utility locator service to arrange for underground utility clearance for the proposed explorations. To the extent practicable, the locations and depths of the various utilities will be identified to avoid damage to such utilities.

In addition to the public utility locate, a private utility line locate survey will be performed at the site during the drilling event to identify utilities in the proposed areas of exploration using geophysical investigation techniques. The survey will be completed by a subcontractor accompanied by Terracon field personnel.

3.2 Soil Sampling

Seven (7) soil borings will be advanced in the vicinity of previous borings B-4, B-5, B-7 and groundwater monitoring well MW-4. Specifically, two borings will be advanced south and northwest of B-4, two borings will be advanced west and east of B-5, and three borings will be advanced south of MW-4 and B-7. Approximate locations of the proposed borings are shown on Figure 3. Due to the presence of a railroad spur and several buried utilities in the proposed soil sampling locations, Terracon field staff will advance the borings using hand tools. The soil borings will be advanced to a depth of approximately 2 to 3 feet bgs, the top of the groundwater table, or to refusal, whichever is shallower.

3.3 Sampling and Analysis Plan

Soil samples will be collected from the borings using a clean stainless steel hand auger and/or clean stainless steel spoons and bowls. All non-disposable sampling equipment will be cleaned with non-phosphate soap wash followed by a potable water rinse prior to the beginning of the field work and after each sampling effort.

Soil samples will be placed into appropriate containers provided by the laboratory and placed into a cooler containing ice or ice substitute. Each sample container was labeled with the site name, date, time, and boring/sample number. One soil sample collected from each boring will be submitted for laboratory analysis to a Washington State-accredited analytical laboratory in strict accordance with industry standard chain-of-custody protocol.

3.3.1 Soil Laboratory Analysis

Up to seven (7) soil samples plus one duplicate soil sample will be analyzed for hydrocarbon identification using Northwest Method NWTPH-HCID. Samples will be analyzed on a normal (5-day) turnaround time. Sufficient soil sample volumes will be collected to additionally analyze

soil samples with hydrocarbon detections for gasoline-, diesel-, and/or oil-range TPH, as appropriate. The following table summarizes the analysis and laboratory methods:

Analysis	Sample Type	Maximum No. of Samples	Method
One soil sample collected from each boring			
Hydrocarbon Identification	Soil	8	NWTPH-HCID
Gasoline-range TPH	Soil	8	NWTPH-Gx
Diesel- and oil-range TPH	Soil	8	NWTPH-Dx

TPH = total petroleum hydrocarbons.

If elevated soil TPH impacts are detected, up to three (3) soil samples with the highest TPH concentrations will additionally be analyzed for n-hexane, volatile petroleum hydrocarbons (VPH), extractable petroleum hydrocarbons (EPH), volatile organic compounds (VOCs), and polycyclic aromatic hydrocarbons (PAHs), in order to establish a site-specific TPH cleanup level using MTCA Method B calculations.

Analysis	Sample Type	Maximum No. of Samples	Method
Three selected soil samples collected from the soil borings			
VPH + n-Hexane	Soil	3	NW-VPH Method
EPH	Soil	3	NW-EPH Method
VOCs + Oxygenates	Soil	3	EPA 8260
PAHs	Soil	3	EPA 8270 SIM

VPH = volatile petroleum hydrocarbons, EPH = extractable petroleum hydrocarbons, VOCs = volatile organic compounds, PAHs = polycyclic aromatic hydrocarbons, and SIM = selected ion monitoring. Samples will be analyzed on a normal 5-day TAT.

3.4 Report Preparation

Upon completion of soil sampling and receipt of analytical results, a report will be prepared that will include the following:

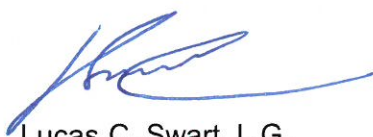
- Summary of previous site work
- Documentation of field activities
- Boring logs
- Analytical laboratory results
- Data evaluation and presentation of pertinent findings
- Site plan showing pertinent site features
- Recommendations concerning further action, if necessary

3.5 Schedule

The field work will be scheduled following the review and approval of the work plan by Ecology. We anticipate completing the field work in late February or early March 2016. Field work will take one day to complete. A report of findings will be prepared within 3 weeks of receipt of all laboratory analytical results.

If you have any questions or comments regarding this work plan, please do not hesitate to contact us at your convenience.

Sincerely,
Terracon Consultants, Inc.

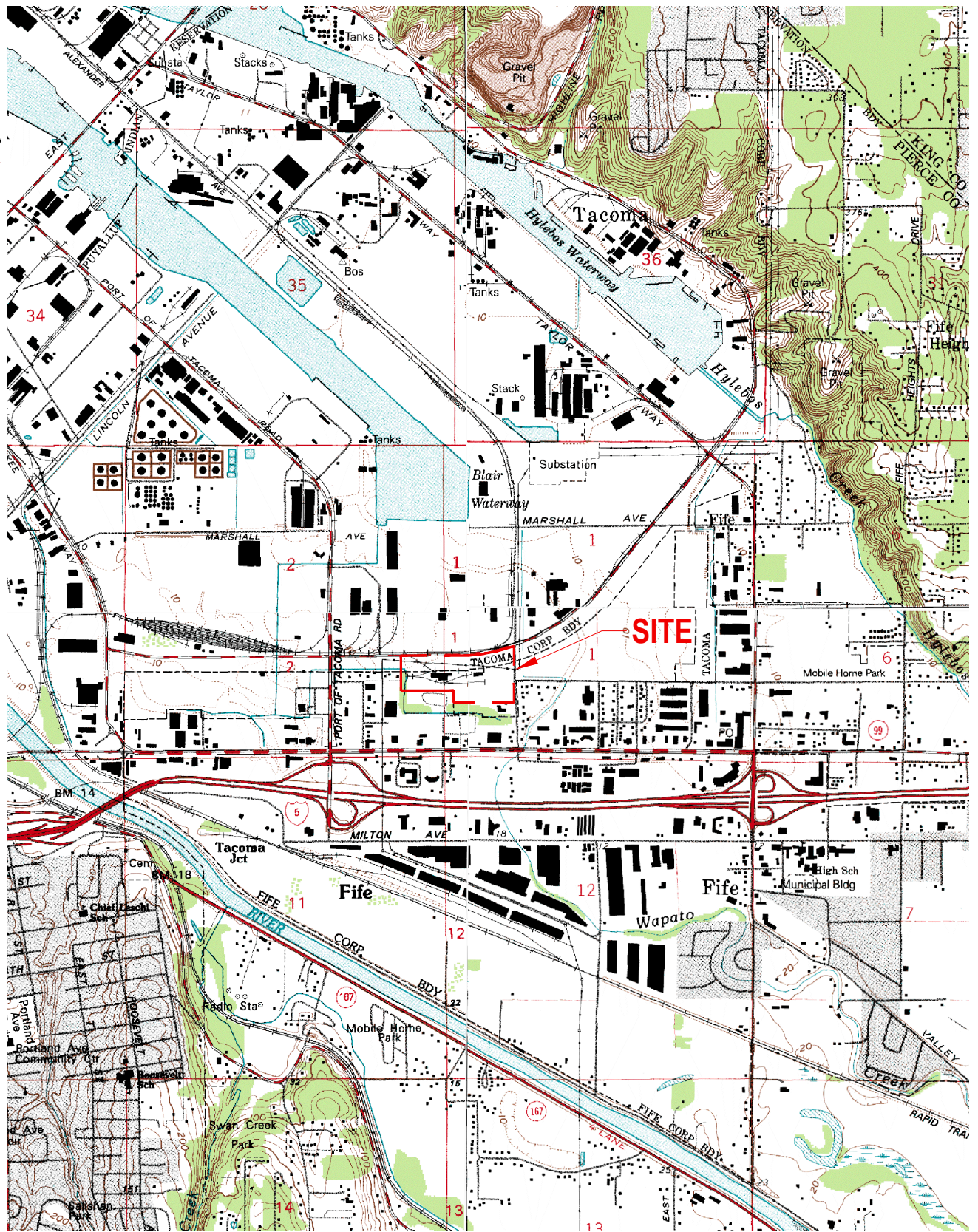


Lucas C. Swart, L.G.
Project Manager



Michael D. Noll, L.G., L.H.G.
Senior Project Manager

Attachments: Figure 1 – Topographic Map
Figure 2 – Site Diagram
Figure 3 – Site Plan



LEGEND:



Approximate site boundary

USGS Topographic Map, Tacoma North, Tacoma South, Poverty Bay, and Puyallup Quadrangles, 1994

Project Mngr:	MDN
Drawn By:	AAS
Checked By:	MDN
Approved By:	MYW
Project No.	81167031
Scale:	Not to scale
File No.	
Date:	January 2016

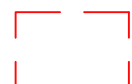
Terracon
Consulting Engineers and Scientists

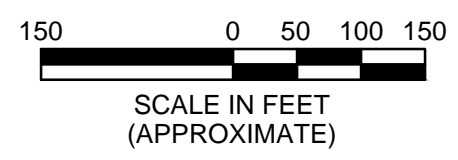
21905 64th Avenue W., Ste 100 Mountlake Terrace, WA 98043
PH. (425) 771-3304 FAX. (425) 771-3549

Topographic Map
Work Plan
4012 SR 509 South Frontage Road
Tacoma, Pierce County, Washington

FIG. No.	1
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LEGEND:
 APPROXIMATE SITE BOUNDARY

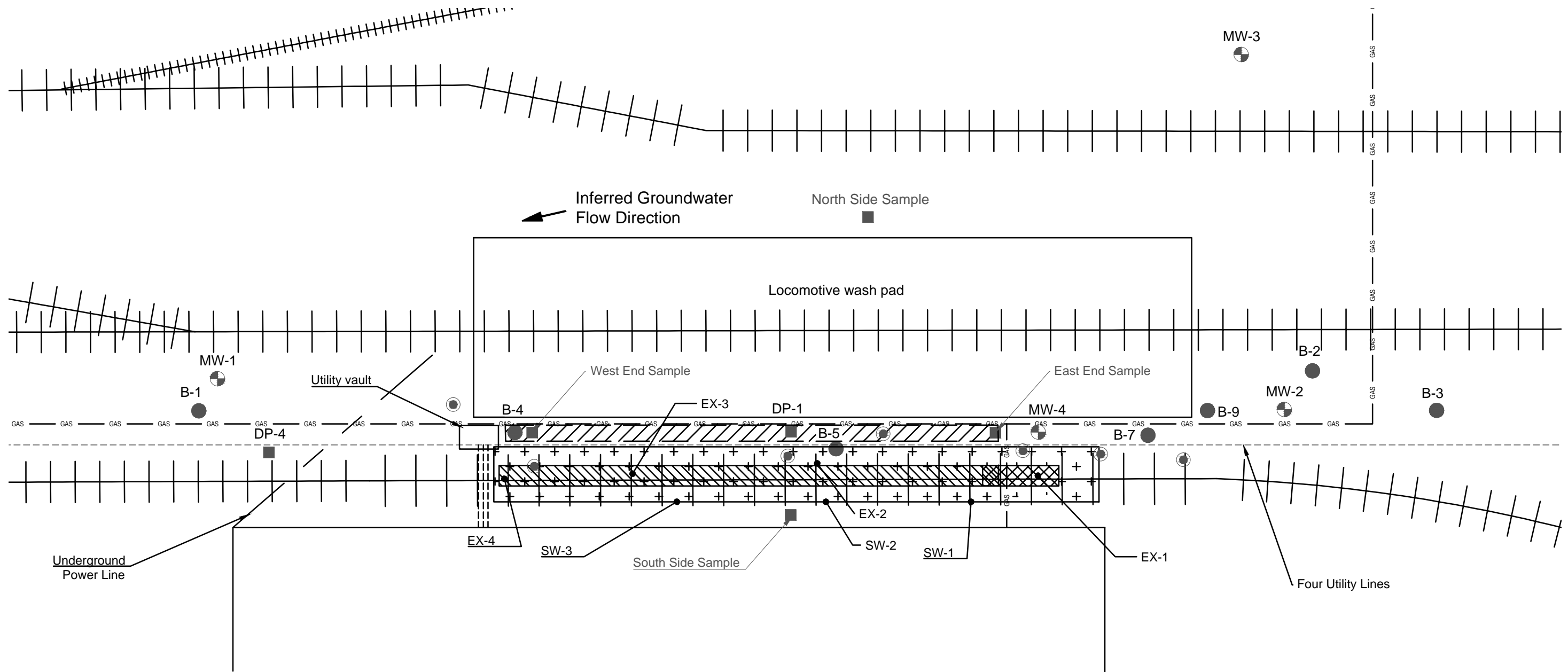


Project Mgr:	EAD	Project No.	81127060
Drawn By:	RMS	Scale:	AS SHOWN
Checked By:	MDN	File No.	Fig2, P2 Plan.dwg
Approved By:	MYW	Date:	September 2014

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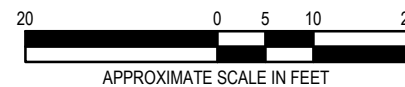
SITE DIAGRAM
 Progress Rail Services
 4012 SR 509 South Frontage Road
 Tacoma, Pierce County, Washington

FIG. No.
2



LEGEND

- Proposed Boring Location
- Boring completed by Terracon
- ⊕ Monitoring well completed by Terracon
- Boring completed by others
- ▨ (diagonal lines) Approximate 2-foot deep excavation completed by others
- ⊕ (crosses) Approximate 2-foot deep excavation completed by Terracon
- ▨ (diagonal lines) Approximate 7-foot deep trench completed by Terracon to direct mix ORC into the saturated soils
- ▩ (cross-hatch) Approximate 4-foot deep excavation completed by Terracon



Information from previous investigation was provided to Terracon by Progress Rail

Project Mgr:	MDN	Project No.	81167031
Drawn By:	EAD/AAS	Scale:	As Shown
Checked By:	MDN	File No.	*.dwg
Approved By:	MYW	Date:	January 2016

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Site Plan
Progress Rail Site
4012 SR 509 South Frontage Road
Tacoma, Pierce County, Washington

FIG. No.
3