1514 Taylor Way Development

Interim Action Work Plan

Prepared for

Avenue 55, LLC
600 University Street, Suite 2305
Seattle, WA 98101

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20 YEARS FLOYD | SNIDER
strategy ▪ science ▪ engineering
Two Union Square • 601 Union Street • Suite 600
Seattle, Washington 98101 • tel: 206.292.2078

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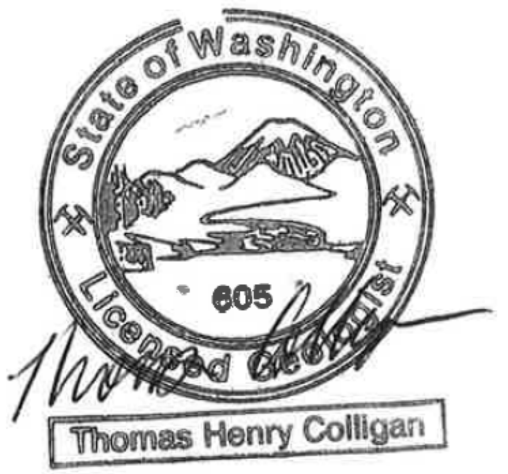
The interpretations and conclusions contained in this report are based in part on site characterization data collected by others and provided by Avenue 55, LLC. Floyd|Snider cannot assure the accuracy of this information.

1514 Taylor Way Development

Interim Action Work Plan

LICENSED GEOLOGIST CERTIFICATION

This document has been prepared for Avenue 55, LLC, under the direction of:



Name: Tom Colligan, LHG
Date: 6/07/2017

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Acronym/ Abbreviation	Definition
AO	Agreed Order
BEHP	Bis(2-Ethylhexyl)phthalate
bgs	Below ground surface
COC	Contaminant of concern
cPAH	Carcinogenic polycyclic aromatic hydrocarbon
CSWGP	Construction Stormwater General Permit
DRO	Diesel-range organics
Ecology	Washington State Department of Ecology
FS	Feasibility Study
GRO	Gasoline-range organics
GWSL	Groundwater screening level
HASP	Health and Safety Plan
IAWP	Interim Action Work Plan
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
MTCA	Model Toxics Control Act
ORO	Heavy oil-range organics
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PCP	Pentachlorophenol
ppb	Parts per billion
Prologis	Prologis Inc.
PRT	Post-run tubing system
RI	Remedial Investigation

Acronym/ Abbreviation	**Definition**
RL	Remediation Level
Site	1514 Taylor Way Development property
SSL	Soil screening level
SVOC	Semivolatile organic compounds
SWPPP	Stormwater Pollution Prevention Plan
TPH	Total petroleum hydrocarbon
TWAAFA	Taylor Way and Alexander Avenue Fill Area
UST	Underground storage tank
VOC	Volatile organic compound
WAC	Washington Administrative Code

1.0 Introduction

This Interim Action Work Plan (IAWP) presents the planned approach to address soil and groundwater contamination at the 1514 Taylor Way Development property in Tacoma, Washington (the Interim Action Area;[1] Figure 1.1). The IAWP was prepared on behalf of Avenue 55, LLC (Avenue 55), who entered into a 2016 contingency agreement with the Port of Tacoma (Port) to lease the property. Avenue 55 proposes to construct two warehouse/distribution centers totaling 203,580 square feet beginning in the summer of 2017. The 2016 contingency agreement enables Avenue 55 to obtain all necessary permits, consents, and approvals including the State Environmental Policy Act ("SEPA") approval for the development (as evidenced by a final, non-appealable Mitigated Determination of Non-Significance (MDNS; hereafter referred to as the SEPA Approval) and the issuance of a fully-executed Agreed Order (AO) for implementing this IAWP. The Port is the lead SEPA agency for this development action and the Washington State Department of Ecology (Ecology) is the SEPA agency for the implementation of this IAWP. The SEPA checklist and MDNS issued by the Port for the development are included in Appendix A.

This IAWP is a continuation of work begun in 2006 by Prologis Inc. (Prologis), the landowner at that time. Prologis undertook a Remedial Investigation (RI) and Feasibility Study (FS) for the property in accordance with an AO with Ecology. The RI/FS defined contamination related to the fill history at the property and the environmental conditions adjacent to the neighboring former CleanCare facility. Subsequent to that work, Ecology included the 1514 Taylor Way property along with other nearby properties into a larger area defined by presence of a variety of industrial fill types. This area has been termed the "Taylor Way and Alexander Avenue Fill Area" (TWAAFA) Site and includes the former CleanCare facility, the Philip Services Corporation Hazardous Waste Facility (now Stericycle), the Hylebos Marsh, and the Potter property (refer to Figure 1.2). As a consequence of Ecology's actions, even though the work proposed herein is identical to the preferred final remedy in the FS, it is administratively considered an interim cleanup action, as this property is now part of a larger Site, the TWAAFA, which will undergo an RI/FS under a separate Ecology order.

This IAWP was prepared to be consistent with requirements described in Section 173-340-430(7) of the Washington Administrative Code (WAC). These requirements include, as appropriate:

1. A description of the interim action—Section 4.0
2. Information from the applicable subsections of the RI/FS—Section 5.0
3. Applicable design and construction requirements—Section 6.0
4. Compliance monitoring—Section 6.0
5. A sampling and analysis plan—Appendix B
6. A health and safety plan—Appendix C

[1] The terms "Interim Action Area" and "property" are used interchangeably in this document.

2.0 Project Organization

This project will be conducted with the assistance and coordination of numerous parties. People directly responsible for major tasks, and their roles associated with this project, are identified below.

Name	Company	Project Role
Steve Teel	Washington State Department of Ecology	Cleanup Site Manager
Scott Hooton	Port of Tacoma	Potentially Liable Party Representative
Drew Zaborowski	Avenue 55, LLC	Developer
Dan Balmelli	Barghausen Consulting Engineers, Inc.	Civil Engineer
Tom Colligan	Floyd|Snider	Environmental Consultant
Bryan Ploetz	Sierra Construction Company, Inc.	Contractor
Mike Spillane	Herrera Environmental Consultants	Landfill Gas Engineer

3.0 Background

3.1 SITE DESCRIPTION

The Interim Action Area is approximately 10 acres and is located at 1514 Taylor Way, in Tacoma, Washington, between the Hylebos Waterway to the north and the Blair Waterway to the south. The topography of the property is flat, sloping gently to the southwest. Currently the property is undeveloped and unpaved, and fenced. The only feature of note is a large mound of soil (surcharge pile) in the southeastern corner of the property, and a detention pond for stormwater runoff originating from the adjacent former Safeway distribution center is located to the east.

3.2 SITE OWNERSHIP HISTORY

A summary of the site history from the RI Report is provided in this section (Floyd|Snider 2006a). The earliest land title record indicates that the property was first sold by Pierce County to the Shaffer Pulp Company in 1935. Subsequent owners included the Nelson Boiler and Tank Company, an unspecified “Smaller War Plant” for 8 months during 1945 to 1946, and then George and Bessie Marvin later in 1946. The Mutual Fir Column Company, a successor corporation to George and Bessie Marvin, and/or Buffelen apparently milled lumber at the Site until the Lindal Cedar Homes operations began in 1975; Lindal Cedar Homes continued operation until 1982, manufacturing prefabricated homes.

AOL Express, a subsidiary of Carr-Gottstein Foods (a grocery chain in Alaska), bought the Site after 1982. AOL Express used the property to warehouse prepackaged products (e.g., groceries, household products, and clothing) for short-term storage prior to shipment to Alaska until 1998, when the property was purchased by Prologis. Prologis acquired the property in 1998 from Gateway Consolidators/Carr-Gottstein, which formed via a merger with AOL Express.

According to the land title record, there are also a few leases on record from the 1940s and 1950s, such as the Lawrence Warehouse Company and Pacific Molasses Company.

3.3 PETROLEUM RELEASE

In 1990, total petroleum hydrocarbon (TPH) contamination–specifically gasoline-range organics (GRO)—was found in soil and groundwater from a former leaking underground storage tank (UST). This contamination was cleaned up on behalf of AOL Express, and in June 2000, Ecology issued a No Further Action determination for the UST GRO release.

3.4 ECOLOGY AGREED ORDER

Prologis entered into an Ecology AO, No. DE 04TCPSR-1160, on January 19, 2005, based on the potential for the presence of hazardous substances on the property (as a result of the potential presence and subsequent migration of hazardous substances originating from an adjoining property). The AO required Prologis to perform a RI/FS. Ecology confirmed that the scope of work associated with the AO was completed, in a certified letter dated December 19, 2006. The FS identified a preferred remedy consisting of capping of contaminated soils by either pavement or buildings, as part of redevelopment of the property (Floyd|Snider 2006b). Findings of the RI/FS are described below and in Section 5.0 of this IAWP.

3.5 FILL HISTORY

A summary of the property fill history from the RI Work Plan and RI Report is provided in this section (Floyd|Snider 2004 and 2006a). Fill history for the property begins as early as the 1920s when Mutual Fir Column Company and/or Buffelen reportedly operated a lumber milling operation on the northern half of the property. A 1936 aerial photograph indicates that grading was conducted in the vicinity of the property and fill had been placed along much of the northern half of the property. The southern half of the property remained unfilled tidal marsh. The filling along Taylor Way likely raised the original grade of the property several feet to match the street elevation. It is likely that this fill was placed as foundation grade soil consisting of locally derived sand/gravel or hydraulic fill sands in advance of property development. Wood debris and sawdust were likely generated on-property during the time period the facility was used for woodworking. It is also likely that some of this debris was used as fill in various locations on-property, including possibly atop the original tidal marsh lands. This is supported by geotechnical and environmental boring logs that indicate the presence of “wood chips” or “wood” in the upper 5 feet or so of what is otherwise described as sandy/gravelly fill soil.

By 1946, a prominent curved rail spur is visible in aerial photographs cutting across the northern half of the property from Taylor Way to south of the existing buildings. A 1960 aerial photograph shows rail cars on either side of a linear building located at the south end of the building complex. The roadbed for the rail spur was built on what appears to be an embankment that led down to a large ponded marsh area covering much of the southern part of the property. This marsh extended onto the CleanCare and Philip Services Corporation facilities. This embankment physically separated the southern half of the property from the northern, developed half.

The former large marsh pond is within the Don Oline Landfill. The Don Oline Landfill is associated with filling low areas of the marsh by dumping various industrial wastes, including: lime solvent sludge from the Hooker Chemical Corp., lime waste from Domtar, and byproducts of auto scrapping (auto fluff) from General Metals (Tacoma-Pierce County Health Department 2001). The lime solvent sludge and auto fluff have been associated with chemical contaminants including chlorinated solvents, petroleum hydrocarbons, polychlorinated biphenyls (PCBs), and heavy metals.

CleanCare was initially developed in the late 1970s. By 1979, tanks are first visible in aerial photographs and are confined to the western portion of the CleanCare facility. In a 1982 photograph, filling activities are still evident, but appear to be limited to the undeveloped eastern portion of the CleanCare facility. Photographs from 1985 and later show no further evidence of filling, as the CleanCare facility appears to be fully developed by this time.

4.0 Description of the Interim Action

4.1. GENERAL DESCRIPTION

The interim action includes a number of components that will result in a protective remedy to block the specific exposure pathway discussed in Section 5.4, which is primarily workers and wildlife coming into contact with contaminated soil. When finished, the development will include two buildings totaling 440,000 square feet and associated pavement covering approximately 90 percent of the entire 10-acre property, with less than 10 percent left pervious (due to City of Tacoma landscaping requirements). Pavement and buildings will also reduce the amount of infiltration, reducing the potential for another exposure pathway—leaching of contaminants in property soils to groundwater, which ultimately discharges to the marine waters. Following completion of the development, institutional controls will be implemented at the parcels through a Restrictive Covenant, which the Port will prepare in consultation with Ecology, consistent with WAC 173-340-440 and the Revised Code of Washington § 64.7.

The 10 existing groundwater monitoring wells will be abandoned prior to construction. It is expected that the locations of replacement wells required for future groundwater monitoring will be identified in the Quarterly Groundwater Monitoring Plan that Ecology will review and approve, as described in a draft AO for the TWAAFA Site.

4.1.1 Construction Details

To establish a firm subgrade, the first activity will be to import 1 to 2 feet of fill that will be laid out across the building footprints. This will be followed by dynamic compaction of the underlying fill soils. Dynamic compaction uses a crane to lift and drop a heavy weight across the ground surface. This process will create a series of small equally spaced depressions that will consolidate existing soils. This will be followed by the import of approximately 28,000 cubic yards of soil from an off-property location. This fill will be placed in large piles to surcharge (i.e., induce settlement) soil that will further compact the existing property soils. The settling caused by the surcharge piles takes about 6 to 8 weeks and will be monitored using settlement markers. The markers will be monitored and recorded weekly until the anticipated settling has been reached as determined by the geotechnical engineer. Estimated settling will range from 3 to 7 inches. Once adequate settling has been achieved, the surcharge pile will be regraded by removing the top 4 feet to meet the final grades necessary for the building floor slabs. It is possible that some of the imported fill required for surcharging will need to be taken off-property if grading results in an excess of soil.

Following grading, warehouse foundation footings will be constructed, followed by the erection of walls/roofs and pouring of floors and truck bays. Underground utilities will also be installed before surrounding hardscape and landscape is completed. Civil engineering drawings for surcharging and property grading and construction stormwater controls are presented in Appendix D.

For the most part, construction worker contact with any existing contaminated material will be limited because excavation into existing property soils will only be necessary during installation of utilities or certain footings. The location of the underground utilities (storm and sanitary sewers) are shown in the drawing entitled “Preliminary Water and Sewer Plan” in Appendix D. The scope of work and procedures for contaminated material management when existing property soils are disturbed is detailed in Section 7.0.

The final property surface, consisting of warehouse buildings and pavement/landscaping will serve as a protective barrier to human and ecological receptors. After construction, stormwater on the property will be collected through stormwater catch basins and routed through an on-property below grade stormwater treatment vault before being discharged into the municipal stormwater conveyance system. No on-property infiltration of stormwater into the underlying native/import soil will occur other than what infiltrates naturally through the limited areas of landscaping that are required in parking areas.

Figure 4.1 outlines the main remedy elements during construction and Appendix D contains the preliminary engineering construction drawing set. Further details of the above-described activities are provided in Sections 6.0 and 7.0.

4.2 OTHER ALTERNATIVES CONSIDERED

The 2006 FS examined other options for addressing the contaminated soils at the property. These options included excavation of soils and encapsulation/stabilization of the same. The large tonnage of contaminated soil (approximately 70,000 tons) rendered both of these other alternatives disproportionately expensive compared to the preferred capping alternative. In addition, soil removal was not expected to result in a more protective remedy given the limited amount of groundwater contamination within the Interim Action Area.

5.0 Information from the Remedial Investigation/Feasibility Study

The following sections describing property conditions are taken from the RI Report and updated with the results of a recently performed groundwater sampling event and geotechnical investigation.

5.1 SOIL AND FILL MATERIAL

The surface fill layer at the property consists of either sandy gravel or gravelly sand in places with intermixed solid wastes. The surface fill layer thickness was observed to vary from approximately 3 to 8 feet in thickness throughout the property, except in the surcharge pile area where the surcharge and underlying fill is about 12 feet in combined thickness.

The following surface fill types were noted:

- **Dredge fill consisting of sand, sandy silt, and silty sand.** Dredge soils are characterized by the presence of shell fragments, which were observed in multiple test pits.
- **Recent construction fill consisting of sandy gravel.** Construction fill was likely used to fill to grade certain parts of the property prior to construction and in places underlain by a geotextile fabric.
- **Debris found intermixed or in between soil-rich layers consisting of concrete rubble, waste lumber, glass, metal or brick fragments, plastic, etc.** The debris was probably generated during general property regrading and possibly past demolition of the pre-existing buildings.
- **Wood wastes (e.g., wood chips, sawdust, crushed or chipped lumber), such as those associated with log sort yards or wood-manufacturing facilities.** Several test pits contained appreciable thickness of wood waste.
- **Paste-like white semi-solid material.** A paste-like white semi-solid material was initially found at an RI Test Pit TP-4 just under the ground surface and occurring within an approximately 10,000-square-foot semi-circular area extending to the property line with CleanCare. This fill type consists of up to 2 feet of whitish-gray clayey material with embedded gravel to cobble sized whiter, more brittle nodules. This paste-like material was found in one other location, at Well PWM-4B in two layers between 6 and 8.5 feet below ground surface (bgs). This well is located within the surcharge pile. The presence of this material at this depth indicates it is present both within and near the base of the surcharge pile. The paste-like material was not found in any of the surcharge pile explorations.

No observations of auto fluff or lime solvent sludge were noted. There were also no observations of highly impacted soil (e.g., heavy petroleum sheens, or heavily stained or highly odorous soil).

Underlying the surface fill layer is a native silt layer, gray to brown in color, with varying amounts of clay, sand, and woody organic material (roots or wood fibers). The silt layer was observed to have a thickness of 1 to 5 feet.

The native sand layer underlies the marsh silt layer. The sand is generally fine to medium-grained with minor gravel, loose, dark gray in color with red and white flecks. The soil borings or well and piezometer installations did not reach the bottom of the native sand layer.

In 2016, Terra Associates, Inc. performed a geotechnical engineering study of the soil conditions at the property to assess redevelopment considerations. As part of the study, 10 test pits were dug across the property. Findings for the soil conditions and debris content were generally consistent with the RI report, showing mostly woody debris with some rubble. No odors, sheens, or other signs of contamination including auto fluff or lime solvent sludge were noted. Test pit and cone penetrometer locations for the 2016 study are shown in Figure 5.1 and the report containing the associated logs is presented in Appendix E.

5.1.1 Contaminants of Concern in Soil

Numerous soil samples were collected across the property during the RI via test pits and soil borings. Results at that time were compared to numerical soil screening levels (SSLs). The SSLs used were developed for the nearby Philip Services facility (now Stericycle) and are considered protective of a variety of exposure pathways including worker exposure to soil and groundwater, ecological exposure, and soil leaching to groundwater at concentrations that would exceed ambient surface water quality criteria.

- **PCBs.** There were not any detections of PCBs in any of the samples analyzed; therefore, PCBs were not retained as contaminants of concerns (COCs) for soil
- **Volatile Organic Compounds (VOCs).** Of the 33 samples, only 1 showed gasoline constituents; however, concentrations were less than SSLs. VOCs were not detected in any of the whitish paste samples collected near TP-4 (four individual samples of the paste were analyzed: TWP05-4-02, -41-01, -42-01, and -46-01), indicating this whitish paste is lime waste from the nearby Domtar facility and not lime solvent sludge from Hooker Chemical Corp. VOCs were not retained as COCs for soil.
- **TPH.** Several sample results showed detections of GRO, and diesel-range organics (DRO). Heavy oil-range organics (ORO) were detected at the greatest concentrations with lesser amounts of DRO and also no GRO. Most of the ORO was found in the surcharge soil, which displayed a hydrocarbon odor. However, the single sample that exceeded the SSL of the 32 samples was not from the surcharge pile but from TP-1, in which ORO was detected at 2,300 milligrams per kilogram (mg/kg), a concentration that slightly exceeded the SSL of 2,000 mg/kg. ORO was retained as a COC.
- **Semivolatile Organic Compounds (SVOCs).** Several sample results showed detections of various polycyclic aromatic hydrocarbon (PAH) compounds, including some carcinogenic PAH (cPAH) compounds at concentrations that did exceed the SSLs. It is likely that in at least some samples, the cPAH detections are associated with the

normal composition of ORO. Pentachlorophenol (PCP) was the only other SVOC detected, but only in one sample from test pit TP-16 at a concentration that exceeded the SSL. Therefore, cPAH and PCP were retained as soil COCs.

- **Metals.** A total of eight metals were detected at concentrations that exceeded the SSLs, which were based on a conservative formula value that predicts leaching of metals to groundwater at concentrations that exceed surface water criteria. Metals exceedances of the SSLs were typically limited to the eastern and southeast portions of the property. The metals that exceeded the SSLs included: arsenic, barium, cadmium, chromium, copper, lead, mercury, and zinc. The greatest concentrations of arsenic, chromium, and mercury were associated with the sample TWP05-04-02 of paste-like fill material. However, the sample collected below the paste also had concentrations of metals exceeding SSLs, including copper, lead, and zinc. These eight metals were retained as soil COCs.

5.2 GROUNDWATER

5.2.1 Hydrogeologic Units

A study of the groundwater conditions at the property was conducted during the RI and updated with information found during the 2016 Geotechnical Report. The hydrogeologic conditions at the property are similar to those found throughout the Commencement Bay Tideflats. The near-surface hydrogeologic layers are identified as follows:

- Shallow fill aquifer
- Upper aquitard
- Intermediate aquifer

The shallow fill aquifer at the property is unconfined and exists solely in the fill soil. Its thickness varies between 1 to 5 feet and is shallower near the northwest side of the property. Water levels in the shallow fill aquifer fluctuate considerably in response to seasonal variations in precipitation and can be as shallow as 2 feet below grade. This aquifer is not tidally influenced. The shallow fill aquifer is equivalent to the designated A and B Zones at the CleanCare facility. The shallow fill aquifer is separated from the intermediate aquifer by the fine grained silty sediments from the original tidal marsh. This marsh layer forms an aquitard due to its high clay/silt content. The upper aquitard was found in all five exploration locations where intermediate wells were installed.

The intermediate aquifer exists in the native sand layer, which underlies the tidal marsh clay/silt layer, as described above, and is subject to tidal influence by the Hylebos and Blair Waterways. This aquifer is equivalent to the designated C Zone at the CleanCare facility.

5.2.2 Groundwater Flow

The shallow fill aquifer piezometric surfaces indicate a consistent northeasterly groundwater flow pattern. Groundwater elevations are highest in wells located along the western side of the property (i.e., those bordering CleanCare), and lowest in wells in the middle portion of the property. The flow direction is in accordance with the topographical gradient of the property. The lowest elevations occurred in Wells PMW-2A and PMW-3A. This caused the contours to form a "trough" in this area.

For the shallow fill aquifer, the CleanCare facility is upgradient of the Interim Action Area. Variations in the specific groundwater surface elevations due to seasonal fluctuations were observed during the three sampling events, but these fluctuations were not significant enough to alter the overall flow pattern for the shallow fill aquifer. Figure 5.2 is a reproduction of the March 2006 groundwater flow map produced during the RI for the shallow fill aquifer.

The flow direction of the intermediate aquifer across the property is generally to the south or southwest (i.e., toward the CleanCare facility). The piezometric gradient, however, is much flatter in the intermediate aquifer compared to the shallow fill aquifer. The elevation of the groundwater surface in the shallow fill aquifer surface was always higher compared to the intermediate aquifer, typically in the range of 3 to 5 feet higher, indicating a downward vertical hydraulic gradient.

5.2.3 Contaminants of Concern in Groundwater Identified during the Remedial Investigation

The following is a summary of the COCs found in groundwater as a result of three rounds of sampling in 2005 and 2006.

- **VOCs.** Very few VOCs were detected. The most common VOCs detected in property groundwater were toluene and isopropyltoluene. However, none of the detected VOCs exceeded the groundwater screening levels (GWSLs).
- **TPH.** There were occasional detections of GRO in groundwater but at concentrations substantially less than the GWSL. DRO and ORO were not detected at concentrations greater than GWSLs in any property groundwater sample, but did exceed GWSLs in samples from wells on the CleanCare facility.
- **SVOCs.** Several sample results showed detections of various PAH compounds including 3,4-methylphenol, bis(2-ethylhexyl)phthalate (BEHP), and PCP. The concentrations of PCP and BEHP exceeded the GWSLs. The SVOC detections primarily occurred in the first round of sampling (September 2005). Subsequent sampling did not confirm the presence of PCP in groundwater. BEHP was not detected in the first round of sampling and, with the exception of one sample collected from Well PMW-4b, the BEHP detected in subsequent sampling rounds was at concentrations less than the GWSLs. BEHP was also detected in the laboratory blank. The earlier detections of PCP were possibly due to sample turbidity cross-contamination that was resolved by subsequent well sampling. BEHP and PCP were retained as potential COCs.

- **Metals.** A number of metals were detected; however, only arsenic and lead concentrations exceeded GWSLs. Lead was detected at a concentration greater than the GWSL at one location (PMW-2a) during only the first round of sampling (September 2005). An elevated concentration of zinc was also noted. Subsequent sample results from this well for lead and zinc were substantially less, indicating that turbidity due to insufficient well development were likely the cause of the initial detection. The maximum concentration of arsenic in the shallow fill aquifer, excluding the first sampling round, was 13 parts per billion (ppb), and for the intermediate aquifer, was 21 ppb. Arsenic was retained as a COC.

5.2.4 2016 Groundwater Sampling Update

The 10 existing property monitoring wells consisting of 5 well pairs (shallow fill/intermediate aquifer) were re-sampled on December 28, 2016, at the request of Ecology. Results from the 2016 sampling event are shown on Table 5.1 and Figure 5.3, and the laboratory report from that event is in Appendix F. Compared to the 2005/2006 results, the 2016 sampling indicates few detections of contaminants and concentrations are similar or lower for VOCs, SVOCs, metals, and GRO. DRO and ORO concentrations are higher compared to the results from previous investigations because samples did not undergo silica gel cleanup per Ecology current policy. All results were entered into Ecology's Environmental Information Monitoring database.

- **VOCs.** Only two VOCs were detected: methyl-tert-butyl-ether and naphthalene. Concentrations were below the Model Toxics Control Act (MTCA) Method A levels for groundwater. The 2016 data confirm that VOCs are not COCs in groundwater.
- **TPH.** GRO and DRO concentrations were less than screening levels. Five locations (PMW-1A, -1B, -4B, -5A, and -5B) showed ORO exceeding screening levels. This result differs from the 2005/2006 RI results for DRO and ORO in part possibly because silica gel cleanup was not used to remove polar organic compounds from the 2016 samples. Review of the sample chromatograms for the DRO and ORO analysis suggests an unresolved chromatographic envelope that is not indicative of a commercial petroleum product; instead, the chromatograms suggest a highly weathered petroleum with what could be biogenic interferences due to either degraded hydrocarbons or naturally occurring organics found in woody debris. However, the ORO exceedances were all found in wells closest to CleanCare, and no exceedances were found in the downgradient wells PMW-2A/2B and PMW-3A/3B. ORO was added as a COC based on 2016 data.
- **SVOCs.** Concentrations of PAH compounds, including 1- and 2-methylnaphtalene, acenaphthene, fluorene, phenanthrene, and naphthalene, were found in monitoring well samples from the upper aquifer at concentrations less than screening levels. PCP and BEHP, which were detected at concentrations greater than screening levels in 2005/2006, were not detected in 2016. PCP and BEHP were, therefore, not retained as COCs based on 2016 data.

- **Metals.** Metal concentrations were generally consistent with previous investigations with only arsenic detected at concentrations greater than screening levels and only in 2 of 10 samples. The highest arsenic concentration was 25 ppb, found at location PMW-3b within the intermediate aquifer. This compares well to the maximum concentration detected in 2005/2006 of 27 µg/L. Arsenic was retained as a COC.

5.3 METHANE AND VAPOR SURVEY

The potential for VOCs and methane to occur in the vapor phase in the vadose zone at concentrations that could pose a risk to a future on-site building was not evaluated during the 2006 RI. Therefore, at the request of Ecology, a vapor survey was undertaken in December of 2016 to assess these risks.

Methane concentrations were measured on December 27, 2016, at eight locations on-property. At each location, an initial bore hole was created using a Geoprobe drill rig to measure the depth to groundwater. A post-run tubing system (PRT) with polyethylene tubing was then inserted 6 inches above the water table or 5 feet bgs if no groundwater was encountered, and sealed using bentonite chips and a putty cap. At some locations, a 6-inch screened probe was used in place of the PRT due to fluctuating groundwater measurements; however, the tubing and seal were identical. A GEM 2000 Plus landfill gas meter was connected to the tubing and, after an equalization period of 2 minutes, measurements were recorded for methane, oxygen, carbon dioxide, and hydrogen sulfide every 20 seconds for 1 minute. Methane was detected at only one location at a concentration of 1.4 percent by volume and, due to the low methane concentrations, no differential pressure testing was necessary. However, methane measurements were unable to be taken at an additional 14 proposed locations on-property due to inaccessibility of the drill rig or shallow groundwater measured at 1 foot bgs or less due to high rainfall and saturated soil conditions at the property.

To better understand the potential for methane risk, dissolved methane was measured from groundwater samples collected at the five shallow fill aquifer monitoring wells. Concentrations ranged from 0.17 to 14.6 milligrams per liter (mg/L). These concentrations are well less than the 26 mg/L saturation limit (at atmospheric pressure) that could lead to methane off gassing from groundwater and air displacement by methane gas accumulations in the vadose zone.

The risk for methane is very low at this property based on the work described above. However, to confirm this, prior to the building construction, a revised vapor survey will be conducted after the surcharge soils have been graded to their final elevation. The work plan for that event, along with the 2016 Methane Survey results, are presented in Appendix B.

5.4 CONCEPTUAL SITE MODEL

The conceptual site model describes, in general terms, affected media, environmental pathways, and potential exposure routes and receptors given the specific environmental conditions and contaminants detected on the property.

Contaminated media at the property include soil containing TPH, cPAH, PCP, and arsenic and other metals, and groundwater containing primarily TPH and arsenic.

There is a potential exposure route of VOCs or methane vaporizing into the indoor air spaces of proposed warehouse buildings. While previous investigations on-site have not found any evidence of a potential vapor intrusion risk, a future property investigation, including a VOC and methane survey, is scheduled for the summer of 2017, prior to the building construction.

The conceptual site model for how these contaminants pose a human health or ecological risk is shown in Figure 5.4. The primary completed exposure scenarios are (1) human exposure to contaminated soil via direct contact[2] and (2) wildlife exposure to contaminated soil. The soil to groundwater to surface water pathway is incomplete because there is no evidence of migration off-property of arsenic and TPH, the two groundwater COCs.

Development of the property will block the worker exposure and ecological exposure scenarios. Capping will also reduce infiltration, leading to a reduction in the amount of water contained in the shallow fill aquifer, thereby lessening the potential of property soils being a source of groundwater contamination.

The conceptual site model also considered future risk in a post-construction scenario. Figure 5.4 identifies a potentially completed pathway if utility workers dig below the pavement in the future and become exposed to contaminants for a limited amount of time.

The drinking water exposure route was not considered. The shallow and intermediate groundwater in the tideflats area is non-potable based on the proximity and hydraulic connection to the brackish waters of Commencement Bay. Deeper aquifers are considered potable; however, strong upward gradients in deep aquifers indicate that hazardous substances are unlikely to be transported to the deep groundwater. Instead, the upper aquifers ultimately discharge to surface water. The remedial objective for groundwater is, therefore, the protection of nearby surface waters (adjacent Blair and Hylebos Waterways). The property qualifies for an exclusion from an ecological evaluation based on future land use per WAC 173-340-7491, as the preferred remedy is paving of the property and covering the contaminated soils with buildings or pavement.

5.5 INTERIM ACTION SOIL AND GROUNDWATER CLEANUP AND REMEDIATION LEVELS

Initial cleanup levels for this property were set in the 2006 RI/FS. Following discussion with Ecology, these cleanup levels were updated to be consistent with current Ecology cleanup levels defined in the CLARC database. In addition, cleanup levels were developed using specific exposure assumptions provided by Ecology that are protective of future utility workers based on

[2] It is important to note that the COCs identified in the RI/FS were detected at concentrations far less than those necessary to protect workers, except arsenic, which slightly exceeded the MTCA Method C standard of 88 mg/kg in 1 of 25 locations sampled (test pit TP-4, where 130 mg/kg of arsenic was detected).

a post-construction scenario in which a worker is exposed to contaminated soil below the pavement during trenching activities.

Current cleanup levels and the resultant interim action remediation levels (RLs) for the COCs in soil are presented in Table 5.2 The purpose of the RL is to set an upper bound on soil contamination that could be left on-property under pavement if encountered during construction. The lowest of all the various cleanup levels was then chosen as the interim action RL. The RLs were typically set at the highest detected soil concentrations for each individual soil COCs as these maximum concentrations are considered empirically protective of groundwater based on the lack of significant groundwater contamination at this property.

For groundwater, its primary risk pathways are worker exposure to contaminated groundwater during construction and discharge to marine surface water. Therefore, Table 5.3 lists the maximum detections of the COCs in comparison to cleanup levels for these pathways. For the most part, the Interim Action cleanup levels were set equivalent to Applicable or Relevant and Appropriate Requirements—typically the marine chronic MTCA Method B surface water cleanup levels listed in CLARC or the MTCA Method A value.

5.6 INSTITUTIONAL CONTROLS

In consultation with Ecology, the Port will prepare an Environmental Restrictive Covenant that will be used to implement Institutional Controls for the Port parcels subject to this IAWP. The Covenant will be consistent with WAC 173-340-440 and RCW 64.70 to restrict future activities and uses of the parcels as agreed to by Ecology and the Port.

6.0 Applicable Design and Construction Requirements

6.1 HEALTH AND SAFETY

Existing property soils will not be moved or relocated during construction except during trenching for utilities and possibly digging for footings. The first activity at the property will be covering existing property soils with fill to establish elevations for the pavement and buildings. In the event that a construction activity, such as trenching, involves risk of contact with underlying contaminated soil or groundwater, personnel will adhere to the health and safety protocols included in the contractor's construction project documents. The Floyd|Snider Health and Safety Plan (HASP) for FloydSnider personnel to follow when digging into potentially contaminated soils is presented in Appendix C. The contractor will develop their own HASP consistent with Washington Industrial Safety and Health Act regulations.

6.2 PERMITS AND SCHEDULE

Avenue 55, LLC, as the developer, has obtained the necessary permits from the City of Tacoma to develop the property. These include a property development permit and a commercial new building permit. Preliminary civil drawings that show expected final property grades and building layout, utilities, and other plans are provided in Appendix D. In addition, coverage under Ecology's construction general stormwater permit will be required.

Construction will begin in summer of 2017, with most earth work done by late fall of 2017. The building and support utilities will be constructed in winter of 2017 and open for occupancy in spring of 2018.

6.3 SOIL IMPORT

The development plan will consist of raising the current grade by 2 to 4 feet in most places. Appendix D drawings shows plan and section views of fill thickness across the property. Prior to this filling, the existing soils under the building footprints will be compacted to consolidate loose soils. The filling will be done by bringing in an additional 28,000 cubic yards of fill soil to create two surcharge piles. The location of the surcharge piles are shown on Figure 4.1. Settling of the surcharge piles will be monitored using settlement markers as depicted in the Geotechnical Report in Appendix E. It is anticipated that about 3 to 7 inches of settling will occur over the 6 to 8 weeks allotted. Following the pre-loading period, the top 4 feet of the surcharge soil piles (around 8,700 cy) would be cut down to meet the finished floor elevation requirements of the new buildings. The removed soil would be redistributed across the entire property to meet final grade requirements. There may be some excess clean fill soil after surcharging that will also need to be moved off property depending on final grading.

It is possible that multiple sources for this amount of fill material will be necessary. Any fill source soil shall be first considered for acceptance by review of a Phase I Environmental Site Assessment or similar due diligence[3] regarding the likelihood of a "recognized environmental condition." Soil will only be imported after this review determines that past or current use has not potentially resulted in impacts to the soil at concentrations exceeding either MTCA Method A or B unrestricted land use concentrations. A property visit shall be performed if necessary to verify that the import fill soil is likely to meet unrestricted land use standards. Ecology will be notified of the sources of fill material once the due diligence review has been conducted and prior to the actual import of the soil, with the exception of fill brought in from established gravel and sand quarries.

Soil from the following sources will not be used unless laboratory testing has been performed and import has been approved by Ecology. If laboratory testing is conducted, Ecology will be consulted to determine the analytes for testing.[4] The minimum number of samples from the sources below or from sites with recognized environmental conditions (as defined by ASTM International Standard E 1527-13) shall be consistent with Table 6.9 in Ecology's Guidance for Remediation of Contaminated Sites (Ecology 2016).

- Soils from sites lying within the greater than 20-ppm contour of the Tacoma Smelter Plume
- Sites undergoing an environmental cleanup
- Agricultural sites where soils contain pesticides, herbicides, or metals
- Industrial and/or commercial sites where hazardous materials were used, handled, or stored
- Sites where petroleum hydrocarbons could have spilled or leaked into the soil
- Street sweepings
- Commercial sites including: former gasoline service stations
- Retail areas that contained dry cleaning facilities or photographic processing facilities, paint stores, or auto repair and/or painting facilities
- Agricultural supply stores
- Industrial facilities including metal processing shops, manufacturing facilities, aerospace facilities, oil refineries, waste treatment plants, or other similar facilities
- Soil from a thermal desorption remediation or treatment process
- Soil from a biological remediation or treatment process

[3] "'Due diligence' means making a good faith effort using investigative techniques to determine whether there may be a release on a property. Investigative techniques may include use of one or more of the following, as warranted by circumstances: review of property ownership and use history; visual inspections of property and adjoining properties; review of government records; searches for recorded environmental title encumbrances; information from past and present owners, operators, occupants, or neighbors; commonly known or reasonably ascertainable information about a property; obviousness of the presence or likely presence of contaminants; environmental questionnaires; analytical testing results; or environmental assessments or audits." (WAC 173-350-100)

[4] Gravel material (rock or mineral pieces greater than 2 millimeters in diameter with minimal organic material and fines) does not require laboratory analysis.

6.4 METHANE AND VAPOR INTRUSION MITIGATION

The May 2017 vapor survey will be used to make a final assessment of vapor risk. If an unacceptable risk of intrusion is found, a mitigation system will be designed by Herrera Consultants and reviewed by Ecology prior to implementation by the contractor. Continued monitoring of the system's effectiveness will occur post-construction, and these details will be presented in the Mitigation System Operations and Maintenance Plan.

6.5 MONITOR WELL ABANDONMENT

Currently, there are five sets of monitoring well pairs and two sets of piezometer pairs located across the Site. These piezometers and wells will be abandoned prior to construction in accordance with WAC 173-160-460.

6.6 INADVERTENT DISCOVERY PLAN

A cultural resource study was previously completed by the Port of Tacoma for a now-shelved terminal redevelopment project whose footprint includes the subject property (Cultural Resource Consultants, Inc. 2009). The report concluded that the likelihood of encountering cultural resources at the project is very low, and is only a risk if excavation occurs in native sediments below the hydraulic fill at the first aquitard, a native soil layer. Given that no penetrations into native soils will occur during this project, there is no need for on-property archeological monitoring.

An Inadvertent Discovery Plan (Appendix G) was prepared for this project as part of the SEPA process described in Section 1.0. This plan will be followed during property development.

6.7 DELIVERABLES

The following are the anticipated deliverables to Ecology during this project:

- **Engineering Design Report**. This report is not necessary, as the project does not involve remedial engineering, unless a vapor mitigation system is deemed necessary, in which case, an Engineering Design Report for that system will be provided to Ecology.
- **Final Construction Drawings.** The final set of construction drawings that pertain to earth work will be provided to Ecology.
- **Methane Survey and Vapor Intrusion Assessment Report.** A report to document the results of the methane and vapor intrusion surveys and the final recommendation for a mitigation system if necessary. If a vapor intrusion mitigation system is designed it will be included in this report. This report will be delivered to Ecology prior to the installation of the mitigation system.

- **Mitigation System Operation and Maintenance Plan.** This plan will only be completed if it is found after the methane and vapor intrusion survey that it is necessary to implement a mitigation system. The plan will include the activities necessary for the ongoing operation of the system, including training and inspections, as well as a sampling plan for monitoring of the system's performance. Roles and responsibilities will be organized in the plan with a schedule for proposed and anticipated activities.
- **Interim Action Report.** This report will document how the construction activities complied with the IAWP requirements. If a methane collection system is installed, this report will include an as-built of its construction with a description of the as-built mitigation system (if installed), its design and performance specifications, and data and observations collected to demonstrate that the system is performing as designed.
- **Restrictive Covenant.** Covenants will be addressed under the AO implementing this IAWP.

7.0 Site Controls

During construction, controls will be implemented to address proper handling of potentially contaminated soil and groundwater.

7.1 CONTAMINATED SOIL HANDLING

No grading of existing soils will occur other than at the existing surcharge pile, which will be cut down and redistributed across the property following the surcharge period. Most of the excavation activities following property surcharging will involve digging for installation of building footings, which will be dug primarily into imported fill soils, although the base of some footings may penetrate existing soils (final footing plans are not yet available). Currently, the only anticipated activity that would penetrate and bring property soils to the surface is installation of storm and sanitary sewers, and possibly domestic water line, fire water, and electrical utilities. It is anticipated that, at its deepest, the depth of digging or trenching into existing soils is approximately 6 to 8 feet when installing manholes and stormwater vaults.

Any disturbed property soils (excepting imported fill soils) that results from these above-described activities will be screened for chemical contaminants using visual and olfactory observations, and a photoionization detector. Unless the soils show signs of chemical impacts, this soil will be considered “potentially clean” and tested for property soil COCs at the frequency specified in Table 6.9 of Ecology’s Guidance for Remediation of Contaminated Sites (Ecology 2016). If concentrations are less then soil RLs in Table 5.2, this soil will be re-used on-property as backfill.

If potentially impacted soil is encountered, the Environmental Consultant will test the potentially impacted soil. If contaminant levels exceed RLs shown in Table 5.2, then the soil will be disposed of off-property at a facility licensed to receive such wastes or soil.

7.1.1 Decontamination

If construction equipment comes into contact with potentially contaminated soil or groundwater based upon the evidence of chemical impacts described above, that equipment will be decontaminated prior to the handling of clean material. After all potentially contaminated soil has been removed from the location, the bucket will be cleaned to meet a visually clean debris surface using dry methods (broom, brush, etc.) and then wet-washed using water or steam. Wash waters will be captured and disposed of properly (by either discharge to the sewer or absorbed to soils destined for off-site transport).

All decontamination will occur over the potentially contaminated soil stockpile in a way that ensures removed material will remain within the stockpile. Before leaving the property, all equipment will be required to pass through an established quarry spall exit to knock soil off of the wheels, and all buckets or other soil handling devices (shovels, blades, etc.) will be brushed free of loose dirt.

7.1.2 Stockpile Management

If potentially impacted soil, as described above, is encountered, a stockpile area next to the excavation area will be sectioned off away from clean soil stockpiles to avoid any possible mixing. This sectioned area will be lined on the bottom with 40-mil plastic to protect the ground surface and will be bermed with sandbags or an appropriate equivalent to prevent any water runoff. The potentially contaminated stockpile will be covered with plastic sheeting and sandbags at the end of each workday.

7.2 UNSUITABLE SOILS HANDLING

Excavation that extends deeper than 2 to 3 feet below the existing ground surface may encounter organic debris and other inert rubble based upon test pit logs recorded during the 2006 RI and 2016 Geotechnical Investigation (Appendix E). Any debris that is classified as not structurally suitable for backfill will be stockpiled separately and disposed of off-property. Larger pieces of debris, including concrete and metal, will be shaken to remove any loose soil before it is stockpiled for disposal.

7.3 GROUNDWATER HANDLING

Groundwater is not expected to be exposed or otherwise encountered during property construction activities with the exception of the excavation of the stormwater and sewer utilities, which will be deep enough in places to penetrate the shallow fill aquifer. In such cases, dewatering of the excavation or trench may be required. The pumped water will go to a holding tank where it will be discharged to the sanitary sewer under permit in accordance with the discharge limits of the permit (currently in progress of being obtained). Pumped groundwater will not be allowed to infiltrate or discharge off-property.

7.4 CONSTRUCTION STORMWATER

Coverage under the construction stormwater general permit (CSWGP) has been obtained by the contractor. The CSWGP coverage application indicates that this is within a MTCA cleanup site. A requirement of that permit is to prepare a property-specific Stormwater Pollution Prevention Plan (SWPPP), which contains details on how stormwater will be managed at the property to achieve compliance with the permit conditions. The SWPPP is included in Appendix H.

The SWPPP describes temporary erosion and sedimentation control (TESC) measures that will include grading to contain stormwater from running off-property. Property stormwater will be directed to a sediment trap pond that will overflow to an engineered stormwater pond with the pond overflow pumped to holding tanks that will in turn discharge to a sanitary sewer manhole. The stormwater pond will remain in place until final grading occurs to prepare the property for paving.

Following construction, because the property is located in a flow control exempt area, the permanent stormwater system will be hard piped to outfalls discharging to surface water and no infiltration by the stormwater drainage improvements will be required.

Drawings in Appendix D show the anticipated stormwater TESC measures. These measures may be modified during construction depending upon property conditions.

8.0 References

Cultural Resource Consultants, Inc. 2009. *Cultural Resources Overview for the Blair-Hylebos Terminal Redevelopment Project, Tacoma, Pierce County, Washington*. Prepared for Grette Associates. Updated 18 February (Originally published in 2008).

Floyd|Snider. 2004. *Prologis Taylor Way Property, Remedial Investigation/Feasibility Study Work Plan*. Prepared for Prologis. December.

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Tacoma-Pierce County Health Department. 2001. *CleanCare Groundwater Investigation*.

Washington State Department of Ecology (Ecology). 2016. *Guidance for Remediation of Petroleum Contaminated Sites.* Prepared by the Toxics Cleanup Program, Publication No. 10-09-07. June.

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Interim Action Work Plan

Tables

Table 5.1
2016 Groundwater Data Summary

		Location	PMW-1A	PMW-1B	PMW-2A	PMW-2B		PMW-3A	PMW-3B	PMW-4A	PMW-4B	PMW-5A	PMW-5B
		Sample ID	TWP16-PMW1A	TWP16-PMW1B	TWP16-PMW2A	TWP16-PMW2B	TWP16-PMW2X	TWP16-PMW3A	TWP16-PMW3B	TWP16-PMW4A	TWP16-PMW4B	TWP16-PMW5A	TWP16-PMW5B
		Sample Date	12/28/2016	12/28/2016	12/28/2016	12/28/2016	12/28/2016	12/28/2016	12/28/2016	12/28/2016	12/28/2016	12/28/2016	12/28/2016
Analyte	**Units**	**Criteria[1]**											
Metals by USEPA 200.8/245.1/7196A													
Arsenic	µg/L	5	1.83	**6.02**	1.65	1 U	1 U	2.02	**25.1**	3.78		1 U	2.41
Barium	µg/L	-	357	17.5	235	161	165	22.7	16.1	38.5		47	3.43
Cadmium	µg/L	-	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U		0.2 U	0.2 U
Chromium	µg/L	-	0.614	0.894	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		1.34	4.58
Chromium(vi)	mg/L	-	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.0642 J[2]	0.05 U		0.05 U	0.0557 J[2]
Copper	µg/L	-	0.5 U	0.5 U	0.695	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		1.06	0.5 U
Lead	µg/L	15	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U
Mercury	µg/L	-	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U	0.1 U
Nickel	µg/L	-	0.5 U	0.5 U	1.09	0.5 U	0.5 U	11.7	1.05	1.15		0.963	0.706
Zinc	µg/L	-	2.44	1.5 U	24	1.5 U	1.5 U	4.41	1.5 U	1.92		5.57	1.5 U
Total Petroleum Hydrocarbons by NWTPH-Gx/NWTPH-Dx													
Gasoline-Range Organics	µg/L	800	55.1	50 U	50 U	50 U	50 U	50 U	50 U	189	50 U	50 U	50 U
Diesel-Range Organics	µg/L	500	483 JM	416 JM	82.1 JM	107 JM	136 JM	78.9 JM	49.7 U	50.3 U		128 JM	125 JM
Heavy Oil-Range Organics	µg/L	500	**943**	**1,170**	109	254	133	100 U	491	**3,750**		**668**	**1,210**
Dissolved Gases by RSK 175													
Methane	mg/L		7.79 J		0.191			0.171		14.6 J		4.15	
Volatile Organic Compounds by USEPA 8260C													
1,1,1,2-Tetrachloroethane	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,3-Trichlorobenzene	µg/L	-	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
1,2,3-Trichloropropane	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	µg/L	-	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,2,4-Trimethylbenzene	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	µg/L	-	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U
1,2-Dichlorobenzene	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3,5-Trimethylbenzene	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichloropropane	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2,2-Dichloropropane	µg/L	-	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ

Table 5.1
2016 Groundwater Data Summary

		Location	PMW-1A	PMW-1B	PMW-2A	PMW-2B		PMW-3A	PMW-3B	PMW-4A	PMW-4B	PMW-5A	PMW-5B
		Sample ID	TWP16-PMW1A	TWP16-PMW1B	TWP16-PMW2A	TWP16-PMW2B	TWP16-PMW2X	TWP16-PMW3A	TWP16-PMW3B	TWP16-PMW4A	TWP16-PMW4B	TWP16-PMW5A	TWP16-PMW5B
		Sample Date	12/28/2016	12/28/2016	12/28/2016	12/28/2016	12/28/2016	12/28/2016	12/28/2016	12/28/2016	12/28/2016	12/28/2016	12/28/2016
Analyte	**Units**	**Criteria[1]**											
Volatile Organic Compounds by USEPA 8260C (Continued)													
2-Chlorotoluene	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
4-Chlorotoluene	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Benzene	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromobenzene	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon tetrachloride	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cymene	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromomethane	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane	µg/L	-	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Ethylbenzene	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Hexachlorobutadiene	µg/L	-	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
iso-Propylbenzene	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene chloride	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl-Tert-Butyl Ether	µg/L	-	1 U	1.3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Naphthalene	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.23	1 U
n-Butylbenzene	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
n-Propylbenzene	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
sec-Butylbenzene	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1	1 U	1 U	1 U
Styrene	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
tert-Butylbenzene	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	µg/L	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl chloride	µg/L	-	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Xylene (meta & para)	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylene (ortho)	µg/L	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Table 5.1
2016 Groundwater Data Summary

		Location	PMW-1A	PMW-1B	PMW-2A	PMW-2B		PMW-3A	PMW-3B	PMW-4A	PMW-4B	PMW-5A	PMW-5B
		Sample ID	TWP16-PMW1A	TWP16-PMW1B	TWP16-PMW2A	TWP16-PMW2B	TWP16-PMW2X	TWP16-PMW3A	TWP16-PMW3B	TWP16-PMW4A	TWP16-PMW4B	TWP16-PMW5A	TWP16-PMW5B
		Sample Date	12/28/2016	12/28/2016	12/28/2016	12/28/2016	12/28/2016	12/28/2016	12/28/2016	12/28/2016	12/28/2016	12/28/2016	12/28/2016
Analyte	**Units**	**Criteria[1]**											
Semivolatile Organic Compounds by USEPA 8270D													
1,2,4-Trichlorobenzene	µg/L	-	0.991 U	0.992 U	1 U	1.01 U	1.01 U	0.997 U	0.998 U	1 U		0.999 U	0.997 U
1,2-Dichlorobenzene	µg/L	-	0.991 U	0.992 U	1 U	1.01 U	1.01 U	0.997 U	0.998 U	1 U		0.999 U	0.997 U
1,3-Dichlorobenzene	µg/L	-	0.991 U	0.992 U	1 U	1.01 U	1.01 U	0.997 U	0.998 U	1 U		0.999 U	0.997 U
1,4-Dichlorobenzene	µg/L	-	0.991 U	0.992 U	1 U	1.01 U	1.01 U	0.997 U	0.998 U	1 U		0.999 U	0.997 U
1-Methylnaphthalene	µg/L	-	0.777	0.496 U	0.502 U	0.504 U	0.504 U	0.498 U	0.499 U	0.5 U		0.499 U	0.498 U
2,4,5-Trichlorophenol	µg/L	-	1.98 U	1.98 U	2.01 U	2.02 U	2.01 U	1.99 U	2 U	2 U		2 U	1.99 U
2,4,6-Trichlorophenol	µg/L	-	1.98 U	1.98 U	2.01 U	2.02 U	2.01 U	1.99 U	2 U	2 U		2 U	1.99 U
2,4-Dichlorophenol	µg/L	-	1.98 U	1.98 U	2.01 U	2.02 U	2.01 U	1.99 U	2 U	2 U		2 U	1.99 U
2,4-Dimethylphenol	µg/L	-	0.991 U	0.992 U	1 U	1.01 U	1.01 U	0.997 U	0.998 U	1 U		0.999 U	0.997 U
2,4-Dinitrophenol	µg/L	-	1.98 UJ	1.98 UJ	2.01 UJ	2.02 UJ	2.01 UJ	1.99 UJ	2 UJ	2 UJ		2 UJ	1.99 UJ
2,4-Dinitrotoluene	µg/L	-	0.991 U	0.992 U	1 U	1.01 U	1.01 U	0.997 U	0.998 U	1 U		0.999 U	0.997 U
2,6-Dinitrotoluene	µg/L	-	0.991 U	0.992 U	1 U	1.01 U	1.01 U	0.997 U	0.998 U	1 U		0.999 U	0.997 U
2-Chloronaphthalene	µg/L	-	0.991 U	0.992 U	1 U	1.01 U	1.01 U	0.997 U	0.998 U	1 U		0.999 U	0.997 U
2-Chlorophenol	µg/L	-	0.991 U	0.992 U	1 U	1.01 U	1.01 U	0.997 U	0.998 U	1 U		0.999 U	0.997 U
2-Methylnaphthalene	µg/L	-	0.593 J	0.496 UJ	0.502 UJ	0.504 UJ	0.504 UJ	0.498 UJ	0.499 UJ	0.5 UJ		0.499 UJ	0.498 UJ
2-Methylphenol	µg/L	-	0.991 U	0.992 U	1 U	1.01 U	1.01 U	0.997 U	0.998 U	1 U		0.999 U	0.997 U
2-Nitroaniline	µg/L	-	4.95 U	4.96 U	5.02 U	5.04 U	5.04 U	4.98 U	4.99 U	5 U		4.99 U	4.98 U
2-Nitrophenol	µg/L	-	1.98 U	1.98 U	2.01 U	2.02 U	2.01 U	1.99 U	2 U	2 U		2 U	1.99 U
4,6-Dinitro-o-cresol	µg/L	-	4.95 UJ	4.96 UJ	5.02 UJ	5.04 UJ	5.04 UJ	4.98 UJ	4.99 UJ	5 UJ		4.99 UJ	4.98 UJ
4-Bromophenyl phenyl ether	µg/L	-	0.991 U	0.992 U	1 U	1.01 U	1.01 U	0.997 U	0.998 U	1 U		0.999 U	0.997 U
4-Chloro-3-methylphenol	µg/L	-	4.95 U	4.96 U	5.02 U	5.04 U	5.04 U	4.98 U	4.99 U	5 U		4.99 U	4.98 U
4-Chloroaniline	µg/L	-	4.95 U	4.96 U	5.02 U	5.04 U	5.04 U	4.98 U	4.99 U	5 U		4.99 U	4.98 U
4-Chlorophenyl phenyl ether	µg/L	-	0.991 U	0.992 U	1 U	1.01 U	1.01 U	0.997 U	0.998 U	1 U		0.999 U	0.997 U
4-Methylphenol	µg/L	-	0.991 U	0.992 U	1 U	1.01 U	1.01 U	0.997 U	0.998 U	1 U		0.999 U	0.997 U
4-Nitrophenol	µg/L	-	4.95 U	4.96 U	5.02 U	5.04 U	5.04 U	4.98 U	4.99 U	5 U		4.99 U	4.98 U
Acenaphthene	µg/L	-	0.495 U	0.496 U	0.502 U	0.504 U	0.504 U	0.498 U	0.499 U	1.57		0.807	0.498 U
Acenaphthylene	µg/L	-	0.495 U	0.496 U	0.502 U	0.504 U	0.504 U	0.498 U	0.499 U	0.5 U		0.499 U	0.498 U
Anthracene	µg/L	-	0.495 U	0.496 U	0.502 U	0.504 U	0.504 U	0.498 U	0.499 U	0.5 U		0.499 U	0.498 U
Benzo(a)anthracene	µg/L	-	0.495 U	0.496 U	0.502 U	0.504 U	0.504 U	0.498 U	0.499 U	0.5 U		0.499 U	0.498 U
Benzo(a)pyrene	µg/L	-	0.495 U	0.496 U	0.502 U	0.504 U	0.504 U	0.498 U	0.499 U	0.5 U		0.499 U	0.498 U
Benzo(b)fluoranthene	µg/L	-	0.495 U	0.496 U	0.502 U	0.504 U	0.504 U	0.498 U	0.499 U	0.5 U		0.499 U	0.498 U
Benzo(g,h,i)perylene	µg/L	-	0.495 U	0.496 U	0.502 U	0.504 U	0.504 U	0.498 U	0.499 U	0.5 U		0.499 U	0.498 U
Benzo(k)fluoranthene	µg/L	-	0.495 U	0.496 U	0.502 U	0.504 U	0.504 U	0.498 U	0.499 U	0.5 U		0.499 U	0.498 U
Benzyl alcohol	µg/L	-	0.991 U	0.992 U	1 U	1.01 U	1.01 U	0.997 U	0.998 U	1 U		0.999 U	0.997 U
bis(2-chloroethoxy)methane	µg/L	-	0.991 U	0.992 U	1 U	1.01 U	1.01 U	0.997 U	0.998 U	1 U		0.999 U	0.997 U
bis(2-chloroethyl)ether	µg/L	-	1.98 U	1.98 U	2.01 U	2.02 U	2.01 U	1.99 U	2 U	2 U		2 U	1.99 U
bis(2-ethylhexyl)phthalate	µg/L	1	0.991 U	0.992 U	1 U	1.01 U	1.01 U	0.997 U	0.998 U	1 U		0.999 U	0.997 U
Butyl benzyl phthalate	µg/L	-	0.991 U	0.992 U	1 U	1.01 U	1.01 U	0.997 U	0.998 U	1 U		0.999 U	0.997 U

Table 5.1
2016 Groundwater Data Summary

		Location	PMW-1A	PMW-1B	PMW-2A	PMW-2B		PMW-3A	PMW-3B	PMW-4A	PMW-4B	PMW-5A	PMW-5B
		Sample ID	TWP16-PMW1A	TWP16-PMW1B	TWP16-PMW2A	TWP16-PMW2B	TWP16-PMW2X	TWP16-PMW3A	TWP16-PMW3B	TWP16-PMW4A	TWP16-PMW4B	TWP16-PMW5A	TWP16-PMW5B
		Sample Date	12/28/2016	12/28/2016	12/28/2016	12/28/2016	12/28/2016	12/28/2016	12/28/2016	12/28/2016	12/28/2016	12/28/2016	12/28/2016
Analyte	**Units**	**Criteria[1]**											
Semivolatile Organic Compounds by USEPA 8270D (Continued)													
Carbazole	µg/L	-	4.95 U	4.96 U	5.02 U	5.04 U	5.04 U	4.98 U	4.99 U	5 U		4.99 U	4.98 U
Chrysene	µg/L	-	0.495 U	0.496 U	0.502 U	0.504 U	0.504 U	0.498 U	0.499 U	0.5 U		0.499 U	0.498 U
Di(2-ethylhexyl)adipate	µg/L	-	0.991 U	0.992 U	1 U	1.01 U	1.01 U	0.997 U	0.998 U	1 U		0.999 U	0.997 U
Dibenzo(a,h)anthracene	µg/L	-	0.495 U	0.496 U	0.502 U	0.504 U	0.504 U	0.498 U	0.499 U	0.5 U		0.499 U	0.498 U
Dibenzofuran	µg/L	-	0.991 U	0.992 U	1 U	1.01 U	1.01 U	0.997 U	0.998 U	1 U		0.999 U	0.997 U
Diethylphthalate	µg/L	-	0.991 U	0.992 U	1 U	1.01 U	1.01 U	0.997 U	0.998 U	1 U		0.999 U	0.997 U
Dimethyl phthalate	µg/L	-	0.991 U	0.992 U	1 U	1.01 U	1.01 U	0.997 U	0.998 U	1 U		0.999 U	0.997 U
Di-n-butyl phthalate	µg/L	-	0.991 U	0.992 U	1 U	1.01 U	1.01 U	0.997 U	0.998 U	1 U		0.999 U	0.997 U
Di-n-octyl phthalate	µg/L	-	0.991 U	0.992 U	1 U	1.01 U	1.01 U	0.997 U	0.998 U	1 U		0.999 U	0.997 U
Fluoranthene	µg/L	-	0.495 U	0.496 U	0.502 U	0.504 U	0.504 U	0.498 U	0.499 U	0.5 U		0.499 U	0.498 U
Fluorene	µg/L	-	0.495 U	0.496 U	0.502 U	0.504 U	0.504 U	0.498 U	0.499 U	0.808		0.499 U	0.498 U
Hexachlorobenzene	µg/L	-	0.991 U	0.992 U	1 U	1.01 U	1.01 U	0.997 U	0.998 U	1 U		0.999 U	0.997 U
Hexachlorobutadiene	µg/L	-	0.991 U	0.992 U	1 U	1.01 U	1.01 U	0.997 U	0.998 U	1 U		0.999 U	0.997 U
Hexachlorocyclopentadiene	µg/L	-	0.991 UJ	0.992 UJ	1 UJ	1.01 UJ	1.01 UJ	0.997 UJ	0.998 UJ	1 UJ		0.999 UJ	0.997 UJ
Hexachloroethane	µg/L	-	0.991 U	0.992 U	1 U	1.01 U	1.01 U	0.997 U	0.998 U	1 U		0.999 U	0.997 U
Indeno(1,2,3-cd)pyrene	µg/L	-	0.495 U	0.496 U	0.502 U	0.504 U	0.504 U	0.498 U	0.499 U	0.5 U		0.499 U	0.498 U
Isophorone	µg/L	-	0.991 U	0.992 U	1 U	1.01 U	1.01 U	0.997 U	0.998 U	1 U		0.999 U	0.997 U
Naphthalene	µg/L	-	0.495 U	0.496 U	0.502 U	0.504 U	0.504 U	0.498 U	0.499 U	0.5 U		1.03	0.498 U
Nitrobenzene	µg/L	-	1.98 U	1.98 U	2.01 U	2.02 U	2.01 U	1.99 U	2 U	2 U		2 U	1.99 U
N-Nitroso-di-n-propylamine	µg/L	-	0.991 U	0.992 U	1 U	1.01 U	1.01 U	0.997 U	0.998 U	1 U		0.999 U	0.997 U
Pentachlorophenol	µg/L	5	1.98 U	1.98 U	2.01 U	2.02 U	2.01 U	1.99 U	2 U	2 U		2 U	1.99 U
Phenanthrene	µg/L	-	0.495 U	0.496 U	0.502 U	0.504 U	0.504 U	0.498 U	0.499 U	0.631		0.499 U	0.498 U
Phenol	µg/L	-	1.98 U	1.98 U	2.01 U	2.02 U	2.01 U	1.99 U	2 U	2 U		2 U	1.99 U
Pyrene	µg/L	-	0.495 U	0.496 U	0.502 U	0.504 U	0.504 U	0.498 U	0.499 U	0.5 U		0.499 U	0.498 U

Notes:

Blank cells are intentional.

BOLD Exceeds screening level.

1 Criteria only identified for site contaminants of concern identified in the 2006 Remedial Investigation. Screening levels are based on MTCA Method A, or, if unavailable, the MTCA Method B value based on Protection of Surface Water for Aquatic Life in Marine Environments, or, if unavailable, laboratory practical quantification limit.

2 Laboratory reports matrix interference and possible false positives due to high iron content of sample.

Abbreviations:

µg/L Micrograms per liter

mg/L Milligrams per liter

NA Not applicable

Qualifiers:

J Analyte was detected, concentration is considered an estimate.

JM Analyte was detected, concentration is considered an estimate due to poor chromatographic match to standard.

U Analyte was not detected, concentration given is the reporting limit.

UJ Analyte was not detected, concentration given is the reporting limit, which is considered an estimate.

Table 5.2
Contaminants of Concern/Remediation Levels for Soil[1]

Primary Contaminants of Concern	Maximum Concentration[2]	Unrestricted Land Use Cleanup Level	Remediation Level: Modified MTCA Method C Direct Contact, Excavation Worker Scenario[3]	Cleanup Level: Protection of Groundwater	Cleanup Level: Ecological[4]	Interim Action Remediation Level	Basis of Site Cleanup Level
Arsenic III/V	130	203	2,244	203	20/260	130	Empirical soil protection of groundwater
Copper	150	3,200[5]	299,22[4]	36[6]	550	150	Empirical soil protection of groundwater
Lead	520	250[7]	1,000[8]	150[9]	220	520	Empirical soil protection of groundwater
DRO	1,400	2,000[10]	NA	2,000[5]	2,000 to 15,000[11]	3,300	Empirical soil protection of groundwater
ORO	2,300		NA				
Total carcinogenic PAH[12]	5.9	0.1	552	0.1	300[9]	5.9	Assumed soil protection of groundwater
Pentachlorophenol	11	2.5	14,026	0.0158	11	11	Empirical soil protection of groundwater

Notes:
1 Units in milligrams per kilogram.
2 Detections from the 2006 *Prologis Taylor Way Property Remedial Investigation* (Floyd|Snider 2006a).
3 Excavation worker scenario calculated using parameter values from Oregon Department of Environmental Quality's *Human Health Risk Assessment Guidance* (October 2010) and calculated using WAC 173-340-745 equations 745-4 and 745-5.
4 Based on the values in WAC 173-340-7492, Table 749-2 for Commercial/Industrial Sites. However, the terrestrial ecological pathway will be blocked following the interim action because all surfaces will be covered with either hardscape or buildings.
5 MTCA Method B, non-cancer direct contact.
6 Soil background from the Washington State Department of Ecology's (Ecology's) *Natural Background Soil Metals Concentrations in Washington State* (October 1994).
7 MTCA Method A, Unrestricted Land Uses.
8 Direct contact cleanup level from MTCA Method A, Industrial Land Use.
9 Obtained using the July 2015 CLARC database tables for Protection of Groundwater in the Saturated Zone.
10 MTCA Method A, Unrestricted Land Uses, combined DRO and ORO cleanup levels as per Ecology's *Implementation Memorandum #4: Determining Compliance with Method A Cleanup Levels for Diesel and Heavy Oil* (June 17, 2004).
11 Compliance with the cleanup level determined by DRO, which includes the sum of diesel fuels and heavy oils using the NWTPH-Dx method.
12 Levels based on the soil concentration for benzo(a)pyrene, toxic equivalent normalized per WAC 173-340-708(a).

Abbreviations:
ARAR Applicable or Relevant and Appropriate Requirements
DRO Diesel-range organics
GW Groundwater
GRO Gasoline-range organics
MTCA Model Toxics Control Act
NA Not applicable
PQL Practical quantitation limit
PAH Polycyclic aromatic hydrocarbon

Table 5.3
Contaminants of Concern for Groundwater[1]

Primary Contaminants of Concern	2016 Maximum Concentration[2]	2016 Maximum Concentration at POC Wells[3]	Excavation Worker Incidental Ingestion[4]	Excavation Worker Dermal Contact[4]	Marine Surface Water ARAR	Interim Action Cleanup Level	Basis for Site Cleanup Level
Arsenic	25.1	2.0	4,260	3,190	0.1	5	MTCA Method A (based on State Background)
Lead	<0.5	<0.5	NA	NA	NA	15	MTCA Method A (ARAR)
Pentachlorophenol	<2.02	<2.01	53,200	205	1.47	2	Protection of Surface Water, adjusted to PQL
Bis(2-ethylhexyl)phthalate	<1.01	<1	85,200	28,100	2.2	2.2	Protection of Surface Water
Total cPAHs (expressed as TEQ)	0.381[5]	0.378[5]	875	1.82	0.018	See Footnote[5]	
Diesel-Range Organics	483 J	483 J	NA	NA	NA	500	MTCA Method A
Heavy Oil-Range Organics	3,750	943[6]	NA	NA	NA	500	MTCA Method A

Notes:
1 Units in micrograms per liter (µg/L).
2 Maximum groundwater well detections taken from 2016 groundwater sampling event. The laboratory report is provided in Appendix F.
3 Maximum 2016 detections shown are from potential future TWAAFA site shallow aquifer conditional point of compliance wells PMW-2A and PMW-3A.
4 Values taken from Table 8-12 of January 2005 Philip Services Corporation Final Comprehensive RI Report.
5 All cPAH groundwater results were less than the laboratory reporting limit and the maximum laboratory reporting limit was 0.504 µg/L. The concentration shown is the benzo(a) pyrene TEQ, calculated by summing one-half the laboratory reporting limit for each individual cPAH compound. Groundwater cPAH concentrations will be further evaluated during the investigation of the larger TWAAFA.
6 Well completed within woody debris and wood chips. Silica gel cleanup was not performed. Result is likely elevated due to organic material.

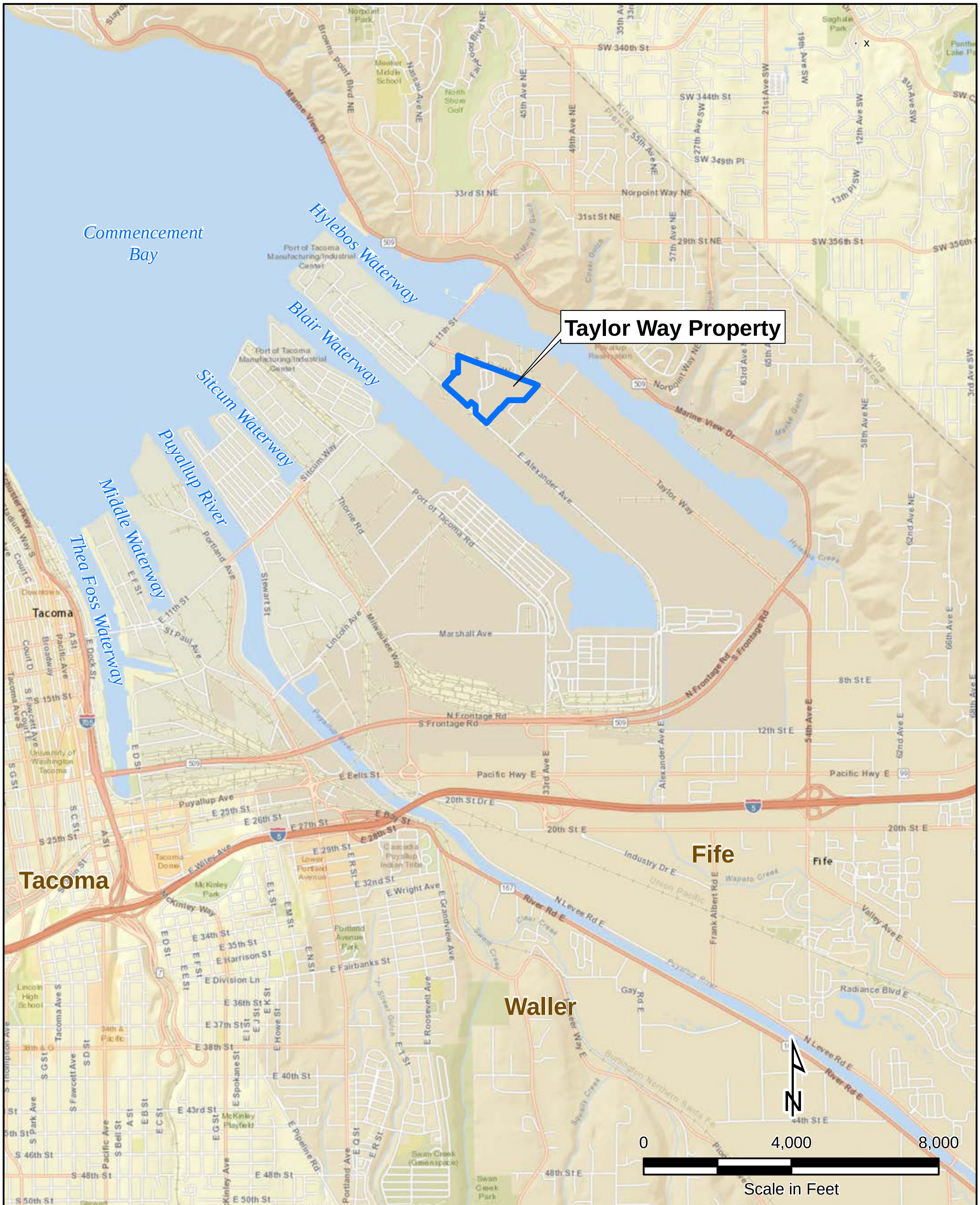
Abbreviations:
ARAR Applicable or relevant and appropriate requirements
cPAH Carcinogenic polycyclic aromatic hydrocarbons
MTCA Model Toxics Control Act
NA Not available
POC Point of Compliance
PQL Practical quantification limit
TEQ Toxic equivalent
TWAAFA Taylor Way and Alexander Ave Fill Area

Qualifier:
J Analyte was detected; concentration shown is considered an estimate due to poor chromatographic match with the diesel standard.

1514 Taylor Way Development

Interim Action Work Plan

Figures



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Interim Action Work Plan
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Tacoma, Washington

Figure 1.1
Vicinity Map

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4/7/2017

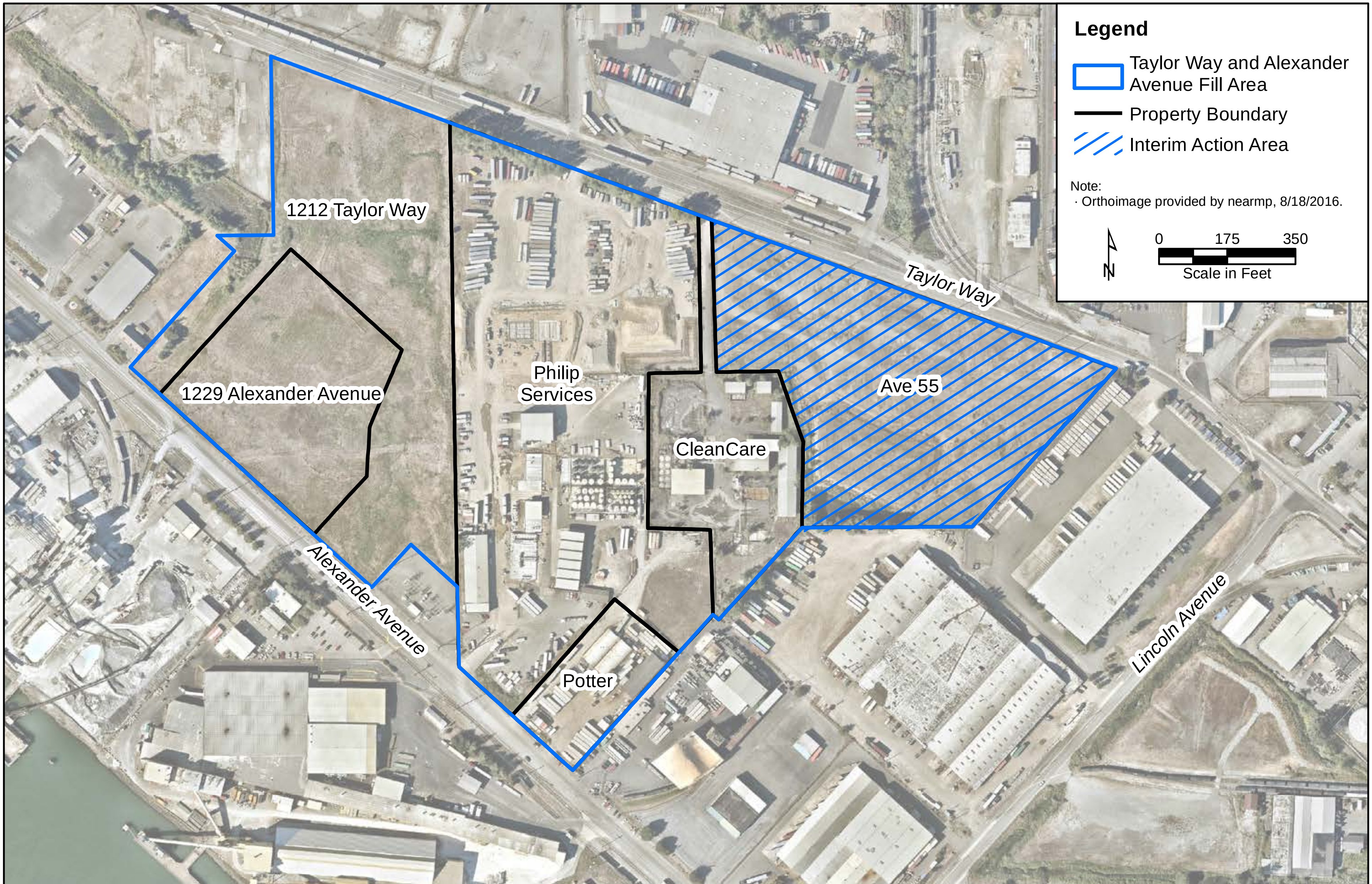

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Figure 1.2
Site Map

I:\GIS\Projects\Ave55-TaylorWay\MXD\InterimActionWorkPlan\Figure 1.2 Taylor Way and Alexander Avenue Fill Site Map.mxd
5/11/2017

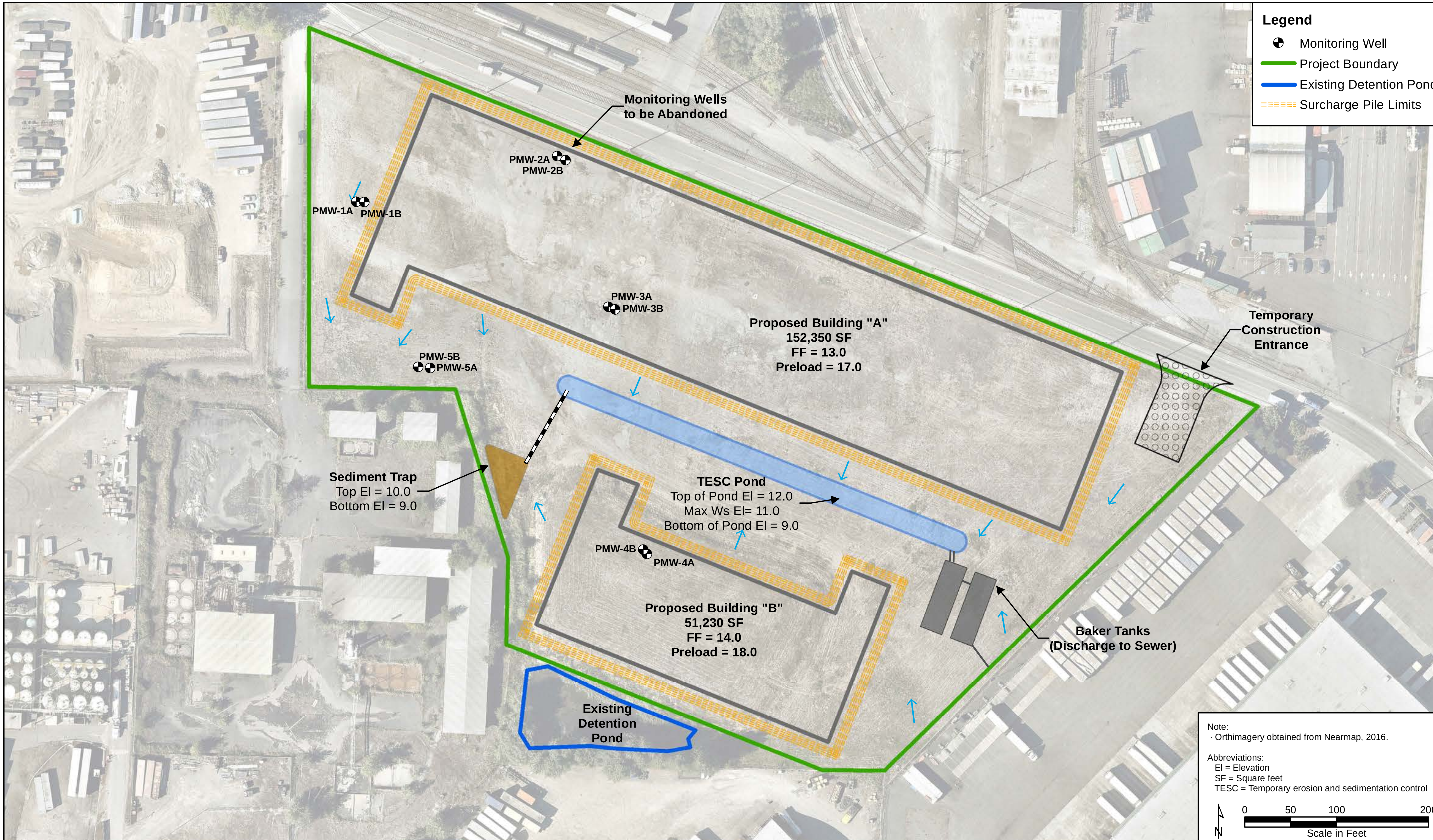

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Figure 4.1
Interim Action Features

I:\GIS\Projects\Ave55-TaylorWay\MXD\InterimActionWorkPlan\Figure 4.1 Interim Action Site Features.mxd
5/17/2017

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Figure 5.1
2016 Geotechnical Study Exploration Locations

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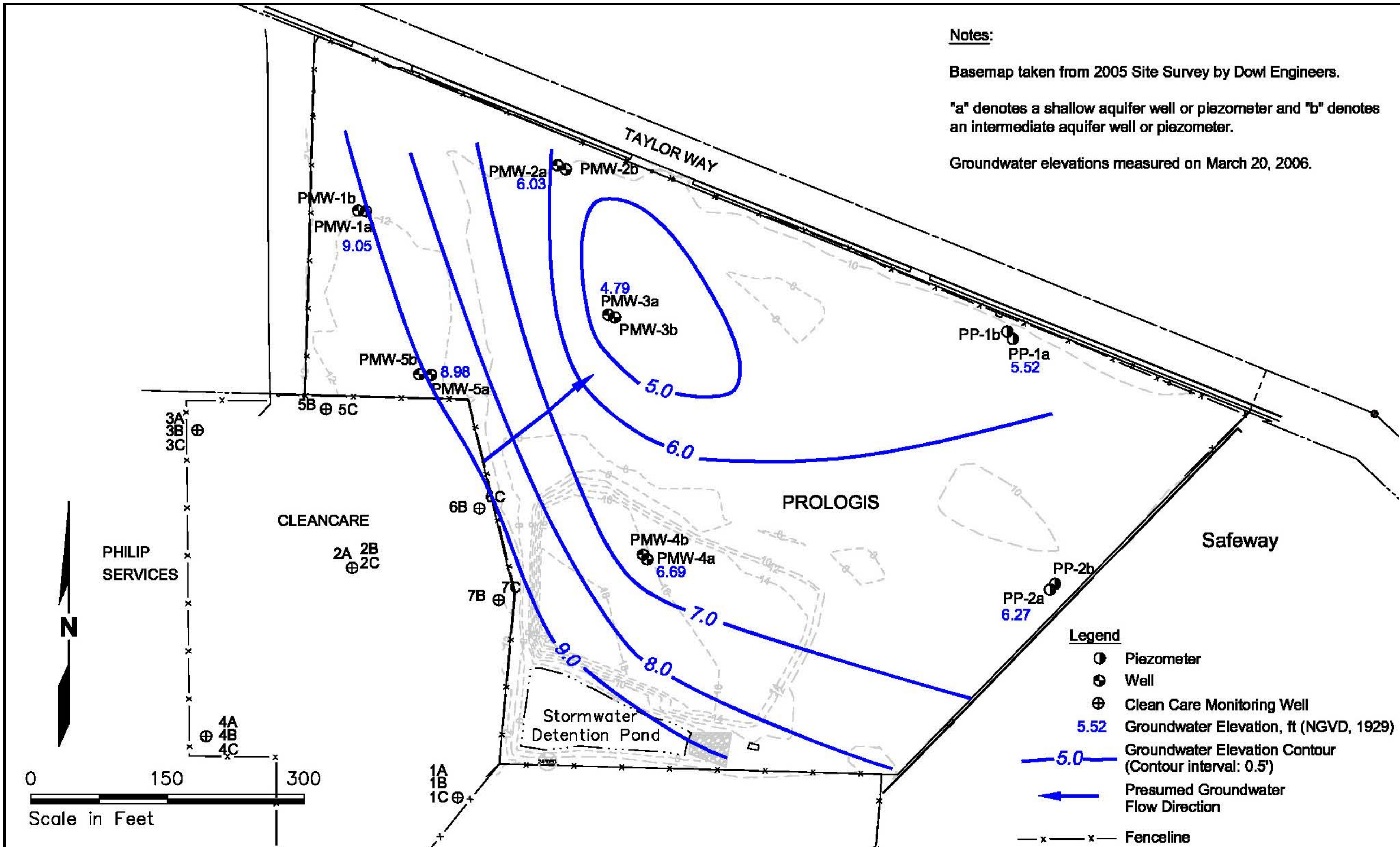
4/7/2017



Source: ProLogis Taylor Way Property Remedial Investigation, Floyd|Snider 2006.

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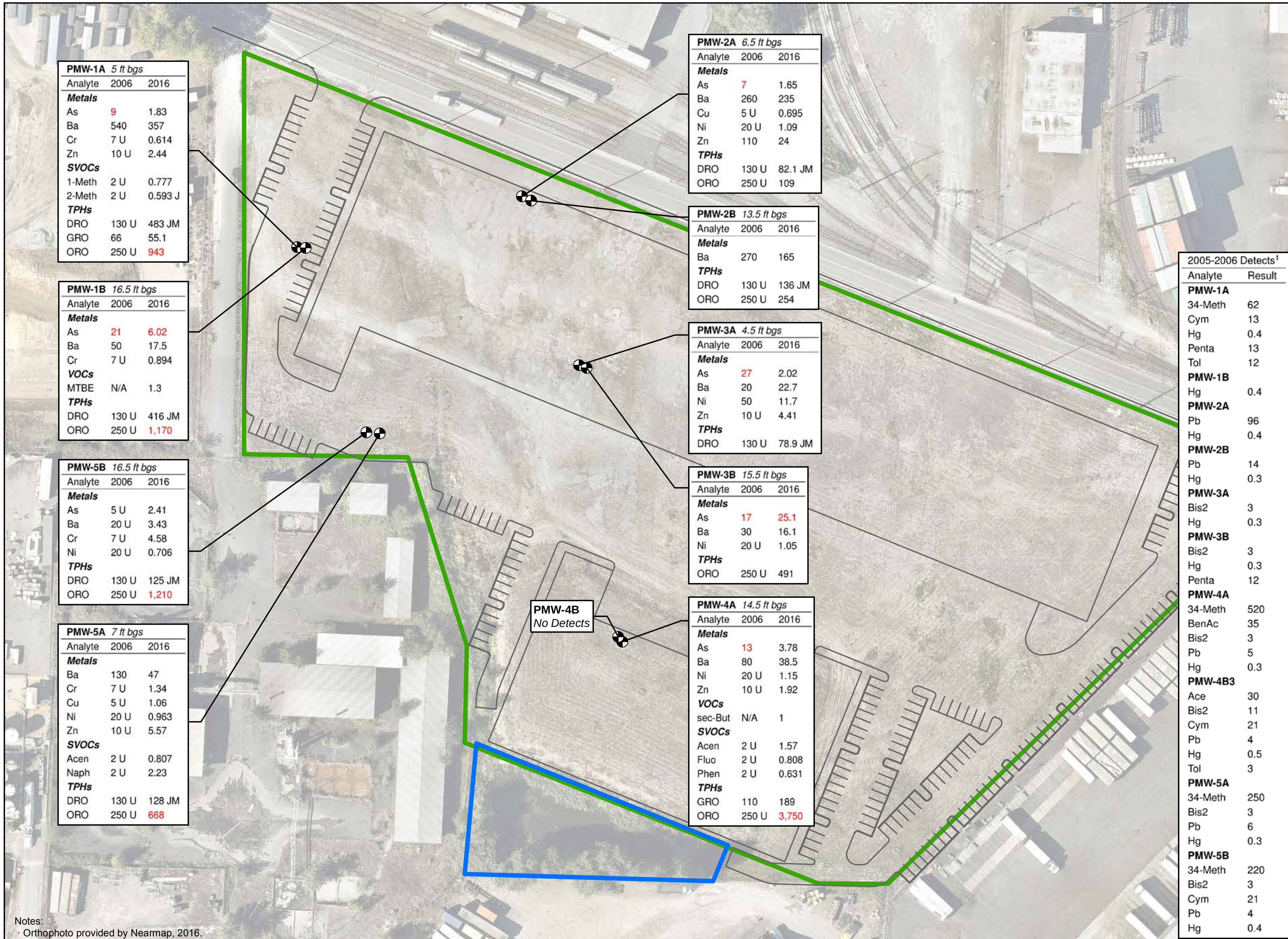
Figure 5.2
March 2006 Groundwater Flow Map of the Shallow Aquifer



Legend

- Monitoring Well Location
- Site Boundary
- Detention Pond
- Proposed Development Footprint

Label Key

Location Name — **PMW-3A** *4.5 ft bgs* — Well Depth (feet below ground surface)
Analyte Class — ***Metals***
Analyte — As 2.02 / Ba 22.7 / Ni 11.7 / Zn 4.41 — Results (µg/l) and Qualifier

Notes:
· Results from groundwater sampling taken December 28, 2016.
· Results in red exceed Interim Action Work Plan cleanup levels (see text).
· Callout boxes show 2016 groundwater investigation detected contaminants and the corresponding maximum 2005/2006 RI result.
· TPH analyzed using silica gel in 2006.
1. Groundwater contaminants detected in 2005/2006 but not detected in 2016.

Qualifiers:
J = Concentration is estimated but acceptable for most uses.
JM = Concentration is estimated due to poor match to standard, acceptablefor use with qualification.
U = Analyte is not detected at the associated reporting limit.

Abbreviations:
µg/l = Micrograms per liter
Metals
As = Arsenic
Ba = Barium
Cr = Chromium
Cu = Copper
Ni = Nickel
Zn = Zinc
VOCs = Volatile Organic Compounds
MTBE = Methyl-Tert-Butyl Ether
sec-But = sec-Butylbenzene
SVOCs = Semivolatile Organic Compounds
1-Meth = 1-Methylnaphthalene
2-Meth = 2-Methylnaphthalene
34-Meth = 3- & 4-Methylphenol
Ace = Acetone
Acen = Acenaphthene
BenAc = Benzoic Acid
Fluo = Fluorene
Naph = Naphthalene
Phen = Phenanthrene
TPH = Total Petroleum Hydrocarbons
DRO = Diesel Range Organics
GRO = Gasoline Range Organics
ORO = Heavy Oil

N
0 50 100 200
Scale in Feet

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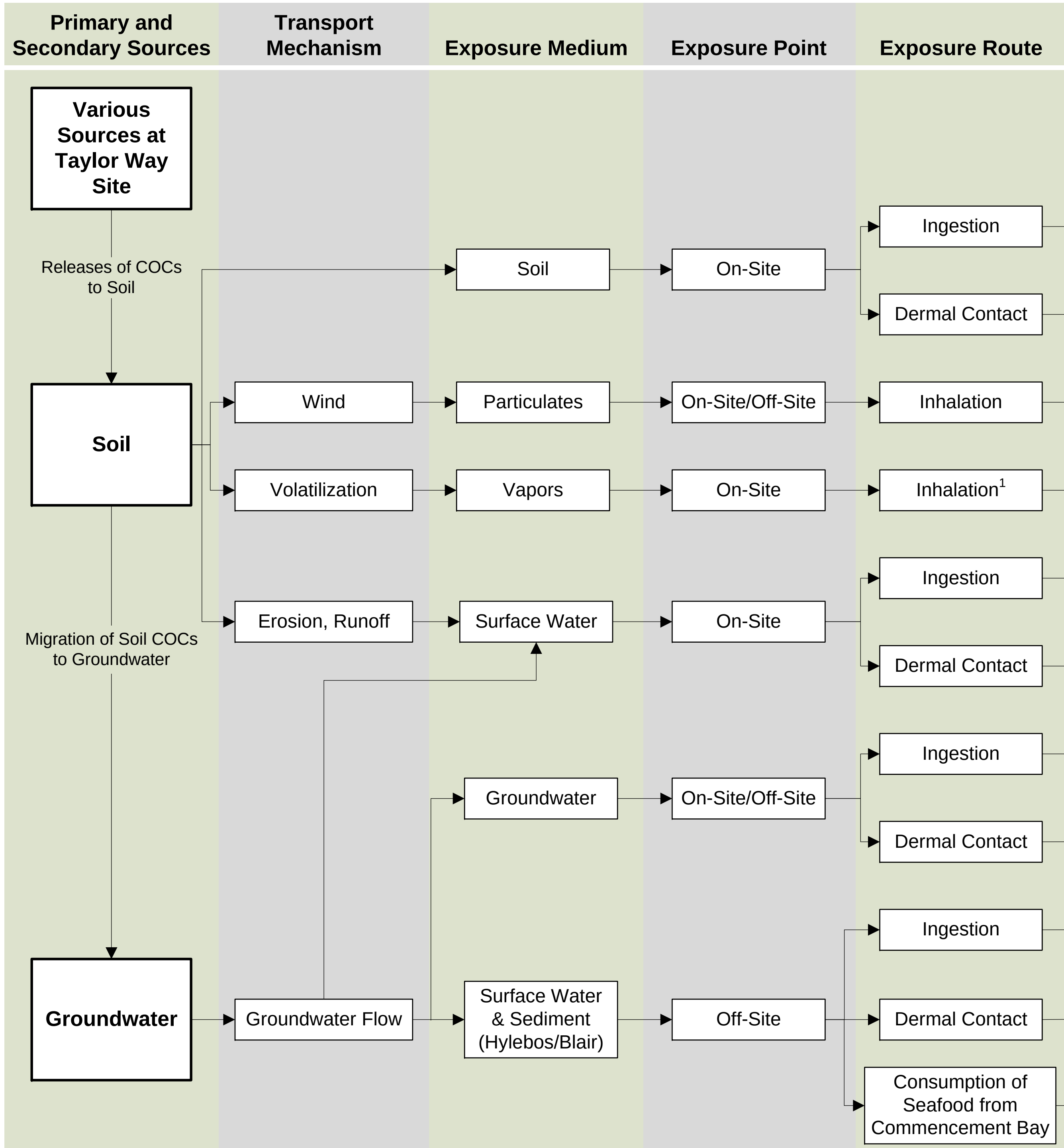
Interim Action Work Plan
1514 Taylor Way Development
Tacoma, Washington

Figure 5.3
2016 Groundwater Data Summary

I:\GIS\Projects\Ave55-TaylorWay\MXD\InterimActionWorkPlan\Figure 5.3 2016 Groundwater Data Summary.mxd
5/17/2017



EXPOSURE SCENARIO

Exposure Medium / Route	Current and Redevelopment Related: Construction/ Utility Workers[2]	Current and Redevelopment Related: Recreators and Subsistence Fishers	Current and Redevelopment Related: Terrestrial Organisms	Current and Redevelopment Related: Aquatic Organisms	Post Redevelopment: Commercial Workers	Post Redevelopment: Utility Maintenance Workers[2]	Post Redevelopment: Recreators and Subsistence Fishers	Post Redevelopment: Terrestrial Organisms	Post Redevelopment: Aquatic Organisms
Soil – Ingestion	Potentially Complete	Incomplete	Complete	Incomplete	Incomplete	Potentially Complete	Incomplete	Incomplete	Incomplete
Soil – Dermal Contact	Potentially Complete	Incomplete	Complete	Incomplete	Incomplete	Potentially Complete	Incomplete	Incomplete	Incomplete
Particulates – Inhalation	Potentially Complete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
Vapors – Inhalation[1]	Potentially Complete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
Surface Water – Ingestion	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
Surface Water – Dermal Contact	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
Groundwater – Ingestion	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
Groundwater – Dermal Contact	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
Surface Water & Sediment – Ingestion	Potentially Complete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
Surface Water & Sediment – Dermal Contact	Potentially Complete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
Consumption of Seafood from Commencement Bay	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete

These exposure scenarios are reasonable maximum exposure scenarios. Therefore, these scenarios are considered protective of other similar exposure scenarios. All potential receptors are on-site, unless otherwise noted.

1 Vapor-related pathways are being considered based upon a future vapor intrusion survey.

2 For construction/utility workers and utility maintenance workers, the potential exposure pathway will be controlled by engineering controls, institutional controls, and health and safety measures.

Legend

- Complete Exposure Pathway
- Potentially Complete Exposure Pathway
- Incomplete Exposure Pathway

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Interim Action Work Plan
1514 Taylor Way Development
Tacoma, Washington

Figure 5.4
Conceptual Site Model

1514 Taylor Way Development

Interim Action Work Plan

Appendix A
SEPA Checklist and Mitigated Determination of Non-Significance

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*:**

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]

   Avenue 55 Port of Tacoma

2. Name of applicant: [help]

   Avenue 55

3. Address and phone number of applicant and contact person: [help]

Drew Zaborowski	*Contact:*	*Dan Balmelli*
Avenue 55		*Barghausen Consulting Engineers*
600 University		*18215-72nd Avenue South*
Seattle, WA 98101		*Kent, WA 98032*

4. Date checklist prepared: [help]

   January 26, 2017
   Revised March 24, 2017
   Revised March 29, 2017
   Revised April 6, 2017

5. Agency requesting checklist: [help]

   Port of Tacoma

6. Proposed timing or schedule (including phasing, if applicable): [help]

   Phase 1 Taylor Way Site - Construction to start second quarter of 2017 with completion by fourth quarter of 2017.

   Phase 2 Lincoln Avenue Site - Construction could begin between second quarter of 2017 and second quarter of 2018 based on market indicators.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain. [help]

   There are no future additions or expansion outside of the scope of work proposed in this application.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal. [help]

   - *Environmental Checklist for MTCA Action to be prepared by Department of Ecology*
   - *Geotechnical Engineering Report prepared by Terra Associates - January 2017*
   - *Preliminary Stormwater Site Plan - Phase 1 prepared by Barghausen Consulting Engineers - January 2017*
   - *Preliminary Stormwater Site Plan - Phase 2 prepared by Barghausen Consulting Engineers - January 2017*
   - *Interim Action Work Plan prepared by Floyd Snyder (to be submitted by Floyd Snyder to Port of Tacoma under separate cover.)*
   - *Cultural Resource Assessment for Blair-Hylebos Redevelopment prepared by Cultural Resources Consultant, LLC for Grette Associated - February 2009*
   - *Traffic Scoping Memorandum prepared by TENW -*

- *Transportation Impact Study prepared by TENW - March 29, 2017*
- *Non-Wetland Verification Memorandum prepared by Soundview Consultants - January 2017*
- *Feasibility Study Prologis Taylor Way Site prepared by Floyd Snyder - December 2006*
- *Remedial Investigation Prologis Taylor Way Site prepared by Floyd Snyder - October 2006*
- *Phase 1 Environmental Site Assessment Update for Educator Building Property prepared by Floyd Snyder - December 2016*

The Phase 1 project is part of a larger cleanup area termed the Taylor Way and Alexander Avenue Fill Site by the Department of Ecology. A remedial Investigation and Feasibility Study for the Phase 1 site was completed in 2006 and approved by the Department of Ecology in 2007. The remedy for the Phase 1 site is to cover the contaminated soils with new building and pavement areas. The Phase 1 work is termed an "interim action" by the Department of Ecology as this project site is part of a larger site whose cleanup work is not yet done. Ecology is requiring that an "Interim Action Work Plan" be prepared in the first quarter of 2017. The work plan will detail environmental protocols to use during construction.

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]

Approval of the Interim Action Work Plan and possible SEPA determination are pending approval by Department of Ecology.

10. List any government approvals or permits that will be needed for your proposal, if known. [help]

SEPA Determination by Port of Tacoma
Demolition and Grade and Fill Permits by City of Tacoma
Building Permits by City of Tacoma
Plumbing/Electrical/Mechanical Permits by City of Tacoma
Watermain Extension by Tacoma Water Department
Sanitary Sewer Extension by City of Tacoma
Site Work Permits by City of Tacoma
Right-of-Way Use Permits by City of Tacoma
Boundary Line Adjustment by City of Tacoma
Pierce County Waste Disposal Authorization
Interim Action Work Plan Approval and possible SEPA Determination by Department of Ecology
Construction Stormwater NPDES Permit by Department of Ecology

Asbestos/Demolition Notification by Puget Sound Clean Air Agency

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 is located on two separate sites totaling approximately 19.71 acres in the Port of Tacoma and will consist of the development of three warehouse buildings to be constructed in two Phases. Phase 1 of the development proposes to construct two warehouse use buildings totaling approximately 203,580 square feet and Phase 2 proposes to construct one warehouse building totaling approximately 220,360 square feet. The southern portion of the site is currently occupied by an approximate 189,500 square foot industrial/manufacturing use building and the northern area contains a storm pond and undeveloped land. Along with building construction the associated site improvements will include demolition of existing building, grading activities, construction of stormwater facilities, water and sanitary sewer extensions, paved parking and truck maneuvering areas, landscaping, right-of-way improvements and franchise utility improvements. Construction of Phase 1 is proposed to start in Spring of 2017 with Phase 2 to start in Fall of 2017 or Spring of 2018, depending on market demand.

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 Phase 1 site is located at approximately 1600 Taylor Way and to the west of Lincoln Avenue and is a portion of the southwest quarter of Section 26, Township 21 North, Range 3 East, W.M.

Tax Parcel Nos: 032126-7005, 032135-6008 and 5007

The Phase 2 site is located at 3401 Lincoln Avenue and is within a portion of the northeast quarter of Section 35, Township 21 North, Range 3 East, W.M.

Tax Parcel No: 032135-1051

B. ENVIRONMENTAL ELEMENTS [help]

1. Earth [help]

a. General description of the site: [help]
(circle one): Flat, rolling, hilly, steep slopes, mountainous, other _____________

The site is generally flat with a large approximately 10-foot high mound located in the center of the property.

b. What is the steepest slope on the site (approximate percent slope)? [help]

The steepest slope on the site is approximately 10 percent.

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]

Site surface soils are granular fill underlain by sands with assorted debris underlain by silty soils at 7 to 10-foot.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe. [help]

No, the surrounding area is flat and there is no history of unstable soils in the area to our knowledge.

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]

Approximately 11,000 cubic yards of cut and 70,350 cubic yards of fill material will be used to prepare the site for building construction and approximately 8,000 cubic yards of unsuitable stripping will be removed from the site. The source of fill material has not yet been identified and will be obtained from an approved source. Each potential fill site will undergo due diligence (eg., Phase 1 report, test results, site visit, etc.) and certain sites will not be considered. The approach for approving sources of fill will be described in the IAWP.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe. [help]

Erosion is not expected to occur, as best management practices will be implemented to control erosion.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)? [help]

Approximately 85 percent of the site will be impervious surface upon project completion.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any: [help]

A temporary erosion and sedimentation control plan will be designed per City of Tacoma standards and implemented during the construction phase of the project to control possible erosion impacts.

2. Air [help]

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]

During the construction phase of the project, emissions from construction equipment would be present. Upon project completion, emissions from truck and vehicular traffic to and from the site would be present.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe. [help]

Emissions from vehicular traffic on area roadways and emissions associated with nearby industrial use facilities would be present but would not be anticipated to affect the project.

c. Proposed measures to reduce or control emissions or other impacts to air, if any: [help]

Construction equipment will meet all state and local emission standards, including Puget Sound Clean Air Agency regulations. Dust control measures include the use of water trucks which will be used during construction to control airborne particles.

3. **Water** [help]

a. Surface Water:

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]

No, however, a manmade storm drainage pond and stormwater drainage ditch in use by the site and adjacent parcel to the south is located in the southeast portion of the Phase 1 site located along Taylor Way. The Hylebos Waterway which flows into Commencement Bay is located to the east of the Phase 1 and Phase 2 sites.

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]

Per the Soundview memo dated 3/23/2017, the OHWM for the ditch will be delineated and then the project will be designed to avoid the ditch.

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 is anticipated.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known. [help]

No surface water withdrawals or diversions are proposed.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan. [help]

The site is not located within a 100-year floodplain per FIRM Map Panel 5301480025B dated December 1983.

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 waste materials will be discharged to surface waters.

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]

No groundwater will be withdrawn other than a limited amount of construction dewatering water. There are no drinking water wells on the site or in the immediate vicinity. Existing monitoring wells will be decommissioned.

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]

No waste materials will be discharged to the ground. Sanitary sewer effluent will be collected and conveyed via sanitary sewer pipe and discharged into the existing City of Tacoma sanitary sewer system.

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) 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]

The source of runoff will be rainfall from building rooftops and pavement areas. All runoff will be collected via catch basins and conveyed into the City of Tacoma storm drainage trunk lines located in Taylor Way. Runoff from pavement areas will be treated via a modular wetland system or other approved method prior to discharging into the city system. Storm water flows south and east to discharge into the Hylebos Waterway.

2) Could waste materials enter ground or surface waters? If so, generally describe. [help]

Waste materials will not enter ground or surface water under this proposal.

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe. [help]

The developed site will use the same drainage pattern as existing condition.

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any: [help]

A storm drainage system will be designed according to City of Tacoma standards and will be constructed to control surface water runoff created by the completed development.

4. **Plants** [help]

a. Check the types of vegetation found on the site: [help]

_X__deciduous tree: alder, maple, aspen, other: *Black cottonwood, Pacific willow*
____evergreen tree: fir, cedar, pine, other
_X__shrubs

_X__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
_X__other types of vegetation: *reed canary grass, soft rush, shortawn foxtail, narrowleaf plantain*

b. What kind and amount of vegetation will be removed or altered? [help]

Very little vegetation exists on the site and all vegetation will be removed for construction of the proposed development.

c. List threatened and endangered species known to be on or near the site. [help]

None are known to be on or near the site to our knowledge.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any: [help]

Landscaping will be designed and implemented in accordance with City of Tacoma standards to preserve and enhance vegetation on the site.

e. List all noxious weeds and invasive species known to be on or near the site. [help]

None are known to be on or near the site to our knowledge.

5. **Animals** [help]

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. [help]
Examples include:

birds: hawk, heron, eagle, songbirds, other: *water fowl*
mammals: deer, bear, elk, beaver, other:
fish: bass, salmon, trout, herring, shellfish, other ________

b. List any threatened and endangered species known to be on or near the site. [help]

None are known to be on or near the site to our knowledge.

c. Is the site part of a migration route? If so, explain. [help]

Yes, the site is part of the Pacific Flyway for Migratory Birds.

d. Proposed measures to preserve or enhance wildlife, if any: [help]

On-site landscaping will be designed and constructed to help enhance and preserve wildlife.

e. List any invasive animal species known to be on or near the site. [help]

The site was formerly part of a voluntary eradication program in partnership with the U.S. Department of Agriculture, Washington Department of Agriculture and the Port of Tacoma for invasive vineyard snail (cernnella virgate). The site has been without snail detection for five years; therefore is considered to be eradicated at this site. Some adjacent sites have ongoing eradication efforts.

6. **Energy and Natural Resources** [help]

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]

Electricity will be used for lighting and overall energy needs and natural gas will be used for heating.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe. [help]

It is not anticipated that the proposed development would affect the use of solar energy by a neighboring property.

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]

The building will be designed to meet all current energy code requirements. No other specific measures are proposed.

7. **Environmental Health** [help]

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]

1) Describe any known or possible contamination at the site from present or past uses. [help]

The Phase 1 area of the site is part of Ecology's Taylor Way and Alexander Avenue Fill Area, State Cleanup Site, Facility/Site 1403183

A Remedial Investigation and Feasibility Study for the Phase 1 site under Agreed Order (AO) DE 04TCPSR-1160 was completed in 2006 by the previous owner (Prologis) and approved by the DOE in 2007. The remedy for the Phase 1 site is to cover the contaminated soils with new building and pavement areas. The Phase 1 work is termed an "interim action" by DOE as this project site is part of a larger site whose cleanup work is not yet done. Ecology is requiring that an "Interim Action Work Plan" be prepared to document how the proposed redevelopment action is consistent with the preferred remedy identified in the Feasibility Study and will achieve the remedial objectives previously approved by Ecology under the AO protocols .

The site has traces of arsenic, cadmium, lead, mercury, pentachlorophenol, PAH and petroleum hydrocarbon in soil and groundwater due to past site uses of wood products manufacturing as well as use as a fill site from various sources. The remedial objectives identified in the Feasibility Study will be achieved as part of the project development by placement of buildings and pavement in accordance with an Ecology approved Interim Action Work Plan.

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. [help]

Chemicals and fuels used by the contractor during the construction phase of the project would be present. No other hazards are anticipated to be present to our knowledge in association with the completion of the project.

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. [help]

Chemicals and fuels used during construction would be present during the construction phase. Upon completion of the development it is not anticipated that toxic or hazardous chemicals would be present at the facilities.

4) Describe special emergency services that might be required. [help]

Other than fire, police and medical services already available in the area, no other special emergency services are anticipated.

5) Proposed measures to reduce or control environmental health hazards, if any: [help]

During construction, the contractor will implement standard accident response measures and pollution and spill prevention policies. An Interim Action Work Plan will be implemented as required by Department of Ecology. No other specific measures are proposed.

b. Noise [help]

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)? [help]

Noise from vehicular traffic on area roadways would be present but would not be anticipated to affect the proposed 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]

On a short-term basis, noise from construction equipment would be present from approximately 7 am to 6 pm, Monday through Friday. On a long-term basis, normal noise from vehicular traffic to and from the site could be present 24 hours a day depending on the tenant.

3) Proposed measures to reduce or control noise impacts, if any: [help]

Construction equipment will comply with jurisdictional noise ordinance and the use of perimeter landscaping will help to contain noise generated by the development to within the project site. It is not anticipated that noise from the new development would significantly increase area noise levels.

8. **Land and Shoreline Use** [help]

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]

The Phase 1 site along Taylor Way is basically undeveloped and contains a manmade storm pond in the southern portion of the site. The Phase 2 Lincoln Avenue site contains a warehouse building and associated gravel parking and truck maneuvering areas. Properties to the east, west and to the north of the site across Taylor Way are primarily warehouse use facilities. Properties to the west of the site contain industrial/manufacturing use facilities along with some vacant property across Lincoln Avenue.

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 site has not been used for farming or forest lands to our knowledge.

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: [help]

   There are no working farms or forest lands on the site or in the immediate vicinity of the site.

c. Describe any structures on the site. [help]

A warehouse building is located on the Phase 2 Lincoln Avenue site.

d. Will any structures be demolished? If so, what? [help]

All structures will be removed for construction of the proposed developments.

e. What is the current zoning classification of the site? [help]

The current zoning classification of the site is Port Maritime and Industrial - PMI.

f. What is the current comprehensive plan designation of the site? [help]

The current comprehensive plan designation is Heavy Industrial.

g. If applicable, what is the current shoreline master program designation of the site? [help]

The current shoreline master program designation is S-10 Port Industrial, however, the site is not subject to the SMP due to the proximity of the property to either Commencement Bay shorelines. The sites are outside of 200-foot of the ordinary high water mark of Commencement Bay.

h. Has any part of the site been classified as a critical area by the city or county? If so, specify. [help]

The City of Tacoma has mapped an area of the site as "wetland presence" which coincides with the location of the existing storm drainage pond. Please refer to the Technical Memo prepared by Soundview Consultants for additional information regarding non-wetland verification.

i. Approximately how many people would reside or work in the completed project? [help]

It is anticipated that between 50 to 300 persons could work at the completed development upon full project build-out.

j. Approximately how many people would the completed project displace? [help]

Tenants will be temporarily displaced from the existing Educator building but will have the opportunity to lease space in the new buildings.

k. Proposed measures to avoid or reduce displacement impacts, if any: [help]

The project will be constructed in phases to help mitigate displacement impacts and current tenants will be given the opportunity to move into Phase 1 buildings to avoid long-term displacement.

L. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any: [help]

The proposed development is a permitted use within the City of Tacoma PMI zone and will meet all design and zoning code requirements.

m. Proposed measures to ensure the proposal is compatible with nearby agricultural and forest lands of long-term commercial significance, if any: [help]

There are no farm or forest lands on or near the site.

9. **Housing** [help]

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing. [help]

N/A

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing. [help]

N/A

c. Proposed measures to reduce or control housing impacts, if any: [help]

N/A

10. **Aesthetics** [help]

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed? [help]

The tallest height of the buildings will be approximately 45 feet. The principal building materials will be painted pre-cast concrete walls and window glass.

b. What views in the immediate vicinity would be altered or obstructed? [help]

Due to the flat nature of the area, views in the immediate vicinity to the site will be altered with development of the proposed buildings but no views are anticipated to be entirely obstructed.

b. Proposed measures to reduce or control aesthetic impacts, if any: [help]

The use of perimeter landscaping will provide visual buffers and shielding of the development.

11. **Light and Glare** [help]

a. What type of light or glare will the proposal produce? What time of day would it mainly occur? [help]

Normal light from vehicular traffic to and from the site and parking lot lighting would be present in early morning and evening hours. Glare from building window glass could also be present during daylight hours.

b. Could light or glare from the finished project be a safety hazard or interfere with views? [help]

It is not anticipated that light or glare created by the project would be a safety hazard or interfere with views.

c. What existing off-site sources of light or glare may affect your proposal? [help]

Light from vehicular traffic on area roadways and street lighting would be present but not anticipated to affect the project.

d. Proposed measures to reduce or control light and glare impacts, if any: [help]

Parking lot lighting will be shielded and window glass will be non-glare. The installation of perimeter landscaping will help to contain light and glare to within the development.

12. **Recreation** [help]

a. What designated and informal recreational opportunities are in the immediate vicinity? [help]

No recreational opportunities are in the immediate vicinity of the development.

b. Would the proposed project displace any existing recreational uses? If so, describe. [help]

No recreational uses will be displaced.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any: [help]

No specific measures are proposed.

13. **Historic and cultural preservation** [help]

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]

There are no places or objects of a historic nature according to the Washington Department of Archeology Historic Preservation's (WISAARD) website, however there are buildings on Phase 2 that were built prior to 45 years ago.

Educators Building:

The Educators Building/Educators Manufacturing Co. - Building 159 at 3401 Lincoln Avenue was construction by the Educators Manufacturing Company and produced quality controlled school furniture. The original building was constructed in 1958 By Hart Construction Company consisting of three sections. A fourth section was added in 1965 to the west of the main building. The building consists of 183,026 square foot of industrial building, is rectangular in size and is sided with corrugated metal. It has four sections all with barrel roofs with the middle section wider that the other sections. The south elevation has ten window combinations symmetrically spaced near the roofline. Eight of the combinations are a double hung side-by-side fixed and a double hung. The center two combinations are double hung windows next to a fixed window. Below the upper row of windows is a second line of five sliding windows and below that are a row of six sliding windows. There are two sets of sliding windows on the south elevation towards the east end. The south elevation has at least three truck bays with roll-up garage-style doors. The north elevation has a shed addition built towards the east end of the building with three sets of sliding windows and is sided with T1-11. The west elevation is not accessible for observation by the public right-of-way. This site is unlikely to be register-eligible on a national, state or local level. While the building is representative of the utilitarian uses required by the Educators Manufacturing Company, it is not unique architecturally. Please refer to the Cultural Resources Assessment for the Blair-Hylebos Redevelopment Project, Tacoma, Pierce County, Washington for more detailed architectural building information and historic preservation assessment of this building.

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]

None are known to be on or near the site to our knowledge. A cultural resource study prepared by Cultural Resource Consultants, LLC for Grette & Associates was previously completed for the Blair-Hylebos redevelopment project in 2008 which included this site and that study concluded that the likelihood of discovery of cultural items at this site is very low, and only a risk if excavation should occur in native sediments which begin below the hydraulic fill layer on the site. It is not anticipated that excavation would disturb the ground to this depth. (The previous cultural resource study is included in this application.)

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]

As mentioned above, a cultural resource study was previously completed for this site.

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. [help]

An Inadvertent Discovery Plan will be kept on the site and implemented should cultural artifacts be uncovered on the site during construction.

14. **Transportation** [help]

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 primary roadways serving the proposed site include Taylor Way and Lincoln Avenue. Taylor Way provides access to and from I-5 and SR509. Vehicular access to the site is proposed via two full access driveways on Taylor Way and two full access driveways on Lincoln Avenue.

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]

Bus service in the area is provided by Pierce Transit, however there are no transit routes provided in the port of Tacoma in the immediate vicinity of the proposed project.

c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate? [help]

Phase 1 will provide 168 parking stalls and Phase 2 will provide 150 parking stalls along with 8 trailer stalls. Approximately 40 to 50 unstripped gravel parking stalls will be eliminated.

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]

It is anticipated that only minor improvements along the frontage of the site will be required, including sidewalk repair and extension, access removal and new access points.

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 is located in the Port of Tacoma with access to water and rail transportation which may be used depending on the nature of the future tenants.

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]

The proposed project is estimated to generate a total of 1090 net new weekday daily trips with 124 net trips occurring during the weekday AM peak hour (99 entering, 25 exiting), and 85 net new trips occurring during the weekday PM peak hour (25 entering, 60 exiting). The percentage of truck volumes is expected to be approximately 20 to 25 percent. Please refer to the Transportation Impact Study prepared by TENW, dated March 29, 2017 and included with this package.

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. [help]

The project will not affect or be affected by the movement of agricultural or forest products in the area.

h. Proposed measures to reduce or control transportation impacts, if any: [help]

Improvement of Taylor Way and Lincoln Avenue along frontage of site to meet City of Tacoma standards, payment to City of Tacoma of pavement conditions contribution fee for Taylor Way in the amount of $52,185 and for Lincoln Avenue in the amount of $3,360 and payment to City of Fife of pro-rata share of Pacific Highway East/54th Avenue East intersection improvements will help to reduce and control impacts. Please refer to the Transportation Impact Study prepared by TEWN, dated March 29, 2017 and included with this package.

15. **Public Services** [help]

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]

Yes, the proposal will result in an increased need for public services. During the construction phases of the project, the need for emergency health services and police protection could be necessary. Upon project completion, the addition of new employees to the area could increase the need for police protection and health care as well as increase the use of public transit if bus service becomes available.

b. Proposed measures to reduce or control direct impacts on public services, if any. [help]

Construction of minor frontage road improvements, construction of looped fire line and new fire hydrants along with payment of utility system development charges, as required, will help to reduce impacts to public services.

16. **Utilities** [help]

a. Circle utilities currently available at the site: [help]
electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other ___________

For Phase I, water, sanitary sewer, storm drainage, natural gas, telephone, cable and electricity will be provided from existing lines within Taylor Way. Please see the section below for the providers of said utilities.

For Phase II, water, sanitary sewer, storm drainage, natural gas, telephone, cable and electricity will be provided from existing lines within Lincoln Avenue. Please see the section below for the providers of said utilities.

c. 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]

Electricity:	*Tacoma Power*
Natural Gas:	*Puget Sound Energy*
Water:	*Tacoma Water Department*
Sanitary Sewer:	*City of Tacoma*
Telephone:	*CenturyLink*
Cable:	*Comcast or Tacoma Click*
Refuse Service:	*Murray's Disposal*

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: Daniel K. Balmelli ....

Name of signee: Daniel K. Balmelli, P.E. ....

Position and Agency/Organization: Barghausen Consulting Engineers ....

Date Submitted: February 1, 2017 / Revised March 24, 2017/Revised March 29, 2017/Revised April 6, 2017 ....

D. supplemental sheet for nonproject actions [help]

(**IT IS NOT NECESSARY** to use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

   Proposed measures to avoid or reduce such increases are:

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

   Proposed measures to protect or conserve plants, animals, fish, or marine life are:

3. How would the proposal be likely to deplete energy or natural resources?

   Proposed measures to protect or conserve energy and natural resources are:

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

   Proposed measures to protect such resources or to avoid or reduce impacts are:

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

Proposed measures to avoid or reduce shoreline and land use impacts are:

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

Proposed measures to reduce or respond to such demand(s) are:

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

Port of Tacoma

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MITIGATED DETERMINATION OF NON-SIGNIFICANCE (MDNS)
WAC 197-11-970

Project Name: Avenue 55 Port of Tacoma
Proponent: Avenue 55
Proposal:
The applicant proposes to construct approximately 430,000 square feet of warehouse/ distribution center space on a 19.71 acre property zoned "PMI" Port Maritime Industrial, replacing an existing approximately 189,500 square foot industrial/manufacturing use building. The proposal includes approximately 90,000 cubic yards of grade and fill to prepare the site for development, approximately 255 on-site parking stalls, Taylor Way and Lincoln Avenue frontage improvements, monetary contributions to the City of Tacoma for pavement impacts to Taylor Way and Lincoln Avenue, and a monetary contribution to the City of Fife for a future Pacific Highway E/54th Ave E intersection improvement ("Proposal").

Location:
Phase 1: 1514, 1614, and 1714 Taylor Way, Parcel Nos. 032126-7005, 032135-6008 and -5007
Phase 2: 3401 Lincoln Avenue, Parcel No. 032135-1051

Lead Agency: Port of Tacoma

The lead agency for this Proposal has determined that the Proposal does not have a probable significant adverse impact on the environment, as mitigated herein. The mitigation measures in Attachment A have been identified to mitigate probable significant adverse impacts of the Proposal. An environmental impact statement (EIS) is not required under Revised Code of Washington (RCW) 43.21C.030(2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. The MDNS and Attachment A, as well as, additional Proposal and/or State Environmental Policy Act (SEPA) information is available upon request at the Port of Tacoma's Administration building, located at One Sitcum Plaza, Tacoma, WA 98421 or at the Port's website at http://www.portoftacoma.com/community/environment/sepa. The lead agency's SEPA policy can be found at http://www.portoftacoma.com/sites/default/files/2016-06-PT-SEPA-10-20-16.pdf.

Comments and Request for Reconsideration: This Mitigated Determination of Non-Significance (MDNS) is issued under Chapter 197-11-340(2) Washington Administrative Code (WAC). Pursuant to Port policy, all interested parties shall have 14 calendars days to comment on the proposed SEPA threshold determination. Only those who commented within the 14-day comment period shall have standing to file a Request for Reconsideration. Any challenge to a SEPA threshold determination shall be initiated by filing a Request for Reconsideration with the Responsible Official or designee no later than close of business (5:00 PM) within 7 calendar days following the end of the 14-day comment period for the SEPA determination. The lead agency will not act on this Proposal during the 14-day comment period or any valid reconsideration request/administrative appeal period. Comments shall be submitted to the Port of Tacoma, Environmental Programs, C/O Diana Meister at One Sitcum Plaza, Tacoma, WA 98421 or at the Port's website at http://www.portoftacoma.com/sepa.

Responsible official: Dakota Chamberlain
Position/title: Chief Facilities Development Officer
Signature [signature] **Date:** 4/13/2017
Comment Start Date: April 17, 2017
Comment End Date: May 1, 2017
Request for Reconsideration End Date: May 8, 2017

ATTACHMENT A

MITIGATION MEASURES

Avenue 55 Port of Tacoma

The probable environmental impacts of this proposal have been documented and are found in the environmental checklist and other information on file with the lead agency. Mitigation measures are permitted under the substantive authority of SEPA in accordance with Port policy.

The below conditions have been identified as mitigation measures to mitigate probable significant adverse impacts of the proposal based on the environmental checklist and other information on file with the lead agency:

1. The proposal shall be implemented in accordance with the Washington State Department of Ecology approved Interim Action Work Plan and any associated SEPA requirements.

2. The land use scenario analyzed in the Updated Transportation Impact Study dated March 29, 2017 generates trips by trucks/heavy vehicles which create significant relative impact to the operating capacity of the Taylor Way roadway (from Lincoln Avenue to SR 509) and Lincoln Avenue roadway (from Taylor Way to approximately Alexander Avenue). A pavement structural analysis indicates a necessary pavement design (i.e., Structural Number) and/or additional pavement material/thickness that would be needed to support the forecasted traffic demands with the site-generated traffic. To mitigate the impact of the site's generated traffic, the applicant shall choose one of the following measures:

   a. Implement the prescribed pavement section/structure (as identified in Appendix G of the Updated Transportation Impact Study), which has associated pavement design structural numbers ranging from about 6.74 to 7.97 depending on the roadway segment, through the reconstruction of Taylor Way from Lincoln Avenue to SR 509 and Lincoln Avenue from Taylor Way to Alexander Avenue; or

   b. Enter into an agreement to provide funds in the amount of $52,185 (for Taylor Way portion) and $3,360 (for Lincoln Avenue portion), as derived from the relative cost increase in paving material thickness (which ranges from 0.125 inches to 0.25 inches of asphalt depending on the roadway segment), as a funding component of future City of Tacoma led roadway project(s) to improve the ability of the pavement on Taylor Way and Lincoln Avenue to support the anticipated traffic loading contributed by the site. In the event that the City of Tacoma requires the applicant to provide a pavement overlay on Lincoln Avenue as part of the site development's frontage improvements, the cost of the overlay shall be credited against the $3,360 improvement of the pavement conditions on Lincoln Avenue. Should the City-led improvements on Taylor Way be conducted through the formation of a Local Improvement District (LID), the funds specific to Taylor Way will be credited toward a LID contribution.

3. The extent of the site-generated trips includes contributions to traffic demands at the City of Fife intersection of Pacific Highway E and 54th Avenue E. Consistent with City of Fife requirements, a pro-rata share was calculated in the Traffic Impact Study for the interim improvement of dual westbound left-turn lanes at Pacific Hwy E/54th Ave E. Based on the ratio of PM peak hour project (Proposal) trips to total trips, and interim improvement costs, the pro-rata share of the westbound dual-left turn lanes at Pacific Hwy E/54th Ave E for Avenue 55 Tacoma Proposal would be $27,021 ($1,900,000 cost x 60 "Avenue 55" project trips / 4,219 total entering vehicles) to be conveyed by the applicant to the City of Fife per their requirements.

1514 Taylor Way Development

Interim Action Work Plan

Appendix B
Proposed Sampling Plan for Methane Survey and Vapor Intrusion Assessment

Two Union Square
601 Union Street, Suite 600
Seattle, WA 98101
tel: 206.292.2078 fax: 206.682.7867

Memorandum

To: Steve Teel, Washington State Department of Ecology

Copies: Drew Zaborowski, Avenue 55, LLC
Scott Hooten, Port of Tacoma

From: Tom Colligan and Layni Wachter, Floyd|Snider

Date: June 7, 2017

Project No: Avenue 55-Taylor Way

Re: **Proposed Sampling Plan for Methane Survey and Vapor Intrusion Assessment**
1514 Taylor Way
Tacoma, Washington

INTRODUCTION

This sampling plan was prepared to outline procedures for a Methane Survey and Vapor Intrusion (VI) Assessment at the Taylor Way property (the Site) to occur in the summer of 2017. The 10-acre site is located on Taylor Way between the Hylebos Waterway to the north and the Blair Waterway to the south.

In May 2004, Prologis, in anticipation of site redevelopment, entered into an Agreed Order (AO) with the Washington State Department of Ecology (Ecology) prompted by the Site's uncertain fill history including potential fill associated with the adjacent Don Oline Landfill as well as the presence of wood debris and other fill materials on-site. In response, a Remedial Investigation (RI) and a Feasibility Study (FS) were completed to the satisfaction of Ecology in 2006. However, no development plans for the site proceeded as the site was sold to the Port of Tacoma (the Port). The Port recently leased the parcel to Avenue 55, LLC, which intends to redevelop the parcel beginning in the summer of 2017 with two warehouse buildings as shown in Figure 1.

The geology of the Site consists of several feet of sandy, gravely fill that was placed over silty, tidal marsh deposits. The fill in places contains extensive debris (including wood, metal, concrete, etc.). Shallow groundwater (A Zone aquifer) occurs in the fill material at an approximate depth of 5 feet below ground surface.

In December 2016, an initial vapor survey was performed at the Site to determine if any design considerations were necessary to mitigate potential human health risks from vapors into future building spaces. Due to site conditions and weather, only a small number of methane sample locations were able to be accessed. Additionally, no volatile organic compound (VOC) samples were taken. The results of the 2016 Methane Survey are shown in Figure 2.

This revised Methane Survey and VI Assessment is intended to close the data gaps and provide for a final determination on vapor design considerations. The sampling will be conducted prior to construction but after the surcharge soils have been graded to the final elevation over the Site. If the vapor survey must be conducted prior to regrading of the surcharge soils then an opinion of completion of settlement shall be sought from the geotechnical engineer prior to scheduling sampling.

Methane Survey

Procedures for the methane survey have been developed based upon standard industry practice and ASTM Standard E2993-16: Standard Guide for Evaluating Potential Hazard as a Result of Methane in the Vadose Zone. Methane concentrations by percent volume will be measured in the vadose zone at the 19 remaining locations placed across the two proposed building footprints and future parking lot (Figure 1). At each location on top of the surcharge piles, a direct-push drill rig will push open a pilot hole down to 9 feet below surcharge ground surface (equivalent to 5 feet below final floor grade) using a 1½-inch-diameter rod. Into each pilot hole a dedicated stainless steel vapor point will be inserted along with an attached flexible polyethylene tube leading to the ground surface. For those locations not on the surcharge piles, if groundwater is encountered shallower than 5 feet, the vapor point will be placed no more than 6 inches to 1 foot above the observed depth to groundwater. If groundwater is present shallower than 2 feet, a flux chamber will be installed 6 inches above the water table. The flux chamber will consist of a plastic bucket secured into the ground with polyethylene tubing extending through the top of the bucket and sealed using plumber's putty.

If refusal is encountered at depths less than 5 feet, the drill rig will be relocated within 50 feet of the refusal. If refusal occurs after a second attempt, then a probe tip will be installed just above the point of refusal.

After the implant tip is set into the bore hole, the remaining annular space will be filled with bentonite and then hydrated to form an impervious seal. A leak test will be performed in accordance with the attached *Floyd|Snider Standard Guideline for Vapor Intrusion* (included as Attachment 1). This involves testing an implant location by first placing a plastic shroud around the sampling point. Helium will be used as the tracer gas and inserted into the shroud by a small hole to a concentration of 10 percent or greater for a minimum of five minutes. The soil vapor implant will be tested for helium by purging it with a vacuum pump. The seal will be considered impervious if the leak percentage is less than 10 percent of the concentration inside the shroud. The full leak testing methodology is presented in the attached guideline. If no leakage is detected then no further leak testing will be necessary for the remainder of the vapor sampling.

Methane concentrations will be tested using a GEM 2000 Plus landfill gas monitor. The equilibration time prior to sampling using the implants as described above shall be 48 hours. However, if field conditions change and the "post-run tubing" method is used, which is a temporary method that does not involve placement of a sand pack, then equilibration times shall be 2 hours.

According to the ASTM Standard, if methane is detected at greater than 5 percent at any location, then differential pressure must also be measured. The GEM 2000 Plus is capable of differential pressure readings as well. To establish equilibrium times for measuring differential pressure, differential pressure testing will be conducted every 15 minutes for one hour at the first sampling location. The established time for the pressure to stabilize will be used at the remaining locations. A photoionization detector (PID) will also be inserted into the tubing and used to assess the presence of volatile organic compounds (VOCs). Field notes will be taken at each sampling location to document location, methane concentration, and pressure differential (if applicable). The risk of methane intrusion will be assessed using the ASTM Standard E2993-16 reporting table based upon evaluating shallow soil gas concentrations and differential pressure (Table 1).

Vapor Intrusion Sampling

The VI sampling will be done in accordance with Ecology's *Guidance for Evaluating Vapor Intrusion in Washington State: Investigation and Remedial Action* (Ecology 2016). The results of the sampling will be used to evaluate the risk of VI from VOCs present in vadose zone soil or shallow groundwater.

A total of three locations will be selected for soil gas sampling as shown on Figure 1. Two of these locations will be at either end of the larger warehouse footprint and one under the smaller warehouse footprint. Sampling locations may be adjusted to other locations driven by the results of the PID screening taken during the methane survey. If groundwater is shallower than 3 feet at any of the proposed VOC sample locations, then the VOC sample will be taken at the next closest proposed location where the sample can be taken at least 3 feet below ground surface.

After an equilibration time of 48 hours, vapor samples will be collected by directly filling 1-liter SUMMA® canisters using the three vapor implants inserted during the methane survey (an implants operation guide is included as Attachment 2). A leak detection test (described previous) will be conducted prior to the collection of the first sample. The attached *Floyd|Snider Standard Guideline for Vapor Intrusion* will be used for sample collection procedures. A field blank and field duplicate will be taken for QA/QC purposes. Samples will be analyzed for VOCs using USEPA Method TO-15 and Air Phase Hydrocarbons by Method TO-15. Reporting limits for each compound analyzed by these methods are shown in Tables 3 and 4.

REPORTING

Results of the above-described work will be reported with a Recommendation for Design memorandum prepared by Floyd|Snider and Herrera Environmental Consultants (Herrera), Floyd|Snider's consultant for vapor hazards. Herrera will use the resulting VOC and methane information to design an appropriate passive, active, or combination system for the warehouse building design. All analytical data will be entered into Ecology's EIM database.

REFERENCES

Floyd|Snider. 2004. *ProLogis Taylor Way Property Remedial Investigation Work Plan*. Prepared for ProLogis, Aurora, Colorado. December.

_____. 2006. *ProLogis Taylor Way Property Remedial Investigation*. Prepared for ProLogis, Aurora, Colorado. 3 October.

Washington State Department of Ecology (Ecology). 2016. *Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action*. Review Draft. Prepared by the Toxics Cleanup Program. Publication No. 09-09-047. Originally published October 2009; revised February.

ATTACHMENTS

Table 1	Suggested Default Decision Matrix for Methane in Soil Gas based on ASTM Standard E2993-16
Table 2	Analyte Testing Methods and Reporting Limits for Water
Table 3	Analyte Testing Methods and Reporting Limits for Volatile Organic Compounds for Gas
Table 4	Analyte Testing Methods and Reporting Limits for Air Phase Hydrocarbons for Gas
Figure 1	Vapor Survey Sample Locations
Figure 2	Methane Survey Sample Locations Actual
Attachment 1	Floyd|Snider Standard Guideline for Vapor Intrusion
Attachment 2	Implants Operation Guide

Tables

Table 1
Suggested Default Decision Matrix for Methane in Soil Gas based on ASTM Standard E2993-16

Shallow Soil Gas Concentration[1]	Corresponding Decision
< 1.25% to 5%	No action necessary
> 5% to 30%	No action necessary unless ΔP > 500 Pa[2]
> 30%	Evaluate the need for vapor controls

Notes:

1 Maximum methane soil gas value for area of building footprint. Shallow soil gas refers to soil gas in the vadose zone within the top 10 m (33 ft) of soil below ground surface.

2 ΔP refers to the differential between barometric pressure and the pressure in the subsurface at the depth of sampling. For gravel or other highly permeable matrices, use of a more conservative criterion less than 500 Pa may be appropriate.

Table 2
Analyte Testing Methods and Reporting Limits for Water[1]

Analyte	Units	MDL	PQL	Method
Gasoline	µg/L	4.8844	50	NWTPH-GX
Diesel (Fuel Oil)	µg/L	6.2304	50	NWTPH-DX
Heavy Oil	µg/L	10	100	NWTPH-DX
Diesel (Fuel Oil)	µg/L	5.3157	500	HCID
Gasoline	µg/L	16.2	400	HCID
Heavy Oil	µg/L	43.2	500	HCID
Kerosene	µg/L	5.3157	500	HCID
Mineral Oil	µg/L	43.2	500	HCID
Mineral Spirits	µg/L	5.3157	500	HCID
Benzene	µg/L	0.0416619	1	8260
Toluene	µg/L	0.0384522	1	8260
Ethylbenzene	µg/L	0.03585686	1	8260
m,p-Xylene	µg/L	0.06158618	1	8260
o-Xylene	µg/L	0.0384522	1	8260
Methyl tert-butyl ether (MTBE)	µg/L	0.03907411	1	8260
Aluminum	µg/L	4.194	55	200.8
Antimony	µg/L	0.015	0.2	200.8
Arsenic	µg/L	0.072	1	200.8
Barium	µg/L	0.032	0.5	200.8
Beryllium	µg/L	0.003	0.2	200.8
Boron	µg/L	1.433	40	200.8
Cadmium	µg/L	0.003	0.2	200.8
Calcium	µg/L	23.772	100	200.8
Chromium	µg/L	0.062	0.5	200.8
Cobalt	µg/L	0.032	0.3	200.8
Copper	µg/L	0.117	0.5	200.8
Iron	µg/L	5.611	100	200.8
Lead	µg/L	0.022	0.5	200.8
Magnesium	µg/L	2.961	100	200.8
Manganese	µg/L	0.047	2	200.8
Mercury	µg/L	0.126	0.3	200.8
Molybdenum	µg/L	0.212	1	200.8
Nickel	µg/L	0.037	0.5	200.8
Phosphorus	µg/L	4.743	200	200.8
Potassium	µg/L	4.187	500	200.8
Selenium	µg/L	0.105	1	200.8
Silver	µg/L	0.032	0.2	200.8
Sodium	µg/L	6.224	100	200.8
Strontium	µg/L	0.025	1	200.8
Thallium	µg/L	0.002	0.2	200.8

Table 2
Analyte Testing Methods and Reporting Limits for Water[1]

Analyte	Units	MDL	PQL	Method
Tin	µg/L	0.06	1	200.8
Titanium	µg/L	0.037	1	200.8
Uranium, Total	µg/L	0.022	0.2	200.8
Vanadium	µg/L	0.042	0.5	200.8
Mercury	µg/L	0.0052	0.1	245.1
Chromium, Hexavalent	mg/L	0.0025	0.05	7196
1,2,4-Trichlorobenzene	µg/L	0.01142373	1	8270
1,2-Dichlorobenzene	µg/L	0.01506828	1	8270
1,3-Dichlorobenzene	µg/L	0.0081028	1	8270
1,4-Dichlorobenzene	µg/L	0.01612231	1	8270
1-Methylnaphthalene	µg/L	0.00778727	0.5	8270
2,4,5-Trichlorophenol	µg/L	0.04515791	2	8270
2,4,6-Trichlorophenol	µg/L	0.01713609	2	8270
2,4-Dichlorophenol	µg/L	0.01671555	2	8270
2,4-Dimethylphenol	µg/L	0.01005459	1	8270
2,4-Dinitrophenol	µg/L	0.12151138	2	8270
2,4-Dinitrotoluene	µg/L	0.12763269	1	8270
2,6-Dinitrotoluene	µg/L	0.01182563	1	8270
2-Chloronaphthalene	µg/L	0.01203714	1	8270
2-Chlorophenol	µg/L	0.01572381	1	8270
2-Methylnaphthalene	µg/L	0.00912423	0.5	8270
2-Methylphenol (o-cresol)	µg/L	0.0209353	1	8270
2-Nitroaniline	µg/L	0.02311063	5	8270
2-Nitrophenol	µg/L	0.01935965	2	8270
4,6-Dinitro-2-methylphenol	µg/L	0.04815407	5	8270
4-Bromophenyl phenyl ether	µg/L	0.02103266	1	8270
4-Chloro-3-methylphenol	µg/L	0.01307786	5	8270
4-Chloroaniline	µg/L	0.00710138	5	8270
4-Chlorophenyl phenyl ether	µg/L	0.01830891	1	8270
4-Methylphenol (p-cresol)	µg/L	0.01663876	1	8270
4-Nitrophenol	µg/L	0.10805365	5	8270
Acenaphthene	µg/L	0.00698495	0.5	8270
Acenaphthylene	µg/L	0.0093284	0.5	8270
Anthracene	µg/L	0.01237588	0.5	8270
Benz[a]anthracene	µg/L	0.00487636	0.5	8270
Benzo[a]pyrene	µg/L	0.01261031	0.5	8270
Benzo (b) fluoranthene	µg/L	0.01871545	0.5	8270
Benzo (g,h,I) perylene	µg/L	0.01084517	0.5	8270
Benzo (k) fluoranthene	µg/L	0.01438593	0.5	8270
Benzyl alcohol	µg/L	0.01636286	1	8270

Table 2
Analyte Testing Methods and Reporting Limits for Water[1]

Analyte	Units	MDL	PQL	Method
Bis(2-chloroethoxy)methane	µg/L	0.01357286	1	8270
Bis(2-chloroethyl) ether	µg/L	0.01612991	2	8270
Bis(2-ethylhexyl) phthalate	µg/L	0.00697689	1	8270
Bis(2-Ethylhexyl)adipate	µg/L	0.01055315	1	8270
Benzyl Butylphthalate	µg/L	0.00930103	1	8270
Carbazole	µg/L	0.0158652	5	8270
Chrysene	µg/L	0.01059602	0.5	8270
Di-n-butyl phthalate	µg/L	0.00339499	1	8270
Di-n-octyl phthalate	µg/L	0.00658966	1	8270
Dibenzo (a,h) anthracene	µg/L	0.01162126	0.5	8270
Dibenzofuran	µg/L	0.01251334	1	8270
Diethylphthalate	µg/L	0.03812191	1	8270
Dimethylphthalate	µg/L	0.00870947	1	8270
Fluoranthene	µg/L	0.00830334	0.5	8270
Fluorene	µg/L	0.0105417	0.5	8270
Hexachlorobenzene	µg/L	0.01945715	1	8270
Hexachlorobutadiene	µg/L	0.01394224	1	8270
Hexachlorocyclopentadiene	µg/L	0.01394839	1	8270
Hexachloroethane	µg/L	0.09373995	1	8270
Indeno (1,2,3-cd) pyrene	µg/L	0.01246833	0.5	8270
Isophorone	µg/L	0.00836761	1	8270
N-Nitrosodi-n-propylamine	µg/L	0.01340459	1	8270
Naphthalene	µg/L	0.00712457	0.5	8270
Nitrobenzene	µg/L	0.03581898	2	8270
Pentachlorophenol	µg/L	0.10920955	2	8270
Phenanthrene	µg/L	0.00935139	0.5	8270
Phenol	µg/L	0.01113111	2	8270
Pyrene	µg/L	0.01051063	0.5	8270
1-Methylnaphthalene	µg/L	0.00203849	0.1	(PAH)8270SIM
2-Methylnaphthalene	µg/L	0.00230399	0.1	(PAH)8270SIM
Acenaphthene	µg/L	0.00210177	0.1	(PAH)8270SIM
Acenaphthylene	µg/L	0.00242228	0.1	(PAH)8270SIM
Anthracene	µg/L	0.00824105	0.1	(PAH)8270SIM
Benz(a)anthracene	µg/L	0.01589565	0.1	(PAH)8270SIM
Benzo(a)pyrene	µg/L	0.00956939	0.1	(PAH)8270SIM
Benzo(b)fluoranthene	µg/L	0.02163277	0.1	(PAH)8270SIM
Benzo(g,h,i)perylene	µg/L	0.01069418	0.1	(PAH)8270SIM
Benzo(k)fluoranthene	µg/L	0.01214055	0.1	(PAH)8270SIM
Chrysene	µg/L	0.00643448	0.1	(PAH)8270SIM
Dibenz(a,h)anthracene	µg/L	0.00273656	0.1	(PAH)8270SIM

Table 2
Analyte Testing Methods and Reporting Limits for Water[1]

Analyte	Units	MDL	PQL	Method
Fluoranthene	µg/L	0.00716505	0.1	(PAH)8270SIM
Fluorene	µg/L	0.00314	0.1	(PAH)8270SIM
Indeno(1,2,3-cd)pyrene	µg/L	0.00710671	0.1	(PAH)8270SIM
Naphthalene	µg/L	0.00216094	0.1	(PAH)8270SIM
Phenanthrene	µg/L	0.00648656	0.1	(PAH)8270SIM
Pyrene	µg/L	0.00936407	0.1	(PAH)8270SIM
Pentachlorophenol	µg/L	0.03440193	0.1	(PENTA)8270SIM
1,1,1,2-Tetrachloroethane	µg/L	0.0391	1	8260
1,1,1-Trichloroethane	µg/L	0.0266	1	8260
1,1,2,2-Tetrachloroethane	µg/L	0.0769	1	8260
1,1,2-Trichloroethane	µg/L	0.0735	1	8260
1,1-Dichloroethane	µg/L	0.0676	1	8260
1,1-Dichloroethene	µg/L	0.0356	1	8260
1,1-Dichloropropene	µg/L	0.0385	1	8260
1,2,3-Trichlorobenzene	µg/L	0.0532	4	8260
1,2,3-Trichloropropane	µg/L	0.0713	1	8260
1,2,4-Trichlorobenzene	µg/L	0.0318	2	8260
1,2,4-Trimethylbenzene	µg/L	0.0385	1	8260
1,2-Dibromo-3-chloropropane	µg/L	0.0748	1	8260
1,2-Dibromoethane	µg/L	0.0577	0.06	8260
1,2-Dichlorobenzene	µg/L	0.0661	1	8260
1,2-Dichloroethane	µg/L	0.0679	1	8260
1,2-Dichloropropane	µg/L	0.0518	1	8260
1,3,5-Trimethylbenzene	µg/L	0.0391	1	8260
1,3-Dichlorobenzene	µg/L	0.0599	1	8260
1,3-Dichloropropane	µg/L	0.0661	1	8260
1,4-Dichlorobenzene	µg/L	0.0599	1	8260
1,4-Dioxane	µg/L	0.0024	1	8260
2,2-Dichloropropane	µg/L	0.0275	2	8260
2-Butanone	µg/L	0.5721	5	8260
2-Chloro-1,3-butadiene	µg/L	0.0007	1	8260
2-Chlorotoluene	µg/L	0.0479	1	8260
2-Hexanone	µg/L	0.2468	1	8260
2-Nitropropane	µg/L	0.2367	1	8260
4-Chlorotoluene	µg/L	0.0446	1	8260
4-Isopropyltoluene	µg/L	0.0318	1	8260
4-Methyl-2-pentanone	µg/L	0.2162	5	8260
Acetone	µg/L	0.5053	5	8260
Acrylonitrile	µg/L	0.0374	1	8260
Allyl chloride	µg/L	0.1026	1	8260

Table 2
Analyte Testing Methods and Reporting Limits for Water[1]

Analyte	Units	MDL	PQL	Method
Benzene	µg/L	0.0417	1	8260
Bromobenzene	µg/L	0.067	1	8260
Bromochloromethane	µg/L	0.0424	1	8260
Bromodichloromethane	µg/L	0.0555	1	8260
Bromoform	µg/L	0.0751	1	8260
Bromomethane	µg/L	0.0454	1	8260
Butyl Chloride	µg/L	0.0028	1	8260
Carbon disulfide	µg/L	0.0542	1	8260
Carbon tetrachloride	µg/L	0.0385	1	8260
Chloroacetonitrile	µg/L	0.005	1	8260
Chlorobenzene	µg/L	0.0542	1	8260
Chlorodibromomethane	µg/L	0.0391	1	8260
Chloroethane	µg/L	0.1011	1	8260
Chloroform	µg/L	0.126	1	8260
Chloromethane	µg/L	0.0466	1	8260
cis -1,2-Dichloroethene	µg/L	0.0609	1	8260
cis -1,3-Dichloropropene	µg/L	0.0318	1	8260
Cumene	µg/L	0.0359	1	8260
Dibromomethane	µg/L	0.0641	1	8260
Dichlorodifluoromethane	µg/L	0.06	1	8260
Diethyl ether	µg/L	0.0864	1	8260
Ethyl acetate	µg/L	0.0961	1	8260
Ethyl methacrylate	µg/L	0.0636	1	8260
Ethylbenzene	µg/L	0.0359	1	8260
Hexachlorobutadiene	µg/L	0.0297	4	8260
Hexachloroethane	µg/L	0.007	1	8260
Iodomethane	µg/L	0.0374	1	8260
m,p-Xylene	µg/L	0.0616	1	8260
Methacrylonitrile	µg/L	0.223	1	8260
Methyl acrylate	µg/L	0.0781	1	8260
Methyl methacrylate	µg/L	0.0599	1	8260
Methylene chloride	µg/L	0.0356	1	8260
n-Butylbenzene	µg/L	0.0374	1	8260
n-Hexane	µg/L	0.1085	1	8260
n-Propylbenzene	µg/L	0.0318	1	8260
Naphthalene	µg/L	0.0407	1	8260
Nitrobenzene	µg/L	0.0002	1	8260
o-Xylene	µg/L	0.0385	1	8260
Pentachloroethane	µg/L	0.0027	1	8260
Propionitrile	µg/L	0.0325	5	8260

Table 2
Analyte Testing Methods and Reporting Limits for Water[1]

Analyte	Units	MDL	PQL	Method
Sec-Butylbenzene	µg/L	0.0356	1	8260
Styrene	µg/L	0.0349	1	8260
Tert-Butyl Methyl Ether	µg/L	0.0391	1	8260
Tert-Butylbenzene	µg/L	0.0349	1	8260
Tetrachloroethene	µg/L	0.0359	1	8260
Tetrahydrofuran	µg/L	0.412	1	8260
Toluene	µg/L	0.0385	1	8260
Trans-1,2-Dichloroethene	µg/L	0.0446	1	8260
Trans-1,3-Dichloropropene	µg/L	0.0278	1	8260
Trans-1,4-Dichloro-2-butene	µg/L	0.0636	1	8260
Trichloroethene	µg/L	0.0454	0.5	8260
Trichlorofluoromethane	µg/L	0.0474	1	8260
Vinyl acetate	µg/L	0.0578	1	8260
Vinyl chloride	µg/L	0.0817	0.2	8260

Note:

1 Provided by Fremont Analytical.

Abbreviations:

MDL Method Detection Limit
µg/L Micrograms per liter
PQL Practical Quantitation Limit

Table 3
Analyte Testing Methods and Reporting Limits for Volatile Organic Compounds for Gas[1]

	PQL		
Analyte	**ppbv**	**µg/m^3**	**Method**
1,1,1-Trichloroethane	0.2	1.09	TO-15
1,1,2,2-Tetrachloroethane	0.3	2.06	TO-15
1,1,2-Trichloroethane	0.5	2.73	TO-15
1,1-Dichloroethane	0.2	0.81	TO-15
1,1-Dichloroethene	0.2	0.793	TO-15
1,2,4-Trichlorobenzene	0.3	2.23	TO-15
1,2,4-Trimethylbenzene	0.3	1.47	TO-15
1,2-Dichlorobenzene	0.5	3.01	TO-15
1,2-Dichloroethane	0.2	0.809	TO-15
1,2-Dichloropropane	0.5	2.31	TO-15
1,3,5-Trimethylbenzene	0.3	1.47	TO-15
1,3-Butadiene	0.5	1.11	TO-15
1,3-Dichlorobenzene	0.3	1.8	TO-15
1,4-Dichlorobenzene	0.3	1.8	TO-15
Propylene	0.5	0.861	TO-15
2-Butanone	0.5	1.47	TO-15
2-Hexanone	1	4.1	TO-15
Acetone	1	2.38	TO-15
Acrolein	0.5	1.15	TO-15
Benzene	0.2	0.639	TO-15
p-Ethyltoluene	0.3	1.47	TO-15
Bromoform	0.2	2.07	TO-15
Bromomethane	0.5	1.94	TO-15
Carbon disulfide	1.5	4.67	TO-15
Carbon tetrachloride	0.2	1.26	TO-15
Trichlorofluoromethane	0.3	1.69	TO-15
1,1,2-Trichloro-1,2,2-trifluoroethane	0.5	3.83	TO-15
Dichlorotetrafluoroethane	0.5	3.5	TO-15
Dichlorodifluoromethane	0.3	1.48	TO-15
Chlorobenzene	0.2	0.921	TO-15
Chlorodibromomethane	0.5	4.26	TO-15
Chloroethane	0.5	1.32	TO-15
Chloroform	0.2	0.977	TO-15
Chloromethane	0.5	1.03	TO-15
cis -1,2-Dichloroethene	0.2	0.793	TO-15
cis -1,3-dichloropropene	0.5	2.27	TO-15
Cyclohexane	0.2	0.688	TO-15
Bromodichloromethane	0.3	2.01	TO-15

Table 3
Analyte Testing Methods and Reporting Limits for Volatile Organic Compounds for Gas[1]

Analyte	PQL ppbv	PQL µg/m^3	Method
1,4-Dioxane	1	3.6	TO-15
Ethyl acetate	1	3.6	TO-15
Ethylbenzene	0.3	1.3	TO-15
1,2-Dibromoethane	0.2	1.54	TO-15
Heptane	0.5	2.01	TO-15
Hexachlorobutadiene	1	10.7	TO-15
n-Hexane	0.2	0.705	TO-15
2-Propanol	1	2.46	TO-15
m,p-Xylene	0.2	0.868	TO-15
4-Methyl-2-pentanone	1	4.1	TO-15
Methyl methacrylate	0.3	1.23	TO-15
tert-Butyl Methyl Ether	0.2	0.721	TO-15
Methylene chloride	1.5	5.21	TO-15
Naphthalene	0.3	1.57	TO-15
o-Xylene	0.2	0.868	TO-15
Styrene	0.3	1.28	TO-15
Tetrachloroethene	0.3	2.03	TO-15
Tetrahydrofuran	0.5	1.47	TO-15
Toluene	0.2	0.754	TO-15
Benzyl chloride	0.5	2.59	TO-15
trans-1,2-Dichloroethene	0.2	0.793	TO-15
trans-1,3-dichloropropene	0.5	2.27	TO-15
Trichloroethene	0.2	1.07	TO-15
Vinyl acetate	1	3.52	TO-15
Vinyl chloride	0.2	0.511	TO-15
1,1,1-Trichloroethane	0.00500	0.0273	TO-15SIM
1,1,2,2-Tetrachloroethane	0.00620	0.0426	TO-15SIM
1,1,2-Trichloroethane	0.0200	0.109	TO-15SIM
1,1-Dichloroethane	0.00800	0.0324	TO-15SIM
1,1-Dichloroethene	0.00900	0.0357	TO-15SIM
1,2,4-Trichlorobenzene	0.0500	0.371	TO-15SIM
1,2,4-Trimethylbenzene	0.0730	0.359	TO-15SIM
1,2-Dichloroethane	0.0200	0.0809	TO-15SIM
Benzene	0.0400	0.128	TO-15SIM
Carbon tetrachloride	0.0200	0.126	TO-15SIM
Chlorobenzene	0.0700	0.322	TO-15SIM
Chloroethane	0.0980	0.259	TO-15SIM
Chloroform	0.0200	0.0977	TO-15SIM

Table 3
Analyte Testing Methods and Reporting Limits for Volatile Organic Compounds for Gas[1]

Analyte	PQL		Method
	ppbv	$\mu g/m^3$	
Chloromethane	0.400	0.826	TO-15SIM
cis -1,2-Dichloroethene	0.0200	0.0793	TO-15SIM
Ethylbenzene	0.0500	0.217	TO-15SIM
1,2-Dibromoethane	0.0200	0.154	TO-15SIM
Hexachlorobutadiene	0.0166	0.177	TO-15SIM
n-Hexane	0.0700	0.247	TO-15SIM
m,p-Xylene	0.0600	0.261	TO-15SIM
tert-Butyl Methyl Ether	0.00900	0.0324	TO-15SIM
Methylene chloride	0.0600	0.208	TO-15SIM
Naphthalene	0.300	1.57	TO-15SIM
o-Xylene	0.0400	0.174	TO-15SIM
Tetrachloroethene	0.0500	0.339	TO-15SIM
Toluene	0.0500	0.188	TO-15SIM
trans-1,2-Dichloroethene	0.00600	0.0238	TO-15SIM
Trichloroethene	0.0170	0.0914	TO-15SIM
Vinyl chloride	0.0850	0.217	TO-15SIM

Note:

1 Provided by Fremont Analytical.

Abbreviations:

$\mu g/m^3$ Micorgrams per square meter

ppbv Parts per billion by volume

PQL Practical Quantitation Limit

Table 4
Analyte Testing Methods and Reporting Limits for Air Phase Hydrocarbons for Gas[1]

Analyte	Units	PQL	Method
1,2,3-Trimethylbenzene	µg/m³	1.41	TO-15
1,3,5-Trimethylbenzene	µg/m³	1.27	TO-15
1,3-Butadiene	µg/m³	1.14	TO-15
1-methyl-3-ethylbenzene	µg/m³	1.29	TO-15
2,3-Dimethylheptane	µg/m³	1.04	TO-15
2,3-Dimethylpentane	µg/m³	0.97	TO-15
4-Isopropyltoluene	µg/m³	1.83	TO-15
Aliphatic Hydrocarbon (EC5-8)[2]	µg/m³	146.65	TO-15
Aliphatic Hydrocarbon (EC9-12)[3]	µg/m³	94.19	TO-15
Aromatic Hydrocarbon (EC9-10)[4]	µg/m³	4.54	TO-15
Benzene	µg/m³	0.53	TO-15
Cyclohexane	µg/m³	1.18	TO-15
Decane	µg/m³	1.26	TO-15
Ethylbenzene	µg/m³	0.69	TO-15
Heptane	µg/m³	0.65	TO-15
Isopentane	µg/m³	1.02	TO-15
Isopropylbenzene	µg/m³	0.85	TO-15
m,p-Xylene	µg/m³	0.73	TO-15
n-butylcyclohexane	µg/m³	2.21	TO-15
n-Dodecane	µg/m³	8.35	TO-15
n-Hexane	µg/m³	0.63	TO-15
n-Undecane	µg/m³	2.69	TO-15
Naphthalene	µg/m³	1.03	TO-15
Nonane	µg/m³	1.24	TO-15
o-Xylene	µg/m³	1.15	TO-15
Octane	µg/m³	1.13	TO-15
Tert-butyl methyl ether	µg/m³	0.45	TO-15

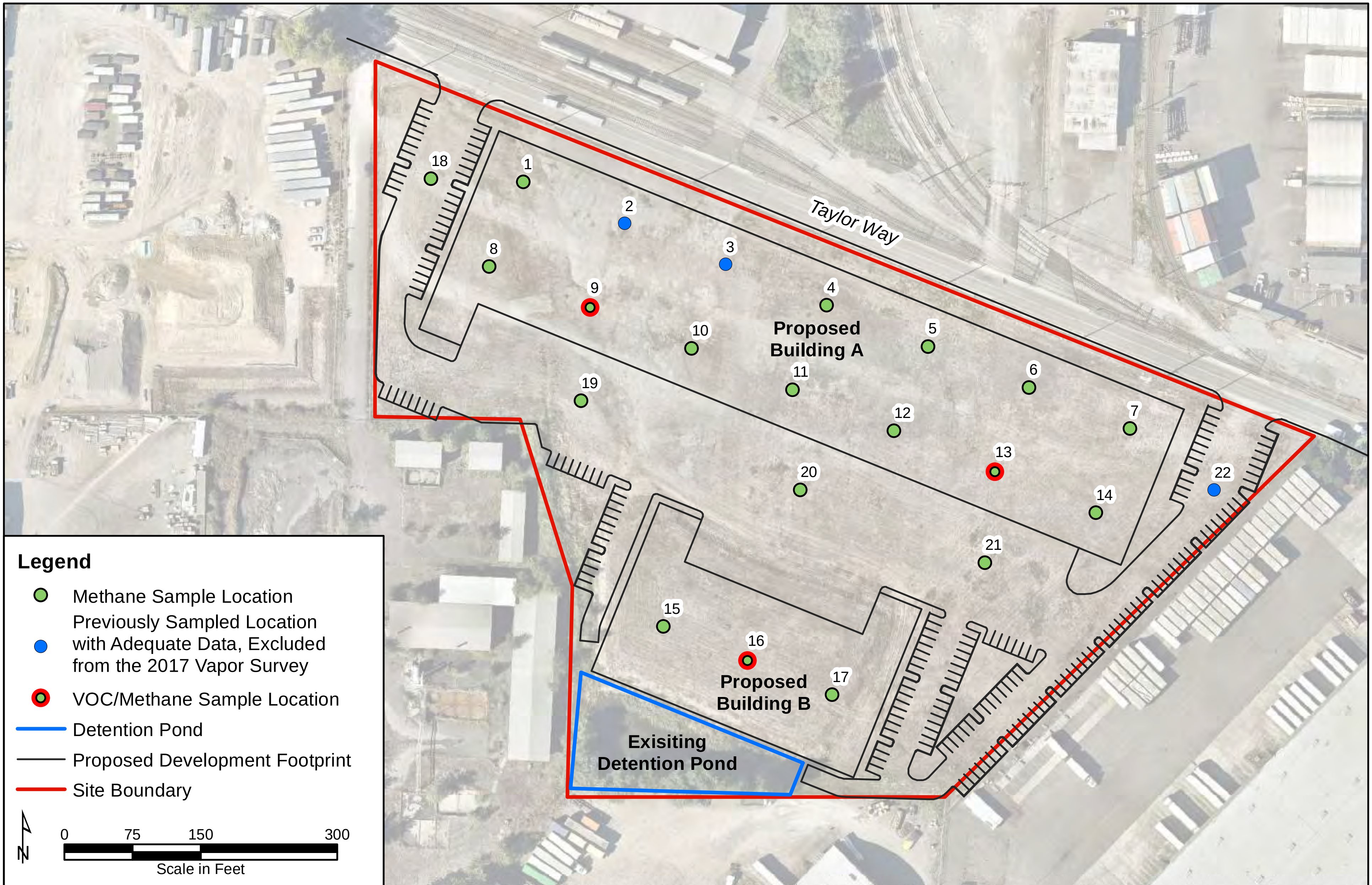
Note:

1 Provided by Fremont Analytical.
2 Molecular weight is 93 grams per mole (g/mol).
3 Molecular weight is 144 g/mol.
4 Molecular weight is 123 g/mol.

Abbreviations:

µg/m³ Micrograms per square meter
PQL Practical Quantitation Limit

Figures



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Proposed Sampling Plan for the 1514 Taylor Way Site
1514 Taylor Way Development
Tacoma, Washington

Figure 1
Vapor Survey Sample Locations

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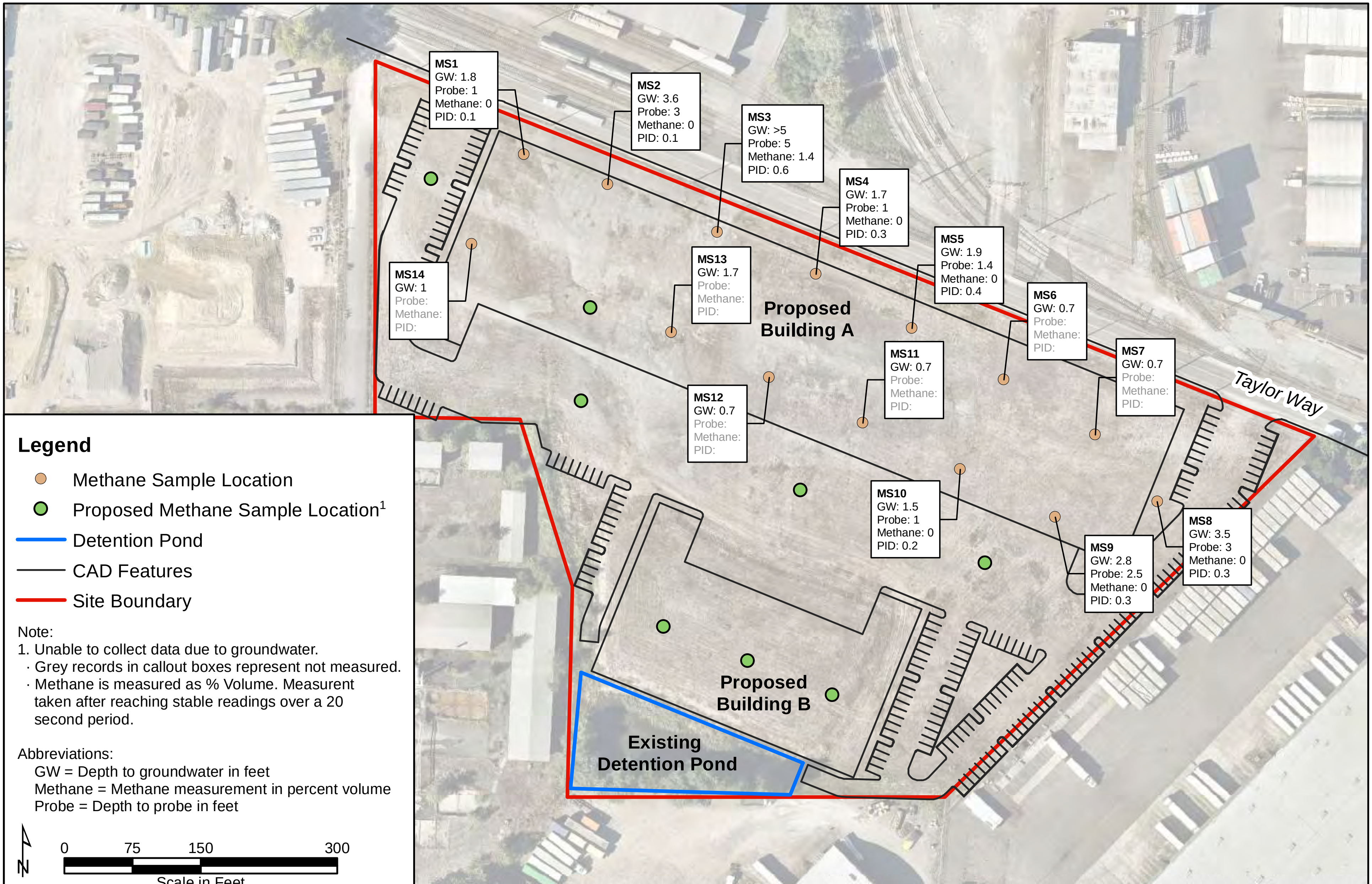
4/7/2017



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**Proposed Sampling Plan for
the Former Prologis Site
2000 Taylor Way
Tacoma Washington**

Figure 2
Methane Survey Sample Locations Actual

I:\GIS\Projects\Ave55-TaylorWay\MXD\Figure 4 Methane Survey Sample Locations Actual.mxd
1/24

Attachment 1
Floyd|Snider Standard Guideline for Vapor Intrusion

Two Union Square
601 Union Street, Suite 600
Seattle, WA 98101
tel: 206.292.2078 fax: 206.682.7867

F|S STANDARD GUIDELINE

Vapor Intrusion

DATE/LAST UPDATE: December 2016

These procedures should be considered standard guidelines and are intended to provide useful guidance when in the field, but are not intended to be step-by-step procedures, as some steps may not be applicable to all projects.

All field staff should be sufficiently trained in the standard guidelines for the sampling method they intend to use and should review and understand these procedures prior to going into the field. It is the responsibility of the field staff to review the standard guidelines with the field manager or project manager and identify any deviations from these guidelines prior to field work. When possible, the project-specific Sampling and Analysis Plan should contain any expected deviations and should be referenced in conjunction with these standard guidelines.

1.0 Scope and Purpose

This standard guideline provides details necessary to complete vapor intrusion monitoring, which may include soil vapor point and sub-slab installation, soil vapor point monitoring and/or sampling, indoor air sampling, and remediation system compliance monitoring. Field screening for volatile organic compounds (VOCs) is most often conducted with a photoionization detector (PID) and confirmed via analytical sample collection. The most common sampling methods are included herein. These guidelines are designed to meet or exceed guidelines set forth by the Draft Washington State Department of Ecology's (Ecology's), *Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action* (Ecology 2015 and 2016a). In addition, refer to Ecology's *Updated Process for Initially Assessing the Potential for Petroleum Vapor Intrusion: Implementation Memorandum No. 14* (Ecology 2016b) and the U.S. Environmental Protection Agency's (USEPA's) *Technical Guide For Addressing Petroleum Vapor Intrusion At Leaking Underground Storage Tank Sites* (USEPA 2015). Defining the lateral and vertical inclusion zones will determine if soil vapor sampling is required. The Interstate Technology and Regulatory Council (ITRC) online guidance for soil vapor intrusion (ITRC 2014) is another good source of information.

2.0 Equipment and Supplies

The following is a list of typical equipment and supplies necessary to complete vapor intrusion monitoring. It is important to note that this list is for a typical project; site-specific conditions may warrant additional or different equipment for completion of the work.

Sub-Slab and Soil Vapor Point Installation:

- Rotary hammer drill
- Drill bit
- Vapor point (AMS or similar)
- Stainless steel (SST) dummy tip (optional)
- Teflon™, nylon, or stainless steel tubing
- Sand pack
- Bentonite chips
- Protective cover for permanent point
- Swagelok® on/off valve (optional)
- Caps or compression fittings
- Quick set (concrete) or hydraulic cement
- Paper towels
- Nylon ferrules
- Shop vac

Soil Vapor Point or Remediation System Screening and/or Sampling:

- PID
- Connector
- Teflon™ or nylon tubing
- SKC air sampling pump or peristaltic pump
- Tedlar® bag or SUMMA® canisters
- Two adjustable wrenches (to tighten SUMMA® canister connections)
- Duplicate sampling (as necessary if duplicate sample collection is required)
- Soil gas manifolds
- Ferrules/fittings
- Helium (or other detection gas if leak detection is necessary)

- Helium detector (if leak detection is necessary with helium)
- Soil vapor sampling sheet (enclosed)

Indoor Air Sampling:

- PID
- Regulator
- SUMMA® canisters (6-liter, lab certified)
- Sampling cane (optional)
- At least two adjustable wrenches
- Indoor air building survey form (enclosed)

3.0 Standard Procedures

Soil vapor samples and/or indoor air samples should be collected from a sufficient number of locations to assess the presence of VOCs and potential exposure to workers or occupants of potentially impacted buildings or future building locations.

3.1 PRE-SCREENING ASSESSMENT

When completing a vapor intrusion survey or indoor air sampling, it is important to complete a pre-sampling survey to document potential activities or storage items that may cause interference with sample results. Some important things to note (list is not comprehensive):

- If smoking has occurred in the building
- Storage of potential contaminants (cleaners, fuels, paints, or paint thinners, etc.)
- HVAC system operation (on or off)
- Temperature and weather (wind direction, barometric pressure, etc.)
- Vehicle maintenance or industrial activities on the property or in the immediate vicinity (especially upwind)
- If new carpet or furniture is present

A pre-sampling soil vapor building survey form can be found at the end of this document. Be mindful of your surroundings and make a comprehensive list of potential factors that may influence sample results.

3.2 SOIL VAPOR POINT INSTALLATION

Soil vapor points can be installed along the outside perimeter of a building or in the lowest level of a building directly through the slab (or beneath the floor into the subsurface if there is not a slab). It is important to evaluate the presence of utilities prior to drilling into the subsurface or through a concrete slab.

If the sampling point is for one time use, tubing inserted into a hole drilled in the slab is sufficient. However, if the sampling is to be part of a long-term monitoring program, a more robust sampler, such as a Geoprobe or AMS probe for permanent soil gas point is recommended. Four different methods for installing soil vapor installation points are described here.

1. For temporary sub-slab points:
    a. Drill a hole into the subsurface. Using a rotary hammer drill and a 3/8-inch drill bit (typical diameter size but not necessary), drill a hole through the concrete floor slab of the building and into the sub-slab material to some depth (e.g., 7 to 8 centimeters [cm] or 3 inches). Drilling into the sub-slab material will create an open cavity, which will prevent obstruction of the tubing intake by small pieces of gravel. Once the thickness of the slab is known, the tubing will be cut to ensure that the probe tubing does not reach the bottom of the hole in order to avoid obstruction with sub-slab material. Sample tubing can be placed directly into the sub-slab. Evaluate and note the sub-slab conditions.
    b. Care should be taken to reduce cross-contaminating sub-slab vapor and indoor air vapor. This may be done by sealing the sample point with VOC-free hydraulic cement, hydrated bentonite, or with VOC-free putty to the top of the slab. Once sealed, wait 15 to 30 minutes before sampling.
2. Suggested installation guidelines for temporary outdoor soil gas points using a rotary hammer and drill bit:
    a. Manufacturers, such as Geoprobe or AMS, make soil gas implant systems designed for use with their equipment. Stainless steel or polyvinyl chloride (PVC) screen can also be used to construct an appropriate soil gas point. The probe screen will be fitted with a Swagelok® or similar fitting and connected to a length of 0.25-inch outer diameter, rigid wall nylon or Teflon™ tubing that will be above grade. Refer to the manufacturer or driller's instructions for specific details regarding assembly and deployment.
    b. To seal the point, the implant should be surrounded with a clean sand pack. Concrete (VOC-free hydraulic cement preferred) should be used above the seal to the top of the slab. Placement of some sort of cap or protective device is recommended if the sampling point will remain in place for some time after the soil gas sample is collected. Once sealed, wait 15 to 30 minutes before sampling.
3. Suggested installation guidelines for outside permanent points installed with a Geoprobe rig or hand auger:
    a. Advance the boring using a geoprobe or hand auger to the required maximum depth. Install a 6-inch long by 0.75-inch diameter stainless steel screen that is capped on the bottom end and fitted with a Swagelok® fitting connected on the

other end (or similar approved screen or soil vapor point). Attach a length of 0.25-inch outer diameter rigid wall nylon or Teflon™ tubing to the probe screen that will be above grade. The above grade end of the probe should be fitted with a stainless steel Swagelok® on/off control valve or similar valve (optional), which is used to prevent short-circuiting of ambient air into the probes and to conduct closed-valve tests. Teflon™ tape should be used on threaded joints to ensure a good seal. Depending on the work plan, it might be necessary to collect an air equipment blank sample through the vapor probe components prior to installation.

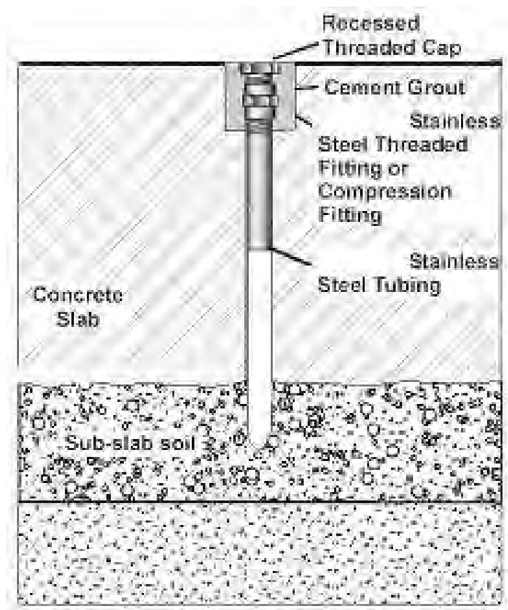
b. The 6-inch screen tip should be vertically centered in a 1-foot long interval containing standard sand pack, resulting in 3 inches of sand above and below the screen. The sand pack will be covered with a 1-foot interval of dry granular bentonite, which should be covered with at least 2 feet of pre-hydrated granular bentonite. The dry granular bentonite is emplaced immediately above the sand pack to ensure that pre-hydrated granular bentonite slurry does not flow down to the probe screen and seal it. The remainder of the borehole will be filled with pre-hydrated granular bentonite slurry (mixed at the surface and poured in) to approximately 12 inches below ground surface (bgs). The top portion should be completed with a 1-foot thick cement cap. A flush-mounted well box or other suitable protective cover should be installed to protect the nylon/Teflon™ tubing and on/off control valve.

4. The following contains suggested equipment and installation guidelines for permanent sub-slab vapor points within a building; however, site-specific conditions may warrant additional or different equipment for completion of the work:

   a. To install the sub-slab vapor probes, a rotary hammer drill will be used to create a “shallow” hole (e.g., ¼-inch deep) that partially penetrates the slab (do not completely penetrate the slab). A portable vacuum can be used to remove the drill cuttings from the hole without compromising the soil vapor samples. Next, a smaller diameter “inner” hole (e.g., 0.8 cm or 5/16 inch diameter) will be drilled through the remainder of the slab and into the sub-slab material to some depth (e.g., 7 to 8 cm or 3 inches). Drilling into the sub-slab material will create an open cavity which will prevent obstruction of the probes by small pieces of gravel. Once the thickness of the slab is known, the tubing will be cut to ensure that the probe tubing does not reach the bottom of the hole and in order to avoid obstruction with sub-slab material.

   b. Each sub-slab vapor point should consist of vacuum-rated Nylon, Teflon™, or stainless steel tubing with ¼-inch outer diameter by 0.15-inch inner diameter, and stainless-steel compression to thread fittings (e.g., ¼-inch outer diameter Swagelok® (SS-400-7-4) NPT female thread connectors or similar equipment). This will be capped with sub-slab tamper resistant cap or other similar protective caps that will be inset into the floor to avoid trip hazards. When time to sample, the sub-slab tamper resistant cap will be removed and Nylon tubing will be attached to the sub-slab vapor point with a ¼-inch out diameter (SS-400-1-4) male NPT. Prior to the installation of one of the sub-slab vapor probes, an air equipment blank sample will be collected if required by the work plan (See Section 3.4.3).

c. Teflon™ tape should be used with all stainless steel treads. All fittings should be attached prior to installing the probe in the sub-slab. A sub-slab tamper resistant cap will be used to ensure that the top of the probe is flush with the surface so as not to interfere with day-to-day use of the building. Portland cement can be used as a surface seal and allowed to cure for at least 24 hours prior to sampling. Hydraulic cement may also be used if free of VOCs, and requires less cure time (typically less than one hour) prior to sample collection. A typical soil gas probe schematic is provided here for reference.



Sub-slab soil gas probe schematic (Source: Ecology 2016a)

3.3 SOIL VAPOR POINT SAMPLING USING TEDLAR® BAGS

The objective of the vapor sampling procedures is to collect representative samples of the targeted media and analyze the gas for the presence of VOCs. Typically, a low volume air pump is used to pull a sample through the sampling train.

1. Connect proper tubing to your sampling point and to your low volume air pump.
2. Purge for 3 to 5 minutes to ensure that you are collecting a representative sample.
3. After purging, connect your Tedlar® bag to your air pump and collect your sample (Note: Tedlar® bags should be filled at a rate of approximately 5 liters per minute).
4. A PID is typically used in conjunction with sample collection in a Tedlar® bag.
   a. Connect the PID probe to the sample container using a section of tubing
   b. Use the PID to read the organic vapor level present in the sample.

Soil Vapor samples are typically collected into 1-liter Tedlar® bags and have a short (typically less than 72-hours) holding time. Samples collected into Tedlar® bags should be transported to the laboratory immediately under chain-of-custody protocol and stored in a dark container at ambient temperature during transport out of direct UV-light. Do not ship Tedlar® bags to the laboratory using an air transportation method as the pressure could compromise the sample or the bag. If air transport is necessary, do not completely fill the Tedlar® to avoid bursting. Soil vapor grab samples can also be collected into 1-liter SUMMA® canisters to provide additional holding time, lower laboratory method detection limits for some analytes, or sample delivery alternatives.

3.4 SOIL VAPOR AND SUB-SLAB SAMPLING WITH SUMMA® CANISTERS

Prior to soil vapor sampling, check all soil vapor sampling supplies to ensure the right sampling equipment arrived from the lab including duplicate Tees, if duplicate sample collection is necessary, and purging canisters. Conduct the following:

- Confirm that all SUMMA® canisters have at least 27 to 30 inches of mercury (in. Hg) prior to going out in the field to sample.
- Check and record all manifold and SUMMA® canister tags and numbers.
- Make sure all connections on the SUMMA® canisters and manifolds are tight.
- Order Helium (or other tracer gas) if needed and rent a helium detector.

Once the sub-slab or soil vapor probes are installed and the concrete well seal at each vapor point has fully cured, vapor sampling activities may commence (ideally a minimum of 2 hours is necessary for probe equilibration, depending on surface seal cure time). Alternatively, existing monitoring wells that are appropriately screened for a vapor intrusion assessment may be used. If indoor air samples will be collected, they may be collected simultaneously during the sub-slab sampling activities (details found in Section 3.6) if required by the work plan. If feasible, vapor sampling should not be conducted during or immediately after a significant rain event (i.e., greater than an inch of rainfall) due to the reduced effective diffusion coefficient and decrease in relative vapor saturation in the unsaturated zone. For sub-slab or soil vapor probe sampling, 1-liter lab certified SUMMA® canisters should be used in order to minimize the volume of soil vapor collected.

A closed-valve test should be conducted prior to soil vapor sample collection to check for leaks in the sampling train. A closed-valve test is conducted by capping the ends with proper Swagelok caps and/or closing any valves at the sampling point and purge canister. Once all ends are closed tight, turn the sampling canister valve on for 5 minutes. If the sampling train maintains its original vacuum for 5 minutes, the equipment will be assumed to be functional and there are no leaks. If the vacuum reading starts to drop, turn off the valves right away, check all connections, tighten if necessary, and re-test. If this passes, the only location that a leak can occur is from the soil ground seal around the vapor probe, which will be tested using helium or another tracer gas during sampling (See Section 3.4.1).

After the close-valve test, a minimum of three tubing volumes should be purged. Purging can be completed using a non-certified 6-Liter SUMMA® canister or a vacuum pump. The maximum flow rate during purging will not exceed the flow rate limit used for subsequent sampling and care will be taken not to over purge. An excel spreadsheet to help calculate tubing volume and purging time can be found at the end of this document.

After the sampling train has been purged, sub-slab soil vapor samples will be collected over a 10 minute period at a flow rate of less than 167 milliliters per minute (ml/min). The flow rate will be controlled by a flow regulator, which is set by the lab. Sub-slab soil vapor samples will be collected in laboratory-certified and pre-evacuated 1-liter SUMMA® canisters. Each SUMMA® canister will be supplied with an analytical test report certifying that the canister is "clean" to concentrations less than the respective method detection limits (MDLs). Each canister will be equipped with a pre-calibrated flow controller sampling train to allow collection of the desired sample. Prior to collecting the samples, the SUMMA® canister ID numbers will be recorded in the field notebook along with the initial canister vacuums, prior to sampling.

Soil vapor samples will be collected per the following steps:

1. Opening the valve on the top of the SUMMA® canister and recording the time in the log book;
2. Observing the vacuum gauge on the sampling train to ensure that the vacuum in the canister is decreasing over time;
3. Shutting off the valve once the vacuum gage reads between 4.0 and 5.0 inches of mercury (in. Hg).

3.4.1 Leak Testing

In addition to soil gas sampling activities, leak testing may be required at sampling locations and should be conducted using the following soil gas sampling set-up procedures:

- Place a large plastic bag (or other acceptable shroud) around the SUMMA® canister, sampling apparatus, and vapor probe.
- Cut a small hole in the bag to allow tubing to be inserted to introduce tracer gas, such as helium, and to subsequently fill the plastic bag.
- Keep the tracer gas (i.e., helium) concentration in the bag at 10 percent by volume or higher.

Detections of the tracer gas in the soil gas samples would indicate that the canister, valves, or ground surface seal to the sample probe have potentially leaked ambient air into the sample. Small amounts of sample train leakage is permissible, however, the leak percentage should not exceed 10 percent of the soil gas results. If the leak percentage exceeds 10 percent, the sampling point may have to be resampled. The integrity of the soil vapor samples can be assessed by estimating the percent leakage as shown here in micrograms per square meter ($\mu g/m^3$):

$$\% \text{ leakage} = 100 \times \frac{\text{helium concentration in soil vapor sample } [\mu g/m^3]}{\text{average helium concentration measured inside the shroud } [\mu g/m^3]}$$

Tracer gas leaks should not occur if the sampling train passes a properly performed closed-valve test and given the low flow rate of 167 ml/min.

3.4.2 Final Readings

Once the sampling is completed and the final vacuum is recorded, the sampling train will be removed from the canister and a Swagelok® cap will be tightly fitted to the inlet port of the canister. A PID can be used to record vapor readings from the manifold connection and logged in the notebook and/or soil vapor sampling sheet (enclosed). In addition, the initial canister vacuums, vacuum testing times, purging times, purged volumes, helium readings, sampling starts and times, final vacuum readings, and PID readings should be recorded on a vapor sampling sheet. Some of this information will also be required on the chain-of-custody.

3.4.3 Equipment Blank

Occasionally, the work plan requires an equipment blank to be collected. An equipment blank can be conducted by collecting a sample of clean air or nitrogen through the probe materials before installation in the ground. Analysis of the equipment blank can provide information on the cleanliness of new materials. Clean stainless steel, Nylon or Teflon® tubing and a certified regulator should be used. Lab-certified canisters (the sample canister and the source canister/cylinder, if applicable) or Tedlar® bags can be used to collect an equipment blank.

3.5 USE OF MONITORING WELLS FOR SOIL GAS SAMPLING

While dedicated soil gas probes are typically used to collect soil gas samples, existing monitoring wells that are appropriately located and screened can also be used for this purpose, with limitations. This is an advantage when evaluating the risk of vapor intrusion solely from contaminated aquifers (as compared to contaminated vadose zone soil) as the soil gas that will be sampled can reflect a soil gas sample that lies close to the zone of saturation and represents a worse case condition for equilibrium partitioning of contamination in groundwater to the gas phase. Also, monitoring wells are typically constructed at a deeper depth than soil vapor probes and are less influenced by changes in barometric pressure. They are also inherently constructed to be well sealed against breakthrough from atmospheric air (while purging and sampling). For an existing well to be used for soil gas sampling, it must have at least 2 to 3 feet of open screen above the water table during sample collection.

The main disadvantage of using existing monitoring wells is that the required purge volume would be much greater because of the significantly larger diameter of the well screen as compared to probes. This requires the use of a larger air pump or small blower instead of the SKC hand pump or peristaltic pump. While purging, care must be taken to minimize the vacuum in the well casing which may be large enough to raise the water column high enough to cover the exposed well screen and invalidate the use of the well for sampling soil gas. Appropriate temporary fittings will need to be installed to allow the reduction of the well casing sufficient to allow connection to the collection tubing.

3.6 INDOOR AIR SAMPLE COLLECTION

Indoor air samples are typically collected into 6-liter SUMMA® canisters, and can either be a grab (not often recommended) or time weighted samples. For time weighted samples, the laboratory will provide preprogrammed flow controllers for the samples for your desired sample duration. An 8-hour flow controller is the most common to assess typical working conditions or to provide a time-weighted average (TWA) to assess residential risk (a 24-hour flow controller may also be used for residential assessments). SUMMA® canisters should be placed in an area that is close to the breathing zone (i.e., 3 to 4 feet above the floor level), a sampling cane can be connected to the SUMMA® canister to sample indoor air at breathing zone height. As a basic guideline and starting point, indoor air samples should at a minimum be collected from the basement (if applicable), first floor living or work area, and from outdoors (ambient/upwind). Other site-specific factors will influence the specific placement location of the SUMMA® canisters, such as proximity to subsurface source area(s) or penetrations through the slab or foundation.

3.6.1 Connection Guidelines

Refer to specific guidelines provided by the laboratory, as equipment can be slightly different from lab to lab. It is important to note the initial vacuum reading on the gauge as well as the post-sampling vacuum. For reference, initial vacuum should be between 27 and 30 inches of mercury, while post-sample vacuum should be between 4 and 5 inches of mercury. Sample collection start and finish times should also be recorded. After sample collection, the SUMMA® canister valve should be shut and the flow controllers should be disconnected from the SUMMA® canisters. Both the controller and the canister ID (unique laboratory tracking ID) should be recorded on the chain-of-custody and the samples should be packed appropriately for delivery to the laboratory following chain-of-custody protocol.

3.7 REMEDIATION SYSTEM VAPOR SAMPLE COLLECTION

Remediation systems that have a soil vapor extraction (SVE) component often require compliance monitoring to evaluate mass removal and effluent discharge limits. Both screening (with a PID) and sampling are routinely conducted during active operation. Tedlar® bags are often used to simplify SVE system screening. Fill a bag following the procedures described in this section and use a PID to measure the VOCs in the sample. Record the maximum observed concentration. Vapor samples for laboratory analysis are most often collected in 1-liter Tedlar® bags, but SUMMA® canisters can also be used. It is a good idea to fill out the label on the Tedlar® bag prior to sample collection.

If the sample port is under vacuum (i.e., SVE manifold or wellhead), it is often necessary to reduce the flow somewhat and to use a hand or mechanical pump to extract the vapor from the line. If the sample port is under a high vacuum, it may be necessary to step down the flow (i.e., close the flow valve) in order to collect a sample. Follow steps in Section 3.3 for sample collection and delivery.

If the sample port is under pressure (i.e., SVE system discharge), the sample can be collected without the use of a pump. Simply attach a clean piece of tubing securely to the sample port, connect the Tedlar® bag to the tubing, open the Tedlar® bag, slowly open the sample port valve, and be careful not to overfill the bag. Remove the Tedlar® bag when full, close the Tedlar® bag (do not over-tighten), and close the sample port valve. Follow steps in Section 3.3 for sample delivery.

4.0 Field Documentation

Soil vapor probe and monitoring point installation field activities should be documented in field notebooks and completion diagrams or boring logs should be completed to document construction. Information recorded will include personnel present, total depth, type and length of implant or screen, screen and filter pack intervals, bentonite seal intervals and surface completion details. Photographs of construction activities should be taken. After probe and monitoring point installation is complete, location coordinates should be recorded with a global positioning system (GPS). If GPS cannot be used (i.e., location within a building), it is important to document the location by recording representative measurements to fixed points.

All sampling activities must be documented in a field notebook and/or on field forms appropriate for the sampling activity. Information recorded will include at a minimum personnel present, weather conditions, date, and time of sample collection, length of sample purge time, and any deviations from the project's work plan or sampling and analysis plan.

5.0 References

Interstate Technology Regulatory Council (ITRC). 2014. Petroleum Vapor Intrusion: Fundamentals of Screening, Investigation, and Management. <http://www.itrcweb.org/PetroleumVI-Guidance/>. October.

Washington State Department of Ecology (Ecology). 2015. Vapor Intrusion Table Update. (Replaces Table B-1 of Ecology's Guidance for Evaluating Soil Vapor Intrusion in Washington State). <http://www.ecy.wa.gov/programs/tcp/policies/VaporIntrusion/Vapor%20Intrusion%20Table%20update%20April%206%202015.xlsx>. 6 April.

_____. 2016a. *Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action*. Review Draft. Prepared by the Toxics Cleanup Program. Publication No. 09-09-047. Originally published October 2009; revised February.

_____. 2016b. *Updated Process for Initially Assessing the Potential for Petroleum Vapor Intrusion: Implementation Memorandum No. 14*. Publication No. 16-09-046. 31 March.

U.S. Environmental Protection Agency (USEPA). 2015. *Technical Guidance for Addressing Petroleum Vapor Intrusion at Leaking Underground Storage Tank Sites*. Prepared by the Office of Underground Storage Tanks. EPA 510-R-15-001. June.

Enclosures: Indoor Air Building Survey Form
Purge Volume Calculations during Soil Vapor Sampling
Soil Vapor Sampling Sheet

INDOOR AIR BUILDING SURVEY FORM

Date:

Site Name:

Title:

Building Use:

Occupants: ______________________________

Building Address: ______________________________

Property Owner: ______________________________

Contact's Phone: ______________________________

Number of Occupants: ______________________________

Business or Residential: ______________________________

Building Characteristics

Building Type: ☐ Residential ☐ Multifamily ☐ Office

☐ Commercial ☐ Industrial ☐ Mall

Describe Building:____

____

Number of Floors Below Grade: _____________ ☐ Basement ☐ Slab-On-Grade ☐ Crawl Space

Bldg Dimensions: Width:______ Length: ________ Height: __________

Basement Floor: Dirt / Concrete / Painted? Foundation Walls: Concrete / Cinder Blocks / Stone

VENTILATION SYSTEM

☐ Central Air Conditioning ☐ Mechanical Fans ☐ Bathroom Vans

☐ Conditioning Units ☐ Kitchen Range Hood ☐ Outside Air Intake

Other:_________________________

HEATING SYSTEM

☐ Hot Air Circulation ☐ Hot Air Radiation ☐ Wood ☐ Steam Radiation

☐ Heat Pump ☐ Hot Water Radiation ☐ Kerosene Heater ☐ Electric Baseboard

Other:_____________

Outside Contaminant Sources

Nearby surrounding property sources: Gas Stations / Emission Stacks

Soil Contamination: Petroleum Hydrocarbons / Solvents

Heavy Vehicle Traffic: Yes / No

Indoor Contaminant Sources

Identify all potential sources found in the building (including attached garages), the location of the source (floor and room), and whether the item was removed from the building 48 hrs prior to indoor sampling event. Any ventilation implemented after removal of the items should be completed at least 24 hours prior to the commencement of the indoor air sampling event.

Potential Sources	Location(s)	Removed (Yes / No / NA)
Gasoline storage cans		
Gas powered equipment		
Kerosene storage cans		
Paints / Thinners / Strippers		
Cleaning solvents / Dry cleaners		
Oven cleaners		
Carpet / upholstery cleaners		

Other house cleaning products		
Moth Balls		
Potential Sources	**Location(s)**	**Removed (Yes / No / NA)**
Polishes / waxes		
Insecticides		
Furniture / floor polish		
Nail polish / polish remover		
Hairspray		
Cologne / perfume		
Air fresheners		
Fuel tank (inside building)		
Wood stove or fireplace		
New furniture		
New carpeting / New flooring		
Hobbies – glues, paints		
Other: __________________		
Other: __________________		
Other: __________________		

SAMPLING INFORMATION

Sampler(s) ____

☐ Indoor Air / Outdoor Air ☐ Sub-slab ☐ Soil Vapor Point ☐ Exterior Soil Gas

☐ Tedlar® Bag ☐ Sorbent ☐ SUMMA® ☐ Other _________

Analytical Method: TO-15 / TO-17 / Other: _________________

WEATHER CONDITIONS

Was there a significant rain event in the last 24 hours? Yes / No

Temperature: _________ Atmospheric Pressure: _______________ Pressure: Rising or Falling?

Describe the general weather conditions: ____

Wind Speed and Direction: ____

PURGE VOLUME CALCULATIONS DURING SOIL VAPOR SAMPLING

Sample Tubing Purge												
Tubing Length (feet)	Pi	Casing Radius (inches)	Area of Casing Radius (Pi(R^2)) (inches)	Length of casing (feet)	Conversion of feet to inches	Number of Casing Volumes to Purge	Conversion of cubic inches to ml	Purge Volume (ml)	Purge Volume (l)	Purge rate (ml/min)	Purge Time (min)	
5	3.141593	0.125	0.049087	5	60	1	16.387064	48.263888	0.048264	167	0.29	
5	3.141593	0.125	0.049087	5	60	3	16.387064	144.79166	0.144792	167	0.87	
5	3.141593	0.125	0.049087	5	60	7	16.387064	337.84721	0.337847	167	2.02	

Annular Space Purge												
Annular Space Length (inches)	Pi	Boring Radius (inches)	Area of Boring Radius (radius^2)	Volume of Annular Space (inches)	Assumed Porosity of Sand Pack*	Air Filled Volume of Annular Space (cubic inches)	Number of Casing Volumes to Purge	Conversion of cubic inches to ml	Purge Volume (ml)	Purge Volume (l)	Purge rate (ml/min)	Purge Time (min)
12	3.141593	2	12.56637	150.7964	0.3	45.23893	1	16.387064	741.3333	0.741333	167	4.44
12	3.141593	2	12.56637	150.7964	0.3	45.23893	3	16.387064	2224	2.224	167	13.32
12	3.141593	2	12.56637	150.7964	0.3	45.23893	7	16.387064	5189.333	5.189333	167	31.07

Summary of Purge Durations	
One Purge Volume	4.73
Three Purge Volumes	14.18
Seven Volumes	33.10

SOIL VAPOR SAMPLING SHEET

Site Reference: ____________________________________ Date: ___________________________________

Address: _____________________________________ Personnel: ____

	Vacuum Test		Purging				Helium		Sampling				PID		
Soil Vapor Sampling Point ID	Time Start Vacuum Testing	Time Stop Vacuum Testing	Time Start Purging	Time Stop Purging	Purging Rate (ml/min)	Total Volume Purged (ml)	Time of Helium Reading	Helium Reading (%)	Time Start Sampling	Time Stop Sampling	Canister Vacuum Before Sampling (in Hg)	Canister Vacuum After Sampling (in Hg)	Time of PID Reading	PID Reading	Notes
					167										
					167										

Notes:

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____

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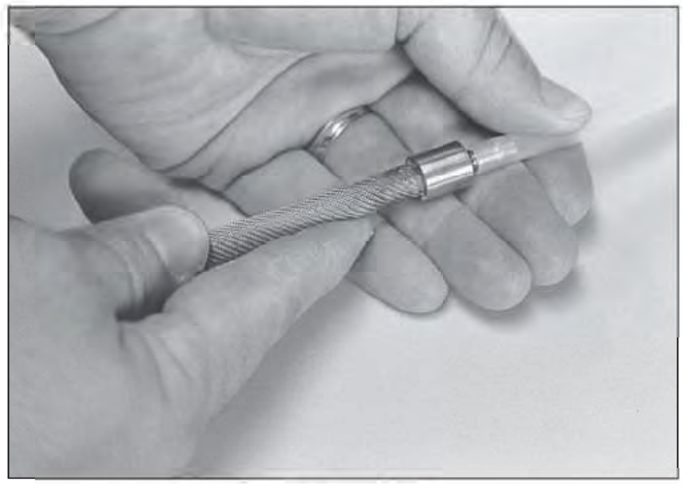
Attachment 2
Implants Operation Guide

Implants Operation

from Geoprobe Systems®

www.geoprobe.com
1-800-436-7762



Attaching polyethylene tubing to the sampling implant.

Installation Instructions for Soil Gas Implants

1. Drive probe rods to the desired depth using a Point Holder (AT-13B) and an Implant Anchor/Drive Point (PR-14). DO NOT disengage the drive point when depth has been reached.

2. Attach appropriate tubing to the implant **(Figure 1)**. If tubing is pre-cut, allow it to be approximately 48 in. (1219 mm) longer than the required depth of the implant. Cover or plug the open end of the tubing.

3. Remove pull cap and lower the implant and tubing down inside the diameter of the probe rods until the implant hits the top of the Anchor/Drive Point. Note the length of the tubing to assure that proper depth has been reached.

4. Rotate tubing counterclockwise while exerting a gentle downward force to engage the PRT threads **(Figure 2)**. Pull up on the tubing lightly to test the connection. DO NOT cut excess tubing.

5. Position a Probe Rod Pull Plate or Manual Probe Rod Jack on the top probe rod. Exert downward pressure on the tubing while pulling the probe rods up. Pull up about 12 in. (305 mm).

6. If using 1/4-in. (6,4 mm) O.D. tubing or smaller, thread the excess tubing through the Implant Funnel and position it over the top probe rod. If using larger tubing, it may not be possible to install the glass beads.

Figure 1. Attaching tubing to the sampling implant.

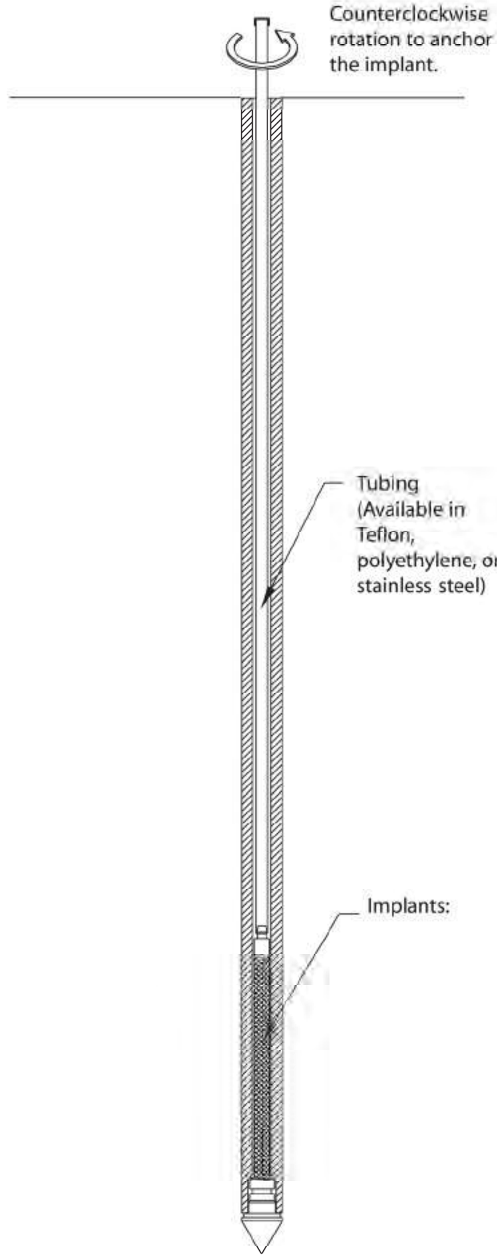


Figure 2. Once depth is achieved, the selected implant and tubing are inserted through the rods. The tubing is rotated to lock the implant into the drive point.

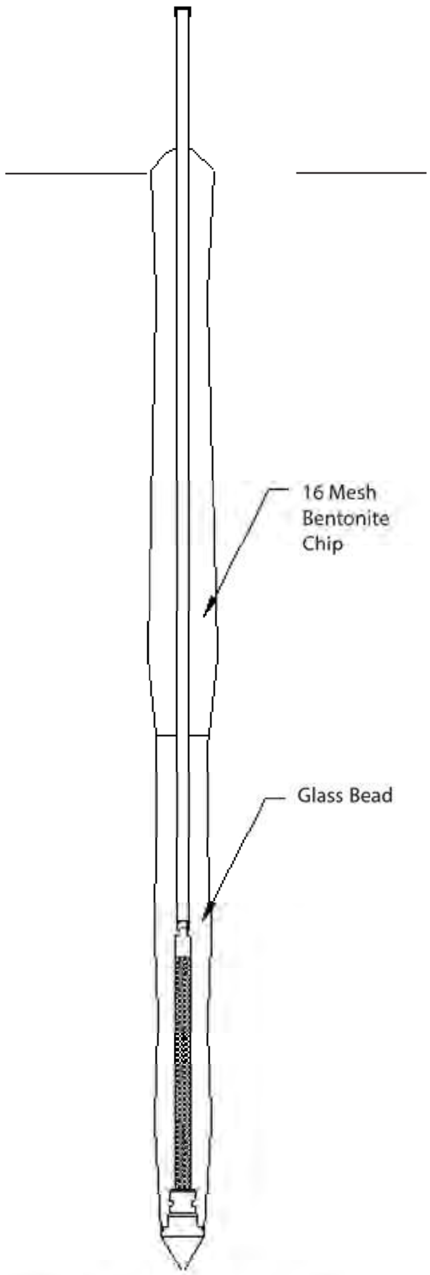


Figure 4. After the implant has been secured, the rods are removed and the annulus backfilled as appropriate.

7. Pour glass beads down the inside diameter of the probe rods around the outside of the tubing. Use the tubing to "stir" the glass beads into place around the implant. Do not lift up on tubing. It should take less than 150 mL of glass beads to fill the space around the implant.

   NOTE: Backfilling through the rods with glass beads or glass beads/bentonite mixes can only be performed in the Vadose Zone, not below the water table.

8. Lift up an additional 18 to 24 in. (457 to 610 mm) and pour the bentonite seal mixture into place as in Step 7. The volume to be filled is about 154 mL per foot. It may be necessary to "chase" the seal mixture with distilled water to initiate the seal.

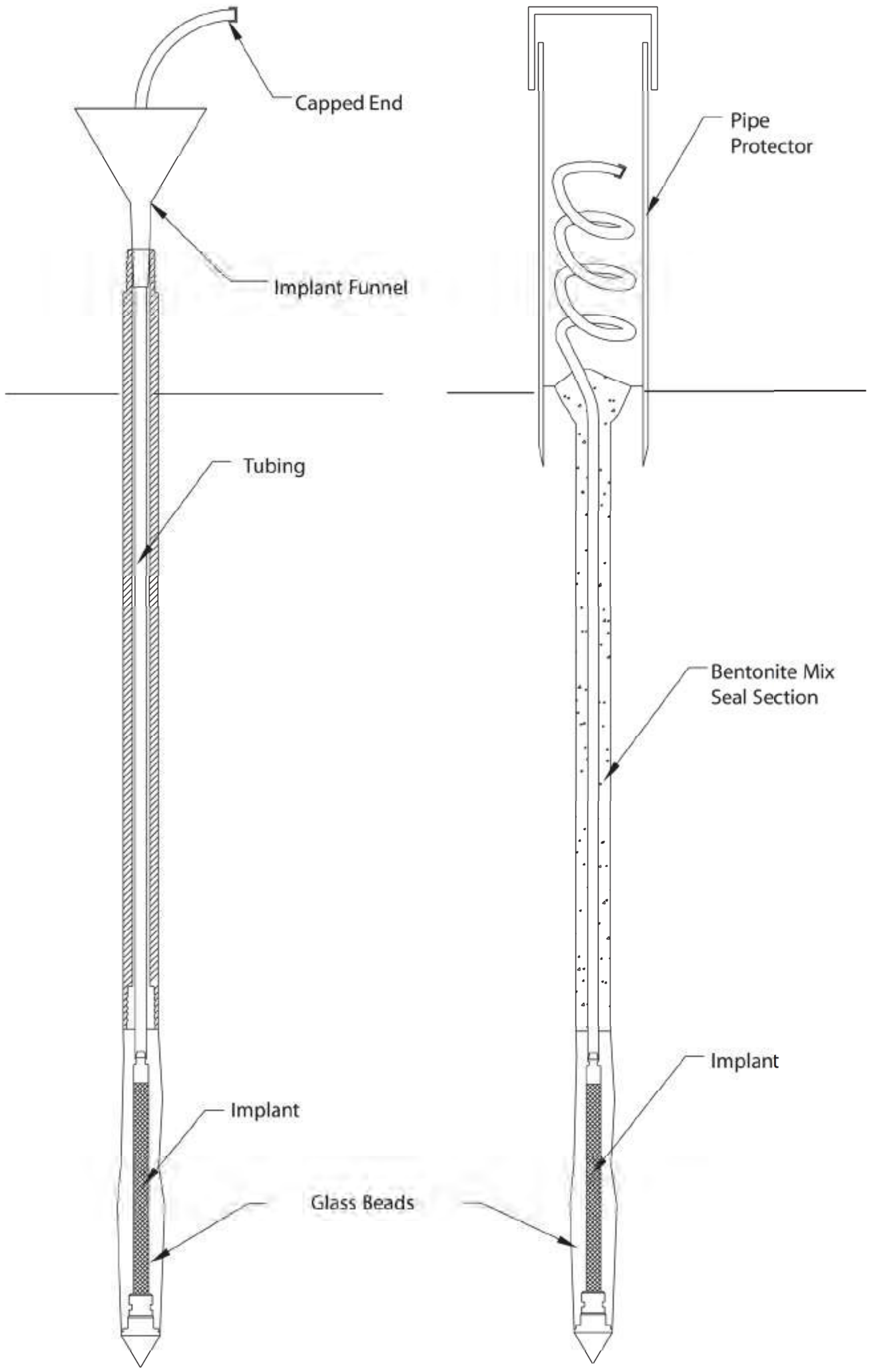
9. Pull the remaining rods out of the hole as in Step 5. Backfilling with sackcrete (cement/sand) or bentonite/sand may be done while removing the rods **(Figure 4)**. If the PR-14 Implant Anchor is used, the tubing may be cut flush with the top probe rod and a regular pull cap may be used to remove the remaining probe rods after Step 8.

10. After the probe rods have been removed, cut the tubing at the surface, attach a connector or plug, and mark the location with a pin flag or stake. The point is ready for sampling now.

Figure 3. Glass Beads create a permeable layer around vapor sample implants.

A vapor implant location.

Sampling Implants – Operation



Backfill materials include glass beads and bentonite sealants.

Example of completed permanent soil gas monitoring point.

1514 Taylor Way Development

Interim Action Work Plan

Appendix C
Health and Safety Plan

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List of Acronyms and Abbreviations

Acronym/ Abbreviation	Definition
CRZ	Contamination reduction zone
Ecology	Washington State Department of Ecology
EZ	Exclusion zone
°F	Degrees Fahrenheit
HASP	Health and Safety Plan
HAZWOP	Hazardous Waste Operations
HSO	Site Health and Safety Officer
PEL	Permissible exposure level
PID	Photoionization detector
PPE	Personal protective equipment
SS	Site Supervisor
SZ	Support zone
VOC	Volatile organic compound
WAC	Washington Administrative Code

1.0 Emergency Contacts & Information

POLICE: 911
FIRE: 911
FIRST AID: 911

In the event of an emergency, be prepared to give the following information:

Site Location:	**1514 Taylor Way** **Tacoma, WA 98421**
Landmarks:	**Safeway Warehouse**
Nearest Cross Street:	**Lincoln Avenue**
Phone Number That You Are Calling From?	**LOOK ON PHONE**
What Happened?	**Type of Accident** **Type(s) of Injuries**
How Many People Need Help?	

Additional Emergency Information:

Nearest Hospital:	**MultiCare Tacoma General Hospital** **315 Martin Luther King Jr. Way** **Tacoma, WA 98405** **(253) 403-1000**

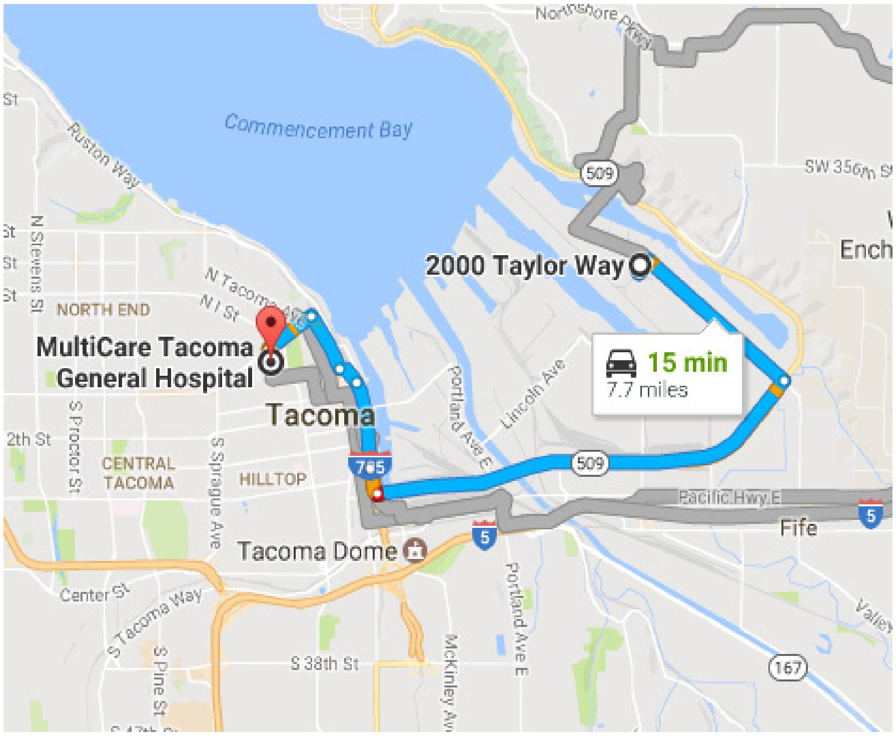
Contact a Principal at Floyd|Snider after Calling Emergency Services

Floyd|Snider	**(206) 292-2078**
Teri Floyd	**(206) 519-6917 home, (206) 713-1329 cell**
Kate Snider	**(206) 375-0762 cell**
Allison Geiselbrecht	**(206) 722-2460 cell**
Jessi Massingale	**(206) 683-4307 cell**

Utility Company Emergency Contacts:

Contact	Normal Business Hours Phone Numbers (8 a.m. to 5 p.m.)	After Hours Emergency Phone Number
Tacoma Public Utilities–Electric	(253) 502-8600	(253) 502-8602
Tacoma Public Utilities–Water	(253) 502-8384	(253) 502-8384
Puget Sound Energy – Natural Gas	(888) 225-5773	(888) 225-5773

Figure C.1
Hospital Directions



1. Head east on Taylor Way toward LINCOLN AVE
2. Turn left onto LINCOLN AVE
3. Turn right onto WA-509 S
4. Take the 705 N exit toward SCHUSTER PKWY/RUSTON
5. Merge onto I-705 N
6. Keep right to stay on I-705 N, follow signs for STADIUM WAY
7. Follow S STADIUM WAY and DIVISION AVE to MARTIN LUTHER KING JR WAY
8. Turn right onto S STADIUM WAY
9. Turn left onto DIVISION AVE
10. Turn left onto MARTIN LUTHER KING JR WAY (destination will be on the left).

2.0 Plan Objectives and Applicability

This Health and Safety Plan (HASP) has been written to comply with the standards prescribed by the Occupational Safety and Health Act (OSHA) and the Washington Industrial Safety and Health Act (WISHA).

The purpose of this HASP is to establish protection standards and mandatory safe practices and procedures for all personnel involved with field activities at the Site. This plan assigns responsibilities, establishes standard operating procedures, and provides for contingencies that may occur during field activities. The plan consists of site and facility descriptions, a summary of work activities, an identification and evaluation of chemical and physical hazards, monitoring procedures, personnel responsibilities, a description of site zones, decontamination and disposal practices, emergency procedures, and administrative requirements.

Mr. Thomas Colligan, of Floyd|Snider, is the designated Project Manager. He is responsible for designating a Site Health and Safety Officer (HSO). The HSO has field responsibility for ensuring that the provisions outlined herein adequately protect worker health and safety and that the procedures outlined by this HASP are properly implemented. In this capacity, the HSO will conduct regular site inspections to ensure that this HASP remains current with potentially changing site conditions. The HSO has the authority to make health and safety decisions that may not be specifically outlined in this plan, should site conditions warrant such actions. In the event that the HSO leaves the site while work is in progress, an alternate HSO will be designated.

The provisions and procedures outlined by this HASP apply to all contractors, subcontractors, owner's representatives, oversight personnel, and any other persons involved with the field activities described herein. All such persons are required to read this HASP and indicate that they understand its contents by signing the HSO's copy of the plan.

It should be noted that this HASP is based on information that was available as of the date indicated on the Title Page. It is possible that additional hazards that are not specifically addressed by this HASP may exist at the work site, or may be created as a result of on-site activities. It is Floyd|Snider's firm belief that active participation in health and safety procedures and acute awareness of on-site conditions by all site workers is crucial to the health and safety of everyone involved. If you identify a site condition that is not addressed by this HASP, or if you have any questions or concerns about site conditions or this plan, immediately notify the HSO.

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3.0 Background Information

The work site is located at: 1514 Taylor Way
Tacoma, WA 98421

3.1 SITE HISTORY

The property is currently owned by the Port of Tacoma and is currently vacant and undeveloped. The fill history and past uses of the surrounding properties has raised concerns that contaminants might be present in the shallow soil and groundwater at the property.

Soil and groundwater contamination is known to exist at the property boundary shared with the former CleanCare facility located immediately west of the ProLogis property. In addition, Philip Services Corporation (now Stericycle) owns a property located immediately upgradient of the ProLogis property. Contaminants from the Stericycle property are known to extend at least to the boundary with this property. It is possible that contaminated groundwater and potentially contaminated fill material such as auto fluff or lime solvent sludge extend beneath the boundary onto this property.

In May 2004, Prologis, in anticipation of site redevelopment, entered into an Agreed Order with the Washington State Department of Ecology (Ecology) prompted by the Site's uncertain fill history. In response, a remedial investigation and a feasibility study were completed to the satisfaction of Ecology in 2006 by Floyd|Snider. However, no development plans for the Site proceeded as the Site was sold to the Port of Tacoma. The Port of Tacoma recently leased the parcel to Avenue 55, LLC, which intends to redevelop the parcel beginning in the summer of 2017 with two warehouse buildings.

This plan has been prepared on behalf of Avenue 55, LLC, to facilitate redevelopment of the property.

3.2 SCOPE OF WORK

The following field activities may occur:

- Direct-push Probing
- Soil Sampling
- Groundwater Sampling
- Excavation and Backfill
- Regrading

Refer to Section 6.0 of the Interim Action Work Plan for further details about the planned field activities.

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4.0 Hazard Evaluation and Risk Analysis

In general, there are three broad hazard categories that may be encountered during site work; Chemical Exposure Hazards, Fire/Explosion Hazards, and Physical Hazards. Subsections 4.1 through 4.3 discuss the specific hazards that fall within each of these broad categories.

4.1 CHEMICAL EXPOSURE HAZARDS

Table C.1 presents chemical-specific data regarding permissible exposure levels (PELs), likely pathways of exposure, target organs that will likely be affected by exposure, and likely symptoms of exposure for hazardous substances that are potentially present at the site. Table C.1 data were compiled from the NIOSH Pocket Guide to Chemical Hazards, June 1997 edition.

4.2 FIRE AND EXPLOSION HAZARDS

Fire and explosion hazards may exist from methane vapor within the soil and fuels and lubricants brought to the Site to support heavy equipment. It is highly unlikely that fuel vapors or methane from the contaminated soils will be present at levels sufficient to create an explosion and/or fire hazard. It should be noted, however, that the 1996 Emergency Response Guidebook, published by the U.S. Department of Transportation, identifies the following explosion and/or fire hazards associated with gasoline vapors.

- Flammable/combustible material may be ignited by heat, sparks, or flames
- Vapors may travel to a source of ignition and flash back
- Containers may explode in heat or fire
- Vapor explosion hazards indoors, outdoors or in sewers
- Run-off to sewers may cause a fire or explosion hazard

When on-site storage of fuels or lubricants are necessary, such material will be stored in containers approved by the Washington State Department of Transportation in a location not exposed to strike hazards and provided with secondary containment. A minimum 2-A:20-B fire extinguisher will be located within 25 feet of the storage location and where refueling occurs. Any subcontractors bringing flammable and combustible liquid hazards to the site are responsible for providing appropriate material for containment and spill response, and the handling of these provisions should be addressed in their respective HASP.

4.3 PHYSICAL HAZARDS

When working in or around any hazardous, or potentially hazardous, substances or situations, all site personnel should plan all activities before starting any task. Site personnel shall identify health and safety hazards involved with the work planned and consult with the HSO and/or Site

Supervisor (SS) as to how the task can be performed in the safest manner, and if personnel have any reasons for concern or uncertainty.

All field personnel will adhere to general safety rules including wearing appropriate personal protective equipment (PPE)—hard hats, steel-toed rubber boots, high-visibility vests, safety glasses, gloves, and hearing protection, as appropriate. Eating, drinking, and/or use of tobacco or cosmetics will not be permitted in work areas. Personnel will prevent splashing of liquids containing chemicals and minimize dust emissions.

The following is a summary of a variety of physical hazards that may be encountered on the job site. For convenience, these hazards have been categorized into several general groupings with suggested preventative measures.

Category	Cause	Prevention
Head Hazards	Falling and/or sharp objects, bumping hazards.	Hard hats will be worn by all personnel at all times when overhead hazards exist, such as during drilling activities and around large, heavy equipment.
Foot/ankle Hazards	Sharp objects, dropped objects, uneven and/or slippery surfaces, chemical exposure.	Chemical resistant, steel-toed boots must be worn at all times on-site. Pay attention to footing on uneven or wet terrain and do not run. Keep work areas organized and free of unmarked trip hazards.
Eye Hazards	Sharp objects, poor lighting, bright lights (welding equipment), exposure due to splashes.	Safety glasses/face shields will be worn when appropriate. Shaded welding protection will be worn when appropriate.
Electrical Hazards	Underground utilities, overhead utilities.	A utility locator service will be used prior to any investigation to locate all underground utilities. Make sure that no damage to extension cords occurs. If an extension cord is used, make sure it is the proper size for the load that is being served and rated SJOW or STOW (an “-A” extension is acceptable for either) and inspected prior to use for defects. The plug connection on each end should be of good integrity. Insulation must be intact and extend to the plugs at either end of the cord. All portable power tools will be inspected for defects before use and must either be a double-insulated design or grounded with a ground-fault circuit interrupter (GFCI).

Category	Cause	Prevention
Mechanical Hazards	Heavy equipment such as drill rigs, service trucks, excavation equipment, saws, drills, etc.	Ensure the use of competent operators, backup alarms, "kill" switches, regular maintenance, daily mechanical checks on all hoses and cables, and proper guards. Subcontractors will supply their own HASP. All project personnel will make eye contact with operator and obtain a clear "OK" before approaching or working within swing radius of heavy equipment, staying clear of swing radius. Obey on-site speed limits.
Traffic Hazards	Vehicle traffic and hazards when working near right-of-ways.	Multiple field staff will work together (buddy system) and spot traffic for each other. Avoid working with your back to traffic whenever possible.
Noise Hazards	Machinery creating less than 85 decibels TWA, less than 115 decibels continuous noise, or peak at less than 140 decibels.	Wear earplugs or protective ear muffs.
Fall Hazards	Elevated and/or slippery or uneven surfaces. Trips caused by poor "housekeeping" practices.	Care should be used to avoid such accidents and to maintain good "housekeeping." Fall protection devices must be used when work proceeds on elevated surfaces.
Lifting Hazards	Injury due to improper lifting techniques, overreaching/ overextending, heavy objects.	Use proper lifting techniques, mechanical devices where appropriate.
Cold Stress	Cold temperatures and related exposure.	Workers will wear appropriate clothing, and take breaks in a heated environment when working in cold temperatures. **Further detail on cold stress is provided in Section 4.3.1.**
Heat Exposure	High temperatures exacerbated by PPE, dehydration.	Workers will maintain adequate hydration, avoid direct sunlight, and take breaks when temperatures are elevated. **Further detail on heat stress is provided in Section 4.3.2.**
Lighting Accidents	Improper illumination.	Work will proceed during daylight hours only, or under sufficient artificial illumination.

4.3.1 Cold Stress

Fieldwork is expected to be completed in summer months; however, if additional phases of work are required, or activities are conducted in winter months, exposure to cold temperatures may occur. Exposure to moderate levels of cold can cause the body's internal temperature to drop to a dangerously low level, causing hypothermia. Symptoms of hypothermia include: slow, slurred speech; mental confusion; forgetfulness; memory lapses; lack of coordination; and drowsiness.

To prevent hypothermia, site personnel will stay dry and avoid exposure. Site personnel will have access to a warm, dry area, such as a vehicle, to take breaks from the cold weather and warm up. Site personnel will be encouraged to wear sufficient clothing in layers such that outer clothing is wind- and waterproof and inner layers retain warmth (wool or polypropylene), if applicable. Site personnel will keep hands and feet well-protected at all times. The signs and symptoms and treatment for hypothermia are summarized below.

Signs and Symptoms

- **Mild hypothermia (body temperature of 98–90 degrees Fahrenheit [°F])**
  - Shivering
  - Lack of coordination, stumbling, fumbling hands
  - Slurred speech
  - Memory loss
  - Pale, cold skin
- **Moderate hypothermia (body temperature of 90–86 °F)**
  - Shivering stops
  - Unable to walk or stand
  - Confused and irrational
- **Severe hypothermia (body temperature of 86–78 °F)**
  - Severe muscle stiffness
  - Very sleepy or unconscious
  - Ice cold skin
  - Death

Treatment of Hypothermia

Proper treatment depends on the severity of the hypothermia.

- **Mild hypothermia**
  - Move to warm area.

- Stay active.
- Remove wet clothes and replace with dry clothes or blankets and cover the head.
- Drink warm (not hot) sugary drinks.

- **Moderate hypothermia**
  - All of the above, plus:
    - Call 911 for an ambulance.
    - Cover all extremities completely.
    - Place very warm objects, such as hot packs or water bottles, on the victim's head, neck, chest, and groin.
- **Severe hypothermia**
  - Call 911 for an ambulance.
  - Treat the victim very gently.
  - Do not attempt to re-warm—the victim should receive treatment in a hospital.

Frostbite

Frostbite occurs when the skin freezes and loses water. In severe cases, amputation of the frostbitten area may be required. While frostbite usually occurs when the temperatures are 30°F or lower, wind chill factors can allow frostbite to occur in above-freezing temperatures. Frostbite typically affects the extremities, particularly the feet and hands. Frostbite symptoms include cold, tingling, stinging, or aching feeling in the frostbitten area followed by numbness and skin discoloration from red to purple, then white or very pale skin. Should any of these symptoms be observed, wrap the area in soft cloth, do not rub the affected area, and seek medical assistance. Call 911 if the condition is severe.

Protective Clothing

Wearing the right clothing is the most important way to avoid cold stress. The type of fabric also makes a difference. Cotton loses its insulation value when it becomes wet. Wool, on the other hand, retains its insulation even when wet. The following are recommendations for working in cold environments:

- Wear at least three layers of clothing.
  - An outer layer to break the wind and allow some ventilation (like Gortex or nylon)
  - A middle layer of down or wool to absorb sweat and provide insulation even when wet
  - An inner layer of cotton or synthetic weave to allow ventilation

- Wear a hat—up to 40 percent of body heat can be lost when the head is left exposed.
- Wear insulated boots.
- Keep a change of dry clothing available in case work clothes become wet.
- Do not wear tight clothing—loose clothing allows better ventilation.

Work Practices

- Drinking—Drink plenty of liquids, avoiding caffeine and alcohol. It is easy to become dehydrated in cold weather. Workers will be provided access to at least 1 quart of drinking water per hour.
- Work Schedule—If possible, heavy work should be scheduled during the warmer parts of the day. Take breaks out of the cold in heated vehicles.
- Buddy System—Try to work in pairs to keep an eye on each other and watch for signs of cold stress.

4.3.2 Heat Stress

To avoid heat-related illness, current regulations in the Washington Administrative Code (WAC) 296-62-095 through 296-62-09570 will be followed during all outdoor work activities. These regulations apply to any outdoor work environment from May 1 through September 30, annually, when workers are exposed to temperatures greater than 89 °F when wearing breathable clothing, greater than 77 °F when wearing double-layered woven clothing (such as jackets or coveralls), or greater than 52 °F when wearing non-breathing clothing such as chemical resistant suits or Tyvek. Floyd|Snider will identify and evaluate temperature, humidity, and other environmental factors associated with heat-related illness including, but not limited to, the provision of rest breaks that are adjusted for environmental factors, and encourage frequent consumption of drinking water. Drinking water will be provided and made readily accessible in sufficient quantity to provide at least 1 quart per employee per hour. All Floyd|Snider personnel will be informed and trained for responding to signs or symptoms of possible heat-related illness and accessing medical aid.

Employees showing signs or demonstrating symptoms of heat-related illness must be relieved from duty and provided with a sufficient means to reduce body temperature, including rest areas or temperature-controlled environments (i.e., air-conditioned vehicle). Any employee showing signs or demonstrating symptoms of heat-related illness must be carefully evaluated to determine whether it is appropriate to return to work or if medical attention is necessary.

Any incidence of heat-related illness must be immediately reported to the project manager directly through the HSO/SS.

The signs, symptoms, and treatment of heat stress include the following:

Condition	Signs/Symptoms	Treatment
Heat Cramps	Painful muscle spasms and heavy sweating.	Increase water intake, rest in shade/cool environment.
Heat Syncope	Brief fainting and blurred vision.	Increase water intake, rest in shade/cool environment.
Dehydration	Fatigue, reduced movement, headaches.	Increase water intake, rest in shade/cool environment. Workers will be provided access to at least 1 quart of drinking water per hour.
Heat Exhaustion	Pale and clammy skin, possible fainting, weakness, fatigue, nausea, dizziness, heaving sweating, blurred vision, slightly elevated body temperature.	Lie down in cool environment, apply cooling measures such as fans or ice towels, drink plenty of fluid, loosen clothing, and call 911 for ambulance transport if symptoms continue once in cool environment.
Heat Stroke	Cessation of sweating, skin hot and dry, red face, high body temperature, unconsciousness, collapse, convulsions, confusion, or erratic behavior.	**Medical Emergency! Call 911** for ambulance transport. This is a life threatening condition. Move victim to shade and immerse in water.

If site temperatures are forecast to exceed 85 °F and physically demanding site work will occur in impermeable clothing, the HSO/SS will promptly consult with a certified industrial hygienist (CIH) and a radial pulse monitoring method will be implemented to ensure that heat stress is properly managed among the affected workers. The following heat index chart indicates the relative risk of heat stress.

Temperature (°F)

Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

Caution   Extreme Caution   Danger   Extreme Danger

4.3.3 Biohazards

Bees and other insects may be encountered during the fieldwork tasks. Persons with allergies to bees will make the HSO/SS aware of their allergies and will avoid areas where bees are identified. Controls such as repellents, hoods, nettings, masks, or other PPE may be used. Report any insect bites or stings to the HSO/SS and seek first aid, if necessary. Inspect the work area for hazardous plants, medical waste (syringes and similar items), and indications of hazardous organisms, and avoid such areas if possible.

Site personnel will maintain a safe distance from any urban wildlife encountered, including stray dogs, raccoons, and rodents, to preclude a bite from a sick or injured animal.

5.0 Air/Site Monitoring

The following sections describe monitoring techniques and equipment that are to be used during site work. The HSO, or a designated alternate, is responsible for performing all monitoring activities. Air and site monitoring will be used to determine the level of protection that is required for work to proceed safely.

5.1 AIR MONITORING

Air monitoring will be performed to ensure that personnel are not exposed to harmful vapor concentrations in excess of PELs. This monitoring will also be used to identify any increases in airborne contaminant concentrations during work activities.

Visual monitoring for dust will be conducted by the HSO/SS to ensure that inhalation of contaminated soil particles does not occur. If visible dust is present in the work area, either work will cease, and the area will be cleared until the dust settles, or dust masks will be worn. Water may be used to suppress any dust clouds generated during work activities.

5.1.1 Air Monitoring Equipment

All monitoring equipment used during this project will be inspected and calibrated at least daily to ensure that it is in proper working condition. If any piece of required monitoring equipment does not work properly, work in the monitored area will stop and will not continue until the monitoring equipment is repaired.

Because exposure to airborne contaminants is expected to be limited to volatile organic compounds (VOCs), air monitoring will be performed with a photoionization detector (PID). The range of contaminants expected to be present requires that the PID be equipped with a 10.2 eV detector lamp.

The PID must be “zeroed” and calibrated according to manufacturer instructions at least daily. Initial monitoring will be performed every 5 minutes, unless odors, tastes, or a PID response indicate the presence of airborne contaminants. If airborne contaminants are detected, air monitoring will be performed continuously. Action levels and protective measures are included in Table C.2.

5.2 SITE MONITORING

The HSO will visually inspect the work site at least daily to identify any new potential hazards. If new potential hazards are identified, immediate measures will be taken to eliminate or reduce the risks associated with these hazards, whenever possible.

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6.0 Hazard Analysis by Task

The following section identifies potential hazards associated with each task listed in Section 3.2 of this HASP. Unless otherwise noted, work will begin and proceed in Level D PPE. The level of protection will be upgraded accordingly by the HSO whenever warranted by conditions present in the work area.

Task	**Potential Hazard**
Direct-Push Probing	Exposure to loud noise; overhead hazards; head, foot/ankle, hand, and eye hazards; electrical and mechanical hazards; methane gas explosion hazards; lifting hazards; dust inhalation hazards; potential dermal or eye exposure to site contaminants in soil; fall hazards; and heat and cold exposure hazards. Other hazards may include contact with utilities or damage to utilities, incorrectly functioning drill rig/fluid release from equipment, pinch points from handling tools and equipment, falling equipment, malfunctioning high-pressure fittings (whip checks).
Soil Sampling	Exposure to VOCs; potential dermal exposure; head, foot/ankle, and eye hazards; mechanical hazards; lifting hazards.
Groundwater Sampling	Exposure to VOCs; potential dermal exposure; head, foot/ankle, and eye hazards; electrical and mechanical hazards; lifting hazards.
Excavation and Backfill	Exposure to VOCs through inhalation, dermal, or eye exposure; head, foot/ankle, and eye hazards; electrical and mechanical hazards; methane gas explosion hazards; dust inhalation hazards; being struck by heavy equipment (drill rig, company vehicles); and heat and cold exposure hazards. Other hazards may include contact with utilities or damage to utilities, incorrectly functioning equipment/fluid release from equipment, pinch points from handling tools and equipment, falling equipment, malfunctioning high-pressure fittings (whip checks) and hydraulic lines, exposure to chemicals; and biological hazards.
Regrading	Exposure to VOCs through inhalation, dermal, or eye exposure; head, foot/ankle, and eye hazards; electrical and mechanical hazards; methane gas explosion hazards; dust inhalation hazards; being struck by heavy equipment (drill rig, company vehicles); and heat and cold exposure hazards. Other hazards may include contact with utilities or damage to utilities, incorrectly functioning equipment/fluid release from equipment, pinch points from handling tools and equipment, falling equipment, malfunctioning high-pressure fittings (whip checks) and hydraulic lines, exposure to chemicals; and biological hazards.

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7.0 Site Control

The site is currently secured by a locked chain-link fence around the property preventing access by pedestrians and other unauthorized personnel. Access to the work site will be restricted to designated personnel. The purpose of site control is to minimize the public's potential exposure to site hazards, to prevent vandalism in the work area, to prevent access by unauthorized persons, and to provide adequate facilities for workers. If members of the public enter the work area, field staff will stop work until the public have left the work area.

This section identifies several activity zones located on the work site. It should be noted that access to some of these activity zones (i.e., the exclusion zone) will be restricted to designated personnel.

7.1 CONTROL ZONES

Work area controls and decontamination areas will be provided to limit the potential for chemical exposure associated with site activities, and transfer of contaminated media from one area of the site to another. The support zone (SZ) for the site includes all areas outside the work area and decontamination areas. An exclusion zone/contamination reduction zone (EZ/CRZ) and SZ will be set up for work being conducted within the limits of the site. Only authorized personnel shall be permitted access to the EZ/CRZ. For work being conducted outside the limits of the site (road shoulders), the EZ/CRZ around work locations will be demarcated with cones and/or barrier hazard tape as needed to effectively limit unauthorized access. Staff will decontaminate all equipment and gear as necessary prior to exiting the CRZ.

7.2 DECONTAMINATION

Decontamination procedures will be strictly followed to prevent off-site spread of contaminated soil or water. The HSO/SS will assess the effectiveness of decontamination procedures by visual inspection.

7.2.1 Contamination Prevention

To avoid personal contact with contaminants, do the following:

- Do not walk through areas of obvious or known contamination.
- Do not directly handle or touch contaminated materials.
- Make sure all PPE have no cuts or tears prior to donning.
- Fasten all closures on suits, and cover with tape, if necessary.
- Take particular care to protect any skin injuries.
- Stay upwind of airborne contaminants.
- Do not carry cigarettes, gum, food, drinks, or similar items into contaminated areas.

To avoid spreading equipment and sample contamination:

- Take care to limit contact with heavy equipment and vehicles.
- If contaminated tools are to be placed on non-contaminated equipment/vehicles for transport to the decontamination pad, use plastic to keep the non-contaminated equipment clean.
- Bag sample containers prior to emplacement of sample material.

7.2.2 Decontamination Procedures – Equipment

Split spoon samplers and other down-hole equipment will be decontaminated with Alconox^{M} soap and water and rinsed with distilled water prior to collecting soil samples for analysis. An alternative method of decontamination is to steam clean all down-hold sampling and drilling equipment. All decontamination wastes will be containerized and left in a designated on-site location.

7.2.3 Decontamination Procedures – Personnel

All disposable personal protective clothing (i.e., nitrile gloves) will be bagged with other miscellaneous waste and discarded in the trash. Wash hands and face thoroughly and shower as soon as possible.

8.0 Emergency Response and Contingency Plan

The purpose of this section is to define procedures and specific responsibilities that are to be followed in the event that a chemical spill or release, a fire or explosion, or an accident involving injuries occurs. The HSO, or a designated alternate, will determine when emergency and/or regulatory agencies should be contacted and which agencies are appropriate to contact. It should be noted that if injuries have occurred, all site workers have the responsibility to secure medical help for the affected worker(s). Medical emergency help can be contacted at the appropriate phone numbers listed in Section 1.0 of this plan.

In all emergency situations, the rule is SAFETY FIRST! Do not, under any circumstances, endanger yourself or others to rescue a fallen co-worker. It is far better to rescue one person after proper safety measures for the rescue have been carefully considered, than to have to rescue additional people whose haste to help out got them in trouble.

In case of injury, call 911.

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9.0 Administrative

9.1 TRAINING REQUIREMENTS

All Floyd|Snider project personnel must comply with applicable regulations specified in WAC Chapter 296-843, Hazardous Waste Operations (HAZWOP), administered by the Washington State Department of Labor and Industries (L&I). Project personnel will be 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) trained and maintain their training with an annual 8-hour refresher. Personnel with limited tasks and minimal exposure potential will be required to have 24-hour training and a site hazard briefing and be escorted by a trained employee. Personnel with defined tasks that do not include potential contact with disturbed site soils or waste, groundwater, or exposures to visible dust (e.g., surveying) are not required to have any level of hazardous waste training beyond a site emergency briefing and hazard orientation by HSO/SS. Floyd|Snider project personnel will fulfill the medical surveillance program requirements.

In addition to the 40-hour course and 8-hour refreshers, the HSO/SS will have completed an 8-hour HAZWOP Supervisor training as required by WAC 296-843-20015. At least one person on-site during fieldwork will have current CPR/First Aid certification. All field personnel will have a minimum of 3 days of hazardous materials field experience under the direction of a skilled supervisor. Documentation of all required training will be maintained in a 3-ring binder, or similar, on-site and kept either in the HSO/SS vehicle or equipment storage bin.

Additional site-specific training that covers on-site hazards, PPE requirements, use and limitations, decontamination procedures, and emergency response information as outlined in this HASP will be given by the HSO/SS before on-site work activities begin. Daily health and safety meetings will be documented on the Daily Tailgate Safety Meeting Form included in this HASP as Appendix A.

9.2 MEDICAL SURVEILLANCE

All Floyd|Snider field personnel are required to participate in Floyd|Snider's medical surveillance program, which includes biennial audiometric and physical examinations for employees involved in HAZWOP projects. The program requires medical clearance before respirator use or participating in HAZWOP activities. Medical examinations must be completed before conducting fieldwork activities and on a biennial basis.

9.3 RECORD KEEPING

The HSO, or a designated alternate, will be responsible for keeping daily logs of workers and visitors present at the work site, attendance lists of personnel present at site health and safety meetings, accident reports, air monitoring results, and signatures of all personnel who have read this HASP.

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10.0 Signature Page

I have read this HASP and understand its contents. I agree to abide by its provisions and will immediately notify the HSO if site conditions or hazards not specifically designated herein are encountered.

Name (Print)	Signature	Date	Company/Affiliation

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1514 Taylor Way Development

Interim Action Work Plan

Appendix C
Health and Safety Plan

Tables

Table C.1
Chemical-Specific Permissible Exposure Levels and Pathways

Chemical Name	PEL	STEL	IDLH	Exposure Route	Target Organs	Symptoms
Acetone	250 ppm		2,500 ppm	Inhalation; ingestion; skin/eye contact	Eyes; skin; respiratory system	Irritation of eyes, nose throat; headache; dizziness; dermatitis
Acetic Acid	10 ppm	15 ppm	50 ppm	Inhalation; skin/eye contact	Eyes; skin; respiratory system; teeth	Irritation of eyes, nose, throat; skin burns; hyperkeratosis; chronic bronchitis
Benzene	1 ppm	5 ppm	500 ppm	Inhalation; ingestion; skin/eye contact	Blood, central nervous system; skin; bone marrow; eyes; respiratory system	Irritation of eyes, nose, respiratory; giddiness; headache; nausea; staggered gait; fatigue; anorexia; lassitude; dermatitis; bone marrow; depression
cis-1,2-Dichloroethene	200 ppm	—	1,000 ppm	Inhalation; ingestion; skin/eye contact	Eyes; upper respiratory system; skin; central nervous system	Irritation of eyes, mucous membrane; central nervous system depression
Ethylbenzene	100 ppm	125 ppm	800 ppm	Inhalation; ingestion; skin/eye contact	Eyes; upper respiratory system; skin; central nervous system	Irritation of eyes, mucous membrane; headache; dermatitis; narcosis; coma
Heptane	85 ppm	500 ppm	750 ppm	Inhalation; ingestion; skin/eye contact	Skin, respiratory system; central nervous system	Lightheadedness, vertigo; loss of appetite, nausea; unconsciousness
Hexane	50 ppm	500 ppm	1,100 ppm	Inhalation; ingestion; skin/eye contact	Eyes; skin; respiratory system; central nervous system; peripheral nervous system	Irritation of eyes, nose; lightheadedness; nausea

Table C.1
Chemical-Specific Permissible Exposure Levels and Pathways

Chemical Name	PEL	STEL	IDLH	Exposure Route	Target Organs	Symptoms
Lead	0.050 mg/m^3		100 mg/m^3	Inhalation; ingestion; direct contact	Eyes; gastrointestinal (GI) tract; central nervous system; kidneys; blood; gingival tissue	Weakness; lassitude; insomnia; facial pallor; pale eyes; anorexia; low weight; malnutrition; constipation; abdominal pain; colic; anemia; gingival lead line; tremor; paralysis of wrist, ankles; encephalopathy; kidney disease; irritated eyes; hypotension
Methylene Chloride	500 ppm	2,000 ppm	2,300 ppm	Inhalation; ingestion; skin absorption, skin and/or eye contact	Eyes; skin; central nervous system; cardiovascular system	Irritation of eyes, skin; lightheadedness; somnolence
Methyl Ethyl Ketone Peroxide	0.2 ppm	—	Not determined	Inhalation; ingestion; skin/eye contact	Eyes; skin; respiratory system; liver, kidneys	Irritation of eyes, skin, nose, throat; cough; blisters; vomiting; blurred vision
Phosphoric Acid	1 mg/m^3	3 mg/m^3	1,000 mg/m^3	Inhalation; ingestion; skin/eye contact	Eyes; skin; respiratory system	Irritation of eyes, skin, upper respiratory system; eye and skin burns
Toluene	100 ppm	150 ppm	500 ppm	Inhalation, absorption, ingestion, skin/eye contact	Central nervous system; liver; kidneys; skin	Fatigue; confusion, euphoria, dizziness, headache; dilated pupils; lacrimation; nervousness; insomnia; parathesia; dermatitis

Table C.1
Chemical-Specific Permissible Exposure Levels and Pathways

Chemical Name	PEL	STEL	IDLH	Exposure Route	Target Organs	Symptoms
Trichloroethene	25 ppm		1,000 ppm	Inhalation; absorption; ingestion; skin/eye contact	Eyes, skin, respiratory system, heart, liver, central nervous system	Irritation of eyes, skin; vertigo; visual distortion; fatigue; giddiness; tremors; nausea, vomiting; dermatitis; cardiac arrhythmia; paresthesia; liver injury
Xylene	100 ppm	150 ppm	900 ppm	Inhalation; ingestion; absorption; skin/eye contact	Central nervous system GI tract; blood; liver; kidneys; skin	Dizziness, excitement, drowsiness, incoordination, staggered gait; irritation of eyes, nose, throat; corneal vacuolization; anorexia; nausea; vomiting, abdominal pain; dermatitis
Vinyl Chloride	1 ppm	—	—	Inhalation; dermal contact	Liver; central nervous system; blood; respiratory system; lymphatic system	Weakness; abdominal pain; GI bleeding; enlarged liver; pallor; cyanosis of extremities

Abbreviations:

IDLH Immediately dangerous to life or health
mg/m^3 Milligrams per cubic meter
PEL Permissible exposure limit
ppm Parts per million
STEL Short-term exposure limit

Table C.2
Photoionization Detector Action Levels and Protective Measures

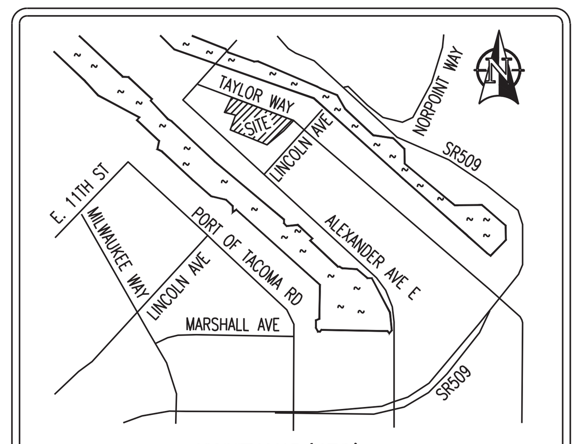
Response	Length of Time	Protective Measure
< 5 ppm	15 minute average	Level D PPE – use colorimetric tubes to test for vinyl chloride. If vinyl chloride is present, use engineering controls to reduce concentration to less than 1 ppm of vinyl chloride.
5 – 25 ppm	15 minute average	Allow work area to vent. If persistent, Level C.
25 – 50 ppm	Sustained over 15 minutes	Level C PPE, high-efficiency organic vapor cartridges in respirator.
> 50 ppm	1 minute average	Vacate work area, notify Site Health and Safety Officer immediately.

Abbreviations:
PPE Personal protective equipment
ppm Parts per million

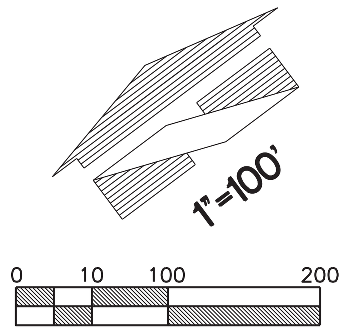
1514 Taylor Way Development

Interim Action Work Plan

Appendix D
Avenue 55/Taylor Way Tacoma Phase 1 Plans



VICINITY MAP (N.T.S.)

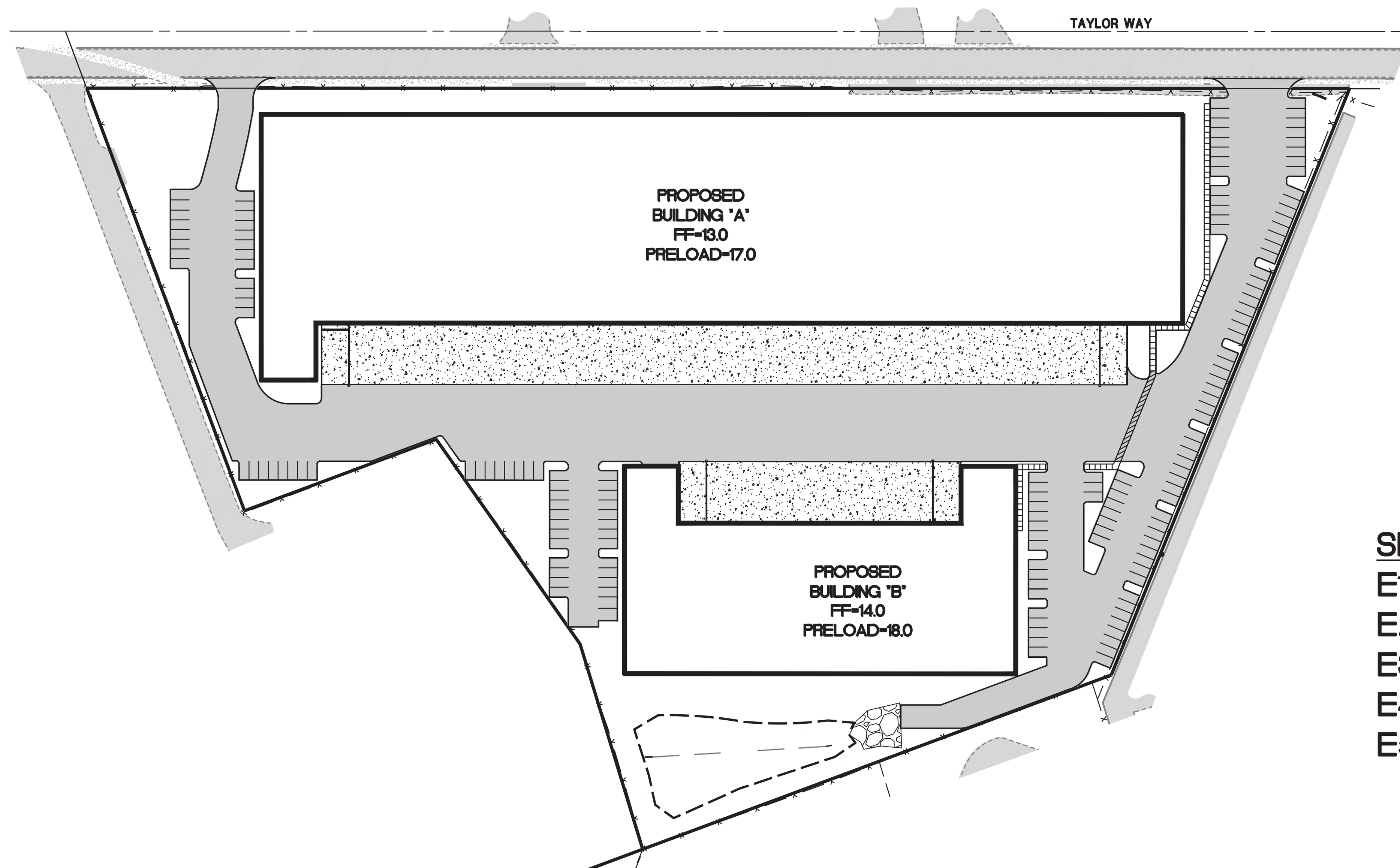


COVER SHEET

FOR

AVENUE 55/TAYLOR WAY PHASE 1

A PORTION OF THE SW 1/4 OF SEC. 26, TOWNSHIP 21N, RANGE 03E W.M. PIERCE COUNTY, CITY OF TACOMA WASHINGTON



SHEET INDEX

SURVEY INFORMATION:

LEGAL DESCRIPTIONS:
(PER BELOW REFERENCED TITLE REPORT)

LOTS 1, 2 AND 3, PIERCE COUNTY SHORT PLAT NUMBER 200310295007, ACCORDING TO THE MAP THEREOF RECORDED OCTOBER 29, 2003, ALSO KNOWN AS CITY OF TACOMA SHORT PLAT NO. MPD2003-00046, IN PIERCE COUNTY, WASHINGTON.

HORIZONTAL DATUM:
HORIZONTAL DATUM FOR THIS SITE IS NAD83/91 PER CITY OF TACOMA. CITY OF TACOMA HORIZONTAL CONTROL POINT NO. 441 WAS HELD FOR POSITION AND A LINE BETWEEN SAID POINT NO. 441 AND HORIZONTAL CONTROL POINT NO. 552 WAS HELD FOR ROTATION BEING SOUTH 30'50'14" WEST.

VERTICAL DATUM:
VERTICAL DATUM FOR THIS PROJECT IS NGVD29 PER CITY OF TACOMA. CITY OF TACOMA VERTICAL CONTROL POINT NO. 4070, BEING 10.585 FEET (NGVD29)

PROCEDURE / NARRATIVE:
THIS IS A FIELD TRAVERSE SURVEY. TOPCON PS TOTAL STATION, TOPCON GR5 GPS AND TOPCON FC5000 DATA COLLECTOR WAS USED TO MEASURE THE ANGULAR AND DISTANCE RELATIONSHIPS BETWEEN THE CONTROLLING MONUMENTATION AS SHOWN. CLOSURE RATIOS OF THE TRAVERSE MET OR EXCEEDED THOSE SPECIFIED IN WAC 332-130-090. ALL INSTRUMENTS AND EQUIPMENT HAVE BEEN MAINTAINED IN ADJUSTMENT ACCORDING TO MANUFACTURERS' SPECIFICATIONS.

LOT AREA:
461,036 +/- S.F. (10.584 +/- ACRES)

POND EASEMENT AREA:
30,579 +/- S.F. (0.70 +/- ACRES)

ADDRESS:
XXX TAYLOR WAY, TACOMA WA (NOT ASSIGNED)

TAX PARCEL NUMBERS:
0321267005, 0321356008 & 0321355007

REFERENCE SURVEYS:
RECORD OF SURVEY, AFN.8207130252
TACOMA SHORT PLAT, AF.8308190230
TACOMA SHORT PLAT, AF.9002280338
TACOMA BOUNDARY LINE ADJUSTMENT, AFN.9812235001
RECORD OF SURVEY, AFN.200903105001
TACOMA SHORT PLAT, AF.200310295007

ZONING:
NO ZONING REPORT WAS PROVIDED.

FLOOD INFORMATION:
SUBJECT PROPERTY LIES WITHIN ZONE C, AREAS OF MINIMAL FLOODING, PER FEMA FIRM MAP COMMUNITY PANEL NO. 530148 0025 B, DATED DECEMBER 1, 1983. CITY OF TACOMA, PANEL 25 OF 45.

DATE OF SURVEY:
THIS SURVEY REPRESENTS VISIBLE PHYSICAL IMPROVEMENT CONDITIONS EXISTING ON DECEMBER 14, 2016. ALL SURVEY CONTROL INDICATED AS "FOUND" WAS RECOVERED FOR THIS PROJECT IN NOVEMBER & DECEMBER 2016.

TITLE INSURANCE:
ALL TITLE INFORMATION SHOWN ON THIS MAP HAS BEEN EXTRACTED FROM CHICAGO TITLE INSURANCE COMPANY COMMITMENT NO. 0084424-TC, UPDATED SECOND COMMITMENT, DATED NOVEMBER 9, 2016 AT 8:00AM. IN PREPARING THIS MAP, BARGHAUSEN CONSULTING ENGINEERS, INC. HAS CONDUCTED NO INDEPENDENT TITLE SEARCH NOR IS BARGHAUSEN CONSULTING ENGINEERS, INC. AWARE OF ANY TITLE ISSUES AFFECTING THE SURVEYED PROPERTY OTHER THAN THOSE SHOWN ON THE MAP AND DISCLOSED BY THE REFERENCED CHICAGO TITLE INSURANCE COMPANY COMMITMENT. BARGHAUSEN CONSULTING ENGINEERS, INC. HAS RELIED WHOLLY ON CHICAGO TITLE INSURANCE COMPANY'S REPRESENTATIONS OF THE TITLE'S CONDITION TO PREPARE THIS SURVEY AND THEREFORE BARGHAUSEN CONSULTING ENGINEERS, INC. QUALIFIES THE MAP'S ACCURACY AND COMPLETENESS TO THAT EXTENT.

SURVEYOR'S NOTES:
1. ALL DISTANCES SHOWN HEREON ARE IN U.S. SURVEY FEET.
2. THE BOUNDARY CORNERS AND LINES DEPICTED ON THIS MAP REPRESENT DEED LINES ONLY. THEY DO NOT PURPORT TO SHOW OWNERSHIP LINES THAT MAY OTHERWISE BE DETERMINED BY A COURT OF LAW.
3. UNDERGROUND UTILITIES AND FEATURES DEPICTED HEREON ARE BASED ON FIELD OBSERVATION, MARKINGS, DEVELOPMENT PLANS, AND/OR AVAILABLE RECORD DOCUMENTS ONLY. THE TRUE LOCATION, NATURE AND/OR EXISTENCE OF BELOW GROUND FEATURES, DETECTED OR UNDETECTED, SHOULD BE VERIFIED.
4. BARGHAUSEN CONSULTING ENGINEERS, INC. SURVEY CREWS DETECTED NO OBSERVABLE EVIDENCE OF RECENT EARTH MOVING WORK, BUILDING CONSTRUCTION OR BUILDING ADDITIONS ON THE SUBJECT PROPERTY.
5. BARGHAUSEN CONSULTING ENGINEERS, INC. SURVEY CREWS DETECTED NO OBSERVABLE EVIDENCE OF CHANGES IN STREET RIGHT-OF-WAY LINES OR OF RECENT STREET OR SIDEWALK CONSTRUCTION ON OR ADJACENT TO THE SUBJECT PROPERTY, EXCEPT AS SHOWN.
6. THERE WAS NO OBSERVABLE EVIDENCE OF ANY WETLAND DELINEATION, BY A QUALIFIED SPECIALIST.
7. THERE ARE NO BUILDINGS ON SITE

LEGEND:

SURVEY MONUMENT	PROPOSED TYPE II CATCH BASIN
EX. POWER VAULT	PROPOSED TYPE I CATCH BASIN
EX. LUMINAIRE (LUM.)	PROPOSED STORM DRAIN FLOW ARROW
EX. LOT LIGHT	PROPOSED STORM DRAINAGE LINE
EX. POWER POLE	PROPOSED TRENCH DRAIN
EX. JUNCTION BOX	PROPOSED SANITARY SEWER LINE
EX. CATCH BASIN (CB)	PROPOSED SANITARY SEWER CLEANOUT
EX. CATCH BASIN (CB) TYPE 2	PROPOSED WATERMAIN (W)
EX. SANITARY SEWER MANHOLE (SSMH)	PROPOSED FIRE HYDRANT
EX. GAS METER	PROPOSED WATER VALVE
EX. GAS VALVE	PROPOSED CONCRETE BLOCKING
EX. WATER VALVE (WV)	PROPOSED 90° BEND
EX. FIRE HYDRANT (FH)	PROPOSED SPOT ELEVATIONS (23.20)
MAIL BOX	EXISTING SPOT ELEVATIONS (+100.0)
EX. WATER METER	EXISTING CONTOURS
EX. SIGN	PROPOSED CONTOURS
EX. WATER LINE	
EX. SANITARY SEWER LINE	
EX. STORM DRAINAGE LINE	EXISTING PAVEMENT
EX. POWER UNDERGROUND (P(UG))	
EX. POWER OVERHEAD (P(OH))	PROPOSED PAVEMENT
EX. METAL FENCE	
EX. WOOD FENCE	PROPOSED CONCRETE
EX. CONTOURS	

SPECIAL EXCEPTIONS:
(PER ABOVE REFERENCED TITLE REPORT)

1. AGREEMENT, INCLUDING THE TERMS AND PROVISIONS THEREOF:
EXECUTED BY: J. P. SIMPSON
PORT OF TACOMA
RECORDING DATE: FEBRUARY 4, 1958
RECORDING NO.: 1808461
REGARDING: SOLE PURPOSE OF CONDUCTING EXCESS WATER TO A DRAIN TILE OR STORM SEWER INSTALLED PARALLEL WITH ALEXANDER AVENUE
(NOT PLOTTABLE) BLANKET IN NATURE. EASEMENT APPEARS TO BE AN APPURTENANT OFF-SITE EASEMENT

2. EASEMENT GRANTED TO CITY OF TACOMA TO CONSTRUCT, OPERATE AND MAINTAIN A RAILROAD SPUR TRACK WITH NECESSARY APPURTENANCES, WITH THE PRIVILEGE OF PASSING AND REPASSING ITS CARS AND ROLLING STOCK OVER AND UPON A STRIP OF LAND 15 FEET WIDE AS THE SAME IS NOW CONSTRUCTED AND LOCATED IN THE NORTHWEST QUARTER OF THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER OF SECTION 35, TOWNSHIP 21 NORTH, RANGE 3 EAST, WILLAMETTE MERIDIAN, BY INSTRUMENT RECORDED UNDER RECORDING NUMBER 1397319, TO WHICH INSTRUMENT REFERENCE IS MADE FOR FULL PARTICULARS.
(PLOTTED HEREON)

3. THIS ITEM INTENTIONALLY DELETED

4. THIS ITEM INTENTIONALLY DELETED

5. EXISTING PRIVATE RAILROAD SPURS AS DELINEATED ON PIERCE COUNTY SURVEY NO. 2744 RECORDED IN VOLUM.E 28 OF SURVEYS, PAGE 44 AND INSTRUMENT RECORDED UNDER RECORDING NUMBER 8109020004.
(PLOTTED HEREON)

6. THIS ITEM INTENTIONALLY DELETED

7. THIS ITEM INTENTIONALLY DELETED

8. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:
GRANTED TO: CITY OF TACOMA
PURPOSE: CONSTRUCT AND MAINTAIN POLES, ANCHORS, TRANSFORMERS AND GUY, SERVICE AND DISTRIBUTION WIRES AND ALL APPURTENANT EQUIPMENT
RECORDING DATE: JUNE 12, 1996
RECORDING NO.: 9606120323
(PLOTTED HEREON)

9. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:
GRANTED TO: TAYLOR PROPERTIES, INC., A DELAWARE CORPORATION
PURPOSE: INSPECT, OPERATE, REPAIR, REPLACE AND MAINTAIN UNDERGROUND STORM WATER DRAINAGE CONDUITS AND RELATED FACILITIES AND EASEMENT TO DRAIN SURFACE STORMWATER RUN OFF AND INCIDENTAL PURPOSES
RECORDING DATE: DECEMBER 30, 1998
RECORDING NO.: 9812301057
(PLOTTED HEREON)

10. EASEMENT AGREEMENT FOR SANITARY SEWER, INCLUDING THE TERMS AND PROVISIONS THEREOF:
RECORDING DATE: OCTOBER 23, 2000
RECORDING NO.: 200010230472
MODIFICATION OF EASEMENT AGREEMENT:
RECORDING DATE: APRIL 18, 2001
RECORDING NO.: 200104180467
(PLOTTABLE) EASEMENT IS SOUTHWEST OF SUBJECT PROPERTY AND AFFECTS PHASE 2

11. THIS ITEM INTENTIONALLY DELETED

12. COVENANTS, CONDITIONS, RESTRICTIONS, RECITALS, RESERVATIONS, EASEMENTS, EASEMENT PROVISIONS, DEDICATIONS, BUILDING SETBACK LINES, NOTES, STATEMENTS, AND OTHER MATTERS, IF ANY, BUT OMITTING ANY COVENANTS OR RESTRICTIONS, IF ANY, INCLUDING BUT NOT LIMITED TO THOSE BASED UPON RACE, COLOR, RELIGION, SEX, SEXUAL ORIENTATION, FAMILIAL STATUS, MARITAL STATUS, DISABILITY, HANDICAP, NATIONAL ORIGIN, ANCESTRY, OR SOURCE OF INCOME, AS SET FORTH IN APPLICABLE STATE OR FEDERAL LAWS, EXCEPT TO THE EXTENT THAT SAID COVENANT OR RESTRICTION IS PERMITTED BY APPLICABLE LAW, AS SET FORTH ON PIERCE COUNTY SHORT PLAT NUMBER 200310295007, ALSO KNOWN AS CITY OF TACOMA SHORT PLAT NO. MPD2003-00046.
(PLOTTED HEREON)

13. ANY RIGHTS, INTERESTS, OR CLAIMS WHICH MAY EXIST OR ARISE BY REASON OF THE FOLLOWING MATTERS DISCLOSED BY SURVEY PERFORMED BY DOWN ENGINEERS DATED MARCH 16, 1998 UNDER JOB NO. S014 AND PIERCE COUNTY SHORT PLAT NUMBER 200310295007:
MATTERS SHOWN: FENCE LINES DO NOT CONFORM TO PROPERTY LINES
(GENERALLY PLOTTED HEREON)

14. ANY RIGHTS, INTERESTS, OR CLAIMS WHICH MAY EXIST OR ARISE BY REASON OF THE FOLLOWING SURVEY:
RECORDING DATE: MARCH 10, 2009
RECORDING NO.: 200903105001
(NOT PLOTTABLE)

15. COVENANTS, CONDITIONS, RESTRICTIONS, RECITALS, RESERVATIONS, EASEMENTS, EASEMENT PROVISIONS, DEDICATIONS, BUILDING SETBACK LINES, NOTES, STATEMENTS, AND OTHER MATTERS, IF ANY, BUT OMITTING ANY COVENANTS OR RESTRICTIONS, IF ANY, INCLUDING BUT NOT LIMITED TO THOSE BASED UPON RACE, COLOR, RELIGION, SEX, SEXUAL ORIENTATION, FAMILIAL STATUS, MARITAL STATUS, DISABILITY, HANDICAP, NATIONAL ORIGIN, ANCESTRY, OR SOURCE OF INCOME, AS SET FORTH IN APPLICABLE STATE OR FEDERAL LAWS, EXCEPT TO THE EXTENT THAT SAID COVENANT OR RESTRICTION IS PERMITTED BY APPLICABLE LAW, AS SET FORTH ON SURVEY:
RECORDING NO: 200903105001
(NOT PLOTTABLE)

16. ADDITIONAL TAP OR CONNECTION CHARGES FOR SEWER FACILITIES LEVIED BY THE CITY OF TACOMA, NOTICE THEREOF IS GIVEN BY THE FILING OF MAP RECORDED NOVEMBER 1, 1978 UNDER RECORDING NUMBER 2864651. SAID MAP WAS CORRECTED BY INSTRUMENT RECORDED UNDER RECORDING NUMBER 2881434 AND AMENDED BY INSTRUMENT RECORDED UNDER RECORDING NUMBER 8012010130. INQUIRY SHOULD BE MADE WITH THE CITY OF TACOMA, DEPARTMENT OF PUBLIC WORKS, FOR THE AMOUNT DUE.
(NOT SURVEY RELATED)

17. PAYMENT OF THE REAL ESTATE EXCISE TAX, IF REQUIRED.
THE LAND IS SITUATED WITHIN THE BOUNDARIES OF LOCAL TAXING AUTHORITY OF THE CITY OF TACOMA. PRESENT RATE OF REAL ESTATE EXCISE TAX AS OF THE DATE HEREIN IS 1.78 PERCENT. ANY CONVEYANCE DOCUMENT MUST BE ACCOMPANIED BY THE OFFICIAL WASHINGTON STATE EXCISE TAX AFFIDAVIT. THE APPLICABLE EXCISE TAX MUST BE PAID AND THE AFFIDAVIT APPROVED AT THE TIME OF THE RECORDING OF THE CONVEYANCE DOCUMENTS. (NOTE: REAL ESTATE EXCISE TAX AFFIDAVITS MUST BE PRINTED AS LEGAL SIZE FORMS). AN ADDITIONAL $5.00 ELECTRONIC TECHNOLOGY FEE MUST BE INCLUDED IN ALL EXCISE TAX PAYMENTS. IF THE TRANSACTION IS EXEMPT, AN ADDITIONAL $5.00 AFFIDAVIT PROCESSING FEE IS REQUIRED.
(NOT SURVEY RELATED)

18. THIS ITEM INTENTIONALLY DELETED

19. SPECIAL CHARGES, PAYABLE FEBRUARY 15, DELINQUENT IF FIRST HALF UNPAID ON MAY 1, SECOND HALF DELINQUENT IF UNPAID ON NOVEMBER 1 OF THE TAX YEAR (AMOUNTS DO NOT INCLUDE INTEREST AND PENALTIES):
2016
TAX ACCOUNT NO.: 032126-700-5
LEVY CODE: 005
ASSESSED VALUE-LAND: $768,900.00
ASSESSED VALUE-IMPROVEMENTS: $0.00
GENERAL AND SPECIAL TAXES:
$5.93
$5.93
$0.00
THE LAND IS PRESENTLY CLASSIFIED AS EXEMPT AND MAY BE SUBJECT TO THE COLLECTION OF BACK TAXES FOR A POSSIBLE THERETO TEN YEAR PERIOD, DEPENDING UPON THE ACTUAL USE CLASSIFICATION OF THE PROPERTY DURING ITS EXEMPT STATUS. INQUIRY SHOULD BE MADE TO THE PIERCE COUNTY ASSESSOR'S OFFICE OR THE COMPANY FOR ADDITIONAL INFORMATION.
(NOT SURVEY RELATED)

20. SPECIAL CHARGES, PAYABLE FEBRUARY 15, DELINQUENT IF FIRST HALF UNPAID ON MAY 1, SECOND HALF DELINQUENT IF UNPAID ON NOVEMBER 1 OF THE TAX YEAR (AMOUNTS DO NOT INCLUDE INTEREST AND PENALTIES):
2016
TAX ACCOUNT NO.: 032126-600-8
LEVY CODE: 005
ASSESSED VALUE-LAND: $1,427,800.00
ASSESSED VALUE-IMPROVEMENTS: $0.00
GENERAL AND SPECIAL TAXES:
$6.23
$6.23
$0.00
THE LAND IS PRESENTLY CLASSIFIED AS EXEMPT AND MAY BE SUBJECT TO THE COLLECTION OF BACK TAXES FOR A POSSIBLE THREE TO TEN YEAR PERIOD, DEPENDING UPON THE ACTUAL USE CLASSIFICATION OF THE PROPERTY DURING ITS EXEMPT STATUS. INQUIRY SHOULD BE MADE TO THE PIERCE COUNTY ASSESSOR'S OFFICE OR THE COMPANY FOR ADDITIONAL INFORMATION.
(NOT SURVEY RELATED)

21. SPECIAL CHARGES, PAYABLE FEBRUARY 15, DELINQUENT IF FIRST HALF UNPAID ON MAY 1, SECOND HALF DELINQUENT IF UNPAID ON NOVEMBER 1 OF THE TAX YEAR (AMOUNTS DO NOT INCLUDE INTEREST AND PENALTIES):
2016
TAX ACCOUNT NO.: 032135-500-7
LEVY CODE: 005
ASSESSED VALUE-LAND: $1,742,800.00
ASSESSED VALUE-IMPROVEMENTS: $0.00
GENERAL AND SPECIAL TAXES:
$6.38
$6.38
$0.00
(NOT SURVEY RELATED)

22. THIS ITEM INTENTIONALLY DELETED

23. THE SEARCH DID NOT DISCLOSE ANY OPEN MORTGAGES OR DEEDS OF TRUST OF RECORD, THEREFORE THE COMPANY RESERVES THE RIGHT TO REQUIRE FURTHER EVIDENCE TO CONFIRM THAT THE PROPERTY IS UNENCUMBERED, AND FURTHER RESERVES THE RIGHT TO MAKE ADDITIONAL REQUIREMENTS OR ADD ADDITIONAL ITEMS OR EXCEPTIONS UPON RECEIPT OF THE REQUESTED EVIDENCE.
(NOT SURVEY RELATED)

24. ANY UNRECORDED LEASEHOLDS, RIGHT OF VENDORS AND HOLDERS OF SECURITY INTERESTS ON PERSONAL PROPERTY INSTALLED UPON THE LAND AND RIGHTS OF TENANTS TO REMOVE TRADE FIXTURES AT THE EXPIRATION OF THE TERMS.
(NOT SURVEY RELATED)

25. IT IS OUR UNDERSTANDING THAT THE PROPOSED TRANSACTION WILL INVOLVE THE INSURANCE OF A LEASEHOLD ESTATE WHICH HAS NOT YET BEEN ESTABLISHED OF RECORD. DOCUMENTS NECESSARY TO CREATE SAID INTEREST MUST BE SUBMITTED FOR OUR REVIEW AND APPROVAL. IF ONLY A MEMORANDUM OR SHORT FORM OF LEASE IS TO BE RECORDED, THE FULL INSTRUMENT, TOGETHER WITH ALL AMENDMENTS, MUST BE SUBMITTED.
(NOT SURVEY RELATED)

26. ANY INSTRUMENT TO BE EXECUTED BY PORT OF TACOMA MUST BE IN ACCORDANCE WITH STATUTE. SATISFACTORY EVIDENCE OF AUTHORITY MUST BE SUBMITTED. THE COMPANY RESERVES THE RIGHT TO EXCEPT ADDITIONAL ITEMS AND/OR MAKE ADDITIONAL REQUIREMENTS AFTER REVIEWING SAID DOCUMENTS.
(NOT SURVEY RELATED)

27. IN THE EVENT TITLE TO SAID LAND IS ACQUIRED BY THE PARTY(IES) NAMED BELOW, THE POLICY(S), WHEN ISSUED, WILL SHOW THE
FOLLOWING ADDITIONAL ITEM(S) IN SCHEDULE B, UNLESS DISPOSED OF TO THE SATISFACTION OF THE COMPANY:
PARTY(IES): AVENUE 55 LLC
ITEM(S): FOLLOWING PARAGRAPH
(NOT SURVEY RELATED)

28. THE COMPANY WILL REQUIRE THE FOLLOWING DOCUMENTS FOR REVIEW PRIOR TO THE ISSUANCE OF ANY TITLE INSURANCE PREDICATED UPON A CONVEYANCE OR ENCUMBRANCE FROM THE ENTITY NAMED BELOW. LIMITED LIABILITY COMPANY: AVENUE 55 LLC
A. A COPY OF ITS OPERATING AGREEMENT, IF ANY, AND ANY AND ALL AMENDMENTS, SUPPLEMENTS AND/OR MODIFICATIONS THERETO, CERTIFIED BY THE APPROPRIATE MANAGER OR MEMBER.
B. IF A DOMESTIC LIMITED LIABILITY COMPANY, A COPY OF ITS ARTICLES OF ORGANIZATION AND ALL AMENDMENT THERETO WITH THE APPROPRIATE FILING STAMPS.
C. IF THE LIMITED LIABILITY COMPANY IS MEMBER-MANAGED A FULL AND COMPLETE CURRENT LIST OF MEMBERS CERTIFIED BY THE APPROPRIATE MANAGER OR MEMBER.
D. IF THE LIMITED LIABILITY COMPANY WAS FORMED IN A FOREIGN JURISDICTION, EVIDENCE, SATISFACTORY TO THE COMPANY THAT IT WAS VALIDLY FORMED, IS IN GOOD STANDING AND AUTHORIZED TO DO BUSINESS IN THE STATE OF ORIGIN.
E. IF LESS THAN ALL MEMBERS, OR MANAGERS, AS APPROPRIATE, WILL BE EXECUTING THE CLOSING DOCUMENTS, FURNISH EVIDENCE OF THE AUTHORITY OF THOSE SIGNING.
THE COMPANY RESERVES THE RIGHT TO ADD ADDITIONAL ITEMS OR MAKE FURTHER REQUIREMENTS AFTER REVIEW OF THE REQUESTED DOCUMENTATION.
(NOT SURVEY RELATED)

29. TO PROVIDE AN EXTENDED COVERAGE LENDER'S POLICY, GENERAL EXCEPTIONS B AND C ARE HEREBY ELIMINATED. GENERAL EXCEPTIONS A AND D HAVE NOT BEEN CLEARED. IN CONSIDERATION OF CLEARING PARAGRAPHS A AND D OF SCHEDULE B, PLEASE HAVE THE BORROWER/OWNER COMPLETE THE ENCLOSED AFFIDAVIT AND RETURN TO OUR OFFICE FOR REVIEW.
(NOT SURVEY RELATED)

ENGINEER/SURVEYOR
BARGHAUSEN CONSULTING ENGINEERS
CONTACT: DANIEL K. BALMELLI, P.E.
ADDRESS: 18215 72ND AVENUE SOUTH
KENT, WA 98032
PHONE: (425) 251-622

ARCHITECT
CRAFT ARCHITECTS, LLC.
ADDRESS: 2505 THIRD AVENUE, SUITE 324
SEATTLE, WA 98121
PHONE: (206) 720-7001

CALL BEFORE YOU DIG:
1-800-424-5555

CAUTION:
UTILITY CONFLICT NOTE:
THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATION, DIMENSION, AND DEPTH OF ALL EXISTING UTILITIES WHETHER SHOWN ON THESE PLANS OR NOT BY POTHOLING THE UTILITIES AND SURVEYING THE HORIZONTAL AND VERTICAL LOCATION PRIOR TO CONSTRUCTION. THIS SHALL INCLUDE CALLING UTILITY LOCATE @ 1-800-424-5555 AND THEN POTHOLING ALL OF THE EXISTING UTILITIES AT LOCATIONS OF NEW UTILITY CROSSINGS TO PHYSICALLY VERIFY WHETHER OR NOT CONFLICTS EXIST. LOCATIONS OF SAID UTILITIES AS SHOWN ON THESE PLANS ARE BASED UPON THE UNVERIFIED PUBLIC INFORMATION AND ARE SUBJECT TO VARIATION. IF CONFLICTS SHOULD OCCUR, THE CONTRACTOR SHALL CONSULT BARGHAUSEN CONSULTING ENGINEERS, INC. TO RESOLVE ALL PROBLEMS PRIOR TO PROCEEDING WITH CONSTRUCTION.

CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR OBTAINING PERMITS FROM THE WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES FOR REMOVING AND REPLACING ALL SURVEY MONUMENTATION THAT MAY BE AFFECTED BY CONSTRUCTION ACTIVITY, PURSUANT TO WAC 332-120. APPLICATIONS MUST BE COMPLETED BY A REGISTERED LAND SURVEYOR. APPLICATIONS FOR PERMITS TO REMOVE MONUMENTS MAY BE OBTAINED FROM THE WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES, OR BY CONTACTING THEIR OFFICE BY TELEPHONE AT (206) 902-1190.

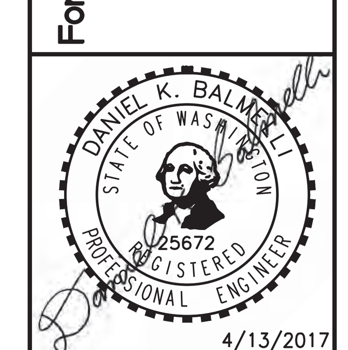
WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES
PUBLIC LAND SURVEY OFFICE
1111 WASHINGTON STREET S.E.
P.O. BOX 47060
OLYMPIA, WASHINGTON 98504-7060

UPON COMPLETION OF CONSTRUCTION, ALL MONUMENTS DISPLACED, REMOVED, OR DESTROYED SHALL BE REPLACED BY A REGISTERED LAND SURVEYOR, AT THE COST AND AT THE DIRECTION OF THE CONTRACTOR, PURSUANT TO THESE REGULATIONS. THE APPROPRIATE FORMS FOR REPLACEMENT OF SAID MONUMENTATION SHALL ALSO BE THE RESPONSIBILITY OF THE CONTRACTOR.

No.	Date	By	Ckd.	Appr.	Revision

Title: COVER SHEET FOR AVENUE 55/TAYLOR WAY TACOMA PHASE 1

For: AVENUE 55
600 UNIVERSITY STREET, SUITE 2305
SEATTLE, WA 98101



Scale: Horizontal 1"=100' Vertical -

Designed WED
Drawn WED
Checked CP
Approved DKB
Date 1/11/17

BARGHAUSEN CONSULTING ENGINEERS, INC.
18215 72ND AVENUE SOUTH
KENT, WA 98032
(425)251-6222
(425)251-8782 FAX
CIVIL ENGINEERING, LAND PLANNING, SURVEYING, ENVIRONMENTAL SERVICES

Job Number 18293

Sheet E1 of 5

File:P:\18000s\18293\preliminary\Grade and Fill\18293-oe.dwg Date/Time:4/13/2017 2:25 PM Scale:1" = 1' WDUNLAP Xref: ----

EXISTING CONDITIONS AND DEMOLITION PLAN

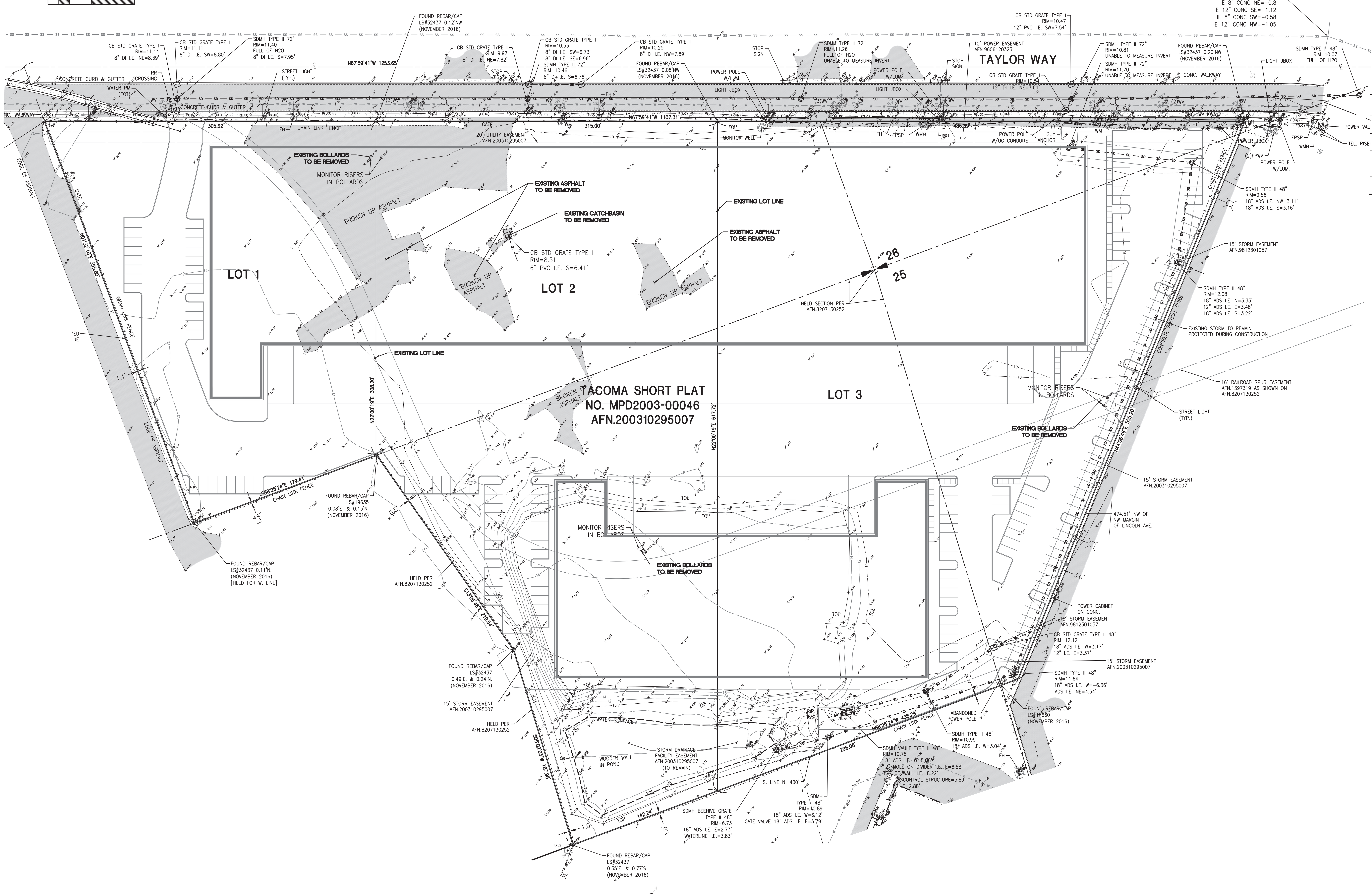
FOR

AVENUE 55/TAYLOR WAY PHASE 1

A PORTION OF THE SW 1/4 OF SEC. 26, TOWNSHIP 21N, RANGE 03E
W.M. PIERCE COUNTY, CITY OF TACOMA WASHINGTON

1"=40'

0 20 40 80



Title:
EXISTING CONDITIONS AND DEMOLITION PLAN
FOR
AVENUE 55/TAYLOR WAY
TACOMA-PHASE 1

For:
AVENUE 55
600 UNIVERSITY STREET, SUITE 2305
SEATTLE, WA 98101

DANIEL K. BALMELLI, STATE OF WASHINGTON, 25672, REGISTERED PROFESSIONAL ENGINEER
4/13/2017

Designed	WED	Scale:	
Drawn	WED	Horizontal	1"=40'
Checked	CP	Vertical	-
Approved	DKB		
Date	1/11/17		

BARGHAUSEN CONSULTING ENGINEERS, INC.
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KENT, WA 98032
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CIVIL ENGINEERING, LAND PLANNING, SURVEYING, ENVIRONMENTAL SERVICES

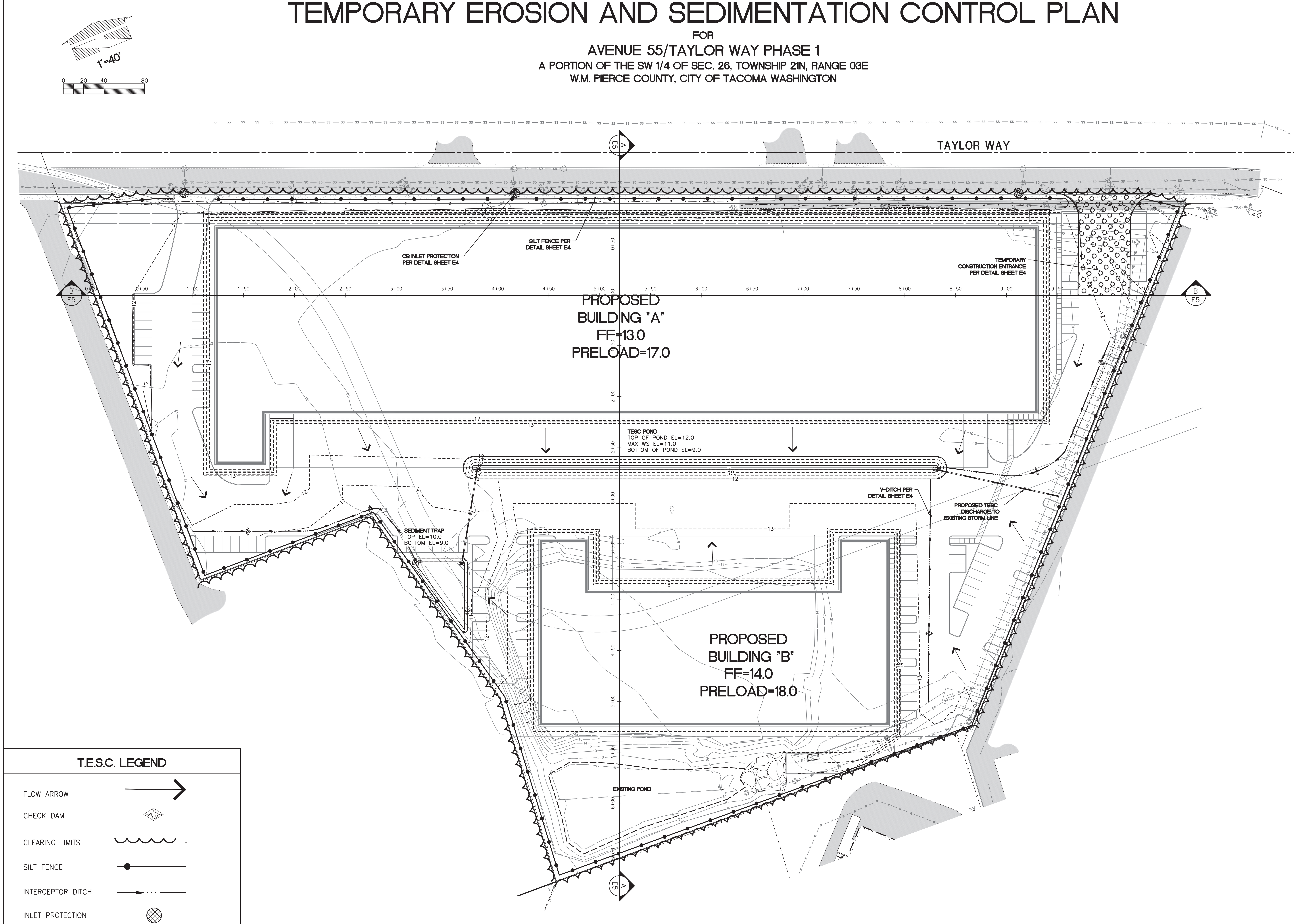
Job Number 18293
Sheet E2 of 5

TEMPORARY EROSION AND SEDIMENTATION CONTROL PLAN

FOR

AVENUE 55/TAYLOR WAY PHASE 1

A PORTION OF THE SW 1/4 OF SEC. 26, TOWNSHIP 21N, RANGE 03E
W.M. PIERCE COUNTY, CITY OF TACOMA WASHINGTON



T.E.S.C. LEGEND

- FLOW ARROW
- CHECK DAM
- CLEARING LIMITS
- SILT FENCE
- INTERCEPTOR DITCH
- INLET PROTECTION

No.	Date	By	Ckd.	Appr.	Revision

Title: TEMPORARY EROSION AND SEDIMENTATION CONTROL PLAN FOR AVENUE 55/TAYLOR WAY TACOMA-PHASE 1

For: AVENUE 55
600 UNIVERSITY STREET, SUITE 2305
SEATTLE, WA 98101

DANIEL K. BALMELLI
STATE OF WASHINGTON
25672
REGISTERED PROFESSIONAL ENGINEER
4/13/2017

Scale: Horizontal 1"=40' Vertical -

Designed WED
Drawn WED
Checked CP
Approved DKB
Date 1/11/17

BARGHAUSEN CONSULTING ENGINEERS, INC.
18215 72ND AVENUE SOUTH
KENT, WA 98032
(425)251-6222
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Job Number 18293

Sheet E3 of 5

File:P:\18000s\18293\preliminary\18293-e.dwg Date/Time:4/13/2017 1:10 PM Scale:1" = 1' WDUNLAP Xref: ----

EROSION CONTROL NOTES AND DETAILS

FOR

AVENUE 55/TAYLOR WAY PHASE 1

A PORTION OF THE SW 1/4 OF SEC. 26, TOWNSHIP 21N, RANGE 03E
W.M. PIERCE COUNTY, CITY OF TACOMA WASHINGTON

STANDARD TESC NOTES

1. THE IMPLEMENTATION OF THESE TESC PLANS AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF TESC FACILITIES IS THE RESPONSIBILITY OF THE APPLICANT/CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED AND APPROVED, VEGETATION/LANDSCAPING IS ESTABLISHED AND THE ENTIRE SITE IS STABILIZED.

2. THE BOUNDARIES OF THE CLEARING LIMITS SHOWN ON THIS PLAN SHALL BE CLEARLY MARKED IN THE FIELD PRIOR TO CONSTRUCTION. DURING THE CONSTRUCTION PERIOD, NO DISTURBANCE BEYOND THE CLEARING LIMITS SHALL BE PERMITTED. THE MARKING SHALL BE MAINTAINED BY THE APPLICANT/CONTRACTOR FOR THE DURATION OF CONSTRUCTION.

3. THE TESC FACILITIES SHOWN ON THIS PLAN SHALL BE CONSTRUCTED PRIOR TO AND/OR IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES, AND IN SUCH A MANNER AS TO ENSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DO NOT ENTER THE DRAINAGE SYSTEM OR ROADWAYS, OR VIOLATE APPLICABLE WATER STANDARDS

4. THE TESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, TESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND TO ENSURE THAT SEDIMENT AND SEDIMENT-LADEN WATER DO NOT LEAVE THE SITE.

5. THE CESCL, CPESC, OR ESC LEAD SHALL BE IDENTIFIED IN THE SWPPP AND SHALL BE ONSITE OR ON-CALL AT ALL TIMES.

6. THE CESCL, CPESC, OR ESC LEAD MUST BE KNOWLEDGEABLE IN THE PRINCIPLES AND PRACTICES OF EROSION AND SEDIMENT CONTROL AND HAVE THE SKILLS TO ASSESS:

   a. SITE CONDITIONS AND CONSTRUCTION ACTIVITIES THAT COULD IMPACT THE QUALITY OF STORMWATER.

   b. EFFECTIVENESS OF EROSION AND SEDIMENT CONTROL MEASURES USED TO CONTROL THE QUALITY OF STORMWATER DISCHARGES.

7. THE CESCL, CPESC, OR ESC LEAD MUST EXAMINE STORMWATER VISUALLY FOR THE PRESENCE OF SUSPENDED SEDIMENT, TURBIDITY, DISCOLORATION, AND OIL SHEEN AND EVALUATE THE EFFECTIVENESS OF BMPS TO DETERMINE IF IT IS NECESSARY TO INSTALL, MAINTAIN, OR REPAIR BMPS.

8. THE CESCL, CPESC, OR ESC LEAD MUST INSPECT ALL AREAS DISTURBED BY CONSTRUCTION ACTIVITIES, ALL BMPS, AND ALL STORMWATER DISCHARGE POINTS AT LEAST ONCE EVERY CALENDAR WEEK AND WITHIN 24 HOURS OF ANY DISCHARGE FROM THE SITE. (INDIVIDUAL DISCHARGE EVENTS THAT LAST MORE THAN ONE DAY DO NOT REQUIRE DAILY INSPECTIONS). THE CESCL OR INSPECTOR MAY REDUCE THE INSPECTION FREQUENCY FOR TEMPORARY STABILIZED, INACTIVE SITES TO ONCE EVERY CALENDAR MONTH.

9. CONSTRUCTION SITE OPERATORS MUST CORRECT ANY PROBLEMS IDENTIFIED BY THE CESCL, CPESC, OR ESC LEAD BY:

   a. REVIEWING THE SWPPP FOR COMPLIANCE WITH THE 13 CONSTRUCTION SWPPP ELEMENTS AND MAKING APPROPRIATE REVISIONS WITHIN 7 DAYS OF THE INSPECTION.

   b. FULLY IMPLEMENT AND MAINTAIN APPROPRIATE SOURCE CONTROL AND/OR TREATMENT BMPS AS SOON AS POSSIBLE BUT CORRECTING THE PROBLEM WITHIN 10 DAYS.

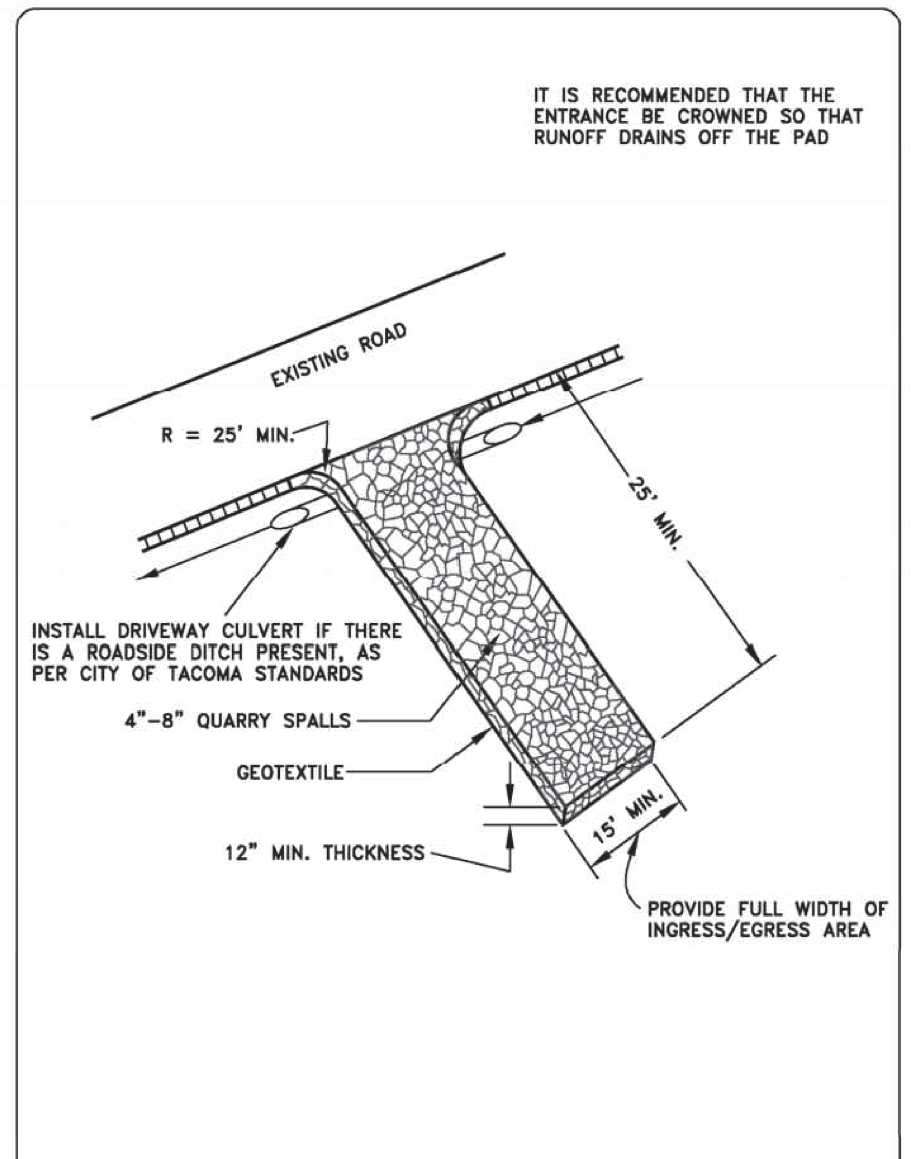
   c. DOCUMENTING BMP IMPLEMENTATION AND MAINTENANCE IN THE SITE LOG BOOK. (REQUIRED FOR SITES LARGER THAN 1 ACRE BUT RECOMMENDED FOR ALL SITES).

   SAMPLING AND ANALYSIS OF THE STORMWATER DISCHARGES FROM A CONSTRUCTION SITE MAY BE NECESSARY ON A CASE-BY-CASE BASIS TO ENSURE COMPLIANCE WITH STANDARDS. ECOLOGY OR THE CITY WILL ESTABLISH THESE MONITORING AND ASSOCIATED REPORTING REQUIREMENTS.

10. AT NO TIME SHALL MORE THAN ONE FOOT OF SEDIMENT BE ALLOWED TO ACCUMULATE WITHIN A CATCH BASIN SEDIMENT TRAP.

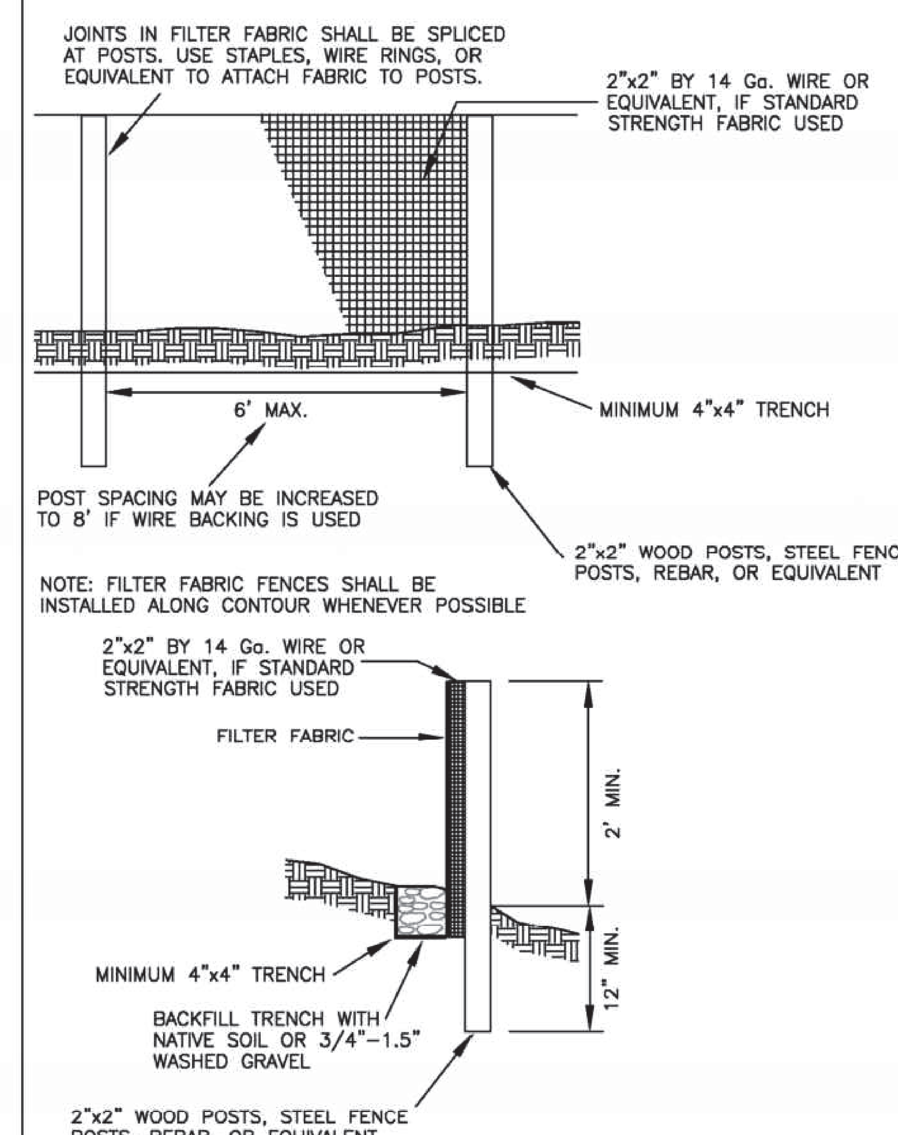
11. ALL CATCH BASINS AND CONVEYANCE LINES SHALL BE CLEANED PRIOR TO PAVING. THE CLEANING OPERATION SHALL NOT FLUSH SEDIMENT-LADEN WATER INTO THE DOWNSTREAM SYSTEM.

12. STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES MAY BE REQUIRED TO ENSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.



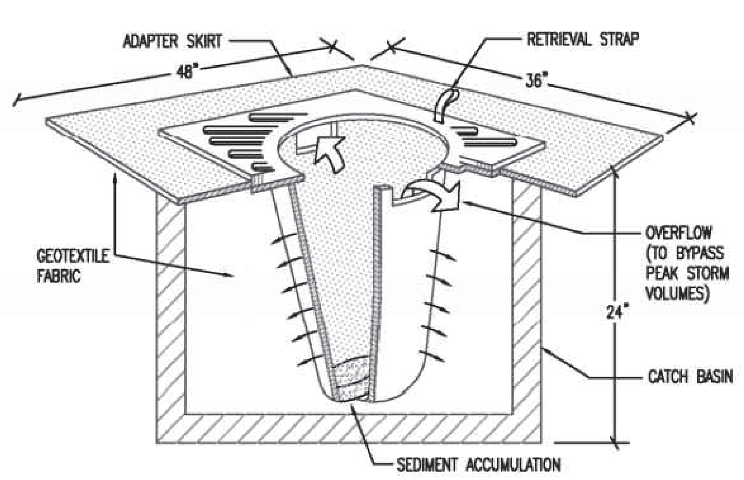
ENTRANCE ROCK PAD
NOT TO SCALE

CONSTRUCTION SWPPP SHORT -FORM
CONSTRUCTION ENTRANCE
CITY OF TACOMA



SILT FENCE
NOT TO SCALE

CONSTRUCTION SWPPP SHORT -FORM
SEDIMENT BARRIER
CITY OF TACOMA

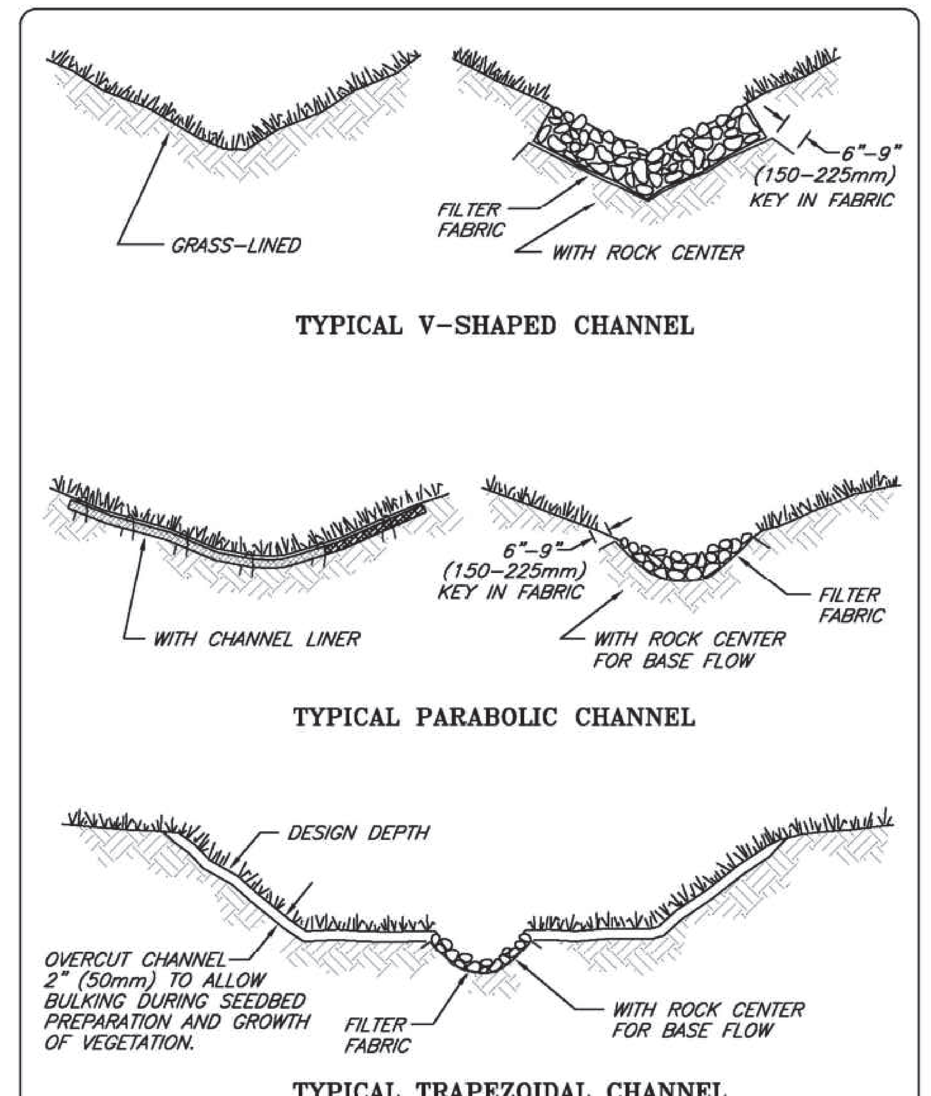


INLET PROTECTION NOTES:

1. FILTERS SHALL BE REMOVED AND CLEANED OR REPLACED AFER EACH STORM EVENT.

BAG FILTER
NOT TO SCALE

CONSTRUCTION SWPPP SHORT -FORM
CATCH BASIN PROTECTION
CITY OF TACOMA



DRAINAGE SWALE CROSS-SECTIONS
NOT TO SCALE

CONSTRUCTION SWPPP SHORT-FORM
WATER RUNOFF CONTAINMENT/ CONTROL
CITY OF TACOMA

Title: EROSION CONTROL NOTES AND DETAILS FOR AVENUE 55/TAYLOR WAY TACOMA PHASE 1

For: AVENUE 55
600 UNIVERSITY STREET, SUITE 2305
SEATTLE, WA 98101

DANIEL K. BALMELLI, STATE OF WASHINGTON, 25672, REGISTERED PROFESSIONAL ENGINEER
4/13/2017

Scale: Horizontal - Vertical -

Designed WED
Drawn WED
Checked CP
Approved DKB
Date 1/11/17

BARGHAUSEN CONSULTING ENGINEERS, INC.
18215 72ND AVENUE SOUTH
KENT, WA 98032
(425)251-6222
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Job Number 18293

Sheet E4 of 5

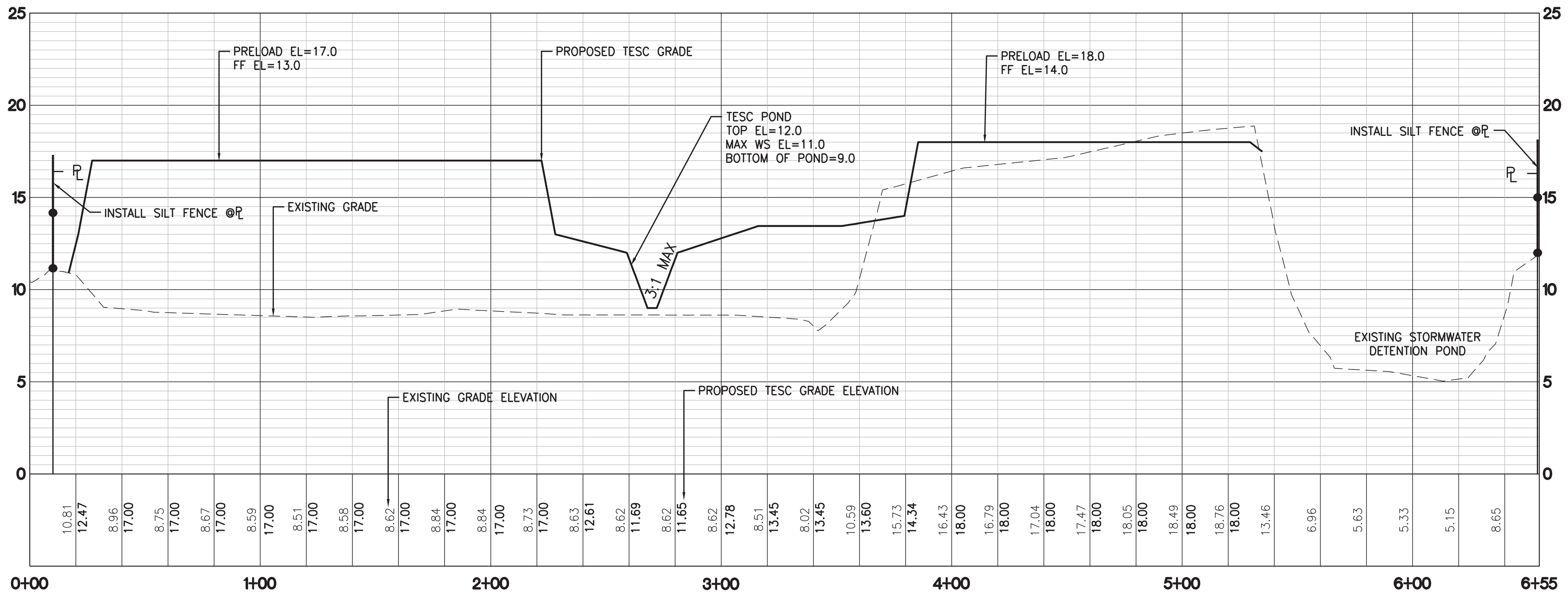
File:P:\18000s\18293\preliminary\Grade and Fill\18293-d.dwg Date/Time:1/25/2017 12:21 PM Scale:1" = 1' WDUNLAP Xref: ----

TEMPORARY EROSION AND SEDIMENTATION CONTROL PROFILES

FOR

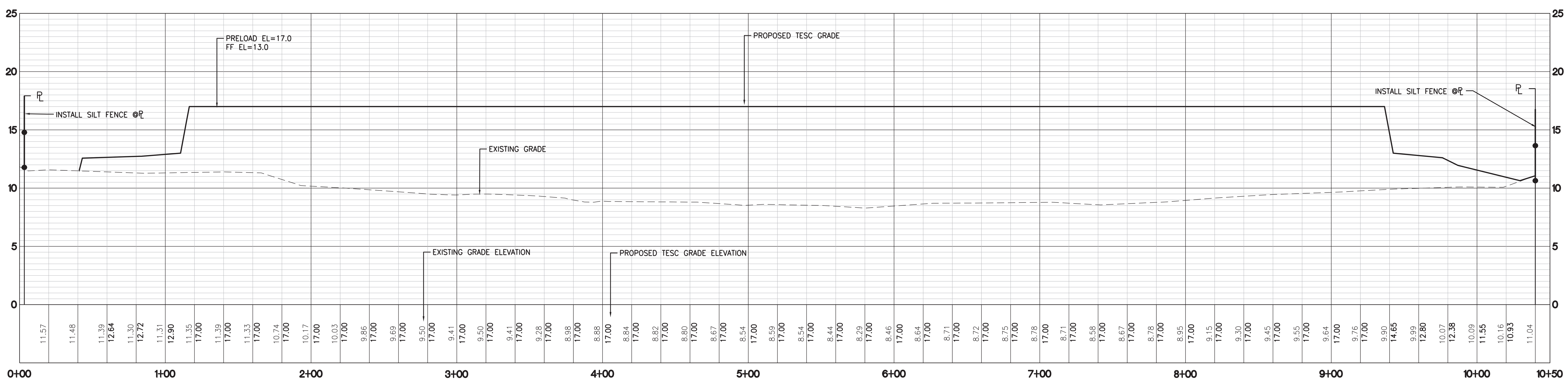
AVENUE 55/TAYLOR WAY PHASE 1

A PORTION OF THE SW 1/4 OF SEC. 26, TOWNSHIP 21N, RANGE 03E
W.M. PIERCE COUNTY, CITY OF TACOMA WASHINGTON



SECTION A

SCALE: H:1"=40' V:1"=5'



SECTION B

SCALE: H:1"=40' V:1"=5'

No.	Date	By	Ckd.	Appr.	Revision

Title: TEMPORARY EROSION AND SEDIMENTATION CONTROL PROFILES FOR AVENUE 55/TAYLOR WAY TACOMA-PHASE 1

For: AVENUE 55
600 UNIVERSITY STREET, SUITE 2305
SEATTLE, WA 98101

DANIEL K. BALMELLI, STATE OF WASHINGTON, 25672, REGISTERED PROFESSIONAL ENGINEER
4/13/2017

Scale: Horizontal 1"=40' Vertical 1"=5'

Designed WED
Drawn WED
Checked CP
Approved DKB
Date 1/11/17

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Job Number 18293

Sheet E5 of 5

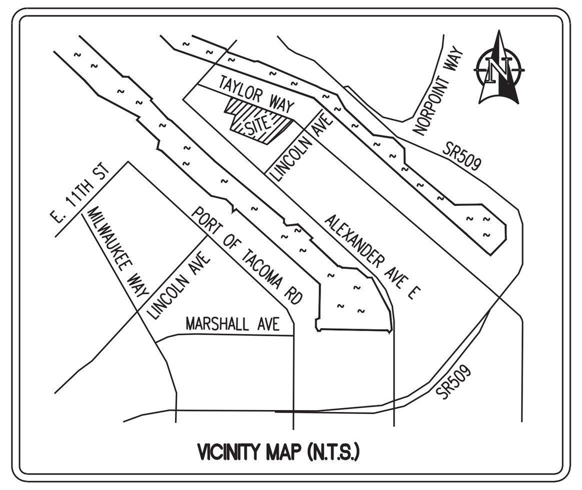
File:P:\18000s\18293\preliminary\18293-ep.dwg Date/Time:4/13/2017 9:54 AM Scale:1" = 1' WDUNLAP Xref: ----

COVER SHEET

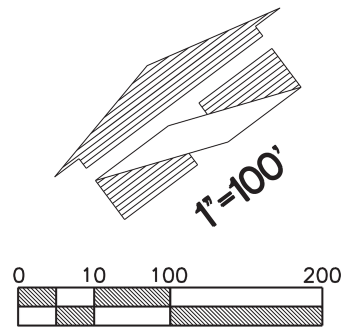
FOR

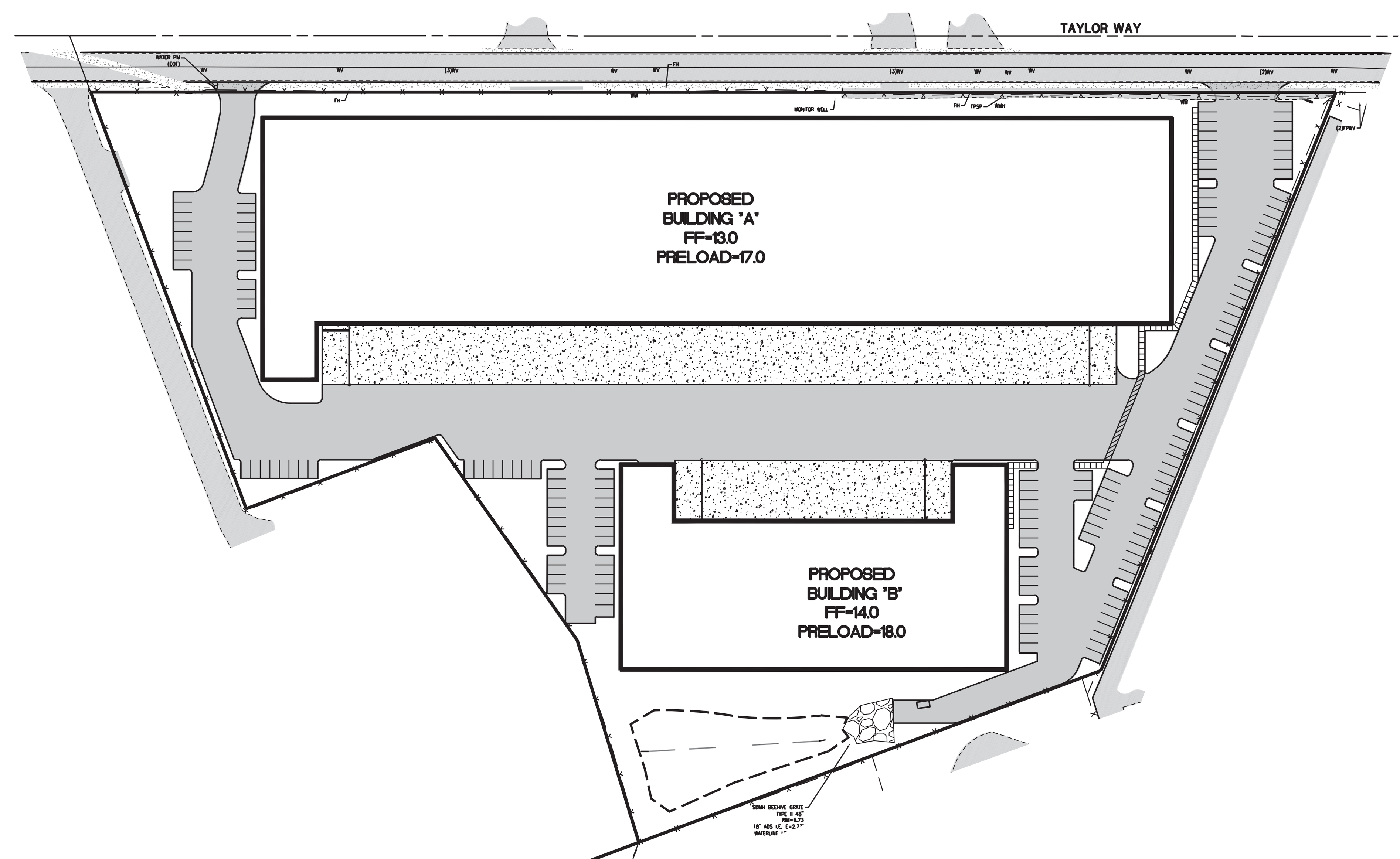
AVENUE 55/TAYLOR WAY PHASE 1

A PORTION OF THE SW 1/4 OF SEC. 26, TOWNSHIP 21N, RANGE 03E
W.M. PIERCE COUNTY, CITY OF TACOMA WASHINGTON



VICINITY MAP (N.T.S.)





SHEET INDEX

SURVEY INFORMATION:

LEGAL DESCRIPTIONS:
(PER BELOW REFERENCED TITLE REPORT)

LOTS 1, 2 AND 3, PIERCE COUNTY SHORT PLAT NUMBER 200310295007, ACCORDING TO THE MAP THEREOF RECORDED OCTOBER 29, 2003, ALSO KNOWN AS CITY OF TACOMA SHORT PLAT NO. MPD2003-00046, IN PIERCE COUNTY, WASHINGTON.

HORIZONTAL DATUM:
HORIZONTAL DATUM FOR THIS SITE IS NAD83/91 PER CITY OF TACOMA. CITY OF TACOMA HORIZONTAL CONTROL POINT NO. 441 WAS HELD FOR POSITION AND A LINE BETWEEN SAID POINT NO. 441 AND HORIZONTAL CONTROL POINT NO. 552 WAS HELD FOR ROTATION BEING SOUTH 30'50'14" WEST.

VERTICAL DATUM:
VERTICAL DATUM FOR THIS PROJECT IS NGVD29 PER CITY OF TACOMA. CITY OF TACOMA VERTICAL CONTROL POINT NO. 4070, BEING 10.585 FEET (NGVD29)

PROCEDURE / NARRATIVE:
THIS IS A FIELD TRAVERSE SURVEY. TOPCON PS TOTAL STATION, TOPCON GR5 GPS AND TOPCON FC5000 DATA COLLECTOR WAS USED TO MEASURE THE ANGULAR AND DISTANCE RELATIONSHIPS BETWEEN THE CONTROLLING MONUMENTATION AS SHOWN. CLOSURE RATIOS OF THE TRAVERSE MET OR EXCEEDED THOSE SPECIFIED IN WAC 332-130-090. ALL INSTRUMENTS AND EQUIPMENT HAVE BEEN MAINTAINED IN ADJUSTMENT ACCORDING TO MANUFACTURERS' SPECIFICATIONS.

LOT AREA:
461,036 +/- S.F. (10.584 +/- ACRES)

POND EASEMENT AREA:
30,579 +/- S.F. (0.70 +/- ACRES)

ADDRESS:
XXX TAYLOR WAY, TACOMA WA (NOT ASSIGNED)

TAX PARCEL NUMBERS:
0321267005, 0321356008 & 0321355007

REFERENCE SURVEYS:
RECORD OF SURVEY, AFN.8207130252
TACOMA SHORT PLAT, AF.8308190230
TACOMA SHORT PLAT, AF.9002280338
TACOMA BOUNDARY LINE ADJUSTMENT, AFN.9812235001
RECORD OF SURVEY, AFN.200903105001
TACOMA SHORT PLAT, AF.200310295007

ZONING:
NO ZONING REPORT WAS PROVIDED.

FLOOD INFORMATION:
SUBJECT PROPERTY LIES WITHIN ZONE C, AREAS OF MINIMAL FLOODING, PER FEMA FIRM MAP COMMUNITY PANEL NO. 530148 0025 B, DATED DECEMBER 1, 1983. CITY OF TACOMA, PANEL 25 OF 45.

DATE OF SURVEY:
THIS SURVEY REPRESENTS VISIBLE PHYSICAL IMPROVEMENT CONDITIONS EXISTING ON DECEMBER 14, 2016. ALL SURVEY CONTROL INDICATED AS "FOUND" WAS RECOVERED FOR THIS PROJECT IN NOVEMBER & DECEMBER 2016.

TITLE INSURANCE:
ALL TITLE INFORMATION SHOWN ON THIS MAP HAS BEEN EXTRACTED FROM CHICAGO TITLE INSURANCE COMPANY COMMITMENT NO. 0084424-TC, UPDATED SECOND COMMITMENT, DATED NOVEMBER 9, 2016 AT 8:00AM. IN PREPARING THIS MAP, BARGHAUSEN CONSULTING ENGINEERS, INC. HAS CONDUCTED NO INDEPENDENT TITLE SEARCH NOR IS BARGHAUSEN CONSULTING ENGINEERS, INC. AWARE OF ANY TITLE ISSUES AFFECTING THE SURVEYED PROPERTY OTHER THAN THOSE SHOWN ON THE MAP AND DISCLOSED BY THE REFERENCED CHICAGO TITLE INSURANCE COMPANY COMMITMENT. BARGHAUSEN CONSULTING ENGINEERS, INC. HAS RELIED WHOLLY ON CHICAGO TITLE INSURANCE COMPANY'S REPRESENTATIONS OF THE TITLE'S CONDITION TO PREPARE THIS SURVEY AND THEREFORE BARGHAUSEN CONSULTING ENGINEERS, INC. QUALIFIES THE MAP'S ACCURACY AND COMPLETENESS TO THAT EXTENT.

SURVEYOR'S NOTES:
1. ALL DISTANCES SHOWN HEREON ARE IN U.S. SURVEY FEET.
2. THE BOUNDARY CORNERS AND LINES DEPICTED ON THIS MAP REPRESENT DEED LINES ONLY. THEY DO NOT PURPORT TO SHOW OWNERSHIP LINES THAT MAY OTHERWISE BE DETERMINED BY A COURT OF LAW.
3. UNDERGROUND UTILITIES AND FEATURES DEPICTED HEREON ARE BASED ON FIELD OBSERVATION, MARKINGS, DEVELOPMENT PLANS, AND/OR AVAILABLE RECORD DOCUMENTS ONLY. THE TRUE LOCATION, NATURE AND/OR EXISTENCE OF BELOW GROUND FEATURES, DETECTED OR UNDETECTED, SHOULD BE VERIFIED.
4. BARGHAUSEN CONSULTING ENGINEERS, INC. SURVEY CREWS DETECTED NO OBSERVABLE EVIDENCE OF RECENT EARTH MOVING WORK, BUILDING CONSTRUCTION OR BUILDING ADDITIONS ON THE SUBJECT PROPERTY.
5. BARGHAUSEN CONSULTING ENGINEERS, INC. SURVEY CREWS DETECTED NO OBSERVABLE EVIDENCE OF CHANGES IN STREET RIGHT-OF-WAY LINES OR OF RECENT STREET OR SIDEWALK CONSTRUCTION ON OR ADJACENT TO THE SUBJECT PROPERTY, EXCEPT AS SHOWN.
6. THERE WAS NO OBSERVABLE EVIDENCE OF ANY WETLAND DELINEATION, BY A QUALIFIED SPECIALIST.
7. THERE ARE NO BUILDINGS ON SITE

LEGEND:

SURVEY MONUMENT	PROPOSED TYPE II CATCH BASIN
EX. POWER VAULT	PROPOSED TYPE I CATCH BASIN
EX. LUMINAIRE (LUM.)	PROPOSED STORM DRAIN FLOW ARROW
EX. LOT LIGHT	PROPOSED STORM DRAINAGE LINE
EX. POWER POLE	PROPOSED TRENCH DRAIN
EX. JUNCTION BOX	PROPOSED SANITARY SEWER LINE
	PROPOSED SANITARY SEWER CLEANOUT
EX. CATCH BASIN (CB)	PROPOSED WATERMAIN
EX. CATCH BASIN (CB) TYPE 2	PROPOSED FIRE HYDRANT
EX. SANITARY SEWER MANHOLE (SSMH)	PROPOSED WATER VALVE
EX. GAS METER	PROPOSED CONCRETE BLOCKING
EX. GAS VALVE	PROPOSED 90° BEND
EX. WATER VALVE (WV)	PROPOSED SPOT ELEVATIONS 23.20
EX. FIRE HYDRANT (FH)	EXISTING SPOT ELEVATIONS
MAIL BOX	
EX. WATER METER	EXISTING CONTOURS
EX. SIGN	PROPOSED CONTOURS
EX. WATER LINE	
EX. SANITARY SEWER LINE	
EX. STORM DRAINAGE LINE	EXISTING PAVEMENT
EX. POWER UNDERGROUND P(UG)	
EX. POWER OVERHEAD P(OH)	PROPOSED PAVEMENT
EX. METAL FENCE	
EX. WOOD FENCE	
EX. CONTOURS	PROPOSED CONCRETE

SPECIAL EXCEPTIONS:
(PER ABOVE REFERENCED TITLE REPORT)

1. AGREEMENT, INCLUDING THE TERMS AND PROVISIONS THEREOF:
EXECUTED BY: J. P. SIMPSON
PORT OF TACOMA
RECORDING DATE: FEBRUARY 4, 1958
RECORDING NO.: 1808461
REGARDING: SOLE PURPOSE OF CONDUCTING EXCESS WATER TO A DRAIN TILE OR STORM SEWER INSTALLED PARALLEL WITH ALEXANDER AVENUE
(NOT PLOTTABLE) BLANKET IN NATURE. EASEMENT APPEARS TO BE AN APPURTENANT OFF-SITE EASEMENT

2. EASEMENT GRANTED TO CITY OF TACOMA TO CONSTRUCT, OPERATE AND MAINTAIN A RAILROAD SPUR TRACK WITH NECESSARY APPURTENANCES, WITH THE PRIVILEGE OF PASSING AND REPASSING ITS CARS AND ROLLING STOCK OVER AND UPON A STRIP OF LAND 15 FEET WIDE AS THE SAME IS NOW CONSTRUCTED AND LOCATED IN THE NORTHWEST QUARTER OF THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER OF SECTION 35, TOWNSHIP 21 NORTH, RANGE 3 EAST, WILLAMETTE MERIDIAN, BY INSTRUMENT RECORDED UNDER RECORDING NUMBER 1397319, TO WHICH INSTRUMENT REFERENCE IS MADE FOR FULL PARTICULARS.
(PLOTTED HEREON)

3. THIS ITEM INTENTIONALLY DELETED

4. THIS ITEM INTENTIONALLY DELETED

5. EXISTING PRIVATE RAILROAD SPURS AS DELINEATED ON PIERCE COUNTY SURVEY NO. 2744 RECORDED IN VOLUM.E 28 OF SURVEYS, PAGE 44 AND INSTRUMENT RECORDED UNDER RECORDING NUMBER 8109020004.
(PLOTTED HEREON)

6. THIS ITEM INTENTIONALLY DELETED

7. THIS ITEM INTENTIONALLY DELETED

8. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:
GRANTED TO: CITY OF TACOMA
PURPOSE: CONSTRUCT AND MAINTAIN POLES, ANCHORS, TRANSFORMERS AND GUY, SERVICE AND DISTRIBUTION WIRES AND ALL APPURTENANT EQUIPMENT
RECORDING DATE: JUNE 12, 1996
RECORDING NO.: 9606120323
(PLOTTED HEREON)

9. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:
GRANTED TO: TAYLOR PROPERTIES, INC., A DELAWARE CORPORATION
PURPOSE: INSPECT, OPERATE, REPAIR, REPLACE AND MAINTAIN UNDERGROUND STORM WATER DRAINAGE CONDUITS AND RELATED FACILITIES AND EASEMENT TO DRAIN SURFACE STORMWATER RUN OFF AND INCIDENTAL PURPOSES
RECORDING DATE: DECEMBER 30, 1998
RECORDING NO.: 9812301057
(PLOTTED HEREON)

10. EASEMENT AGREEMENT FOR SANITARY SEWER, INCLUDING THE TERMS AND PROVISIONS THEREOF:
RECORDING DATE: OCTOBER 23, 2000
RECORDING NO.: 200010230472
MODIFICATION OF EASEMENT AGREEMENT:
RECORDING DATE: APRIL 18, 2001
RECORDING NO.: 200104180467
(PLOTTABLE) EASEMENT IS SOUTHWEST OF SUBJECT PROPERTY AND AFFECTS PHASE 2

11. THIS ITEM INTENTIONALLY DELETED

12. COVENANTS, CONDITIONS, RESTRICTIONS, RECITALS, RESERVATIONS, EASEMENTS, EASEMENT PROVISIONS, DEDICATIONS, BUILDING SETBACK LINES, NOTES, STATEMENTS, AND OTHER MATTERS, IF ANY, BUT OMITTING ANY COVENANTS OR RESTRICTIONS, IF ANY, INCLUDING BUT NOT LIMITED TO THOSE BASED UPON RACE, COLOR, RELIGION, SEX, SEXUAL ORIENTATION, FAMILIAL STATUS, MARITAL STATUS, DISABILITY, HANDICAP, NATIONAL ORIGIN, ANCESTRY, OR SOURCE OF INCOME, AS SET FORTH IN APPLICABLE STATE OR FEDERAL LAWS, EXCEPT TO THE EXTENT THAT SAID COVENANT OR RESTRICTION IS PERMITTED BY APPLICABLE LAW, AS SET FORTH ON PIERCE COUNTY SHORT PLAT NUMBER 200310295007, ALSO KNOWN AS CITY OF TACOMA SHORT PLAT NO. MPD2003-00046.
(PLOTTED HEREON)

13. ANY RIGHTS, INTERESTS, OR CLAIMS WHICH MAY EXIST OR ARISE BY REASON OF THE FOLLOWING MATTERS DISCLOSED BY SURVEY PERFORMED BY DOWN ENGINEERS DATED MARCH 16, 1998 UNDER JOB NO. S014 AND PIERCE COUNTY SHORT PLAT NUMBER 200310295007:
MATTERS SHOWN: FENCE LINES DO NOT CONFORM TO PROPERTY LINES
(GENERALLY PLOTTED HEREON)

14. ANY RIGHTS, INTERESTS, OR CLAIMS WHICH MAY EXIST OR ARISE BY REASON OF THE FOLLOWING SURVEY:
RECORDING DATE: MARCH 10, 2009
RECORDING NO.: 200903105001
(NOT PLOTTABLE)

15. COVENANTS, CONDITIONS, RESTRICTIONS, RECITALS, RESERVATIONS, EASEMENTS, EASEMENT PROVISIONS, DEDICATIONS, BUILDING SETBACK LINES, NOTES, STATEMENTS, AND OTHER MATTERS, IF ANY, BUT OMITTING ANY COVENANTS OR RESTRICTIONS, IF ANY, INCLUDING BUT NOT LIMITED TO THOSE BASED UPON RACE, COLOR, RELIGION, SEX, SEXUAL ORIENTATION, FAMILIAL STATUS, MARITAL STATUS, DISABILITY, HANDICAP, NATIONAL ORIGIN, ANCESTRY, OR SOURCE OF INCOME, AS SET FORTH IN APPLICABLE STATE OR FEDERAL LAWS, EXCEPT TO THE EXTENT THAT SAID COVENANT OR RESTRICTION IS PERMITTED BY APPLICABLE LAW, AS SET FORTH ON SURVEY:
RECORDING NO: 200903105001
(NOT PLOTTABLE)

16. ADDITIONAL TAP OR CONNECTION CHARGES FOR SEWER FACILITIES LEVIED BY THE CITY OF TACOMA, NOTICE THEREOF IS GIVEN BY THE FILING OF MAP RECORDED NOVEMBER 1, 1978 UNDER RECORDING NUMBER 2864651. SAID MAP WAS CORRECTED BY INSTRUMENT RECORDED UNDER RECORDING NUMBER 2881434 AND AMENDED BY INSTRUMENT RECORDED UNDER RECORDING NUMBER 8012010130. INQUIRY SHOULD BE MADE WITH THE CITY OF TACOMA, DEPARTMENT OF PUBLIC WORKS, FOR THE AMOUNT DUE.
(NOT SURVEY RELATED)

17. PAYMENT OF THE REAL ESTATE EXCISE TAX, IF REQUIRED.
THE LAND IS SITUATED WITHIN THE BOUNDARIES OF LOCAL TAXING AUTHORITY OF THE CITY OF TACOMA. PRESENT RATE OF REAL ESTATE EXCISE TAX AS OF THE DATE HEREIN IS 1.78 PERCENT. ANY CONVEYANCE DOCUMENT MUST BE ACCOMPANIED BY THE OFFICIAL WASHINGTON STATE EXCISE TAX AFFIDAVIT. THE APPLICABLE EXCISE TAX MUST BE PAID AND THE AFFIDAVIT APPROVED AT THE TIME OF THE RECORDING OF THE CONVEYANCE DOCUMENTS. (NOTE: REAL ESTATE EXCISE TAX AFFIDAVITS MUST BE PRINTED AS LEGAL SIZE FORMS). AN ADDITIONAL $5.00 ELECTRONIC TECHNOLOGY FEE MUST BE INCLUDED IN ALL EXCISE TAX PAYMENTS. IF THE TRANSACTION IS EXEMPT, AN ADDITIONAL $5.00 AFFIDAVIT PROCESSING FEE IS REQUIRED.
(NOT SURVEY RELATED)

18. THIS ITEM INTENTIONALLY DELETED

19. SPECIAL CHARGES, PAYABLE FEBRUARY 15, DELINQUENT IF FIRST HALF UNPAID ON MAY 1, SECOND HALF DELINQUENT IF UNPAID ON NOVEMBER 1 OF THE TAX YEAR (AMOUNTS DO NOT INCLUDE INTEREST AND PENALTIES):
2016
TAX ACCOUNT NO.: 032126-700-5
LEVY CODE: 005
ASSESSED VALUE-LAND: $768,900.00
ASSESSED VALUE-IMPROVEMENTS: $0.00
GENERAL AND SPECIAL TAXES:
$5.93
$5.93
$0.00
THE LAND IS PRESENTLY CLASSIFIED AS EXEMPT AND MAY BE SUBJECT TO THE COLLECTION OF BACK TAXES FOR A POSSIBLE THERETO TEN YEAR PERIOD, DEPENDING UPON THE ACTUAL USE CLASSIFICATION OF THE PROPERTY DURING ITS EXEMPT STATUS. INQUIRY SHOULD BE MADE TO THE PIERCE COUNTY ASSESSOR'S OFFICE OR THE COMPANY FOR ADDITIONAL INFORMATION.
(NOT SURVEY RELATED)

20. SPECIAL CHARGES, PAYABLE FEBRUARY 15, DELINQUENT IF FIRST HALF UNPAID ON MAY 1, SECOND HALF DELINQUENT IF UNPAID ON NOVEMBER 1 OF THE TAX YEAR (AMOUNTS DO NOT INCLUDE INTEREST AND PENALTIES):
2016
TAX ACCOUNT NO.: 032126-600-8
LEVY CODE: 005
ASSESSED VALUE-LAND: $1,427,800.00
ASSESSED VALUE-IMPROVEMENTS: $0.00
GENERAL AND SPECIAL TAXES:
$6.23
$6.23
$0.00
THE LAND IS PRESENTLY CLASSIFIED AS EXEMPT AND MAY BE SUBJECT TO THE COLLECTION OF BACK TAXES FOR A POSSIBLE THREE TO TEN YEAR PERIOD, DEPENDING UPON THE ACTUAL USE CLASSIFICATION OF THE PROPERTY DURING ITS EXEMPT STATUS. INQUIRY SHOULD BE MADE TO THE PIERCE COUNTY ASSESSOR'S OFFICE OR THE COMPANY FOR ADDITIONAL INFORMATION.
(NOT SURVEY RELATED)

21. SPECIAL CHARGES, PAYABLE FEBRUARY 15, DELINQUENT IF FIRST HALF UNPAID ON MAY 1, SECOND HALF DELINQUENT IF UNPAID ON NOVEMBER 1 OF THE TAX YEAR (AMOUNTS DO NOT INCLUDE INTEREST AND PENALTIES):
2016
TAX ACCOUNT NO.: 032135-500-7
LEVY CODE: 005
ASSESSED VALUE-LAND: $1,742,800.00
ASSESSED VALUE-IMPROVEMENTS: $0.00
GENERAL AND SPECIAL TAXES:
$6.38
$6.38
$0.00
(NOT SURVEY RELATED)

22. THIS ITEM INTENTIONALLY DELETED

23. THE SEARCH DID NOT DISCLOSE ANY OPEN MORTGAGES OR DEEDS OF TRUST OF RECORD, THEREFORE THE COMPANY RESERVES THE RIGHT TO REQUIRE FURTHER EVIDENCE TO CONFIRM THAT THE PROPERTY IS UNENCUMBERED, AND FURTHER RESERVES THE RIGHT TO MAKE ADDITIONAL REQUIREMENTS OR ADD ADDITIONAL ITEMS OR EXCEPTIONS UPON RECEIPT OF THE REQUESTED EVIDENCE.
(NOT SURVEY RELATED)

24. ANY UNRECORDED LEASEHOLDS, RIGHT OF VENDORS AND HOLDERS OF SECURITY INTERESTS ON PERSONAL PROPERTY INSTALLED UPON THE LAND AND RIGHTS OF TENANTS TO REMOVE TRADE FIXTURES AT THE EXPIRATION OF THE TERMS.
(NOT SURVEY RELATED)

25. IT IS OUR UNDERSTANDING THAT THE PROPOSED TRANSACTION WILL INVOLVE THE INSURANCE OF A LEASEHOLD ESTATE WHICH HAS NOT YET BEEN ESTABLISHED OF RECORD. DOCUMENTS NECESSARY TO CREATE SAID INTEREST MUST BE SUBMITTED FOR OUR REVIEW AND APPROVAL. IF ONLY A MEMORANDUM OR SHORT FORM OF LEASE IS TO BE RECORDED, THE FULL INSTRUMENT, TOGETHER WITH ALL AMENDMENTS, MUST BE SUBMITTED.
(NOT SURVEY RELATED)

26. ANY INSTRUMENT TO BE EXECUTED BY PORT OF TACOMA MUST BE IN ACCORDANCE WITH STATUTE. SATISFACTORY EVIDENCE OF AUTHORITY MUST BE SUBMITTED. THE COMPANY RESERVES THE RIGHT TO EXCEPT ADDITIONAL ITEMS AND/OR MAKE ADDITIONAL REQUIREMENTS AFTER REVIEWING SAID DOCUMENTS.
(NOT SURVEY RELATED)

27. IN THE EVENT TITLE TO SAID LAND IS ACQUIRED BY THE PARTY(IES) NAMED BELOW, THE POLICY(S), WHEN ISSUED, WILL SHOW THE
FOLLOWING ADDITIONAL ITEM(S) IN SCHEDULE B, UNLESS DISPOSED OF TO THE SATISFACTION OF THE COMPANY:
PARTY(IES): AVENUE 55 LLC
ITEM(S): FOLLOWING PARAGRAPH
(NOT SURVEY RELATED)

28. THE COMPANY WILL REQUIRE THE FOLLOWING DOCUMENTS FOR REVIEW PRIOR TO THE ISSUANCE OF ANY TITLE INSURANCE PREDICATED UPON A CONVEYANCE OR ENCUMBRANCE FROM THE ENTITY NAMED BELOW. LIMITED LIABILITY COMPANY: AVENUE 55 LLC
A. A COPY OF ITS OPERATING AGREEMENT, IF ANY, AND ANY AND ALL AMENDMENTS, SUPPLEMENTS AND/OR MODIFICATIONS THERETO, CERTIFIED BY THE APPROPRIATE MANAGER OR MEMBER.
B. IF A DOMESTIC LIMITED LIABILITY COMPANY, A COPY OF ITS ARTICLES OF ORGANIZATION AND ALL AMENDMENT THERETO WITH THE APPROPRIATE FILING STAMPS.
C. IF THE LIMITED LIABILITY COMPANY IS MEMBER-MANAGED A FULL AND COMPLETE CURRENT LIST OF MEMBERS CERTIFIED BY THE APPROPRIATE MANAGER OR MEMBER.
D. IF THE LIMITED LIABILITY COMPANY WAS FORMED IN A FOREIGN JURISDICTION, EVIDENCE, SATISFACTORY TO THE COMPANY THAT IT WAS VALIDLY FORMED, IS IN GOOD STANDING AND AUTHORIZED TO DO BUSINESS IN THE STATE OF ORIGIN.
E. IF LESS THAN ALL MEMBERS, OR MANAGERS, AS APPROPRIATE, WILL BE EXECUTING THE CLOSING DOCUMENTS, FURNISH EVIDENCE OF THE AUTHORITY OF THOSE SIGNING.
THE COMPANY RESERVES THE RIGHT TO ADD ADDITIONAL ITEMS OR MAKE FURTHER REQUIREMENTS AFTER REVIEW OF THE REQUESTED DOCUMENTATION.
(NOT SURVEY RELATED)

29. TO PROVIDE AN EXTENDED COVERAGE LENDER'S POLICY, GENERAL EXCEPTIONS B AND C ARE HEREBY ELIMINATED. GENERAL EXCEPTIONS A AND D HAVE NOT BEEN CLEARED. IN CONSIDERATION OF CLEARING PARAGRAPHS A AND D OF SCHEDULE B, PLEASE HAVE THE BORROWER/OWNER COMPLETE THE ENCLOSED AFFIDAVIT AND RETURN TO OUR OFFICE FOR REVIEW.
(NOT SURVEY RELATED)

ENGINEER/SURVEYOR
BARGHAUSEN CONSULTING ENGINEERS
CONTACT: DANIEL K. BALMELLI, P.E.
ADDRESS: 18215 72ND AVENUE SOUTH
KENT, WA 98032
PHONE: (425) 251-622

ARCHITECT
CRAFT ARCHITECTS, LLC.
ADDRESS: 2505 THIRD AVENUE, SUITE 324
SEATTLE, WA 98121
PHONE: (206) 720-7001

CALL BEFORE YOU DIG:
1-800-424-5555

CAUTION:
UTILITY CONFLICT NOTE:
THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATION, DIMENSION, AND DEPTH OF ALL EXISTING UTILITIES WHETHER SHOWN ON THESE PLANS OR NOT BY POTHOLING THE UTILITIES AND SURVEYING THE HORIZONTAL AND VERTICAL LOCATION PRIOR TO CONSTRUCTION. THIS SHALL INCLUDE CALLING UTILITY LOCATE @ 1-800-424-5555 AND THEN POTHOLING ALL OF THE EXISTING UTILITIES AT LOCATIONS OF NEW UTILITY CROSSINGS TO PHYSICALLY VERIFY WHETHER OR NOT CONFLICTS EXIST. LOCATIONS OF SAID UTILITIES AS SHOWN ON THESE PLANS ARE BASED UPON THE UNVERIFIED PUBLIC INFORMATION AND ARE SUBJECT TO VARIATION. IF CONFLICTS SHOULD OCCUR, THE CONTRACTOR SHALL CONSULT BARGHAUSEN CONSULTING ENGINEERS, INC. TO RESOLVE ALL PROBLEMS PRIOR TO PROCEEDING WITH CONSTRUCTION.

CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR OBTAINING PERMITS FROM THE WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES FOR REMOVING AND REPLACING ALL SURVEY MONUMENTATION THAT MAY BE AFFECTED BY CONSTRUCTION ACTIVITY, PURSUANT TO WAC 332-120. APPLICATIONS MUST BE COMPLETED BY A REGISTERED LAND SURVEYOR. APPLICATIONS FOR PERMITS TO REMOVE MONUMENTS MAY BE OBTAINED FROM THE WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES, OR BY CONTACTING THEIR OFFICE BY TELEPHONE AT (206) 902-1190.

WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES
PUBLIC LAND SURVEY OFFICE
1111 WASHINGTON STREET S.E.
P.O. BOX 47060
OLYMPIA, WASHINGTON 98504-7060

UPON COMPLETION OF CONSTRUCTION, ALL MONUMENTS DISPLACED, REMOVED, OR DESTROYED SHALL BE REPLACED BY A REGISTERED LAND SURVEYOR, AT THE COST AND AT THE DIRECTION OF THE CONTRACTOR, PURSUANT TO THESE REGULATIONS. THE APPROPRIATE FORMS FOR REPLACEMENT OF SAID MONUMENTATION SHALL ALSO BE THE RESPONSIBILITY OF THE CONTRACTOR.

No.	Date	By	Ckd.	Appr.	Revision

Title: COVER SHEET FOR AVENUE 55/TAYLOR WAY TACOMA PHASE 1

For: AVENUE 55
600 UNIVERSITY STREET, SUITE 2305
SEATTLE, WA 98101

DANIEL K. BALMELLI
STATE OF WASHINGTON
25672
REGISTERED PROFESSIONAL ENGINEER
1/30/2017

Scale: Horizontal 1"=100' Vertical -

Designed WED
Drawn WED
Checked CP
Approved DKB
Date 1/11/17

BARGHAUSEN CONSULTING ENGINEERS, INC.
18215 72ND AVENUE SOUTH
KENT, WA 98032
(425)251-6222
(425)251-8782 FAX
CIVIL ENGINEERING, LAND PLANNING, SURVEYING, ENVIRONMENTAL SERVICES

Job Number 18293

Sheet C1 of 5

File:P:\18000s\18293\preliminary\18293-o.dwg Date/Time:1/26/2017 1:15 PM Scale:1" = 1' WDUNLAP Xref: ----

PRELIMINARY GRADING AND STORM DRAINAGE PLAN

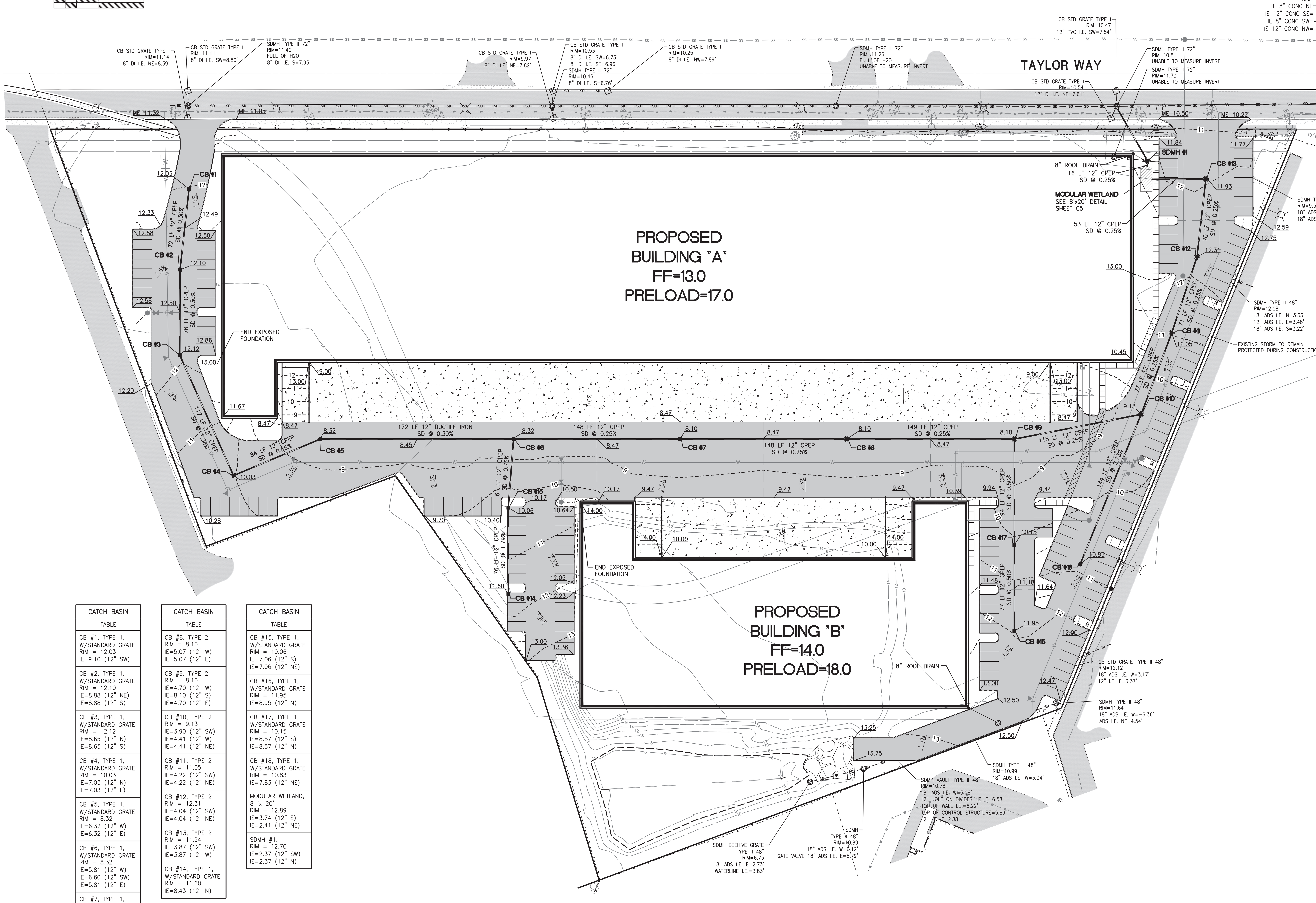
FOR

AVENUE 55/TAYLOR WAY PHASE 1

A PORTION OF THE SW 1/4 OF SEC. 26, TOWNSHIP 21N, RANGE 03E
W.M. PIERCE COUNTY, CITY OF TACOMA WASHINGTON

1"=40'

0 20 40 80



CATCH BASIN TABLE
CB #1, TYPE 1, W/STANDARD GRATE RIM = 12.03 IE=9.10 (12" SW)
CB #2, TYPE 1, W/STANDARD GRATE RIM = 12.10 IE=8.88 (12" NE) IE=8.88 (12" S)
CB #3, TYPE 1, W/STANDARD GRATE RIM = 12.12 IE=8.65 (12" N) IE=8.65 (12" S)
CB #4, TYPE 1, W/STANDARD GRATE RIM = 10.03 IE=7.03 (12" N) IE=7.03 (12" E)
CB #5, TYPE 1, W/STANDARD GRATE RIM = 8.32 IE=6.32 (12" W) IE=6.32 (12" E)
CB #6, TYPE 1, W/STANDARD GRATE RIM = 8.32 IE=5.81 (12" W) IE=6.60 (12" SW) IE=5.81 (12" E)
CB #7, TYPE 1, W/STANDARD GRATE RIM = 8.10 IE=5.44 (12" W) IE=5.44 (12" E)

CATCH BASIN TABLE
CB #8, TYPE 2 RIM = 8.10 IE=5.07 (12" W) IE=5.07 (12" E)
CB #9, TYPE 2 RIM = 8.10 IE=4.70 (12" W) IE=8.10 (12" S) IE=4.70 (12" E)
CB #10, TYPE 2 RIM = 9.13 IE=3.90 (12" SW) IE=4.41 (12" W) IE=4.41 (12" NE)
CB #11, TYPE 2 RIM = 11.05 IE=4.22 (12" SW) IE=4.22 (12" NE)
CB #12, TYPE 2 RIM = 12.31 IE=4.04 (12" SW) IE=4.04 (12" NE)
CB #13, TYPE 2 RIM = 11.94 IE=3.87 (12" SW) IE=3.87 (12" W)
CB #14, TYPE 1, W/STANDARD GRATE RIM = 11.60 IE=8.43 (12" N)

CATCH BASIN TABLE
CB #15, TYPE 1, W/STANDARD GRATE RIM = 10.06 IE=7.06 (12" S) IE=7.06 (12" NE)
CB #16, TYPE 1, W/STANDARD GRATE RIM = 11.95 IE=8.95 (12" N)
CB #17, TYPE 1, W/STANDARD GRATE RIM = 10.15 IE=8.57 (12" S) IE=8.57 (12" N)
CB #18, TYPE 1, W/STANDARD GRATE RIM = 10.83 IE=7.83 (12" NE)
MODULAR WETLAND, 8 'x 20' RIM = 12.89 IE=3.74 (12" E) IE=2.41 (12" NE)
SDMH #1, RIM = 12.70 IE=2.37 (12" SW) IE=2.37 (12" N)

No.	Date	By	Ckd.	Appr.	Revision

Title: PRELIMINARY GRADING AND STORM DRAINAGE PLAN FOR AVENUE 55/TAYLOR WAY TACOMA-PHASE 1

For: AVENUE 55
600 UNIVERSITY STREET, SUITE 2305
SEATTLE, WA 98101

DANIEL K. BALMELLI
STATE OF WASHINGTON
25672
REGISTERED PROFESSIONAL ENGINEER
1/30/2017

Scale: Horizontal 1"=40'
Vertical –

Designed WED
Drawn WED
Checked CP
Approved DKB
Date 1/11/17

BARGHAUSEN CONSULTING ENGINEERS, INC.
18215 72ND AVENUE SOUTH
KENT, WA 98032
(425)251-6222
(425)251-8782 FAX
CIVIL ENGINEERING, LAND PLANNING, SURVEYING, ENVIRONMENTAL SERVICES

Job Number 18293

Sheet C2 of 5

File:P:\18000s\18293\preliminary\18293-gm.dwg Date/Time:1/31/2017 8:58 AM Scale:1" = 1' WDUNLAP Xref: ----

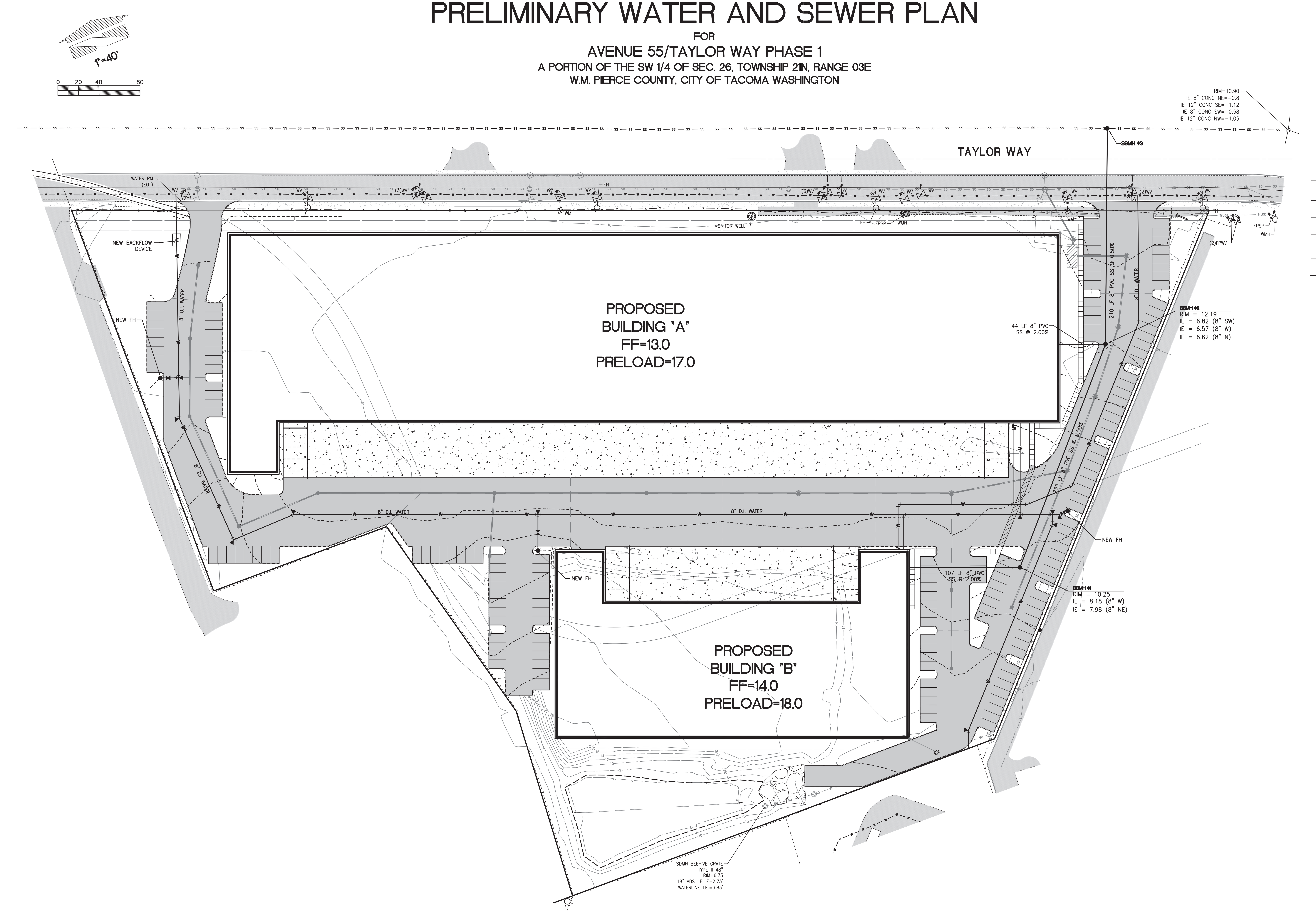
PRELIMINARY WATER AND SEWER PLAN

FOR

AVENUE 55/TAYLOR WAY PHASE 1

A PORTION OF THE SW 1/4 OF SEC. 26, TOWNSHIP 21N, RANGE 03E

W.M. PIERCE COUNTY, CITY OF TACOMA WASHINGTON



Revision | No. | Date | By | Ckd. | Appr.

Title: PRELIMINARY WATER AND SEWER PLAN FOR AVENUE 55/TAYLOR WAY TACOMA-PHASE 1

For: AVENUE 55
600 UNIVERSITY STREET, SUITE 2305
SEATTLE, WA 98101

DANIEL K. BALMELLI, STATE OF WASHINGTON, 25672, REGISTERED PROFESSIONAL ENGINEER
1/30/2017

Scale: Horizontal 1"=40' Vertical -

Designed WED
Drawn WED
Checked CP
Approved DKB
Date 1/11/17

18215 72ND AVENUE SOUTH
KENT, WA 98032
(425)251-6222
(425)251-8782 FAX

CIVIL ENGINEERING, LAND PLANNING, SURVEYING, ENVIRONMENTAL SERVICES

BARGHAUSEN CONSULTING ENGINEERS, INC.

Job Number 18293

Sheet C3 of 5

File:P:\18000s\18293\preliminary\18293-ws.dwg Date/Time:1/31/2017 10:44 AM Scale:1" = 1' WDUNLAP Xref: ----

CONSTRUCTION NOTES AND DETAILS

FOR

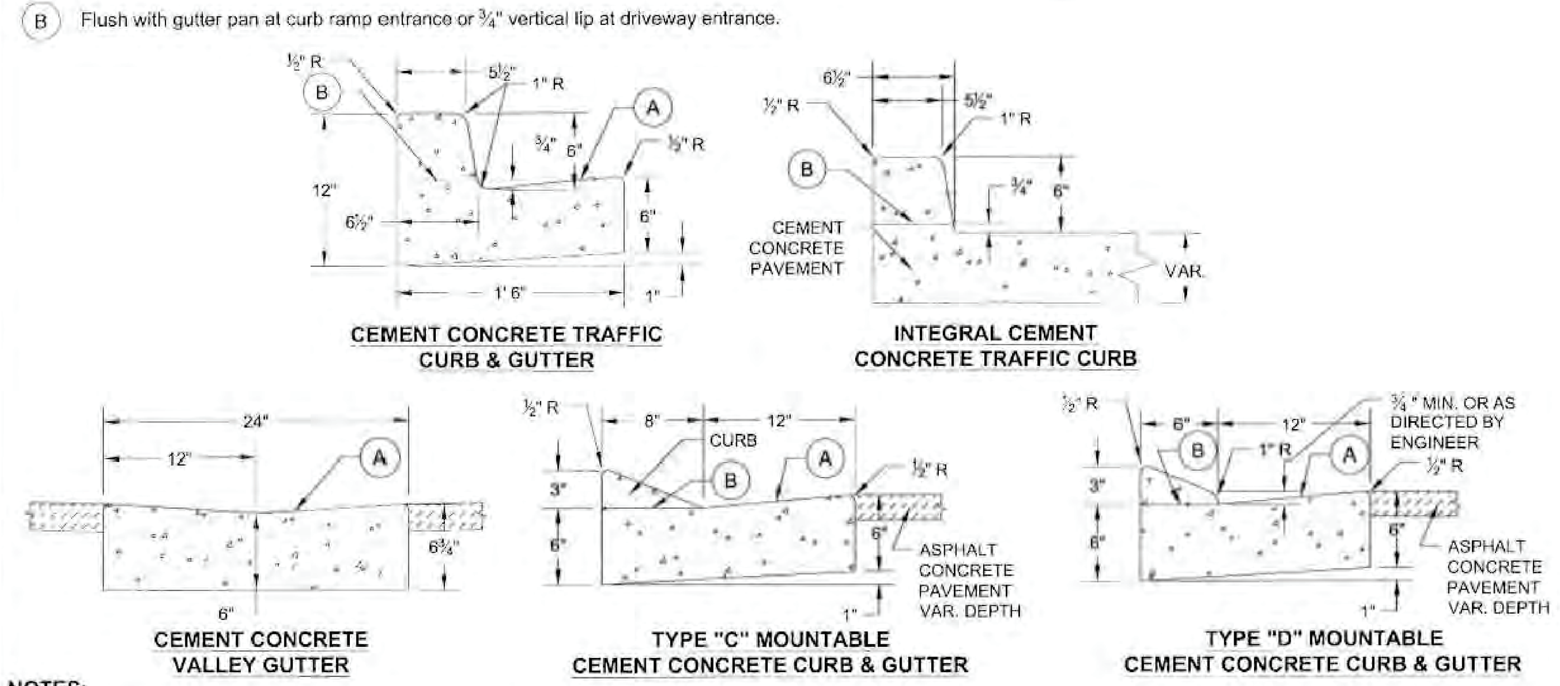
AVENUE 55/TAYLOR WAY PHASE 1

A PORTION OF THE SW 1/4 OF SEC. 26, TOWNSHIP 21N, RANGE 03E
W.M. PIERCE COUNTY, CITY OF TACOMA WASHINGTON

NOTES:

(A) When used on high side of roadways, the cross slope of the gutter shall match the cross slope of the adjacent pavement. The height of the curb shall be 6", unless otherwise shown on plans.

(B) Flush with gutter pan at curb ramp entrance or 3/4" vertical lip at driveway entrance.



CEMENT CONCRETE TRAFFIC CURB & GUTTER

INTEGRAL CEMENT CONCRETE TRAFFIC CURB

CEMENT CONCRETE VALLEY GUTTER

TYPE "C" MOUNTABLE CEMENT CONCRETE CURB & GUTTER

TYPE "D" MOUNTABLE CEMENT CONCRETE CURB & GUTTER

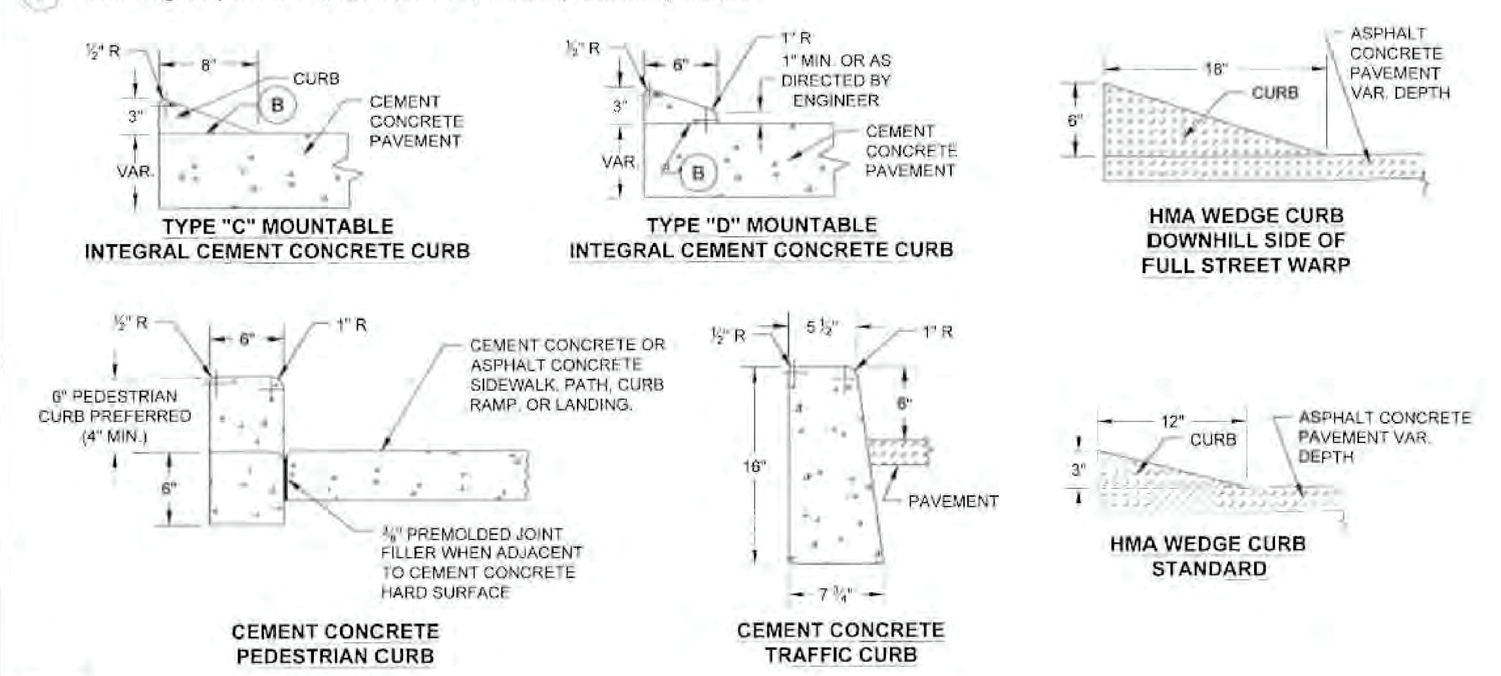
NOTES:

1. For trench crossings, curb and gutter shall be removed to a minimum 2' cut back over undisturbed soil.
2. In all projects, any remaining sections of curb and gutter less than 5' in length between the project area and the nearest control joint shall also be removed and replaced.
3. All joints shall be saw cut full depth prior to restoration and 3/8" expansion joint installed.
4. Concrete finish shall match existing.
5. Cutting wheel run-out beyond the limits of the opening shall be filled in accordance with WSDOT Standard Specification 5-05.3(8)B for cement concrete surfaces and 5-04.3(5)C for asphalt concrete surfaces.
6. Foundations shall be fully compacted prior to form placement.
7. Unsuitable foundation shall be replaced with 5/8" crushed surfacing top course.

REVIEWED BY		APPROVED FOR PUBLICATION	CITY OF TACOMA
DCS PUBLIC WORKS	GMS ENVIRONMENTAL SERVICES	CITY ENGINEER 8/16/16 DATE	CEMENT CONCRETE CURB AND GUTTER
NA TACOMA POWER	NA TACOMA WATER		STANDARD PLAN NO. SU-03

NOTE:

(B) Flush with gutter pan at curb ramp entrance or 3/4" vertical lip at driveway entrance.



TYPE "C" MOUNTABLE INTEGRAL CEMENT CONCRETE CURB

TYPE "D" MOUNTABLE INTEGRAL CEMENT CONCRETE CURB

HMA WEDGE CURB DOWNHILL SIDE OF FULL STREET WARP

CEMENT CONCRETE PEDESTRIAN CURB

CEMENT CONCRETE TRAFFIC CURB

HMA WEDGE CURB STANDARD

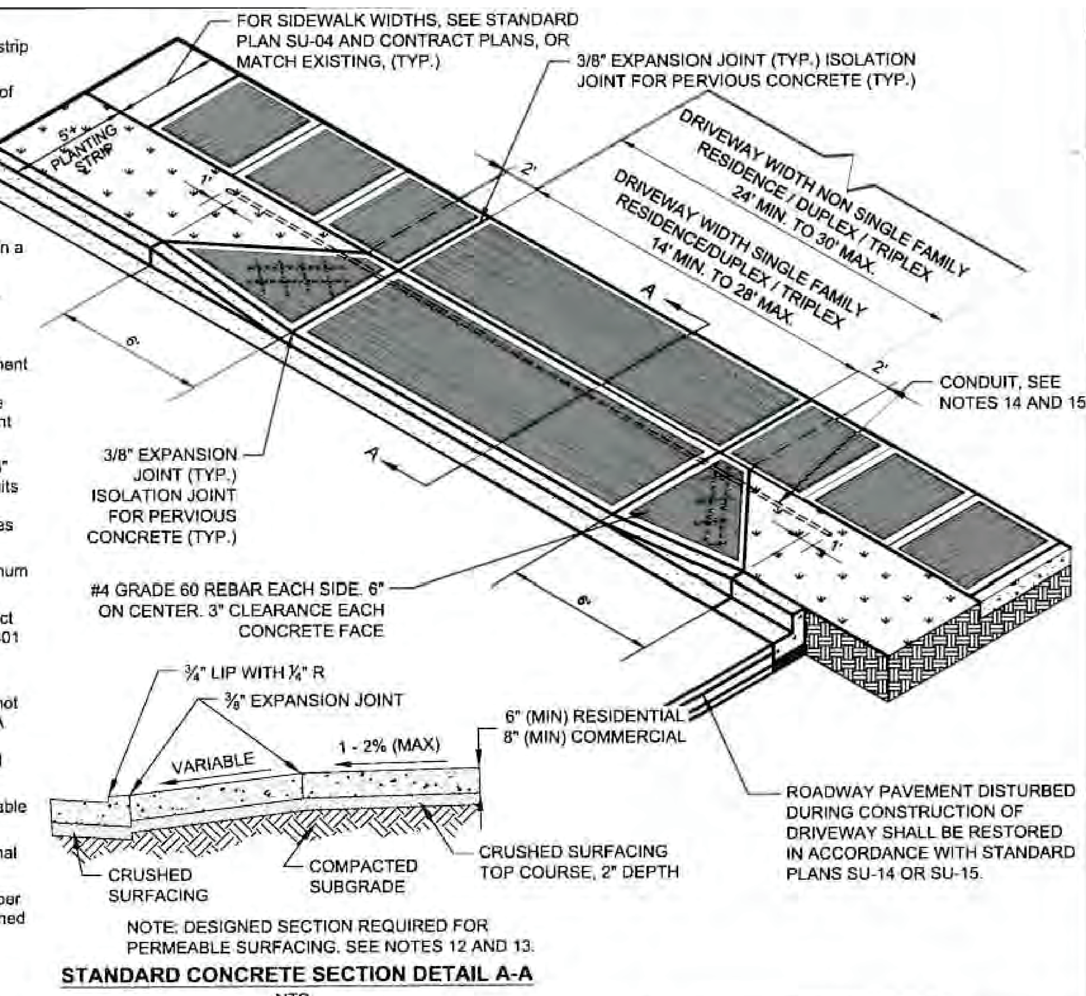
NOTES:

1. For trench crossings, curb and gutter shall be removed to a minimum 2' cut back over undisturbed soil.
2. In all projects, any remaining sections of curb and gutter less than 5' in length between the project area and the nearest control joint shall also be removed and replaced.
3. All joints shall be saw cut full depth prior to restoration and 3/8" expansion joint installed.
4. Concrete finish shall match existing.
5. Cutting wheel run-out beyond the limits of the opening shall be filled in accordance with WSDOT Standard Specification 5-05.3(8)B for cement concrete surfaces and 5-04.3(5)C for asphalt concrete surfaces.
6. Foundations shall be fully compacted prior to form placement.
7. Unsuitable foundation shall be replaced with 5/8" crushed surfacing top course.

REVIEWED BY		APPROVED FOR PUBLICATION	CITY OF TACOMA
DCS PUBLIC WORKS	GMS ENVIRONMENTAL SERVICES	CITY ENGINEER 8/16/16 DATE	CEMENT CONCRETE CURB AND GUTTER AND ASPHALT WEDGE CURB
NA TACOMA POWER	NA TACOMA WATER		STANDARD PLAN NO. SU-03A

NOTES:

1. Type 1 access shall be used at driveways where the planting strip width is 5' or greater.
2. Standard Concrete shall be a minimum compressive strength of 3,000 PSI.
3. All joints shall be cleaned & edged. External joints to the driveway shall be 1/2" radius. Internal joints to the driveway shall be 1/4" radius.
4. Driveways wider or narrower than shown on this plan require approval of the Director of Public Works.
5. Standard concrete driveway section shall be a brushed finish in a transverse direction to the center line of driveway.
6. Driveways wider than 20' require a center line expansion joint.
7. All expansion or isolation joints shall be full depth.
8. When trenching through a driveway access:
   - 8.a. If driveway is 20' or less in width, a full driveway replacement is required.
   - 8.b. If driveway is greater than 20' in width, a minimum 2' wide cut back over undisturbed soil is required and replacement shall extend to the nearest control joint.
9. All joints shall be saw cut full depth prior to restoration and 3/8" expansion joint installed. Cutting wheel run-out beyond the limits of the opening shall be filled in accordance with WSDOT Standard Specification 5-05.3(8)B for cement concrete surfaces and 5-04.3(5)C for asphalt concrete surfaces.
10. Transition panel from new access to sidewalk shall be a minimum of 5 feet.
11. For driveway entrances within the North Slope Historical District area use Standard Plan HD-NS02. See Standard Plan HD-NS01 for map of Historical District area limits.
12. Permeable surfacing may be allowed for driveway entrances. Refer to Standard Plans PD-01 and PD-02 as applicable. Do not compact subgrade for permeable surfacing and refer to APWA GSP 2-06.3(3) Subgrade for Permeable Pavements. A soils report is required and modeling may be necessary per SWMM BMP L633.
13. Geomembrane barrier required between standard and permeable sections. Refer to City of Tacoma Standard Plan GSI-18.
14. Refer to Tacoma Municipal Code 10.14, driveways for additional information.
15. A 1-1/4" Ø PVC Sch. 80 Conduit shall be installed as shown, per TMC 10.14.070. Conduit shall be buried 24 inches below finished grade.

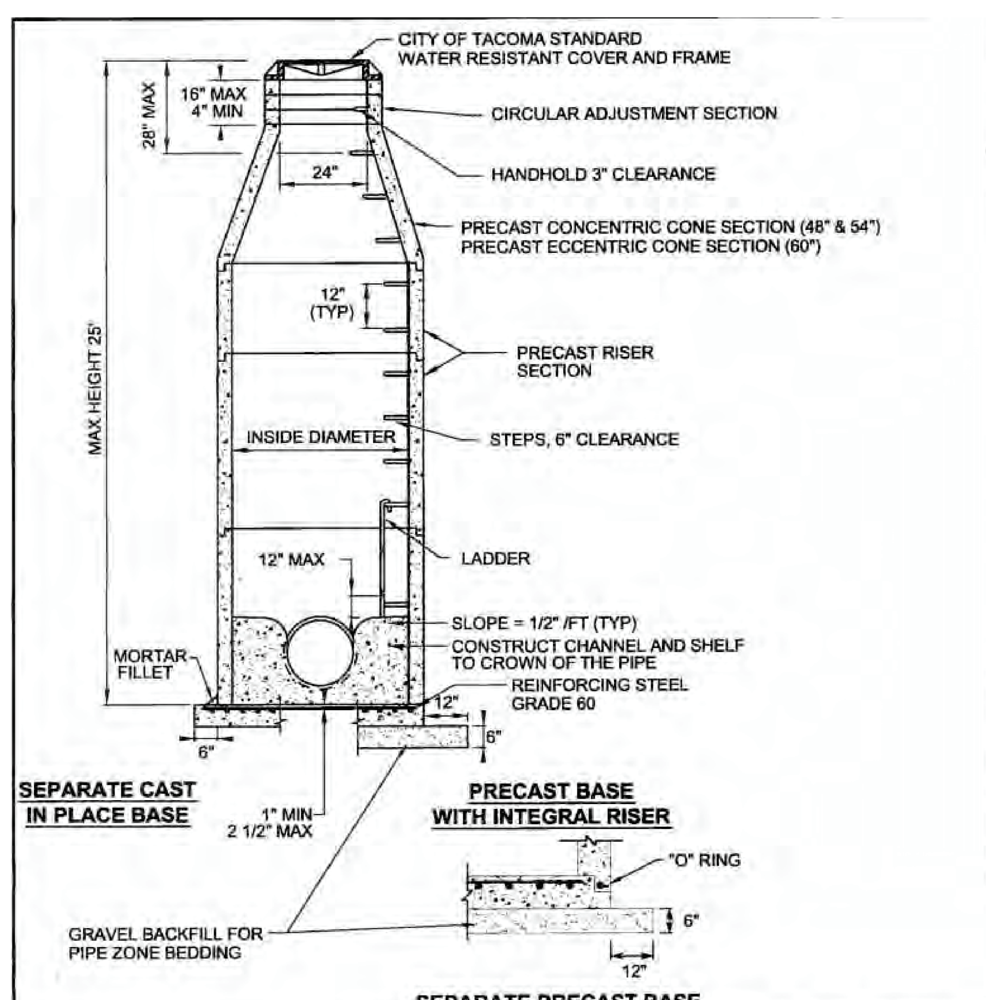


NOTE: DESIGNED SECTION REQUIRED FOR PERMEABLE SURFACING. SEE NOTES 12 AND 13.

STANDARD CONCRETE SECTION DETAIL A-A

NTS

REVIEWED BY		APPROVED FOR PUBLICATION	CITY OF TACOMA
DCS PUBLIC WORKS	GMS ENVIRONMENTAL SERVICES	CITY ENGINEER 4/4/16 DATE	CEMENT CONCRETE ACCESS TYPE 1
NA TACOMA POWER	NA TACOMA WATER		STANDARD PLAN NO. SU-07



SEPARATE CAST IN PLACE BASE

PRECAST BASE WITH INTEGRAL RISER

SEPARATE PRECAST BASE

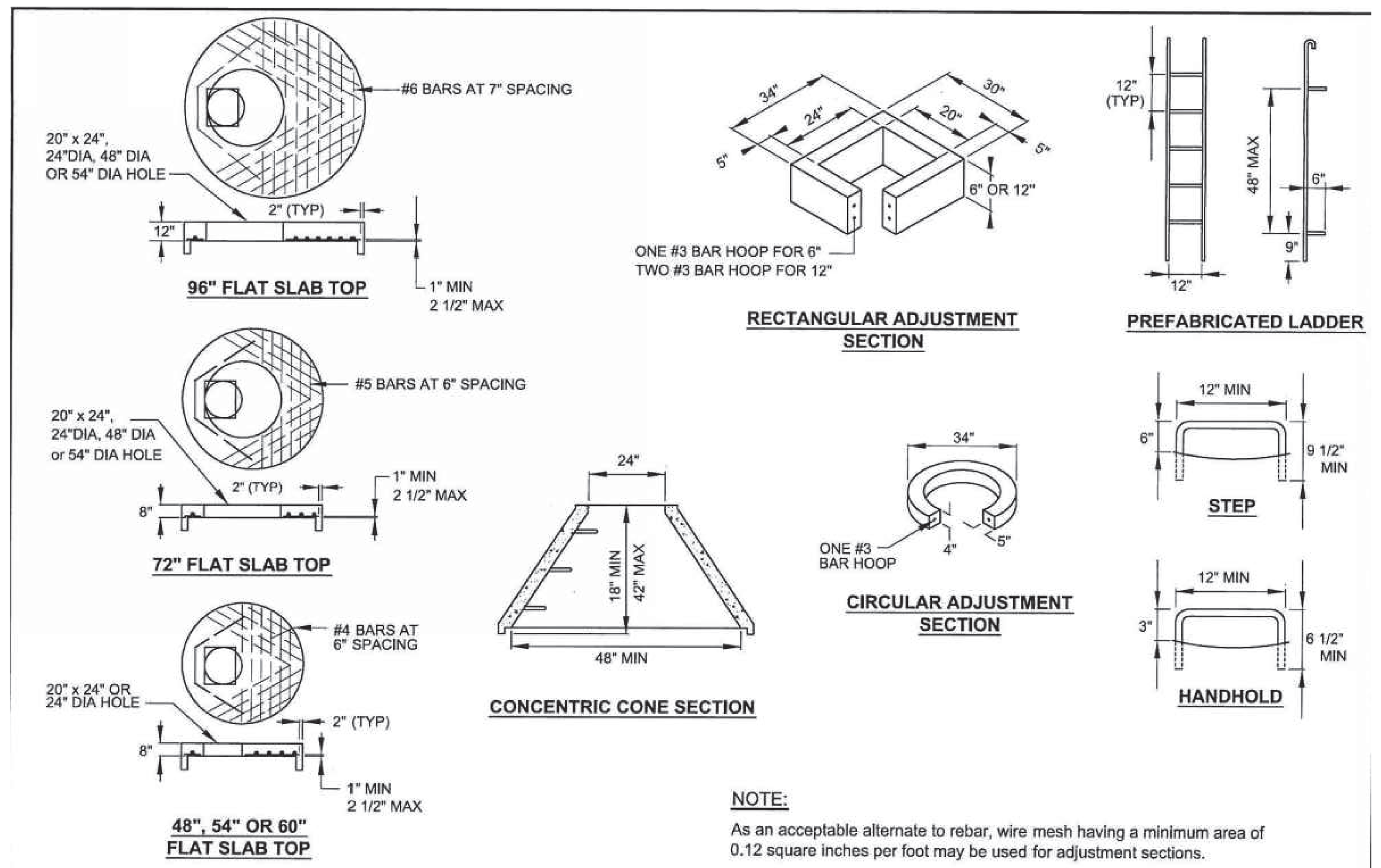
NOTES:

1. For details showing grade ring, ladder, steps, handholds and top slabs, see Standard Plan No. SU-21.
2. Non-reinforced concrete in channel and shelf shall be Class 3000. All precast concrete shall be Class 4000.
3. Rubber gaskets shall be used in tongue and groove joints of pre-cast sections.
4. A flexible pipe-to-manhole connector shall be employed in all connections of rigid and flexible pipes to new precast concrete manholes. The connector shall be "Kor-N-Seal" with "Wedge Korband" manufactured by NPC, Inc., or approved equal.
5. Base reinforcing steel shall be per manufacturer's recommendation.

MANHOLE DIMENSION TABLE

INSIDE DIAMETER	MINIMUM WALL THICKNESS	MINIMUM BASE THICKNESS	MAXIMUM HOLE SIZE	MINIMUM DISTANCE BETWEEN HOLES
48"	4"	6"	36"	8"
54"	4 1/2"	8"	42"	8"
60"	5"	8"	48"	8"

CITY OF TACOMA DEPARTMENT OF PUBLIC WORKS	APPROVED FOR PUBLICATION	MANHOLE-TYPE 1 48", 54" AND 60"
	CITY ENGINEER 1/17/14 DATE	STANDARD PLAN NO. SU-17



96" FLAT SLAB TOP

72" FLAT SLAB TOP

48", 54" OR 60" FLAT SLAB TOP

RECTANGULAR ADJUSTMENT SECTION

CONCENTRIC CONE SECTION

CIRCULAR ADJUSTMENT SECTION

PREFABRICATED LADDER

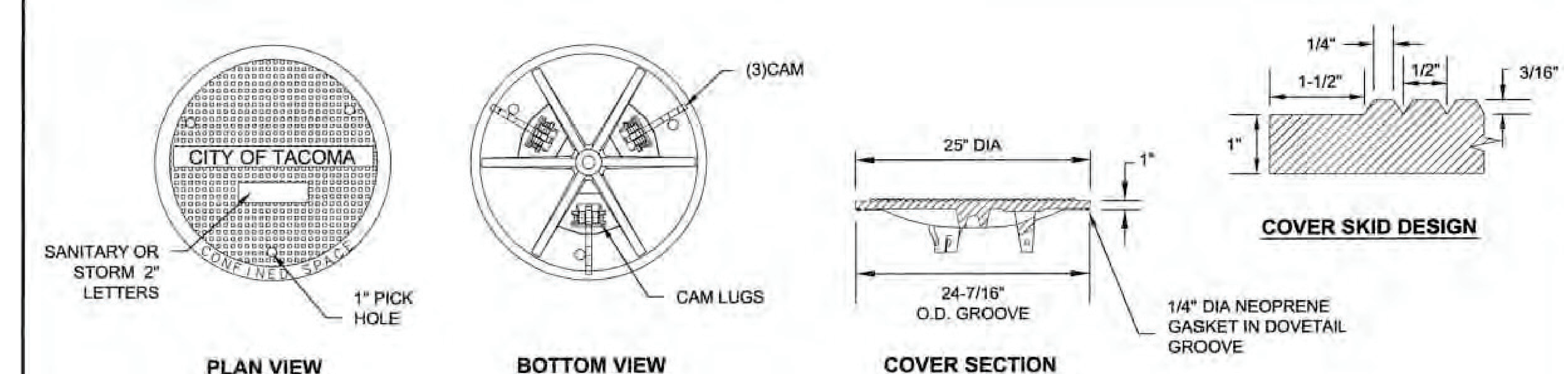
STEP

HANDHOLD

NOTE:

As an acceptable alternate to rebar, wire mesh having a minimum area of 0.12 square inches per foot may be used for adjustment sections.

CITY OF TACOMA DEPARTMENT OF PUBLIC WORKS	APPROVED FOR PUBLICATION	MISCELLANEOUS DETAILS FOR MANHOLES AND CATCH BASINS
	CITY ENGINEER 12 Jun 2009 DATE	STANDARD PLAN NO. SU-21

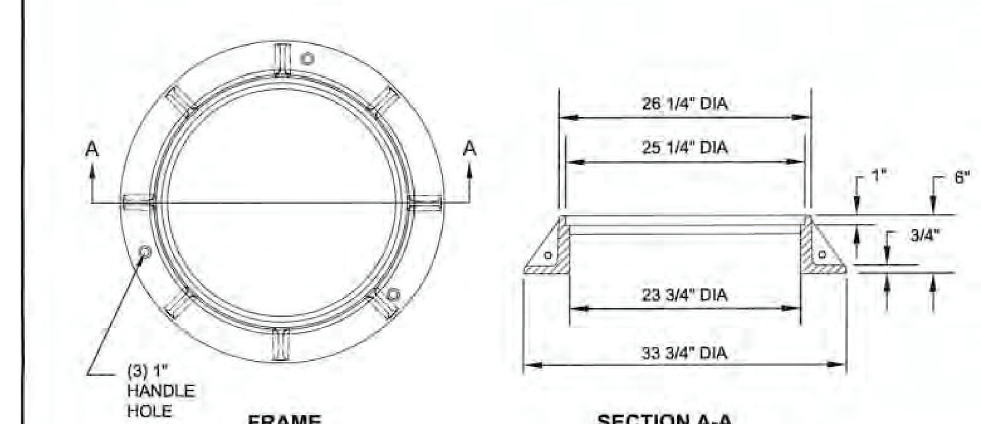


PLAN VIEW

BOTTOM VIEW

COVER SECTION

COVER SKID DESIGN



FRAME

SECTION A-A

NOTES:

1. Covers shall have the word "SANITARY" in 2 inch raised letters when used with sanitary sewer installations, or "STORM" when installed with storm sewers. All covers shall have the words "CITY OF TACOMA" in 1-1/2 inch raised letters and the words "CONFINED SPACE" in 1-inch raised letters.
2. Lids must be interchangeable, any lid shall fit any and all frames.
3. Frame and cover shall be designed for H-20 loading.
4. Frame shall be grey-iron conforming to the requirements of AASHTO M 105, grade 30B.
5. Covers shall be ductile iron conforming to ASTM A 536, grade 80-55-06.
6. Per WSDOT Standard Specification 9-05.15, metal castings shall not be dipped, painted, welded, plugged, or repaired.

CITY OF TACOMA DEPARTMENT OF PUBLIC WORKS	APPROVED FOR PUBLICATION	MANHOLE FRAME AND COVER
	CITY ENGINEER 1/17/14 DATE	STANDARD PLAN NO. SU-22

No.	Date	By	Ckd.	Appr.	Revision

Title: CONSTRUCTION NOTES AND DETAILS FOR AVENUE 55/TAYLOR WAY TACOMA PHASE 1

For: AVENUE 55
600 UNIVERSITY STREET, SUITE 2305
SEATTLE, WA 98101

DANIEL K. BALMELLI STATE OF WASHINGTON 25672 REGISTERED PROFESSIONAL ENGINEER 1/30/2017

Scale: Horizontal - Vertical -

Designed WED Drawn WED Checked CP Approved DKB Date 1/11/17

BARGHAUSEN CONSULTING ENGINEERS, INC.
18215 72ND AVENUE SOUTH
KENT, WA 98032
(425)251-6222
(425)251-8782 FAX
CIVIL ENGINEERING, LAND PLANNING, SURVEYING, ENVIRONMENTAL SERVICES

Job Number 18293

Sheet C4 of 5

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CONSTRUCTION NOTES AND DETAILS

FOR

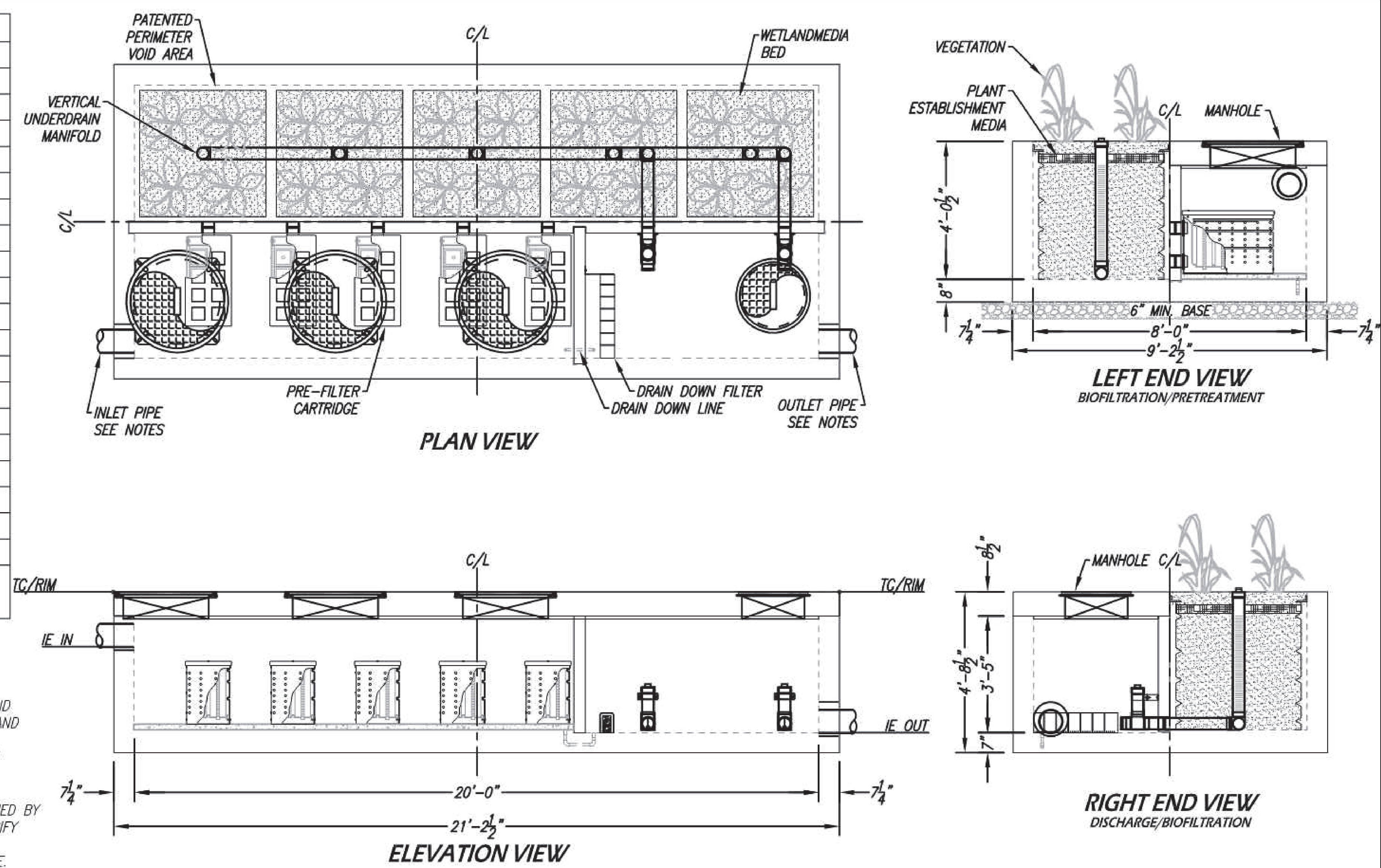
AVENUE 55/TAYLOR WAY PHASE 1

A PORTION OF THE SW 1/4 OF SEC. 26, TOWNSHIP 21N, RANGE 03E

W.M. PIERCE COUNTY, CITY OF TACOMA WASHINGTON

SITE SPECIFIC DATA

PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
TREATMENT HGL AVAILABLE (FT)			
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PARKWAY	OPEN PLANTER	PARKWAY
FRAME & COVER	ø30"	N/A	ø24"
WETLANDMEDIA VOLUME (CY)			11.85
WETLANDMEDIA DELIVERY METHOD			TBD
ORIFICE SIZE (DIA. INCHES)			ø2.43"
MAXIMUM PICK WEIGHT (LBS)			TBD
NOTES:			



INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE TO VERIFY PROJECT ENGINEERS RECOMMENDED BASE SPECIFICATIONS.
3. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL GAPS AROUND PIPES SHALL BE SEALED WATER TIGHT WITH A NON-SHRINK GROUT PER MANUFACTURERS STANDARD CONNECTION DETAIL AND SHALL MEET OR EXCEED REGIONAL PIPE CONNECTION STANDARDS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO GROUT ALL MANHOLES AND HATCHES TO MATCH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. DRIP OR SPRAY IRRIGATION REQUIRED ON ALL UNITS WITH VEGETATION.

GENERAL NOTES

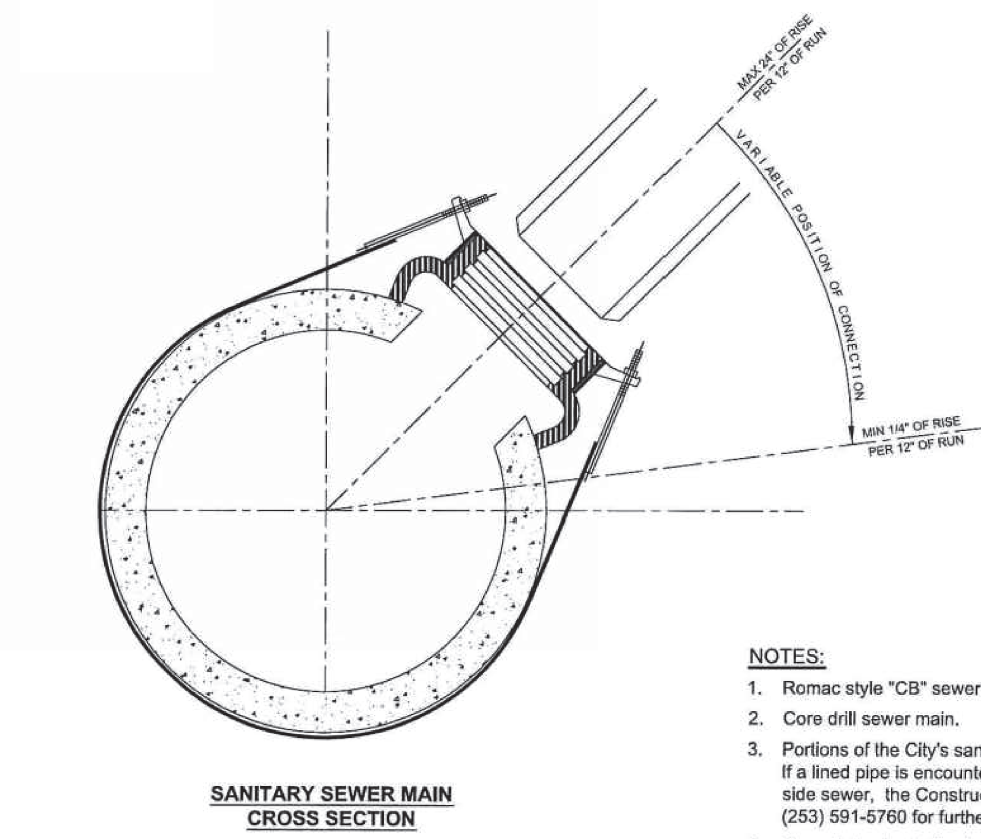
1. MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT MANUFACTURER.

TREATMENT FLOW (CFS)	0.577
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	TBD
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

MODULAR WETLANDS

MWS-L-8-20-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

6/2/15JOHN

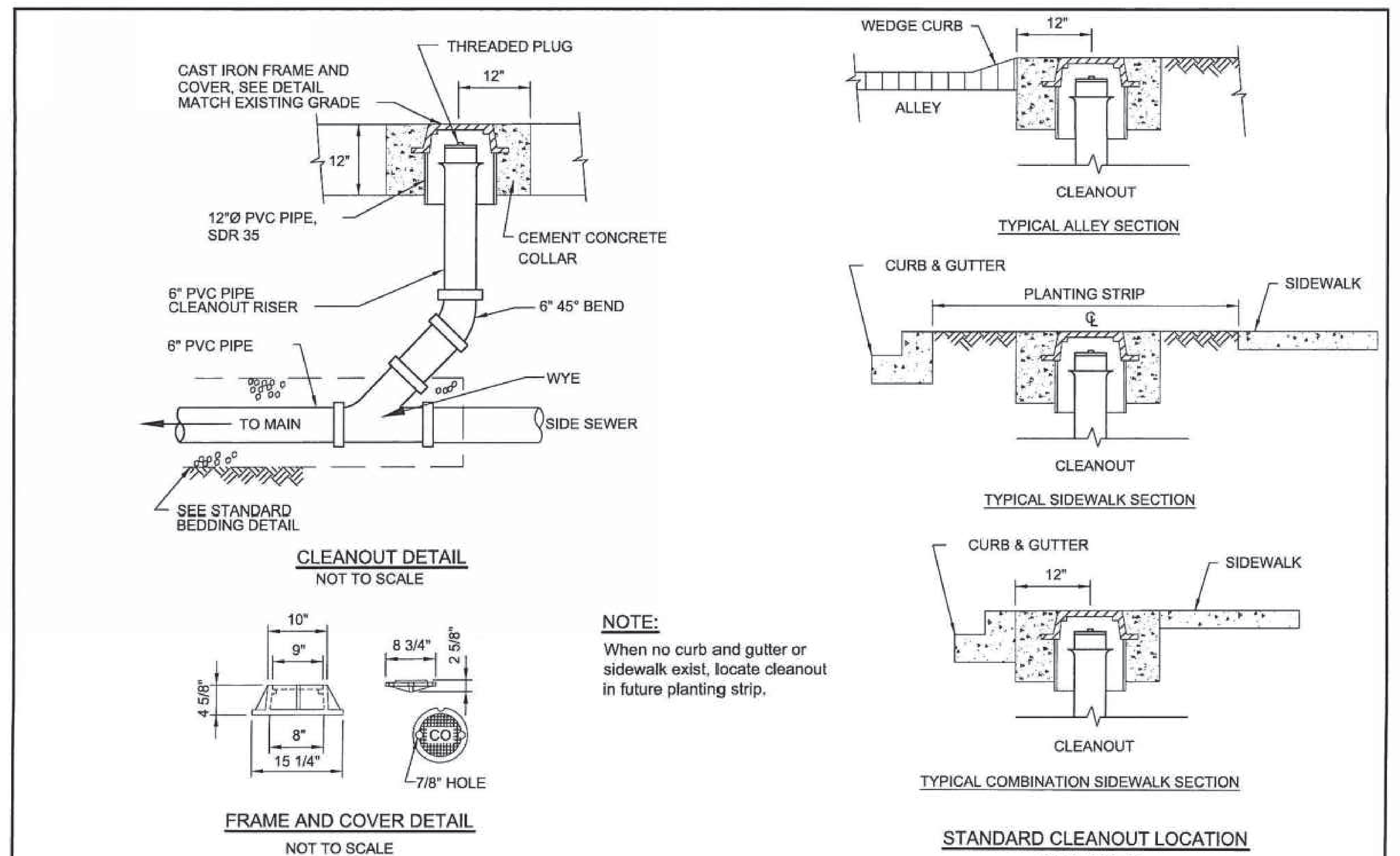


SANITARY SEWER MAIN CROSS SECTION

NOTES:

1. Romac style "CB" sewer saddle or approved equal.
2. Core drill sewer main.
3. Portions of the City's sanitary sewer system have been lined. If a lined pipe is encountered during connection of the new side sewer, the Construction Division shall be contacted at (253) 591-5760 for further instructions.
4. Sewer laterals shall not extend beyond the interior wall of the sanitary sewer main.

CITY OF TACOMA DEPARTMENT OF PUBLIC WORKS	APPROVED FOR PUBLICATION CITY ENGINEER 12 Jun 2009 DATE	LATERAL SEWER CONNECTION TO SANITARY SEWER MAIN STANDARD PLAN NO. SU-23



NOTE:
When no curb and gutter or sidewalk exist, locate cleanout in future planting strip.

CITY OF TACOMA DEPARTMENT OF PUBLIC WORKS	APPROVED FOR PUBLICATION CITY ENGINEER 12 Jun 2009 DATE	SIDE SEWER CLEANOUT AND COVER DETAIL STANDARD PLAN NO. SU-24

No.	Date	By	Ckd.	Appr.	Revision

Title: CONSTRUCTION NOTES AND DETAILS FOR AVENUE 55/TAYLOR WAY TACOMA PHASE 1

For: AVENUE 55
600 UNIVERSITY STREET, SUITE 2305
SEATTLE, WA 98101

DANIEL K. BALMELLI, STATE OF WASHINGTON, 25672, REGISTERED PROFESSIONAL ENGINEER
1/30/2017

Scale: Horizontal – Vertical –

Designed WED
Drawn WED
Checked CP
Approved DKB
Date 1/11/17

BARGHAUSEN CONSULTING ENGINEERS, INC.
18215 72ND AVENUE SOUTH
KENT, WA 98032
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CIVIL ENGINEERING, LAND PLANNING, SURVEYING, ENVIRONMENTAL SERVICES

Job Number 18293

Sheet C5 of 5

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1514 Taylor Way Development

Interim Action Work Plan

Appendix E
Geotechnical Report

GEOTECHNICAL REPORT

Taylor Way and Lincoln Avenue Industrial Sites
Taylor Way and Lincoln Avenue
Tacoma, Washington

Project No. T-7543

Terra Associates, Inc.

Prepared for:

Avenue 55, LLC
Seattle, Washington

April 10, 2017

TERRA ASSOCIATES, Inc.
Consultants in Geotechnical Engineering, Geology
and
Environmental Earth Sciences

April 10, 2017
Project No. T-7543

Mr. Drew Zaborowski
Avenue 55, LLC
600 University Street, Suite 2305
Seattle, Washington 98101

Subject: Geotechnical Report
Taylor Way and Lincoln Avenue Industrial Sites
Taylor Way and Lincoln Avenue
Tacoma, Washington

Dear Mr. Zaborowski:

As requested, we have conducted a geotechnical engineering study for the subject project. The attached report presents our findings and recommendations for the geotechnical aspects of project design and construction.

Our field exploration indicates the soil conditions at the Taylor Way site consisted of five to ten feet of loose to medium dense, fill material overlying alluvial silts and sands. The fill material consists of silty sand with gravel, sand, and silt mixed with organics and construction rubble. The upper alluvium is composed predominantly of loose to medium dense silt, sandy silt, and silty sand. CPT data indicates highly variable interbedded alluvial soils composed of silts, clays, and silty sand layers are present to a depth of 35 to 42 feet followed by medium dense to dense silty sand and sand to the termination depths of the CPTs, 60 feet. In general, where fine grained sediments (silt and clay soils) are indicated, correlated N_{60} values, indicate consistencies in the soft to stiff range. Where cohesionless (sand) sediments are indicated, correlated N_{60} values indicate relative densities in the medium dense to dense range.

In general, the soil conditions observed in the test borings at the Lincoln Avenue site consisted of four and one-half to seven feet of medium dense to dense, inorganic fill material overlying alluvial silts and sands with some organic fragments. The upper alluvium is composed predominantly of loose to medium dense silt, sandy silt, and silty sand. CPT data again indicates highly variable interbedded alluvial soils composed of silts, clays, and silty sand layers are present to a depth of 18 to 40 feet followed by medium dense to dense silty sand and sand to the termination depths of the CPTs, 60 feet.

12220 113th Avenue NE, Ste. 130, Kirkland, Washington 98034
Phone (425) 821-7777 • Fax (425) 821-4334

Soil conditions would not be suitable for support of the proposed buildings and infrastructure in their current condition. In order to gain suitable support, ground conditions will need to be improved by implementing a surcharge program and excavating and replacing soils immediately below footings with granular structural fill. In addition, the existing fill material on the Taylor Way site will need to be overexcavated and replaced or compacted in place. Also, if the owner is not willing to accept the risk for building damage due to the potential for liquefaction induced settlements during an earthquake or it is determined that the estimated liquefaction settlements would preclude design of the structure of the building shells on the project to meet all governing life safety codes, including the life safety provisions of the 2015 International Building Code, the building foundations should be supported on ground improved using stone columns designed to mitigate soil liquefaction settlements or the building site grades should be raised.

Detailed geotechnical engineering recommendations regarding these issues along with other geotechnical design and construction considerations are summarized in the attached report.

We trust this information is sufficient for your current needs. If you have any questions or require additional information, please call.

Sincerely yours,
TERRA ASSOCIATES, INC.

Carolyn S. Decker, P.E.
Project Engineer

THEODORE J. SCHEPPER
STATE OF WASHINGTON
26742
REGISTERED
PROFESSIONAL ENGINEER

4-9-17

Theodore J. Schepper, P.E.
President

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Geotechnical Report
Taylor Way and Lincoln Avenue Industrial Sites
Taylor Way and Lincoln Avenue
Tacoma, Washington

1.0 PROJECT DESCRIPTION

The project will consist of redeveloping the approximately 19.6-acre site with three industrial buildings with associated access, parking, and utility improvements. Based on the conceptual site plans prepared by Craft Architects dated September 9, 2016 and October 13, 2016, the project will be completed in two phases. Phase I will consist of two buildings on the Taylor Way site and Phase II will consist of one building on the Lincoln Avenue Site. The buildings range in size from 51,800 square feet to 214,800 square feet. The buildings will have dock high loading on one side with paved parking and access around the remainder of the building. Grading plans were not available at the time of this report. Based on the existing topography, we expect grading will be minimal with cuts and fills from one to three feet.

We expect the buildings will be constructed using precast concrete wall panels with interior columns supporting the roof structure and possible mezzanine level. Structural loading is expected to consist of perimeter wall loads ranging from 4 to 6 kips per foot with interior columns carrying 100 to 150 kips. Uniform distribution of product loading on the slab-on-grade floors is not expected to exceed 350 pounds per square foot (psf).

The recommendations in the following sections of this report are based on our understanding of the design features outlined above. We should review design drawings as they become available to verify that our recommendations have been properly interpreted and to supplement them, if required.

2.0 SCOPE OF WORK

Our work was completed in accordance with our proposal dated October 26, 2016. On November 28, 2016, we observed the soil and groundwater conditions at 10 test pits excavated on the Taylor Way site to depths of 5 to 10 feet below current site grades. On December 7 and December 8, 2016, we observed the soil and groundwater conditions in 6 soil test borings drilled on the Lincoln Avenue site to a depth of approximately 26 feet below current site grades. On November 10 and November 11, 2016, In-Situ Engineering, under subcontract with Terra Associates, Inc., performed 9 cone penetration tests (CPTs) to depths of 60 feet below existing surface grades. Five were completed on the Taylor Way site and four were completed on the Lincoln Avenue site. Using this data and laboratory test data, we preformed analyses to develop geotechnical recommendations for project design and construction. Specifically, this report addresses the following:

- Soil and groundwater conditions
- Seismic Site Class per the current International Building Code (IBC)
- Geologic Hazards per City of Tacoma Municipal Code
- Site preparation and grading
- Surcharge/preload
- Excavation
- Foundations

- Slab-on-grade floors
- Lateral earth pressure on below-grade walls
- Stormwater facilities
- Drainage
- Utilities
- Pavement

It should be noted that recommendations outlined in this report regarding drainage are associated with soil strength, design earth pressures, erosion, and stability. Design and performance issues with respect to moisture as it relates to the structure environment are beyond Terra Associates' purview. A building envelope specialist or contractor should be consulted to address these issues, as needed.

3.0 SITE CONDITIONS

3.1 Surface

The project site consists of two tax parcels located south and west of the intersection of Taylor Way and Lincoln Avenue in Tacoma, Washington. Phase I is located off Taylor Way and consists of an approximately 10.5-acre irregular shaped parcel. Phase II is located at 3401 Lincoln Avenue and consists of an approximately 9.1-acre irregular shaped parcel. The approximate location of the sites are shown on Figure 1.

The Taylor Way site is currently developed with a stormwater pond in the southern portion of the site. The remainder of the site is undeveloped and covered with grass and brush. Site topography is generally flat with no obvious sloping.

The Lincoln Avenue site is currently developed with a Quonset style warehouse and associated access and parking. The access and parking areas are gravel surfaced. Site topography is generally flat with no obvious sloping.

3.2 Soils

In general, the soil conditions observed in the test pits at the Taylor Way site consisted of five to ten feet of loose to medium dense, fill material overlying alluvial silts and sands. The fill material consists of silty sand with gravel, sand, and silt mixed with large amounts of organics and construction rubble. The upper alluvium is composed predominantly of loose to medium dense silt, sandy silt, and silty sand. CPT data indicates highly variable interbedded alluvial soils composed of silts, clays, and silty sand layers are present to a depth of 35 to 42 feet followed by medium dense to dense silty sand and sand to the termination depths of the CPTs, 60 feet. In general, where fine grained sediments (silt and clay soils) are indicated, correlated N_{60} values, indicate consistencies in the soft to stiff range. Where cohesionless (sand) sediments are indicated, correlated N_{60} values indicate relative densities in the medium dense to dense range.

In general, the soil conditions observed in the test borings at the Lincoln Avenue site consisted of four and one-half to seven feet of medium dense to dense, inorganic fill material overlying alluvial silts and sands with some organic fragments. The upper alluvium is composed predominantly of loose to medium dense silt, sandy silt, and silty sand. CPT data again indicates highly variable interbedded alluvial soils composed of silts, clays, and silty sand layers are present to a depth of 18 to 40 feet followed by medium dense to dense silty sand and sand to the termination depths of the CPTs, 60 feet.

The *Geological Map of Washington – Northwest Quadrant,* by J.D. Dragovich, et al. (2002) maps the site as Modified Land (Qml). This mapped description is consistent with the soils observed in the upper portions of the test pits, test borings, and CPTs.

The preceding discussion is intended to be a brief review of the soil conditions observed at the site. More detailed descriptions are presented on the Test Pit Logs, Test Boring Logs, and CPT Logs attached in Appendix A.

3.3 Groundwater

We observed minor to moderate groundwater seepage in all ten of the test pits excavated on the Taylor Way site between two and four feet below current site grades. We observed groundwater in all six of the test borings completed on the Lincoln Avenue site at approximately seven feet below current site grades.

We also performed pore water dissipation testing at CPT-1, CPT-4, and CPT-9 at 24, 30, and 42 feet below current site grades, respectively. A pressure transducer mounted behind the tip of the cone measures the pore water pressure as the cone is advanced. Dissipation testing consists of terminating cone advancement and allowing the pore water pressure to stabilize. Once stabilized, the pressure reading represents the head of water above the cone tip. The results of the dissipation testing are included with the CPT Log attached in Appendix A. Dissipation testing indicated the static groundwater table was at the ground surface.

Fluctuations in the static groundwater level will occur seasonally. Typically, groundwater will reach maximum levels during the wet winter months. Based on the time of year of our site exploration, the groundwater levels observed at the site likely represent the seasonal high groundwater levels.

4.0 GEOLOGIC HAZARDS

4.1 Seismic Considerations

Section 6.4.7.B.3 of the City of Tacoma Municipal Code (TMC) defines a seismic hazard as "areas subject to severe risk of damage as a result of seismic-induced settlement, shaking, lateral spreading, surface faulting, slope failure, or soil liquefaction. These conditions occur in areas underlain by soils of low cohesion or density usually in association with a shallow groundwater table. Seismic hazard areas shall be as defined by the Washington Department of Ecology Coastal Zone Atlas (Seismic Hazard Map prepared Tacoma Municipal Code City Clerk's Office 13-409 (Revised 9/2016) by GeoEngineers) as: Class U (Unstable), Class Uos (Unstable old slides), Class Urs (Unstable recent slides), Class I (Intermediate), and Class M (Modified) as shown in the Seismic Hazard Map."

The northwest corner of the Taylor Way site is mapped as a Category M (Modified) on the Washington Department of Ecology Coastal Zone Atlas. Therefore, the northwest corner of the Taylor Way site would be classified as a seismic hazard area.

Based on the soil conditions encountered and the local geology, per Section 16 of the 2015 International Building Code (IBC) for seismic conditions, site class "E" should be used in design of the structure. Based on this site class, in accordance with the 2015 IBC, the following parameters should be used in computing seismic forces:

Seismic Design Parameters (IBC 2015)

Spectral response acceleration (Short Period), S_{MS}	1.163
Spectral response acceleration (1 – Second Period), S_{M1}	1.201
Five percent damped .2 second period, S_{DS}	0.775
Five percent damped 1.0 second period, S_{D1}	0.801

These values were determined using the latitude/longitude coordinates 47.270978/-122.388479 and the United States Geological Survey (USGS) Ground Motion Parameter Calculator accessed on December 22, 2016 at the web site http://earthquake.usgs.gov/designmaps/us/application.php.

Soil Liquefaction

Liquefaction is a phenomenon where there is a reduction or complete loss of soil strength due to an increase in pore water pressure induced by vibrations from a seismic event. Liquefaction mainly affects geologically recent deposits of fine-grained sands that are below the groundwater table. Soils of this nature derive their strength from intergranular friction. The generated water pressure or pore pressure essentially separates the soil grains and eliminates this intergranular friction; thus, eliminating the soil's strength.

As described earlier, the soils indicated at the site by the CPT data consist of highly variable interbedded layers of fine grained sediments (silts and clays) and cohesionless layers composed of silty sand, sandy silt, and relatively clean sand. The consistency of the fine grained sediments indicate that they would exhibit sufficient undrained strength to offset shear stresses imposed during an earthquake and would resist the liquefaction phenomenon. The indicated relative density of the coarser alluvial sediments also indicates that these layers have likely liquefied during past seismic events, thus increasing their relative density and making them more resistant to liquefaction during future events.

We completed a liquefaction analysis using the computer program LiquifyPro following procedures outlined by Seed and Idriss. The analysis was completed using a ground acceleration of .31g, which was determined in accordance with the National Earthquake Hazards Reduction Program (NEHRP) recommendations outlined in Federal Emergency Management Agency (FEMA) Publication P-750. This value is equivalent to $S_{DS}/2.5$.

The impact to the site should liquefaction occur will be in the form of surface subsidence or settlement. Estimated total potential settlement from our analysis of the CPT data for the Taylor Way site is in the range of one and one-half to four inches. Estimated total potential settlement from our analysis of the CPT data for the Lincoln Avenue site is in the range of four and one-half to six inches. Approximately one-half of these total settlements would likely be differential in nature. The settlements are border line regarding structural impairment and should be reviewed by the project structural engineer. If the structural engineer indicates the settlement could structurally impair the buildings, foundations should be supported on ground improved using stone columns designed to mitigate soil liquefaction settlements. Alternatively, the building site grades could be raised by a minimum of four feet, which would reduce the total potential settlement from four and one-half to six inches to three to four inches and differential settlement to about two inches. In our opinion, this amount of settlement would not structurally impair the building but would result in damage of a cosmetic nature.

If the owner is not willing to accept the risk of building damage requiring repair should liquefaction induced settlements occur, or if the structural engineer cannot design the structure of the building shells on the project to meet all governing life safety codes, including the life safety provisions of the 2015 International Building Code, foundations should be supported on ground improved using stone columns designed to mitigate soil liquefaction settlements. Results of the liquefaction analysis are attached in Appendix B.

4.2 Erosion Hazard Areas

Section 6.4.7.B.1 of the TMC defines an erosion hazard area as "areas where the combination of slope and soil type makes the area susceptible to erosion by water flow, either by precipitation or by water runoff. Concentrated stormwater runoff is a major cause of erosion and soil loss. Erosion hazard critical areas include the following:

> a. Areas with high probability of rapid stream incision, stream bank erosion or coastal erosion, or channel migration.
>
> b. Areas defined by the Washington Department of Ecology Coastal Zone Atlas as one of the following soil areas: Class U (Unstable) includes severe erosion hazards and rapid surface runoff areas, Class Uos (Unstable old slides) includes areas having severe limitations due to slope, Class Urs (Unstable recent slides), and Class I (Intermediate).
>
> c. Any area characterized by slopes greater than 15 percent; and the following types of geologic units as defined by draft geologic USGS maps: m (modified land), Af (artificial fill), Qal (alluvium), Qw (wetland deposits), Qb (beach deposits), Qtf (tide-flat deposits), Qls (landslide deposits), Qmw (mass-wastage deposits), Qf (fan deposits), Qvr and Qvs series of geologic material types (Vashon recessional outwash and Steilacoom Gravel), and Qvi (Ice-contact deposits).
>
> d. Slopes steeper than 25 percent and a vertical relief of 10 or more feet."

The site is relatively flat with no slopes greater than 15 percent and does not contain any of the above conditions. Therefore, the site is not considered an erosion hazard area by the City of Tacoma. Regardless, erosion protection measures as required by the City of Tacoma will need to be in place prior to starting grading activities on the site. This would include perimeter silt fencing to contain erosion on-site and cover measures to prevent or reduce soil erosion during and following construction.

4.3 Landslide Hazard Areas

Section 6.4.7.B.2 of the TMC defines an erosion hazard area as "areas potentially subject to landslides based on a combination of geologic, topographic, and hydrologic factors. They include areas susceptible because of any combination of bedrock, soil, slope, slope aspect, structure, hydrology, or other factors. Landslide hazard areas are identified as any area with all three of the following characteristics:

a. Slopes steeper than 25 percent and a vertical relief of 10 or more feet.

b. Hillsides intersecting geologic contacts that contain impermeable soils (typically silt and clay) frequently interbedded with permeable granular soils (predominantly sand and gravel), or impermeable soils overlain with permeable soils.

c. Springs or groundwater seepage.

d. Any area which has exhibited movement during the Holocene epoch (from 10,000 years ago to present) or that are underlain or covered by mass wastage debris of that epoch.

e. Any area potentially unstable due to rapid stream incision stream bank erosion or undercutting by wave action.

f. Any area located on an alluvial fan presently subject to, or potentially subject to, inundation by debris flows or deposition of stream-transported sediments.

g. Any area where the slope is greater than the angle of repose of the soil.

h. Any shoreline designated or mapped as Class U, Uos, Urs, or I by the Washington Department of Ecology Coastal Zone Atlas."

None of the above conditions are present at the site. Therefore, the site is not a landslide hazard as defined by the TMC.

5.0 DISCUSSION AND RECOMMENDATIONS

5.1 General

In our opinion, there are no geotechnical considerations that would preclude development of the site, as planned. The primary geotechnical concern on both sites are the soft, fine grained native soil layers that will consolidate under static dead loads imposed by the structures and by product loading on structural floor slabs. Improving ground conditions by surcharging the building pads to pre-consolidate the compressible soils and overexcavating and replacing these soils with compacted structural fill below the building footings is recommended.

The second concern on the Taylor Way site is the presence of the rubble fill material in the upper five to ten feet of the soil profile. These existing fills will not be suitable for immediate support of buildings or infrastructure and will require improvement either by excavation and replacement with suitable structural fill or in-situ compaction.

If potential liquefaction related settlements are determined to structurally impair the building, in our opinion, mitigating potential settlement-related impacts would best be accomplished by supporting the structure on spread footings bearing on ground conditions improved by installation of stone columns. Alternatively, the building site grades could be raised by four feet and the potential liquefaction related settlement would be reduced.

The soils observed at the site contain a significant amount of fines and will be difficult to compact as structural fill when too wet. The ability to use native soil and existing fill soils from site excavations as structural fill will depend on its moisture content and the prevailing weather conditions at the time of construction. If grading activities will take place during winter, the owner should be prepared to import clean granular material for use as structural fill and backfill. Alternatively, stabilizing the moisture in the native and existing fill soils with cement or lime can be considered.

Detailed recommendations regarding these issues and other geotechnical design considerations are provided in the following sections. These recommendations should be incorporated into the final design drawings and construction specifications.

5.2 Site Preparation and Grading

To prepare the Taylor Way site for construction, existing surface vegetation and other deleterious materials should be stripped and removed. Based on conditions observed at the test pits, we would estimate that surface stripping will be minimal to remove site vegetation and associated near-surface organic debris. Organic topsoil will not be suitable for use as structural fill, but may be used for limited depths in nonstructural areas.

Based on the current site conditions, site preparation on the Lincoln Avenue site will mainly involve removal of the existing structures. Demolition of existing structures should include removal of existing foundations and abandonment of underground septic systems and other buried utilities.

As noted above, the existing fill material on the Taylor Way site would not be suitable for support of building elements in its current condition. In order to prepare the site for building support, we recommend removing the existing fill material and replacing it with new structural fill as outlined below. The actual depth and lateral extent of the excavation will need to be determined in the field at the time of grading. We can use the existing test pit information to prepare a conceptual excavation map, if requested. The maximum excavation depth is expected to be approximately ten feet. The excavated material will not be suitable for reuse as structural fill. We recommend importing a material that meets the requirements outlined below.

Once clearing and demolition operations are complete fill operations can be initiated to establish desired building grades. Prior to placing fill, all exposed bearing surfaces should be observed by a representative of Terra Associates to verify soil conditions are as expected and suitable for support of new fill or building elements. Our representative may request a proofroll using heavy rubber-tired equipment to determine if any isolated soft and yielding areas are present. If excessively yielding areas are observed, and they cannot be stabilized in place by compaction, the affected soils should be excavated and removed to firm bearing and grade restored with new structural fill. If the depth of excavation to remove unstable soils is excessive, the use of geotextile fabrics, such as Mirafi 500X, or an equivalent fabric, can be used in conjunction with clean granular structural fill. Our experience has shown that, in general, a minimum of 18 inches of a clean, granular structural fill placed and compacted over the geotextile fabric should establish a stable bearing surface.

We recommend supporting conventional spread footing foundations on a minimum of two feet of granular structural fill that replaces the native alluvial soils. The granular structural fill should meet requirements for wet weather structural fill as discussed in the following paragraphs. The structural fill should extend a minimum of one-foot laterally from the edges of the continuous wall or isolated column footing. Depending on final building elevations, structural fill placed to establish the design floor grade could meet this requirement for support of interior column footings. Overexcavation of loose and soft native alluvial soils and replacement with granular structural fill will likely be required below perimeter strip footings adjacent the loading dock areas.

A representative of Terra Associates should observe all bearing surfaces to verify that soil conditions are as expected and are suitable for support of building foundations, floor slabs, and site pavements.

Our study indicates that the native soils contain a sufficient percentage of fines (silt and clay size particles) that will make them difficult to compact as structural fill if they are too wet or too dry. Accordingly, the ability to use these native soils from site excavations as structural fill will depend on their moisture content and the prevailing weather conditions when site grading activities take place. Native soils that are too wet to properly compact could be dried by aeration during dry weather conditions or mixed with an additive such as cement or lime to stabilize the soil and facilitate compaction. If an additive is used, additional Best Management Practices (BMPs) for its use will need to be incorporated into the Temporary Erosion and Sedimentation Control plan (TESC) for the project.

U.S. Sieve Size	Percent Passing
6 inches	100
No. 4	75 maximum
No. 200	5 maximum*

* Based on the 3/4-inch fraction.

Prior to use, Terra Associates, Inc. should observe and test all materials imported to the site for use as structural fill.

Structural fill should be placed in uniform loose layers not exceeding 12 inches and compacted to a minimum of 95 percent of the soil's maximum dry density, as determined by American Society for Testing and Materials (ASTM) Test Designation D-698 (Standard Proctor). The moisture content of the soil at the time of compaction should be within two percent of its optimum, as determined by this ASTM standard. In nonstructural areas, the degree of compaction can be reduced to 90 percent.

Deep Dynamic Compaction (DDC)

As an alternative to excavation and replacement of the existing fill soils, we recommend improving the fill condition using DDC. This process imparts significant energy into the ground that will densify the fill and establish suitable support for buildings and infrastructure. The process consists of repeatedly dropping a heavy weight onto the ground surface from a pre-determined height using a large crane. The impact or drop locations are set up in a grid pattern with center to center spacing of about ten feet. The weight is dropped on the same location several times before moving to the next impact site. The operation results in considerable surface disturbance with deep craters formed at the impact sites. Once the DDC is completed the upper disturbed surface is densified using conventional earth moving equipment.

The required weight and drop height is dependent on soil type and desired improvement depth. For the rubble fill depth of 10 feet, we estimate a 5 metric ton weight dropped from a height of 20 to 25 feet will be required. A specialty contractor will need to be retained to complete the DDC. Various combinations of weight and drop heights can be used and will be dependent on the contractor's equipment. We will work closely with the contractor to establish the requirements for completing the DDC and to establish a quality control program to verify results.

5.3 Surcharge

We recommend implementing a surcharge program to limit static building and floor slab settlements to tolerable levels. For this procedure, we recommend placing a minimum of four feet of surcharge fill above the finished floor grades in the building areas and delaying building construction until settlement under this fill load has occurred. The fill should extend a minimum of two feet beyond the outside edge of the perimeter building footing.

For the Taylor Way site the surcharge program should be implemented following the overexcavation or DDC.

We estimate that total settlement under the surcharge fill will be in the range of three to seven inches. It is estimated that 90 percent of the consolidation settlement will occur in about 4 to 6 weeks following full application of the surcharge.

To evaluate the amount of settlement and the time rate of movement, the preload/surcharge program should be monitored by installing settlement markers. The settlement markers should be installed on the existing grade prior to placing any surcharge fill. Once installed, elevations of both the fill height and marker should be taken daily until the full height of the surcharge is in place. Once fully surcharged, readings should continue weekly until the anticipated settlements have occurred. Monitoring data should be forwarded to us within two days after it is obtained for review and comment. A typical settlement marking detail is shown on Figure 3.

It is critical that the grading contractor recognize the importance of the settlement marker installations. All efforts must be made to protect the markers from damage during fill placement. It is difficult, if not impossible, to evaluate the progress of the preload/surcharge program if the markers are damaged or destroyed by construction equipment. If the markers are impacted, it may be necessary to install new markers and extend the surcharging time period in order to ensure that settlements have ceased and building construction can begin.

Following the successful completion of the preload/surcharge program, with foundations designed as recommended in Section 5.5 of this report, you should expect maximum total and differential post-construction settlements of one-inch for perimeter foundations and interior columns.

5.4 Excavation

All excavations at the site associated with confined spaces, such as utility trenches, must be completed in accordance with local, state, and federal requirements. Based on regulations outlined in the Washington Industrial Safety and Health Act (WISHA), the native soils would be classified as Type C soils. Temporary excavation side slopes in Type C soils can be laid back at a minimum slope inclination of 1.5:1 (Horizontal:Vertical). If there is insufficient room to complete the excavations in this manner, using temporary shoring to support the excavations may need to be considered. A properly designed and installed shoring trench box can be used to support utility trench excavation sidewalls.

Groundwater should be anticipated within excavations extending below depths of two to seven feet from current surface grades. Based on our study, the volume of water and rate of flow into the excavation will be moderate particularly where excavations extend greater than five to ten feet below current site grades. For shallower excavations conventional sump pumping procedures and a system of collection trenches, if necessary, should be capable of maintaining a relatively dry excavation for construction purposes. If the excavations extend deeper than ten feet, particularly during the winter months, it is likely that the excavation will require dewatering by well points or isolated deep-pump wells. The utility subcontractor should be prepared to implement excavation dewatering by well point or deep-pump wells, as needed.

This information is provided solely for the benefit of the owner and other design consultants, and should not be construed to imply that Terra Associates, Inc. assumes responsibility for job site safety. It is understood that job site safety is the sole responsibility of the project contractor.

5.5 Foundations

In our opinion, following the successful implementation of the surcharge program as outlined in Section 5.3 of this report the buildings can be supported on conventional spread footing foundations. However, if the owner is not willing to accept the risk for building damage due to the potential for liquefaction induced settlements during an earthquake or it is determined that the estimated liquefaction settlements would preclude design of the structure of the building shells on the project to meet all governing life safety codes, including the life safety provisions of the 2015 International Building Code, the building foundations should be supported on ground improved using stone columns designed to mitigate soil liquefaction settlements.

In addition, the existing fill soils on the Taylor Way site must be either overexcavated and replaced or compacted in place using DDC.

Spread Footings

In our opinion, following successful completion of a surcharge program and overexcavation or DDC on the existing fill soils on the Taylor Way site, the buildings may be supported on conventional spread footing foundations bearing on a minimum of two feet of structural fill placed and compacted as recommended in Section 5.2 of this report. Foundations exposed to the weather should bear at a minimum depth of 1.5 feet below adjacent grades for frost protection. Interior foundations can be supported at any convenient depth below the floor slab, provided immediate support is obtained on a minimum of two feet of structural fill.

We recommend designing foundations for a net allowable bearing capacity of 2,500 psf. For short-term loads, such as wind and seismic, a one-third increase in this allowable capacity can be used. Following successful completion of the surcharge program with the expected building loads and this bearing stress applied, in general, total and differential settlements should not exceed one-inch.

For designing foundations to resist lateral loads, a base friction coefficient of 0.35 can be used. Passive earth pressures acting on the sides of the footings can also be considered. We recommend calculating this lateral resistance using an equivalent fluid weight of 300 pcf. We do not recommend including the upper 12 inches of soil in this computation because it can be affected by weather or disturbed by future grading activity. This value assumes the foundation will be backfilled with structural fill, as described in Section 5.2 of this report. The values recommended include a safety factor of 1.5.

Ground Improvement

One method to reduce the potential liquefaction settlements consists of improving ground conditions by installation of stone columns. Stone columns are highly densified columns of graded aggregate that would extend through the soft and loose alluvial sediments to a predetermined depth required to reduce liquefaction settlements to a tolerable amount. Because of the methods used to construct the columns some improvement of the adjacent soils is also realized. Conventional spread footing foundations can then be designed to bear immediately above the stone column locations. This ground improvement technique is typically completed on a design/build approach with both design and construction completed by a specialty geotechnical contractor. We can assist in contacting and selecting the specialty contractor, if desired.

As discussed earlier, another method of improving ground conditions and reducing potential liquefaction settlements would be to raise site grades. This method reduces the liquefaction potential and settlement in soft ground by increasing the overburden stress during an earthquake along with an increase in soil strength due to the increase in overburden stress. If site grades are raised four feet, analysis indicates liquefaction induced settlement would be reduced to three to four inches.

5.6 Slab-on-Grade Construction

Slab-on-grade floors may be supported on subgrades prepared as recommended in Section 5.2 of this report. Immediately below the floor slabs, we recommend placing a four-inch thick capillary break layer of clean, free-draining, coarse sand or fine gravel that has less than three percent passing the No. 200 sieve. This material will reduce the potential for upward capillary movement of water through the underlying soil and subsequent wetting of the floor slabs.

The capillary break layer will not prevent moisture intrusion through the slab caused by water vapor transmission. Where moisture by vapor transmission is undesirable, such as covered floor areas, a common practice is to place a durable plastic membrane on the capillary break layer and then cover the membrane with a layer of clean sand or fine gravel to protect it from damage during construction, and aid in uniform curing of the concrete slab. It should be noted that if the sand or gravel layer overlying the membrane is saturated prior to pouring the slab, it will be ineffective in assisting uniform curing of the slab, and can actually serve as a water supply for moisture transmission through the slab and affecting floor coverings. Therefore, in our opinion, covering the membrane with a layer of sand or gravel should be avoided if floor slab construction occurs during the wet winter months and the layer cannot be effectively drained. We recommend floor designers and contractors refer to the current American Concrete Institute (ACI) Manual of Concrete Practice for further information regarding vapor barrier installation below slab-on-grade floors.

With floor subgrade prepared as recommended in Section 5.2, a subgrade modulus of 100 pci can be used in design.

5.7 Lateral Earth Pressures for Wall Design

The magnitude of earth pressure development on below-grade walls will partly depend on the quality of the wall backfill. We recommend placing and compacting wall backfill as structural fill as described in Section 5.2 of this report. To guard against hydrostatic pressure development, wall drainage must also be installed. A typical recommended wall drainage detail is shown on Figure 4.

With wall backfill placed and compacted as recommended, and drainage properly installed, we recommend designing unrestrained walls for an active earth pressure equivalent to a fluid weighing 35 pounds per cubic foot (pcf). For restrained walls, an additional uniform load of 100 psf should be added to the 35 pcf. To account for typical traffic surcharge loading, the walls can be designed for an additional imaginary height of two feet (two-foot soil surcharge). For evaluation of wall performance under seismic loading, a uniform pressure equivalent to 8H psf, where H is the height of the below-grade portion of the wall should be applied in addition to the static lateral earth pressure. These values assume a horizontal backfill condition and that no other surcharge loading, sloping embankments, or adjacent buildings will act on the wall. If such conditions exist, then the imposed loading must be included in the wall design. Friction at the base of foundations and passive earth pressure will provide resistance to these lateral loads. Values for these parameters are provided in Section 5.5 of this report.

5.8 Stormwater Facilities

Stormwater management plans were unavailable at the time of this report. There is an existing stormwater detention pond along the southern portion of the Taylor Way site. We would assume that this pond will be incorporated into the final plans for the site.

Detention Vault

The magnitude of earth pressures developing on the vault walls will depend in part on the quality and compaction of the wall backfill. We recommend placing and compacting wall backfill as structural fill, as recommended in the Section 5.2 of this report. Lateral earth pressures recommended in Section 5.7 can be used in designing the below-grade vault walls. If it is not possible to discharge collected water at the footing elevation, we recommend setting the invert elevation of the wall drainpipe equivalent to the outfall invert and connecting the drain to the outfall pipe for discharge. For any portion of the wall that falls below the invert elevation of the wall drain, an earth pressure equivalent to a fluid weighing 85 pcf should be used.

Detention Pond

If fill berms will be constructed, the berm locations should be stripped of topsoil, duff, and soils containing organic material prior to the placement of fill. Fill material required to construct perimeter containment berm should consist of silty soils with at least 25 percent fines that is compacted structurally, as recommended in Section 5.2 of this report.

Because of exposure to fluctuating stored water levels, soils exposed on the interior side slopes of the ponds may be subject to some risk of periodic shallow instability or sloughing. Establishing interior slopes at a 3:1 gradient will significantly reduce or eliminate this potential. Exterior berm slopes and interior slopes above the maximum water surface should be graded to a finished inclination no steeper than 2:1. Finished slope faces should be thoroughly compacted and vegetated to guard against erosion.

We should review stormwater management plans when they become available to verify suitability of soils in the planned locations and to provide supplemental discussion and recommendations, if needed.

5.9 Drainage

Surface

Final exterior grades should promote free and positive drainage away from the site at all times. Water must not be allowed to pond or collect adjacent to foundations or within the immediate building areas. We recommend providing a positive drainage gradient away from the building perimeters. If this gradient cannot be provided, surface water should be collected adjacent to the structures and disposed to appropriate storm facilities.

Subsurface

Considering that impervious pavements will extend up to the building perimeter along with positive drainage maintained away from the structure, installation of customary perimeter foundation drains adjacent the strip footings would not be necessary, in our opinion.

5.10 Utilities

Utility pipes should be bedded and backfilled in accordance with American Public Works Association (APWA), or City of Tacoma specifications. As a minimum, trench backfill should be placed and compacted as structural fill, as described in Section 5.2 of this report. The native alluvial soils will likely be excavated in a wet condition and would not be suitable for use as trench backfill unless dried back to a moisture content that will facilitate proper compaction. If utility construction takes place during the wet winter months, it will likely be necessary to import suitable wet weather fill for utility trench backfilling.

Excavations into the native soils below the groundwater table will likely expose soft soils that will be unstable and would not provide suitable support for the utility pipes when backfilled. When soft unstable soils are exposed, the utility contractor should be prepared to overexcavate and remove the soils and replace them with crushed rock or bedding aggregate to establish a stable pipe foundation. Given conditions indicated by the CPTs, we would not expect overexcavation and replacement of soils for establishing stable pipe foundations would exceed three feet.

5.11 Pavements

Pavement subgrade should be prepared as described in the Section 5.2 of this report. Regardless of the degree of relative compaction achieved, the subgrade must be firm and relatively unyielding before paving. The subgrade should be proofrolled with heavy rubber-tired construction equipment such as a load 10-yard dump truck to verify this condition.

The pavement design section is dependent upon the supporting capability of the subgrade soils and the traffic conditions to which it will be subjected. We expect traffic at the facility will consist of cars and light trucks, along with heavy traffic in the form of tractor-trailer rigs. For design considerations, we have assumed traffic in parking and in car/light truck access pavement areas can be represented by an 18-kip Equivalent Single Axle Loading (ESAL) of 50,000 over a 20-year design life. For heavy traffic pavement areas, we have assumed an ESAL of 500,000 would be representative of the expected loading. These ESALs represent traffic loading equivalent to 3 and 29, loaded (80,000 pound gross vehicle weight) tractor-trailer rigs, respectively, traversing the pavement per day over a 20-year design life.

With a stable subgrade prepared as recommended, we recommend the following pavement sections:

Light Traffic and Parking:

- Two inches of hot mix asphalt (HMA) over six inches of crushed rock base (CRB)
- Four inches of full depth HMA

Heavy Traffic:

- Three inches of HMA over eight inches of CRB
- Six inches of full depth HMA

The paving materials used should conform to the current Washington State Department of Transportation (WSDOT) specifications for ½-inch hot mix asphalt HMA and CRB surfacing.

Long-term pavement performance will depend on surface drainage. A poorly-drained pavement section will be subject to premature failure as a result of surface water infiltrating into the subgrade soils and reducing their supporting capability. For optimum performance, we recommend surface drainage gradients of at least two percent. Some degree of longitudinal and transverse cracking of the pavement surface should be expected over time. Regular maintenance should be planned to seal cracks when they occur.

6.0 ADDITIONAL SERVICES

Terra Associates, Inc. should review the final design drawings and specifications in order to verify that earthwork and foundation recommendations have been properly interpreted and implemented in project design. We should also provide geotechnical services during construction to observe compliance with our design concepts, specifications, and recommendations. This will allow for design changes if subsurface conditions differ from those anticipated prior to the start of construction.

7.0 LIMITATIONS

We prepared this report in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made. This report is the copyrighted property of Terra Associates, Inc. and is intended for specific application to the Taylor Way and Lincoln Avenue Industrial Sites project in Tacoma, Washington. This report is for the exclusive use of Avenue 55 and their authorized representatives.

The analyses and recommendations presented in this report are based on data obtained from the subsurface explorations performed on the site. Variations in soil conditions can occur, the nature and extent of which may not become evident until construction. If variations appear evident, Terra Associates, Inc. should be requested to reevaluate the recommendations in this report prior to proceeding with construction.

REFERENCE: http://www.wsdot.wa.gov/data/tools/geoportal/

ACCESSED 1/3/17

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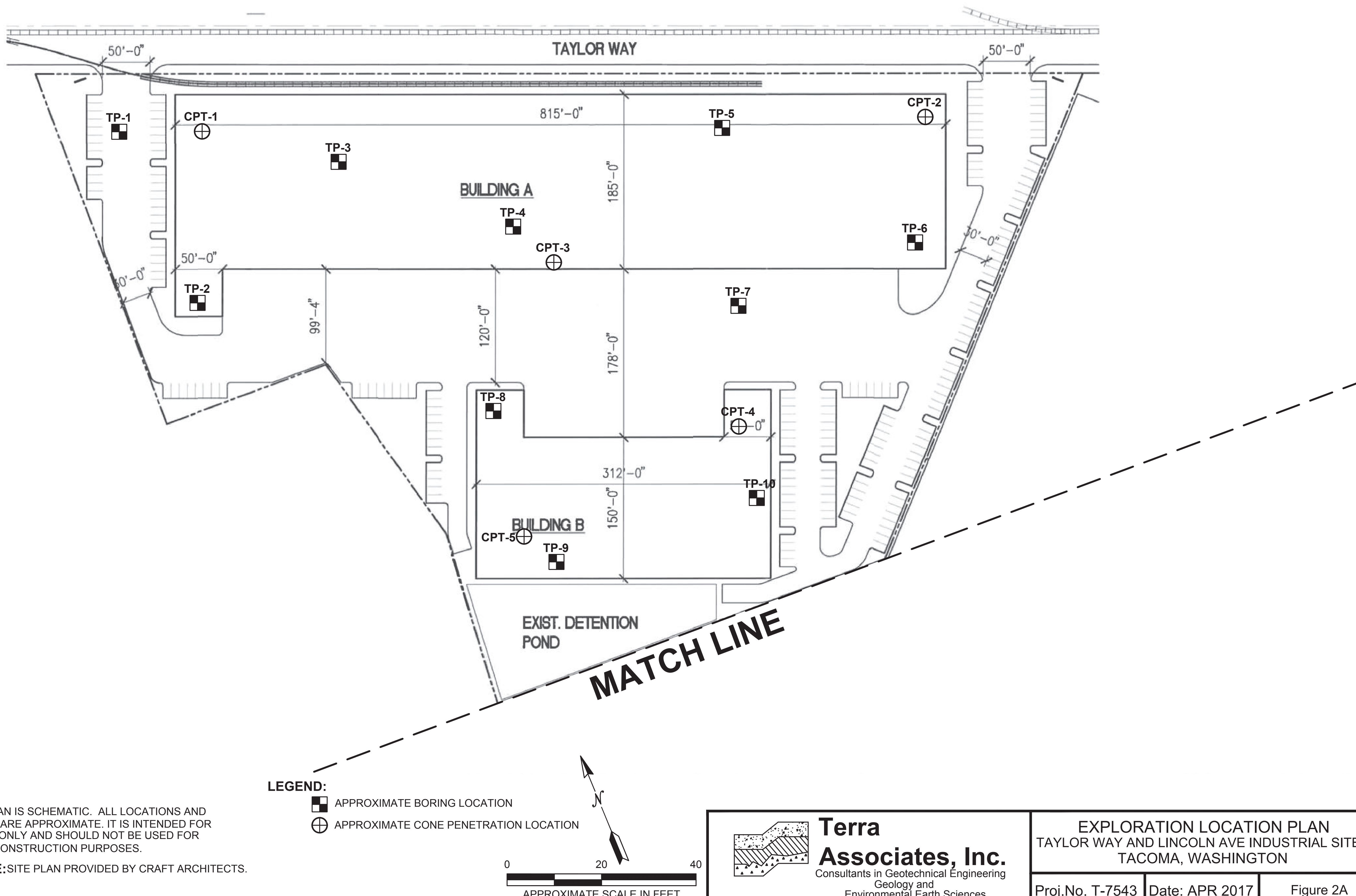
VICINITY MAP
TAYLOR WAY AND LINCOLN AVE INDUSTRIAL SITES
TACOMA, WASHINGTON

Proj.No. T-7543	Date: APR 2017	Figure 1



NOTE:

THIS SITE PLAN IS SCHEMATIC. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE. IT IS INTENDED FOR REFERENCE ONLY AND SHOULD NOT BE USED FOR DESIGN OR CONSTRUCTION PURPOSES.

REFERENCE: SITE PLAN PROVIDED BY CRAFT ARCHITECTS.

LEGEND:

- APPROXIMATE BORING LOCATION
- APPROXIMATE CONE PENETRATION LOCATION

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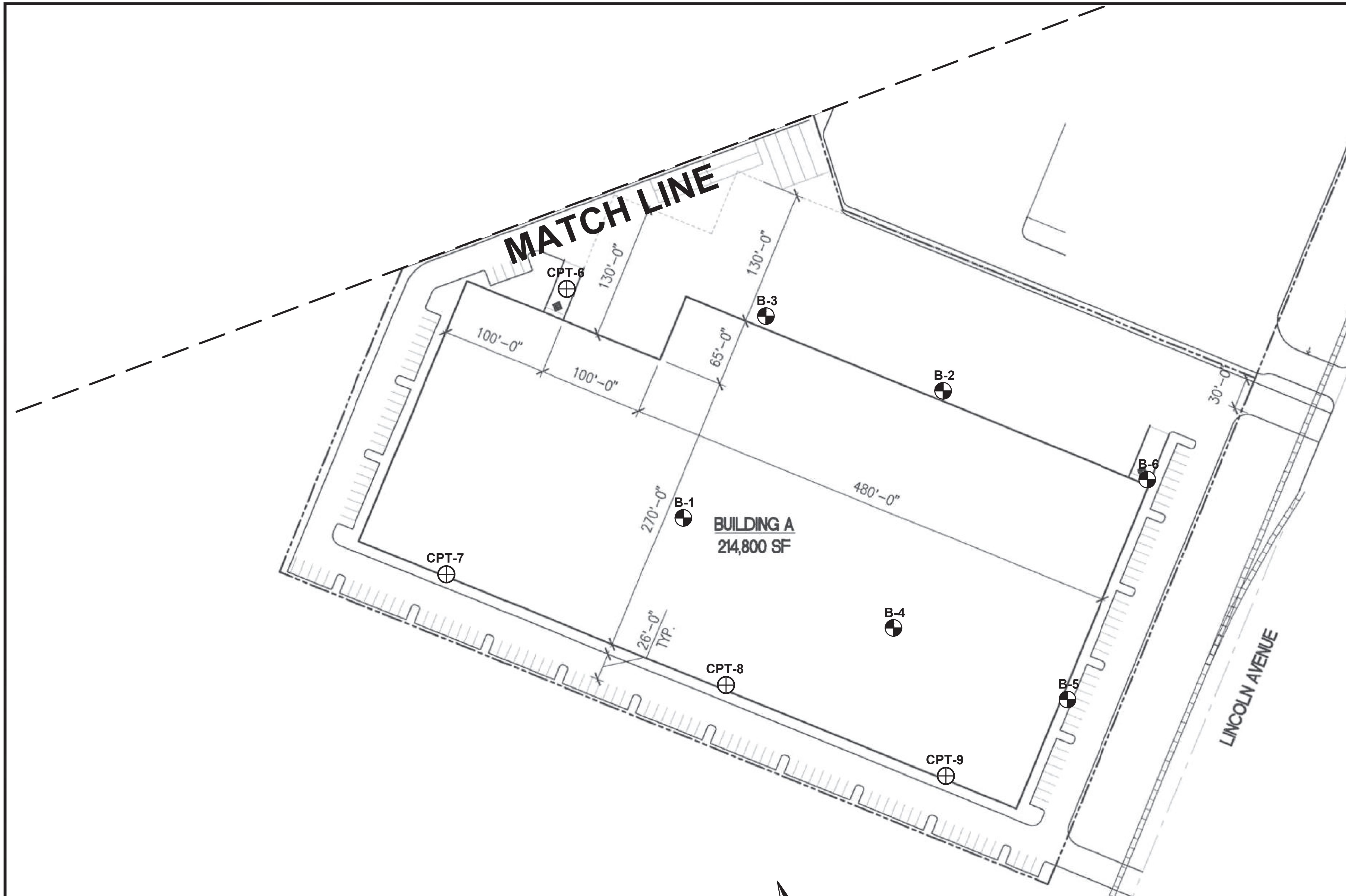
EXPLORATION LOCATION PLAN
TAYLOR WAY AND LINCOLN AVE INDUSTRIAL SITES
TACOMA, WASHINGTON

Proj.No. T-7543	Date: APR 2017	Figure 2A



NOTE:

THIS SITE PLAN IS SCHEMATIC. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE. IT IS INTENDED FOR REFERENCE ONLY AND SHOULD NOT BE USED FOR DESIGN OR CONSTRUCTION PURPOSES.

REFERENCE: SITE PLAN PROVIDED BY CRAFT ARCHITECTS.

LEGEND:

- APPROXIMATE TEST PIT LOCATION
- APPROXIMATE CONE PENETRATION LOCATION

N

0 100 200

APPROXIMATE SCALE IN FEET

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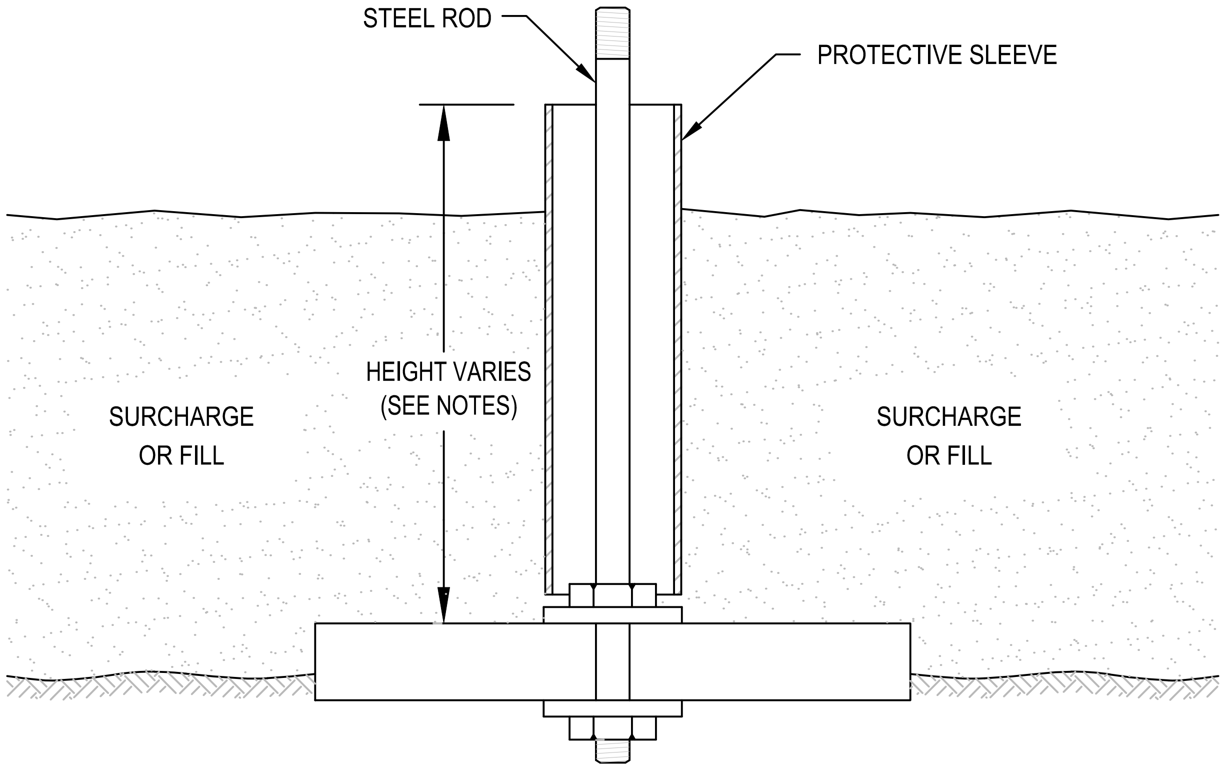
EXPLORATION LOCATION PLAN
TAYLOR WAY AND LINCOLN AVE INDUSTRIAL SITES
TACOMA, WASHINGTON

Proj.No. T-7543	Date: APR 2017	Figure 2B

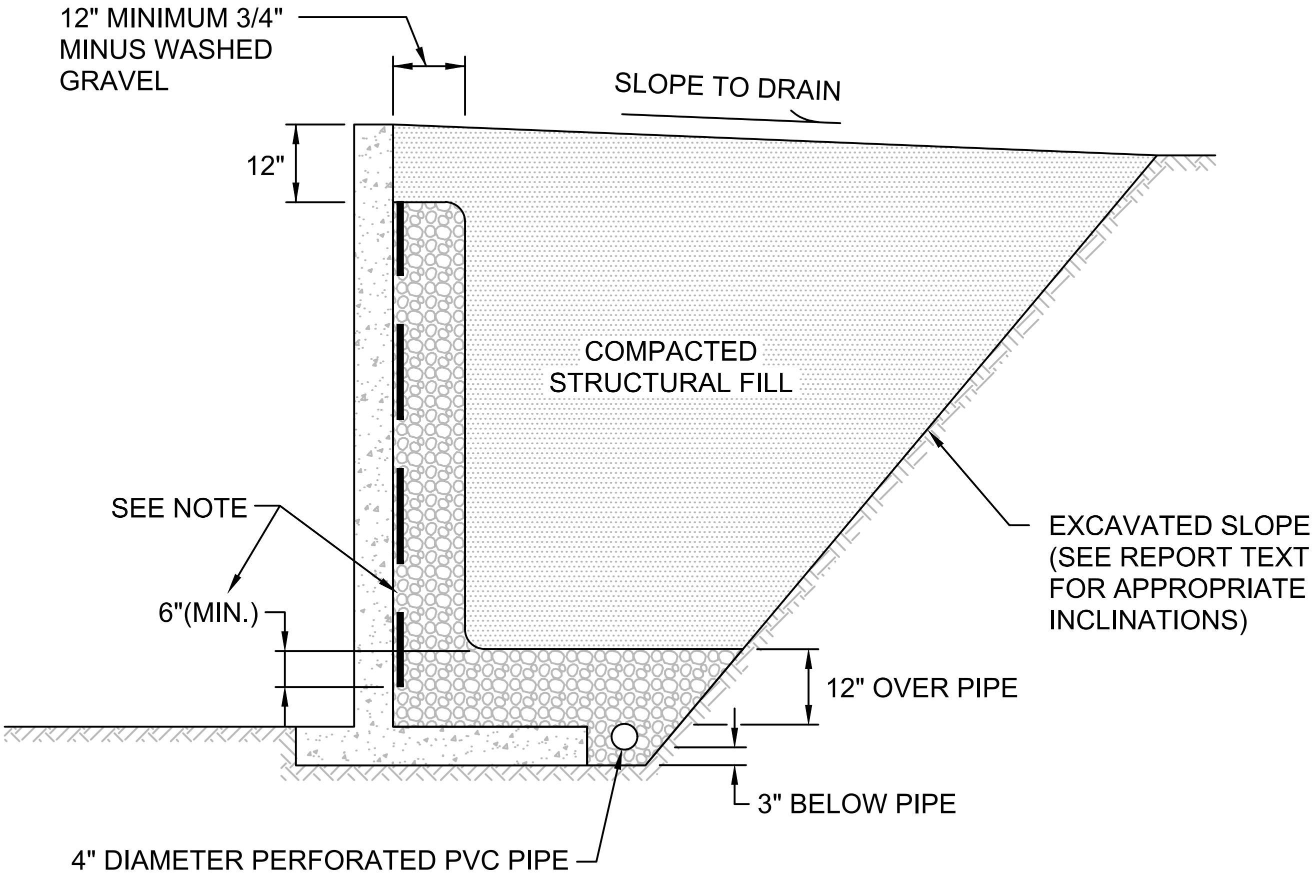


NOT TO SCALE

NOTES:

1. BASE CONSISTS OF 3/4" THICK, 2'x2' PLYWOOD WITH CENTER DRILLED 5/8" DIAMETER HOLE.
2. BEDDING MATERIAL, IF REQUIRED, SHOULD CONSIST OF CLEAN COARSE SAND.
3. MARKER ROD IS 1/2" DIAMETER STEEL ROD THREADED AT BOTH ENDS.
4. MARKER ROD IS ATTACHED TO BASE BY NUT AND WASHER ON EACH SIDE OF BASE.
5. PROTECTIVE SLEEVE SURROUNDING MARKER ROD SHOULD CONSIST OF 2" DIAMETER PLASTIC TUBING. SLEEVE IS NOT ATTACHED TO ROD OR BASE.
6. ADDITIONAL SECTIONS OF STEEL ROD CAN BE CONNECTED WITH THREADED COUPLINGS.
7. ADDITIONAL SECTIONS OF PLASTIC PROTECTIVE SLEEVE CAN BE CONNECTED WITH PRESS-FIT PLASTIC COUPLINGS.
8. STEEL MARKER ROD SHOULD EXTEND AT LEAST 6" ABOVE TOP OF PLASTIC PROTECTIVE SLEEVE.
9. PLASTIC PROTECTIVE SLEEVE SHOULD EXTEND AT LEAST 1" ABOVE TOP OF FILL SURFACE.

Terra Associates, Inc. Consultants in Geotechnical Engineering Geology and Environmental Earth Sciences	SETTLEMENT MARKER DETAIL TAYLOR WAY AND LINCOLN AVE INDUSTRIAL SITES TACOMA, WASHINGTON
	Proj.No. T-7543 | Date: APR 2017 | Figure 3



NOT TO SCALE

NOTE:

MIRADRAIN G100N PREFABRICATED DRAINAGE PANELS OR SIMILAR PRODUCT CAN BE SUBSTITUTED FOR THE 12-INCH WIDE GRAVEL DRAIN BEHIND WALL. DRAINAGE PANELS SHOULD EXTEND A MINIMUM OF SIX INCHES INTO 12-INCH THICK DRAINAGE GRAVEL LAYER OVER PERFORATED DRAIN PIPE.

Terra Associates, Inc. Consultants in Geotechnical Engineering Geology and Environmental Earth Sciences	TYPICAL WALL DRAINAGE DETAIL TAYLOR WAY AND LINCOLN AVE INDUSTRIAL SITES TACOMA, WASHINGTON		
	Proj.No. T-7543	Date: APR 2017	Figure 4

APPENDIX A
FIELD EXPLORATION AND LABORATORY TESTING

Taylor Way and Lincoln Avenue Industrial Sites
Tacoma, Washington

On November 28, 2016, we completed our site exploration by observing soil conditions at 10 test pits. On December 7 and December 8, 2016, we supplemented this data by observing soil conditions at 6 test borings drilled to a depth of 26 feet. The test pits were excavated using a track-mounted excavator to a maximum depth of ten feet below existing site grades. Test pit and boring locations were determined in the field by measurements from existing site features. The approximate location of the test pits and test borings is shown on the attached Exploration Location Plans, Figures 2a and 2b. Test Pit Logs and Test Boring Logs are attached as Figures A-2 through A-17.

An engineering geologist from our office conducted the field exploration. Our representative classified the soil conditions encountered, maintained a log of each test pit and test boring, obtained representative soil samples, and recorded water levels observed during excavation. During drilling, soil samples were obtained in general accordance with ASTM Test Designation D-1586. Using this procedure, a 2-inch (outside diameter) split barrel sampler is driven into the ground 18 inches using a 140-pound hammer free falling a height of 30 inches. The number of blows required to drive the sampler 12 inches after an initial 6-inch set is referred to as the Standard Penetration Resistance value or N value. This is an index related to the consistency of cohesive soils and relative density of cohesionless materials. N values obtained for each sampling interval are recorded on the Boring Logs, Figures A-12 through A-17. All soil samples were visually classified in accordance with the Unified Soil Classification System (USCS) described on Figure A-1.

Representative soil samples obtained from the test pits and test borings were placed in closed containers and taken to our laboratory for further examination and testing. The moisture content of each sample was measured and is reported on the individual Test Pit Logs and Test Boring Logs. Atterberg Limits Tests were performed on selected samples. The results of the Atterberg Limits tests are shown on the individual Test Boring Logs.

InSitu Engineering, under subcontract with Terra Associates, Inc. conducted nine electric CPTs at locations selected by Terra Associates, Inc., which are shown on Figures 2a and 2b. The CPTs were advanced to depths of 60 feet below the surface. The CPT is an instrumented approximately 1 ½-inch diameter cone that is pushed into the ground at a constant rate. During advancement, continuous measurements are made of the resistance to penetration of the cone and the friction of the outer surface of a sleeve. The cone is also equipped with a porous filter and a pressure transducer for measuring groundwater or pore water pressure generated. Measurements of tip and sleeve frictional resistance, pore pressure, and interpreted soil conditions are summarized in graphical form on the attached CPT Logs.

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTION
COARSE GRAINED SOILS More than 50% material larger than No. 200 sieve size	**GRAVELS** More than 50% of coarse fraction is larger than No. 4 sieve	Clean Gravels (less than 5% fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines.
			GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines.
		Gravels with fines	GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines.
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines.
	SANDS More than 50% of coarse fraction is smaller than No. 4 sieve	Clean Sands (less than 5% fines)	SW	Well-graded sands, sands with gravel, little or no fines.
			SP	Poorly-graded sands, sands with gravel, little or no fines.
		Sands with fines	SM	Silty sands, sand-silt mixtures, non-plastic fines.
			SC	Clayey sands, sand-clay mixtures, plastic fines.
FINE GRAINED SOILS More than 50% material smaller than No. 200 sieve size	**SILTS AND CLAYS** Liquid Limit is less than 50%		ML	Inorganic silts, rock flour, clayey silts with slight plasticity.
			CL	Inorganic clays of low to medium plasticity. (Lean clay)
			OL	Organic silts and organic clays of low plasticity.
	SILTS AND CLAYS Liquid Limit is greater than 50%		MH	Inorganic silts, elastic.
			CH	Inorganic clays of high plasticity. (Fat clay)
			OH	Organic clays of high plasticity.
HIGHLY ORGANIC SOILS			PT	Peat.

DEFINITION OF TERMS AND SYMBOLS

COHESIONLESS

Density	Standard Penetration Resistance in Blows/Foot
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	>50

COHESIVE

Consistancy	Standard Penetration Resistance in Blows/Foot
Very Soft	0-2
Soft	2-4
Medium Stiff	4-8
Stiff	8-16
Very Stiff	16-32
Hard	>32

Symbol	Definition
I	2" OUTSIDE DIAMETER SPILT SPOON SAMPLER
‖	2.4" INSIDE DIAMETER RING SAMPLER OR SHELBY TUBE SAMPLER
▼	WATER LEVEL (Date)
Tr	TORVANE READINGS, tsf
Pp	PENETROMETER READING, tsf
DD	DRY DENSITY, pounds per cubic foot
LL	LIQUID LIMIT, percent
PI	PLASTIC INDEX
N	STANDARD PENETRATION, blows per foot

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Geology and
Environmental Earth Sciences

UNIFIED SOIL CLASSIFICATION SYSTEM
TAYLOR WAY AND LINCOLN AVE INDUSTRIAL SITES
TACOMA, WASHINGTON

Proj.No. T-7543 | Date: APR 2017 | Figure A-1

LOG OF TEST PIT NO. TP-1

FIGURE A-2

PROJECT NAME: Taylor Way and Lincoln Avenue Industrial Sites **PROJ. NO:** T-7543 **LOGGED BY:** NRH

LOCATION: Tacoma, Washington **SURFACE CONDITIONS:** Bare/Grass **APPROX. ELEV:** N/A

DATE LOGGED: November 28, 2016 **DEPTH TO GROUNDWATER:** 2 Feet **DEPTH TO CAVING:** 2 Feet

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
0–1.5		FILL: Gray silty SAND with gravel, fine grained, moist to wet.	Medium Dense	
1.5–5 (▼ 2)		Dark brown silt and wood debris, mostly wood debris and rubble.	Loose	
5		Test pit terminated at 5 feet due to heavy caving. Groundwater seepage observed at 2 feet.		
6				
7				
8				
9				
10				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. TP-2

FIGURE A-3

PROJECT NAME: Taylor Way and Lincoln Avenue Industrial Sites **PROJ. NO:** T-7543 **LOGGED BY:** NRH

LOCATION: Tacoma, Washington **SURFACE CONDITIONS:** Bare/Grass **APPROX. ELEV:** N/A

DATE LOGGED: November 28, 2016 **DEPTH TO GROUNDWATER:** 4 Feet **DEPTH TO CAVING:** N/A

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		FILL: Tan SAND, medium grained, moist.		
1		FILL: Gray silty SAND with gravel, fine grained, moist.	Medium Dense	
2				
3		FILL: Brown silty SAND, sticks, and organic debris. Heavy seepage at 4 feet.	Soft	
4		FILL: Metal, wood, and various other types of rubble.	Loose	
5				
6				
7				
8		Test pit terminated at 8 feet. Excavator stuck on rubble. Groundwater seepage observed at 4 feet.		
9				
10				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. TP-3

FIGURE A-4

PROJECT NAME: Taylor Way and Lincoln Avenue Industrial Sites **PROJ. NO:** T-7543 **LOGGED BY:** NRH

LOCATION: Tacoma, Washington **SURFACE CONDITIONS:** Asphalt **APPROX. ELEV:** N/A

DATE LOGGED: November 28, 2016 **DEPTH TO GROUNDWATER:** 3 Feet **DEPTH TO CAVING:** N/A

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0–1		FILL: Sand with gravel, medium grained, moist.		
1–3		FILL: Gray silty SAND with gravel, fine grained, moist.		
▼ 3–7		FILL: Bricks and rubble, saturated.		
7–10		Dark brown and gray silty CLAY/clayey SILT, soft, moist. (ML)		
10–15		Test pit terminated at 10 feet. Groundwater seepage observed at 3 feet.		

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. TP-4

FIGURE A-5

PROJECT NAME: Taylor Way and Lincoln Avenue Industrial Sites **PROJ. NO:** T-7543 **LOGGED BY:** NRH

LOCATION: Tacoma, Washington **SURFACE CONDITIONS:** Bare/Grass **APPROX. ELEV:** N/A

DATE LOGGED: November 28, 2016 **DEPTH TO GROUNDWATER:** 2 Feet **DEPTH TO CAVING:** N/A

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0–1		FILL: Gravel with silt, moist.	Medium Dense	
1–2		FILL: Gray silty SAND with gravel, fine grained, moist.		
2–5		FILL: Gray gravelly SAND with wood debris, medium grained, moist. Light seepage from 2 to 5 feet.	Loose	
5–7		FILL: Dark brown SILT with wood debris, moist.	Soft	
7–10		Gray and brown silty CLAY/clayey SILT, moist. (ML)	Soft	
10–15		Test pit terminated at 10 feet. Groundwater seepage observed at 2 feet.		

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. TP-5

FIGURE A-6

PROJECT NAME: Taylor Way and Lincoln Avenue Industrial Sites **PROJ. NO:** T-7543 **LOGGED BY:** NRH

LOCATION: Tacoma, Washington **SURFACE CONDITIONS:** Bare/Grass **APPROX. ELEV:** N/A

DATE LOGGED: November 28, 2016 **DEPTH TO GROUNDWATER:** 3 Feet **DEPTH TO CAVING:** N/A

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0–3		FILL: Tan and gray silty SAND with gravel, fine grained, saturated. Heavy seepage observed at 3 feet.	Medium Dense	
3–7		FILL: Brick and concrete rubble with cobbles, saturated.	Loose	
7–8		FILL: Dark brown organic SILT, moist. (ML)	Soft	
8–10		Brown silty CLAY/clayey SILT, moist. (ML)	Soft	
10		Test pit terminated at 10 feet. Groundwater seepage observed at 3 feet.		

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. TP-6

FIGURE A-7

PROJECT NAME: Taylor Way and Lincoln Avenue Industrial Sites **PROJ. NO:** T-7543 **LOGGED BY:** NRH

LOCATION: Tacoma, Washington **SURFACE CONDITIONS:** Bare/Grass **APPROX. ELEV:** N/A

DATE LOGGED: November 28, 2016 **DEPTH TO GROUNDWATER:** 4 Feet **DEPTH TO CAVING:** N/A

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0				
		FILL: Brown SAND, medium grained, moist, minor rubble debris.		
1				
2			Medium Dense	
3				
▼ 4		Brown and gray sandy SILT and SILT, wet. (ML)		
5				
6			Soft	
7		Dark gray SAND, meidum grained, wet to saturated. (SP)		
8				
9			Loose	
10		Test pit terminated at 10 feet. Groundwater seepage observed at 4 feet.		
11				
12				
13				
14				
15				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. TP-7

FIGURE A-8

PROJECT NAME: Taylor Way and Lincoln Avenue Industrial Sites **PROJ. NO:** T-7543 **LOGGED BY:** NRH

LOCATION: Tacoma, Washington **SURFACE CONDITIONS:** Bare/Grass **APPROX. ELEV:** N/A

DATE LOGGED: November 28, 2016 **DEPTH TO GROUNDWATER:** 4 Feet **DEPTH TO CAVING:** N/A

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		(TOPSOIL)		
1		FILL: Gray SAND, fine to medium grained, moist.	Loose	
2				
3				
▼ 4				
5				
6				
7		Test pit terminated at 7 feet due to excessive caving. Groundwater seepage observed at 4 feet.		
8				
9				
10				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. TP-8

FIGURE A-9

PROJECT NAME: Taylor Way and Lincoln Avenue Industrial Sites **PROJ. NO:** T-7543 **LOGGED BY:** NRH

LOCATION: Tacoma, Washington **SURFACE CONDITIONS:** Grass **APPROX. ELEV:** N/A

DATE LOGGED: November 28, 2016 **DEPTH TO GROUNDWATER:** 7 Feet **DEPTH TO CAVING:** N/A

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0–10		FILL: Grayish-brown silty SAND with gravel, fine to medium grained, moist, occasional cobble sized chunks of asphalt and concrete rubble.	Loose	
7		Light to moderate seepage observed at 7 feet.		
10–15		Test pit terminated at 10 feet. Groundwater seepage observed at 7 feet.		

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. TP-9

FIGURE A-10

PROJECT NAME: Taylor Way and Lincoln Avenue Industrial Sites **PROJ. NO:** T-7543 **LOGGED BY:** NRH

LOCATION: Tacoma, Washington **SURFACE CONDITIONS:** Grass **APPROX. ELEV:** N/A

DATE LOGGED: November 28, 2016 **DEPTH TO GROUNDWATER:** N/A **DEPTH TO CAVING:** N/A

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		FILL: Grayish-brown silty SAND with gravel, fine grained, moist, minor brick and concrete debris, minor organics.	Loose	
5		Cobbles in fill from 5 to 10 feet.	Loose to Medium Dense	
10		Test pit terminated at 10 feet. No groundwater seepage observed.		
15				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF TEST PIT NO. TP-10

FIGURE A-11

PROJECT NAME: Taylor Way and Lincoln Avenue Industrial Sites **PROJ. NO:** T-7543 **LOGGED BY:** NRH

LOCATION: Tacoma, Washington **SURFACE CONDITIONS:** Grass **APPROX. ELEV:** N/A

DATE LOGGED: November 28, 2016 **DEPTH TO GROUNDWATER:** 4 Feet **DEPTH TO CAVING:** N/A

Depth (ft)	Sample No.	Description	Consistency/ Relative Density	W (%)
0		FILL: Gray silty SAND with gravel, fine grained, wet, occasional rubble.		
1				
2				
3				
▼ 4			Loose	
5				
6		Encountered 8-inch PVC pipe bedded in gravel at 7 feet. Bedding was saturated.		
7				
8		Test pit terminated at 8 feet in fill. Groundwater seepage observed at 4 feet.		
9				
10				

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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LOG OF BORING NO. B-1

Figure No. A-12

Project: Taylor Way and Lincoln Avenue Industrial Sites **Project No:** T-7543 **Date Drilled:** December 7, 2016

Client: Avenue 55, LLC **Driller:** Boretec **Logged By:** JCS

Location: Tacoma, Washington **Depth to Groundwater:** 7 feet **Approx. Elev:** NA

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	SPT (N) Blows/foot (10 30 50)	Moisture Content (%)
0		5-inch concrete slab.			
		FILL: Brown SAND with gravel, fine sand, fine gravel, moist. (SP)	Medium Dense	24	
5		FILL: Dark brown SAND with silt, fine grained, moist, scattered silty sand pockets, trace of shell fragments. (SP-SM)		11	
		Gray-brown to dark gray-brown SAND, fine grained, wet, trace of shell fragments. (SP) (Possible fill)	Very Loose	4	
10				2	
		Gray-brown slightly clayey to clayey SILT, wet, numerous fine black organic fragments. (MH) LL=52, PL=35, PI=17	Very Soft to Soft	2	
15		Dark gray, trace to slightly clayey, silty SAND to trace to slightly clayey, sandy SILT, fine grained, wet. (SM/ML)	Very Loose	2	
		Dark gray-brown SAND, fine grained, wet. (SP)	Medium Dense		
20				13	
		Dark gray-brown silty SAND to sandy SILT, fine grained, wet. (SM/ML)			
		Dark gray SAND, fine grained, wet. (SP)			
25				13	
		Boring terminated at 26.5 feet. Groundwater encountered at approximately 7 feet.			
30					

NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

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LOG OF BORING NO. B-2

Figure No. A-13

Project: Taylor Way and Lincoln Avenue Industrial Sites **Project No:** T-7543 **Date Drilled:** December 7, 2016

Client: Avenue 55, LLC **Driller:** Boretec **Logged By:** JCS

Location: Tacoma, Washington **Depth to Groundwater:** 7 feet **Approx. Elev:** NA

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	SPT (N) Blows/foot (10 30 50)	Moisture Content (%)
0		6-inch concrete slab.			
		FILL: Gray-brown SAND with silt and gravel to silty SAND with gravel, fine to medium sand, fine to coarse gravel, moist. (SP-SM)	Medium Dense	16	
5		FILL: Brown to gray-brown SAND, fine grained, moist, scattered shell fragments, trace of silty fine sand layers. (SP)		13	
		Dark gray-brown SAND with silt to silty SAND, fine grained, wet. (SP-SM/SM) (Possible fill)	Loose	6	
10		Gray SAND, fine to medium grained, trace of fine gravel, wet. (SP) (Possible fill)		9	
		Dark gray SAND with silt and gravel, fine sand, fine gravel, wet, trace of wood fragments. (SP-SM)	Very Loose	4	
15		Dark gray silty SAND to sandy SILT, fine grained, wet, scattered wood fragments and organic fibers, trace of silty clay to clayey silt pockets and layers. (SM/ML)		2	
20				2	
		Dark gray-brown SAND, fine grained, wet. (SP)	Medium Dense		
25				18	
		Boring terminated at 26.5 feet. Groundwater encountered at approximately 7 feet.			
30					

NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

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LOG OF BORING NO. B-3

Figure No. A-14

Project: Taylor Way and Lincoln Avenue Industrial Sites **Project No:** T-7543 **Date Drilled:** December 7, 2016

Client: Avenue 55, LLC **Driller:** Boretec **Logged By:** JCS

Location: Tacoma, Washington **Depth to Groundwater:** 7 feet **Approx. Elev:** NA

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	SPT (N) Blows/foot (10 30 50)	Moisture Content (%)
0		4-inch concrete slab. FILL: Brown SAND with silt and gravel, fine to medium sand, fine to coarse gravel, moist. (SP-SM)	Dense	33	
5		FILL: Gray-brown SAND, fine grained, moist. (SP)	Medium Dense	17	
		Gray SAND to SAND with silt, fine to coarse grained, trace of fine gravel, wet, trace of shell fragments. (SP/SP-SM) (Possible fill)	Loose to Very Loose	6 2	
10					
		Gray-brown slightly clayey SILT, wet, numerous fine black organic fragments, scattered wood fragments. (ML)	Very Soft to Soft	2	
15		Dark gray silty SAND to sandy SILT, fine grained, wet, trace of organic fibers. (SM/ML)	Very Loose to Loose	5	
20				2	
		Dark gray-brown SAND with silt, fine grained, wet, trace of organic fibers. (SP-SM)			
25				7	
		Boring terminated at 26.5 feet. Groundwater encountered below about 7 feet.			
30					

NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

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LOG OF BORING NO. B-4

Figure No. A-15

Project: Taylor Way and Lincoln Avenue Industrial Sites **Project No:** T-7543 **Date Drilled:** December 8, 2016

Client: Avenue 55, LLC **Driller:** Boretec **Logged By:** JCS

Location: Tacoma, Washington **Depth to Groundwater:** 7 feet **Approx. Elev:** NA

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	SPT (N) Blows/foot	Moisture Content (%)
0		5-inch concrete slab. FILL: Brown SAND with gravel, fine to medium sand, fine to coarse gravel, moist. (SP)	Medium Dense	15	
5		Gray-brown SAND to SAND with silt, fine grained, moist. (SP/SP-SM)		11	
		Gray SAND, fine grained, wet. (SP)	Very Loose	4	
10		Gray-brown sandy SILT, fine grained, trace of clay, wet, trace of organic fibers. (ML)		1	
		Light brown slightly clayey to clayey SILT, wet, numerous fine black organic fragments, scattered wood fragments and organic fibers. (ML/MH)	Very Soft to Soft	2	
15		Interbedded gray SILT to sandy SILT and SAND, fine grained, wet, scattered organic fibers and wood fragments. (ML/SP)	Loose to Medium Dense	4	
		Dark gray SAND, fine grained, wet. (SP)			
20				12	
25				5	
		Boring terminated at 26.5 feet. Groundwater encountered at approximately 7 feet.			
30					

NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

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LOG OF BORING NO. B-5

Figure No. A-16

Project: Taylor Way and Lincoln Avenue Industrial Sites **Project No:** T-7543 **Date Drilled:** December 8, 2016

Client: Avenue 55, LLC **Driller:** Boretec **Logged By:** JCS

Location: Tacoma, Washington **Depth to Groundwater:** 7 feet **Approx. Elev:** NA

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	SPT (N) Blows/foot	Moisture Content (%)
0		5-inch concrete slab. FILL: Brown SAND to SAND with silt, fine grained, trace of fine gravel, moist. (SP/SP-SM)	Medium Dense to Dense	33 25	
5					
		Gray-brown SAND, fine grained, wet. (SP) (Possible fill)	Very Loose	3	
10		Interbedded dark gray SILT and SAND, fine grained, wet, trace of organic fibers. (ML/SP)		2	
		Dark gray-brown SILT to sandy SILT, fine grained, wet, numerous black organic seams and pockets. (ML)	Very Loose to Loose	1 9	
15					
		Dark gray SAND, fine to medium grained, wet. (SP)	Loose to Medium Dense	11 8	
20					
25					
		Boring terminated at 26.5 feet. Groundwater encountered below about 7 feet.			
30					

NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

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LOG OF BORING NO. B-6

Figure No. A-17

Project: Taylor Way and Lincoln Avenue Industrial Sites **Project No:** T-7543 **Date Drilled:** December 8, 2016

Client: Avenue 55, LLC **Driller:** Boretec **Logged By:** JCS

Location: Tacoma, Washington **Depth to Groundwater:** 7 feet **Approx. Elev:** NA

Depth (ft)	Sample Interval	Soil Description	Consistency/ Relative Density	SPT (N) Blows/foot	Moisture Content (%)
0		5-inch concrete slab. FILL: Brown SAND with gravel, fine sand, fine to coarse gravel, moist. (SP)	Dense	39	
5		FILL: Gray-brown SAND, fine grained, moist, trace of shell fragments. (SP)	Medium Dense	12	
		Interbedded dark gray-brown SAND and SILT with sand, fine grained, wet, scattered slightly clayey silt with sand layers, trace of shell fragments. (SP/ML) (Possible fill)	Very Loose	3 3	
10		Gray-brown, trace to slightly clayey SILT to sandy SILT, fine grained, wet, numerous fine black organic fragments and partings, trace of wood fragments. (ML) LL=40 PL=30 PI=10	Very Soft to Medium Stiff	2 5	
15		Dark gray-brown SAND to SAND with silt, fine grained, wet. (SP/SP-SM)	Loose	9 7	
20					
25		Boring terminated at 26.5 feet. Groundwater encountered at approximately 7 feet.			
30					

NOTE: This borehole log has been prepared for geotechnical purposes. This information pertains only to this boring location and should not be interpeted as being indicative of other areas of the site

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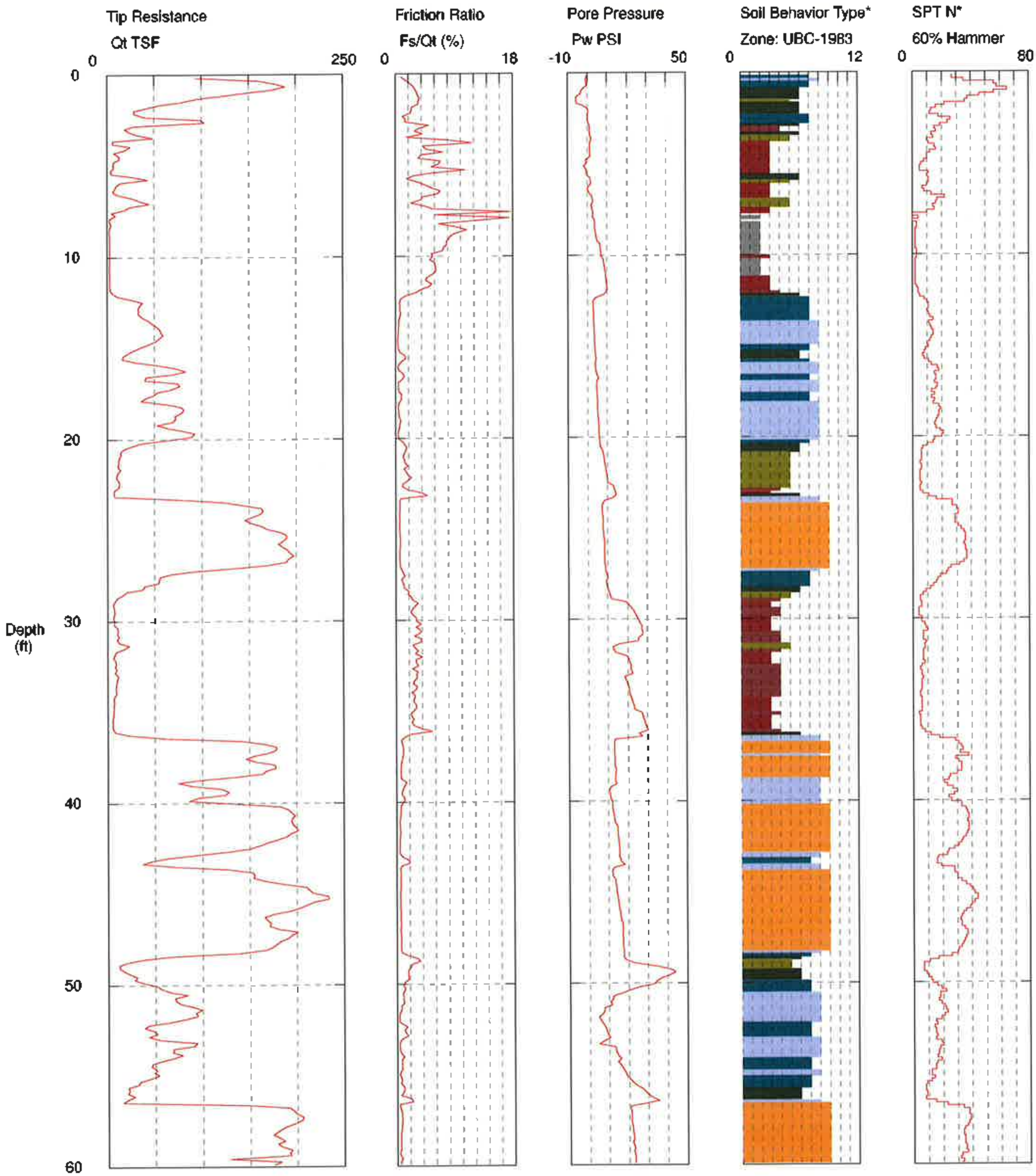
Terra Associates

Operator: Romanelli
Sounding: CPT-01
Cone Used: DDG1263
GPS Data: NO GPS

CPT Date/Time: 11/10/2016 5:10:25 PM
Location: Tacoma
Job Number: T-7543



Maximum Depth = 60.04 feet

Depth Increment = 0.164 feet

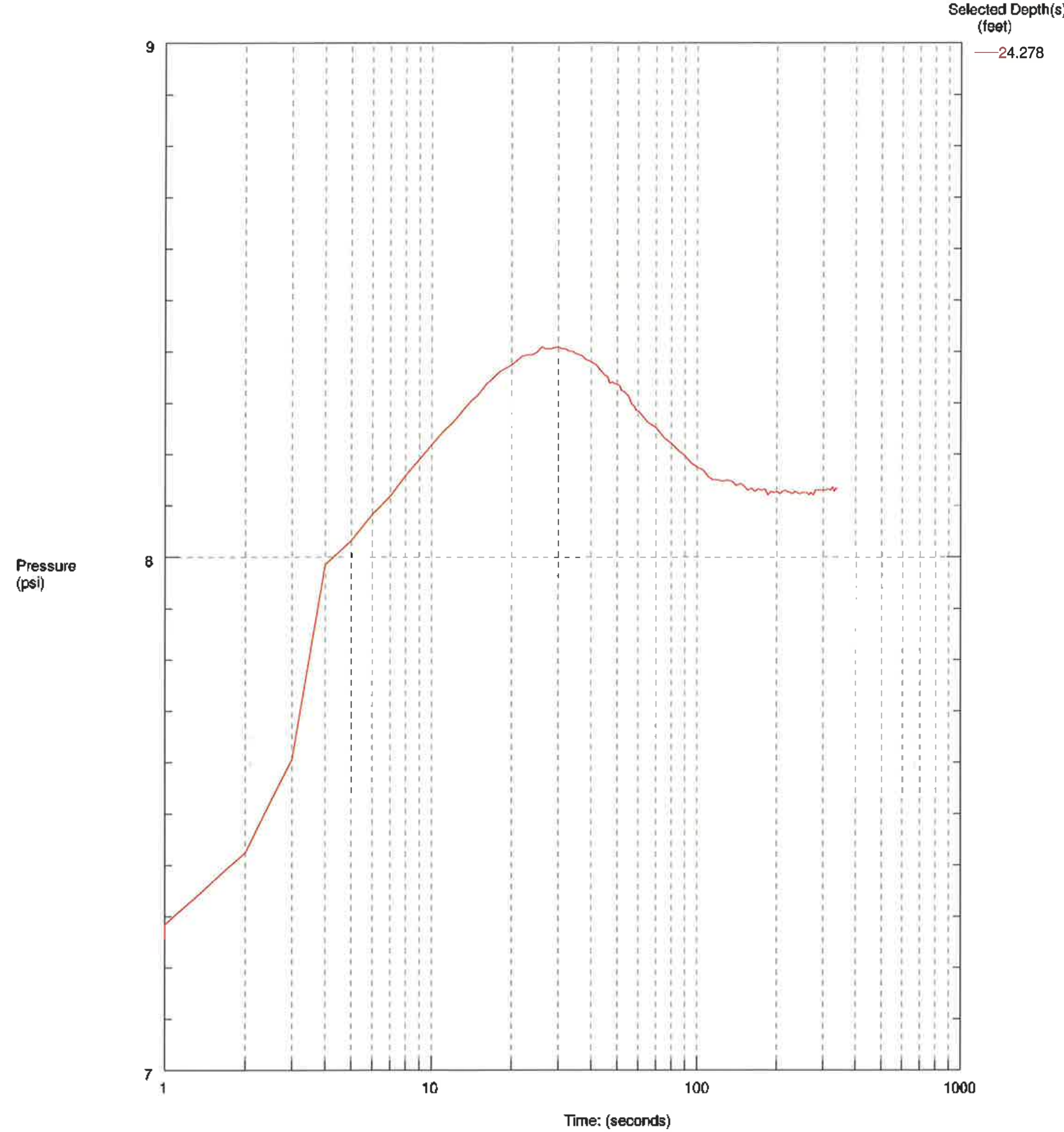
1 sensitive fine grained	4 silty clay to clay	7 silty sand to sandy silt	10 gravelly sand to sand
2 organic material	5 clayey silt to silty clay	8 sand to silty sand	11 very stiff fine grained (*)
3 clay	6 sandy silt to clayey silt	9 sand	12 sand to clayey sand (*)

*Soil behavior type and SPT based on data from UBC-1983

Terra Associates

Operator Romanelli
Sounding: CPT-01
Cone Used: DDG1263
GPS Data: NO GPS

CPT Date/Time: 11/10/2016 5:10:25 PM
Location: Tacoma
Job Number: T-7543

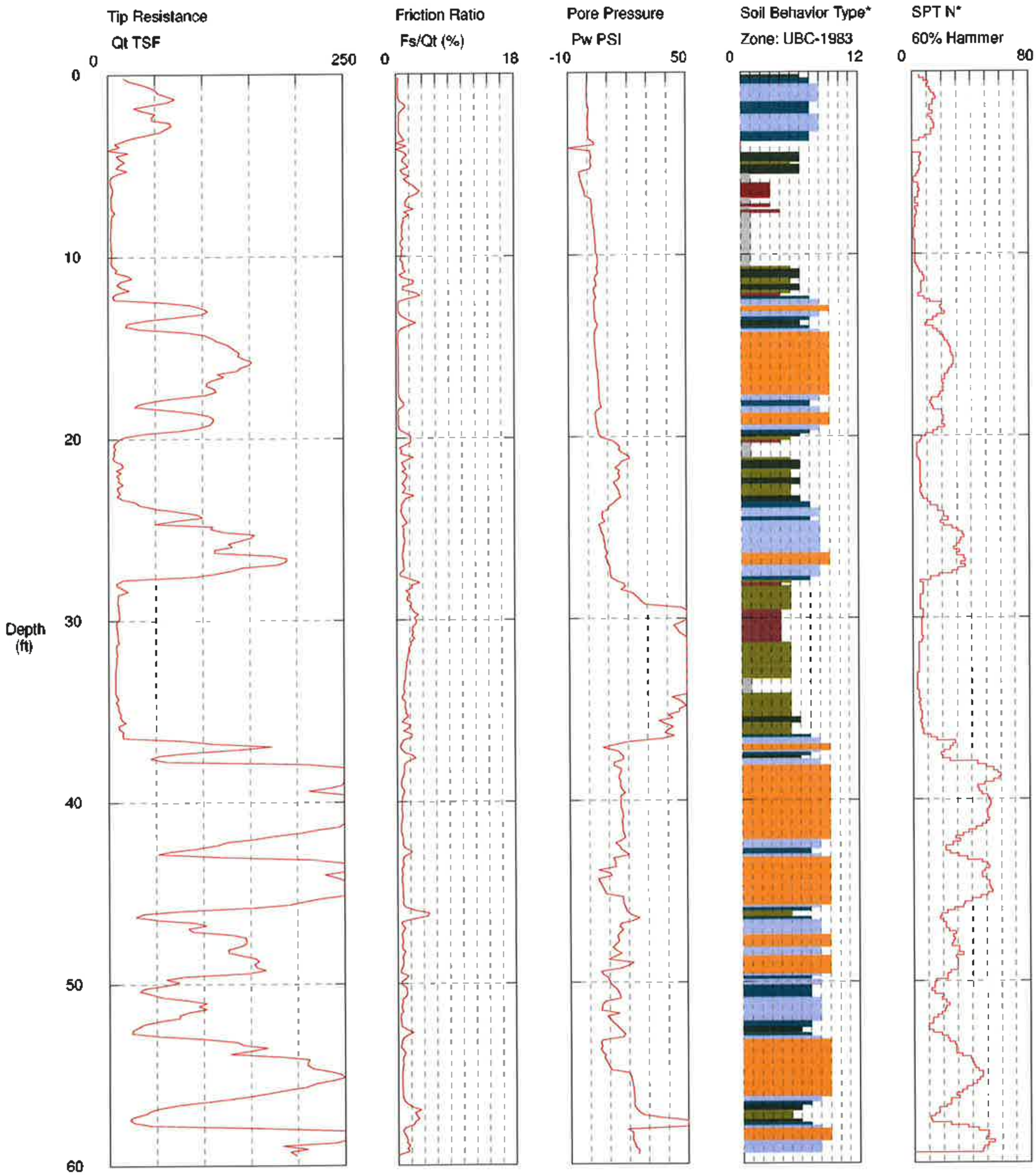


Maximum Pressure = 8.41 psi

Terra Associates

Operator: Romanelli
Sounding: CPT-02
Cone Used: DDG1263
GPS Data: NO GPS

CPT Date/Time: 11/10/2016 2:58:47 PM
Location: Tacoma
Job Number: T-7543



Maximum Depth = 59.42 feet

Depth Increment = 0.164 feet

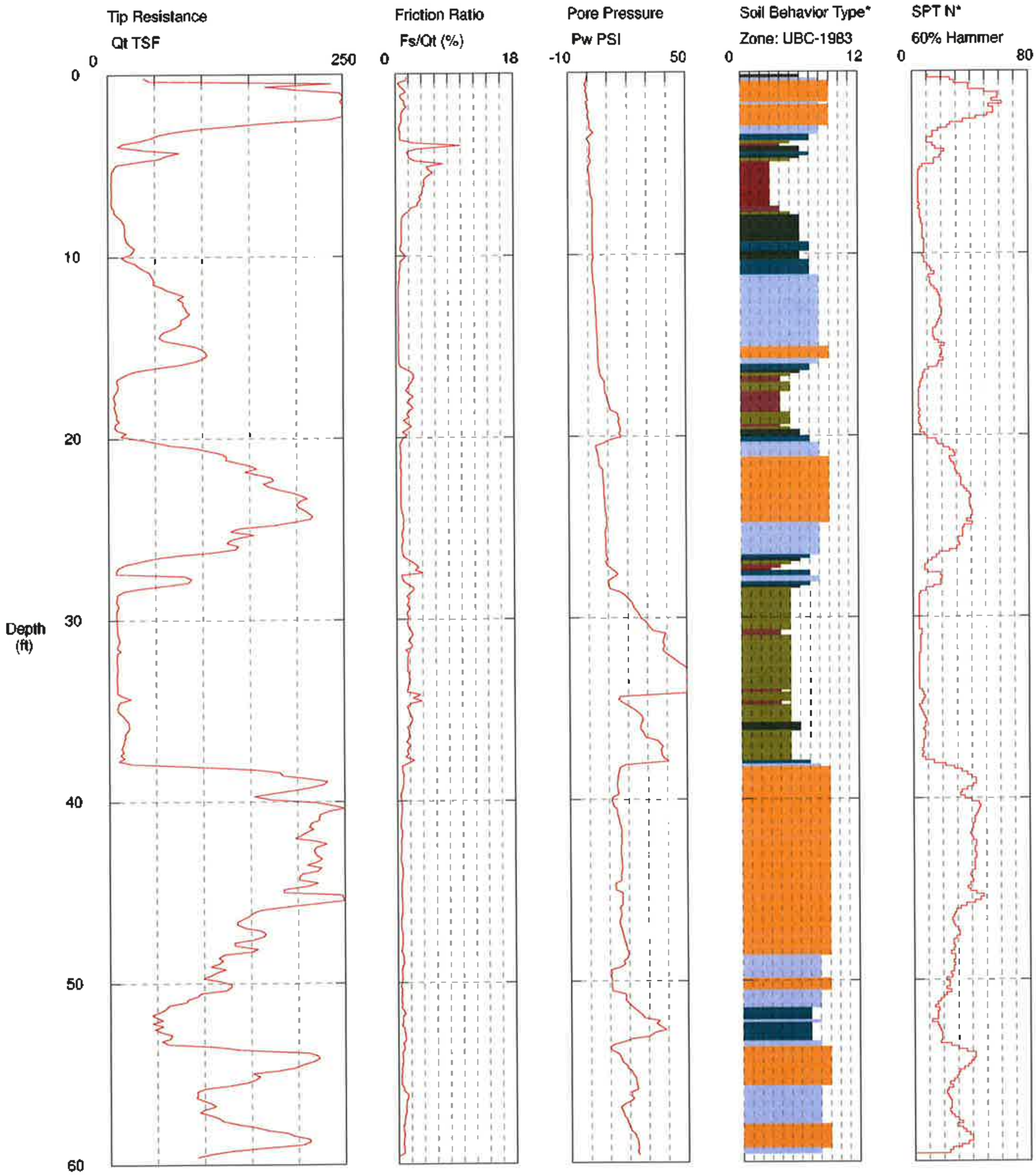
1 sensitive fine grained	4 silty clay to clay	7 silty sand to sandy silt	10 gravelly sand to sand
2 organic material	5 clayey silt to silty clay	8 sand to silty sand	11 very stiff fine grained (*)
3 clay	6 sandy silt to clayey silt	9 sand	12 sand to clayey sand (*)

*Soil behavior type and SPT based on data from UBC-1983

Terra Associates

Operator: Romanelli
Sounding: CPT-03
Cone Used: DDG1263
GPS Data: NO GPS

CPT Date/Time: 11/10/2016 4:07:01 PM
Location: Tacoma
Job Number: T-7543



Maximum Depth = 59.55 feet

Depth Increment = 0.164 feet

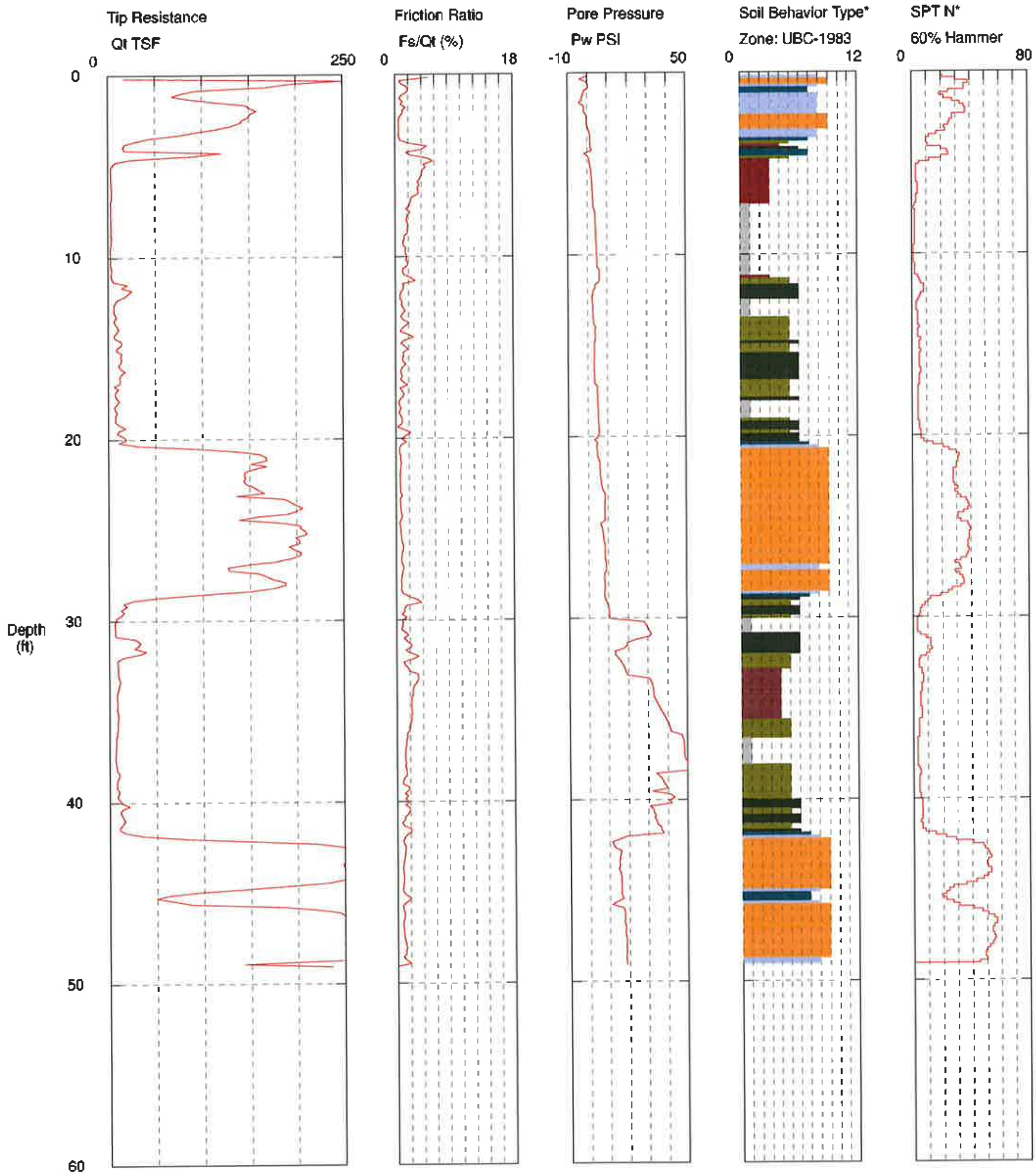
1 sensitive fine grained	4 silty clay to clay	7 silty sand to sandy silt	10 gravelly sand to sand
2 organic material	5 clayey silt to silty clay	8 sand to silty sand	11 very stiff fine grained (*)
3 clay	6 sandy silt to clayey silt	9 sand	12 sand to clayey sand (*)

*Soil behavior type and SPT based on data from UBC-1983

Terra Associates

Operator: Romanelli
Sounding: CPT-04b
Cone Used: DDG1369
GPS Data: NO GPS

CPT Date/Time: 11/10/2016 7:08:58 PM
Location: Tacoma
Job Number: T-7543



Maximum Depth = 49.05 feet

Depth Increment = 0.164 feet

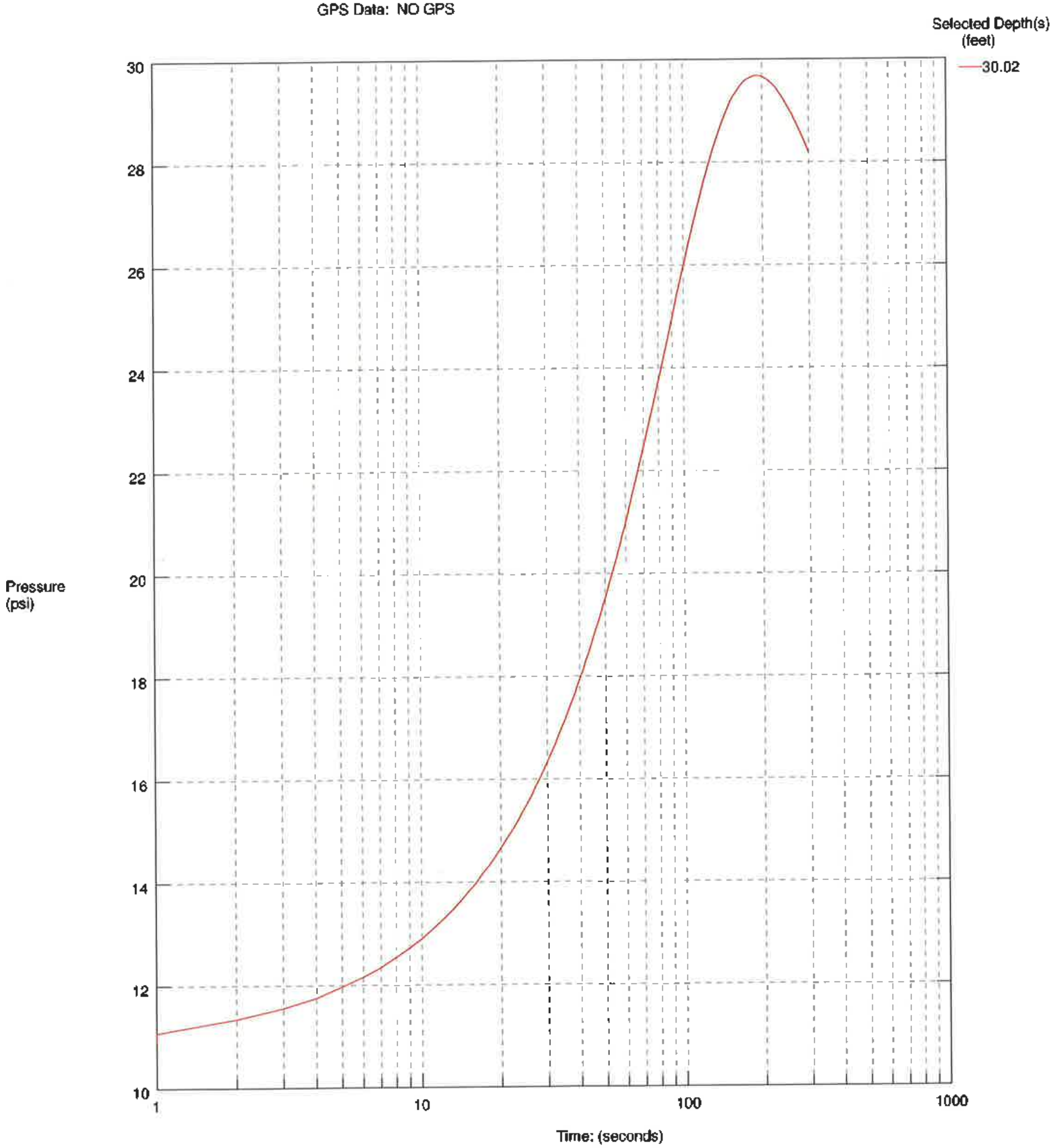
1 sensitive fine grained	4 silty clay to clay	7 silty sand to sandy silt	10 gravelly sand to sand
2 organic material	5 clayey silt to silty clay	8 sand to silty sand	11 very stiff fine grained (*)
3 clay	6 sandy silt to clayey silt	9 sand	12 sand to clayey sand (*)

*Soil behavior type and SPT based on data from UBC-1983

Terra Associates

Operator Romanelli
Sounding: CPT-04b
Cone Used: DDG1369
GPS Data: NO GPS

CPT Date/Time: 11/10/2016 7:08:58 PM
Location: Tacoma
Job Number: T-7543

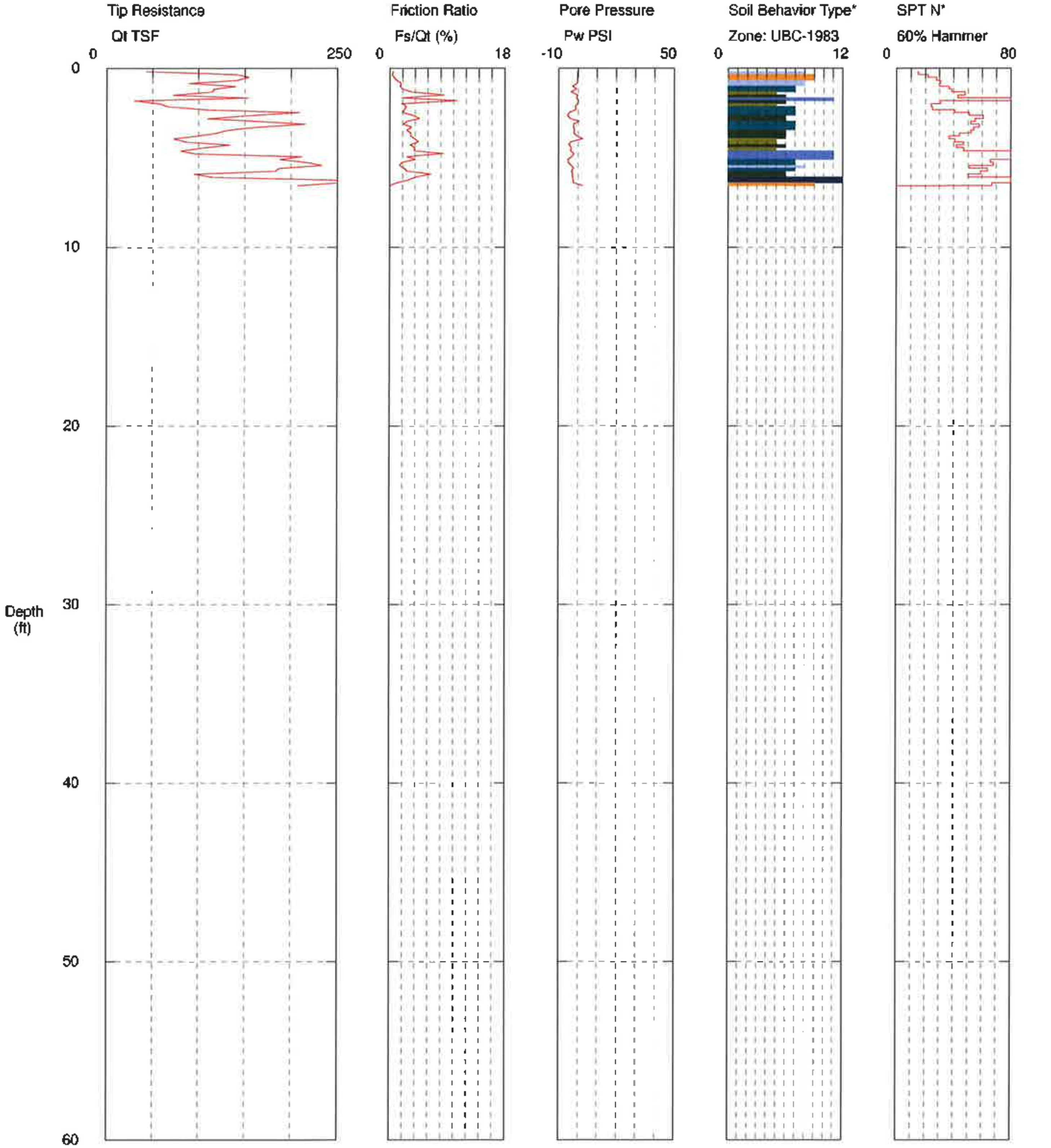


Maximum Pressure = 29.682 psi

Terra Associates

Operator: Romanelli
Sounding: CPT-05
Cone Used: DDG1369
GPS Data: NO GPS

CPT Date/Time: 11/10/2016 2:13:23 PM
Location: Tacoma
Job Number: T-7543



Maximum Depth = 6.56 feet

Depth Increment = 0.164 feet

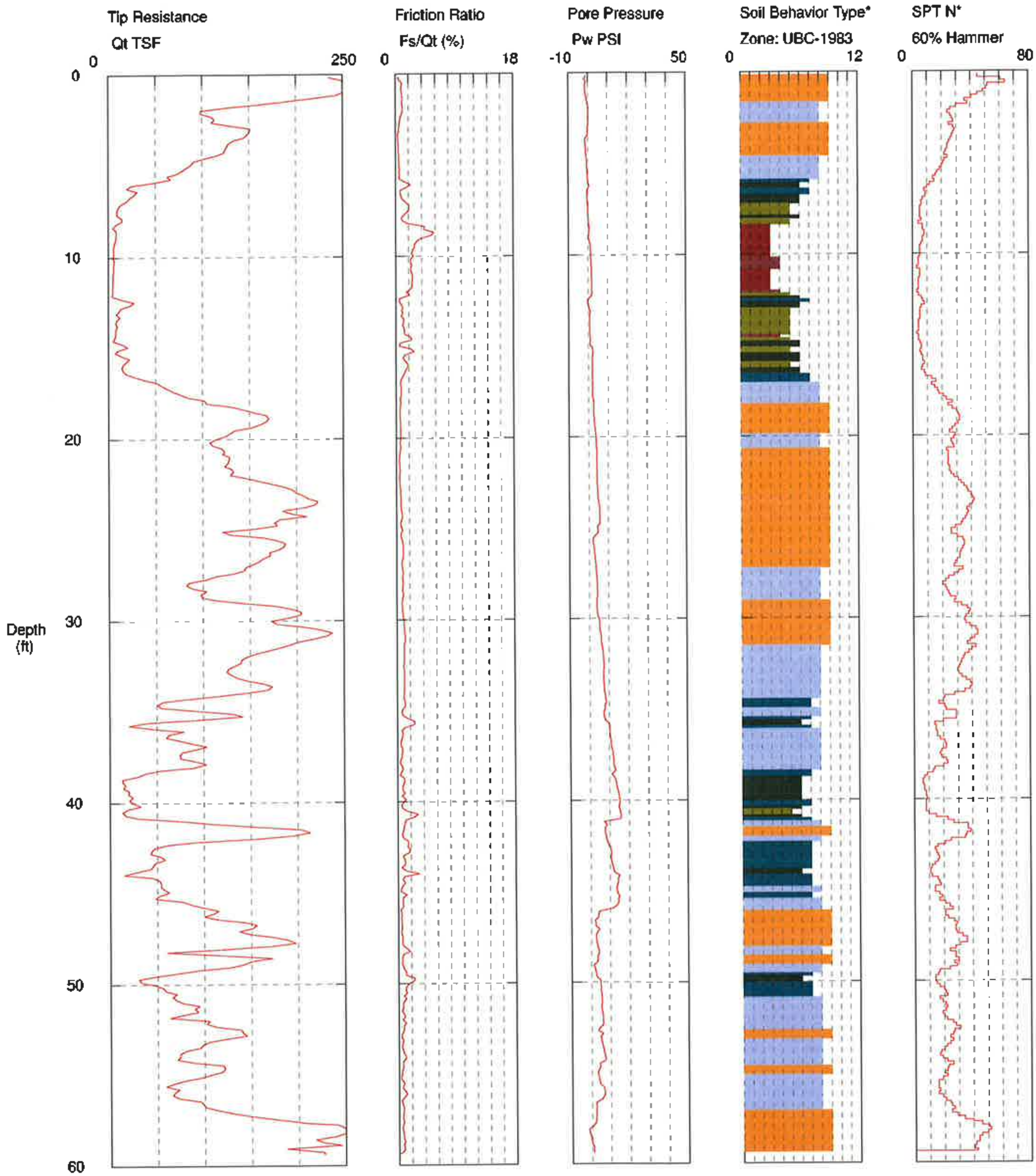
1 sensitive fine grained	4 silty clay to clay	7 silty sand to sandy silt	10 gravelly sand to sand
2 organic material	5 clayey silt to silty clay	8 sand to silty sand	11 very stiff fine grained (*)
3 clay	6 sandy silt to clayey silt	9 sand	12 sand to clayey sand (*)

*Soil behavior type and SPT based on data from UBC-1983

Terra Associates

Operator: Romanelli
Sounding: CPT-06a
Cone Used: DDG1263
GPS Data: NO GPS

CPT Date/Time: 11/11/2016 8:42:28 AM
Location: Tacoma
Job Number: T-7543



Maximum Depth = 59.38 feet

Depth Increment = 0.164 feet

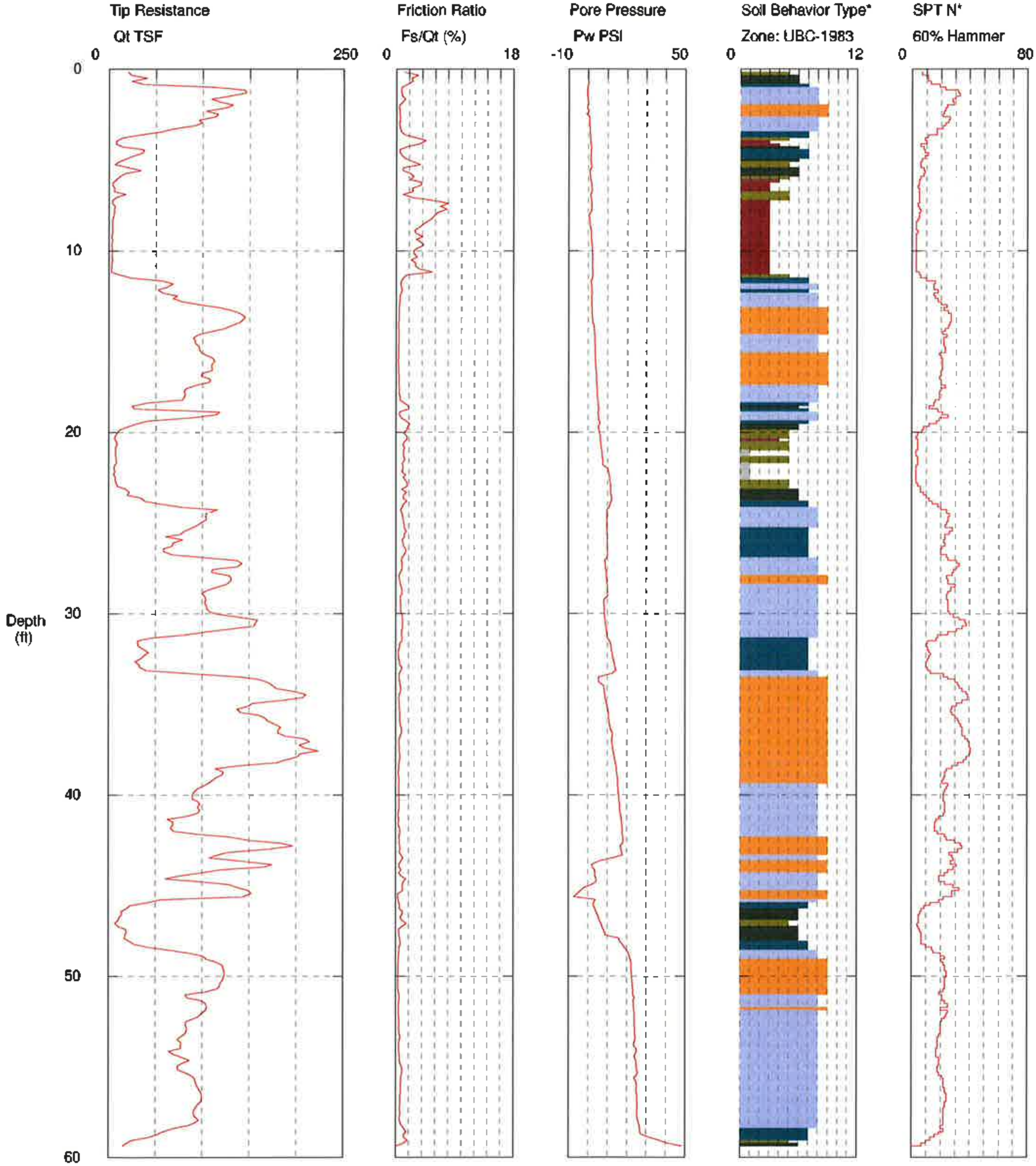
1 sensitive fine grained	4 silty clay to clay	7 silty sand to sandy silt	10 gravelly sand to sand
2 organic material	5 clayey silt to silty clay	8 sand to silty sand	11 very stiff fine grained (*)
3 clay	6 sandy silt to clayey silt	9 sand	12 sand to clayey sand (*)

*Soil behavior type and SPT based on data from UBC-1983

Terra Associates

Operator: Romanelli
Sounding: CPT-07
Cone Used: DDG1263
GPS Data: NO GPS

CPT Date/Time: 11/11/2016 9:41:54 AM
Location: Tacoma
Job Number: T-7543



Maximum Depth = 59.38 feet

Depth Increment = 0.164 feet

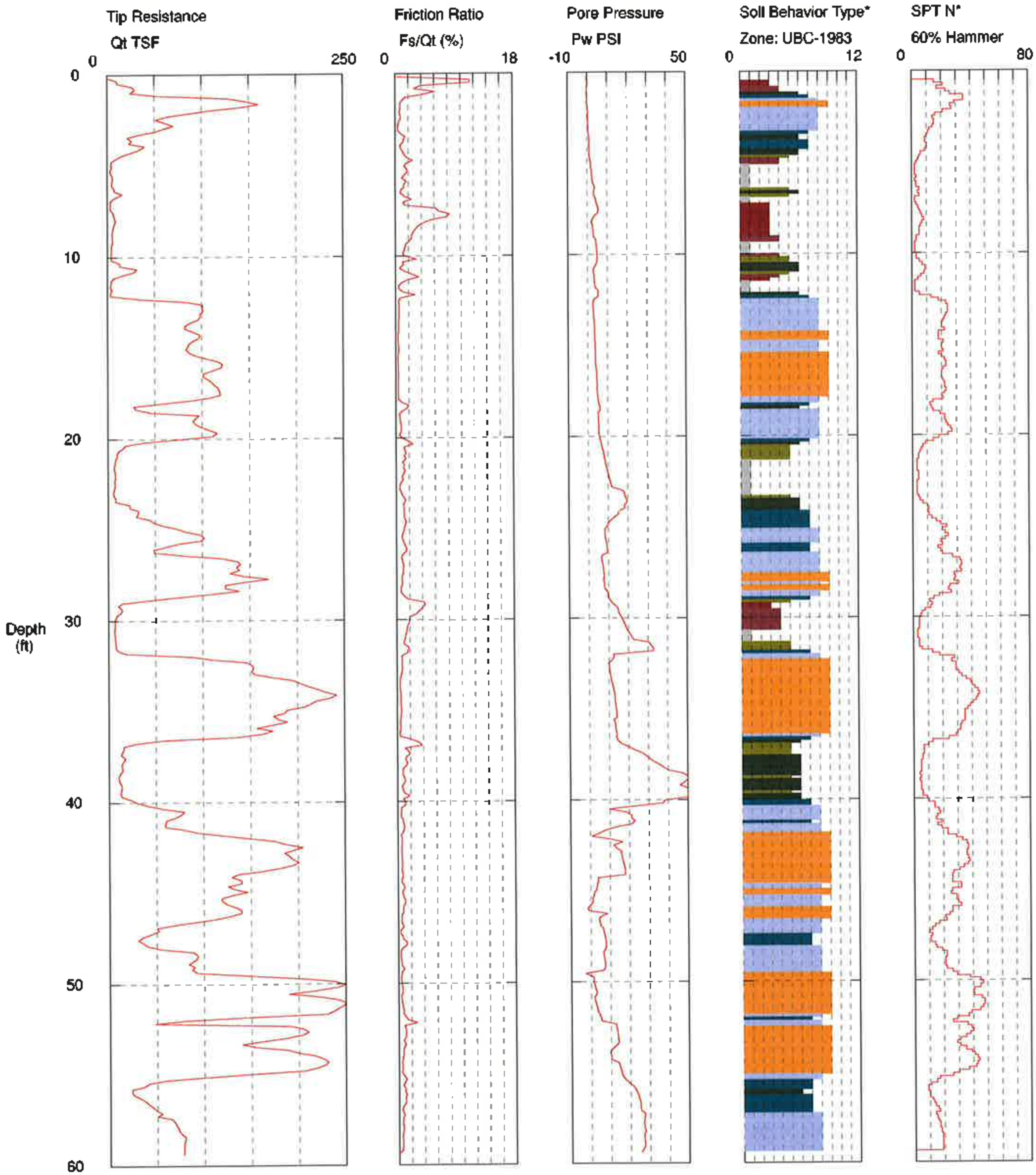
1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

*Soil behavior type and SPT based on data from UBC-1983

Terra Associates

Operator: Romanelli
Sounding: CPT-08a
Cone Used: DDG1263
GPS Data: NO GPS

CPT Date/Time: 11/11/2016 10:49:49 AM
Location: Tacoma
Job Number: T-7543



Maximum Depth = 59.38 feet

Depth Increment = 0.164 feet

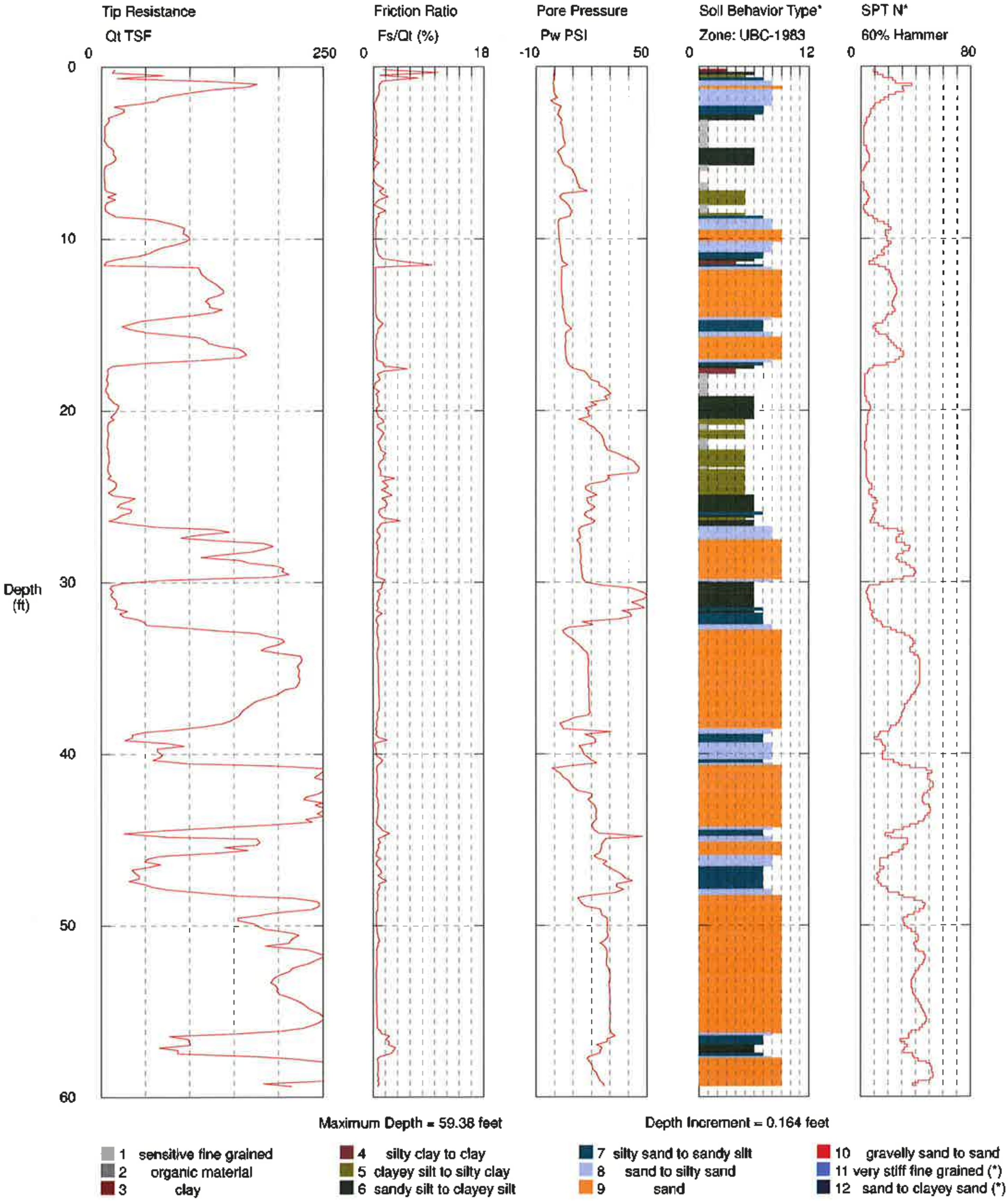
1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

*Soil behavior type and SPT based on data from UBC-1983

Terra Associates

Operator: Romanelli
Sounding: CPT-09a
Cone Used: DDG1263
GPS Data: NO GPS

CPT Date/Time: 11/11/2016 11:49:41 AM
Location: Tacoma
Job Number: T-7543

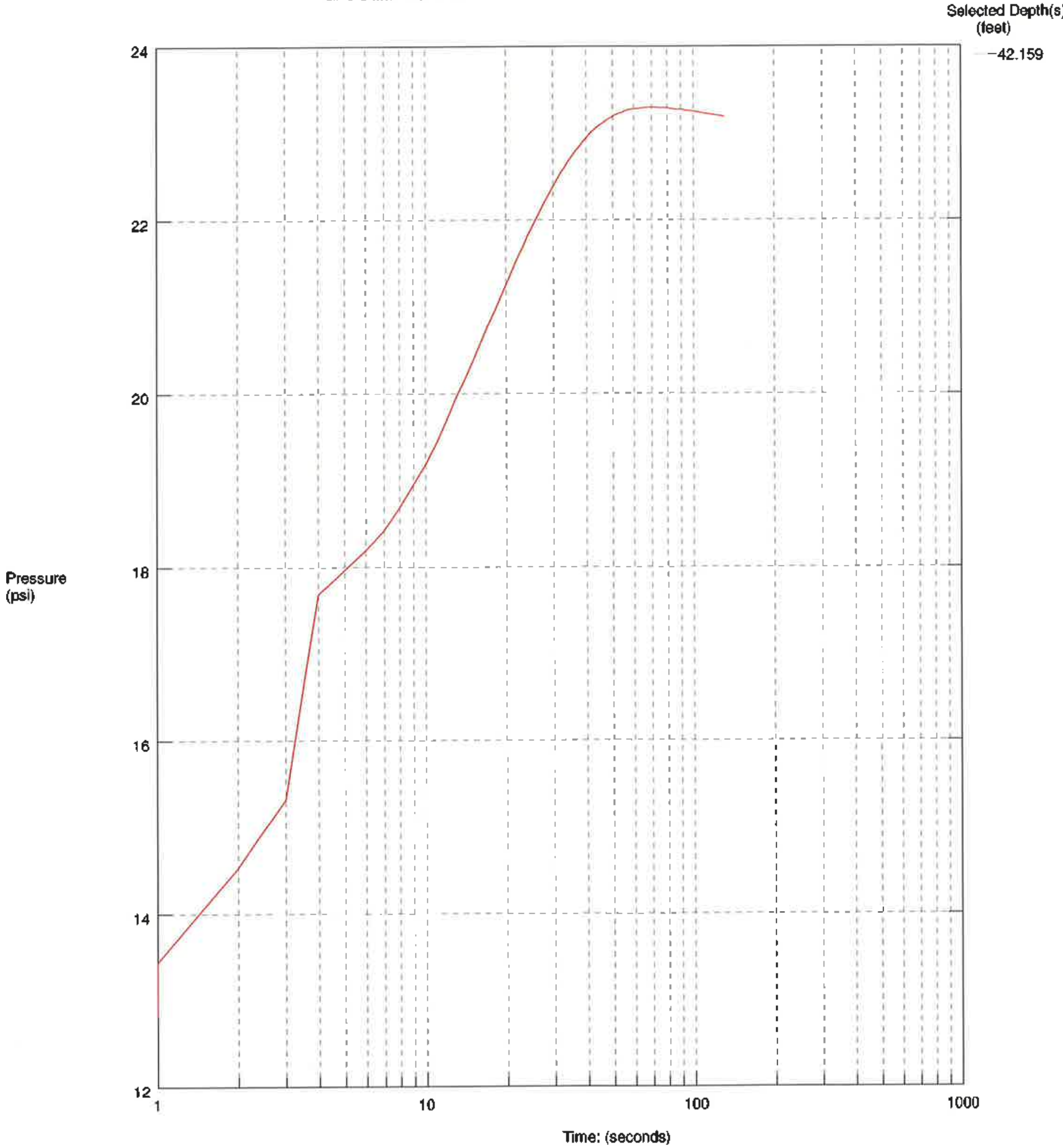


*Soil behavior type and SPT based on data from UBC-1983

Terra Associates

Operator Romanelli
Sounding: CPT-09a
Cone Used: DDG1263
GPS Data: NO GPS

CPT Date/Time: 11/11/2016 11:49:41 AM
Location: Tacoma
Job Number: T-7543



Maximum Pressure = 23.298 psi

APPENDIX B

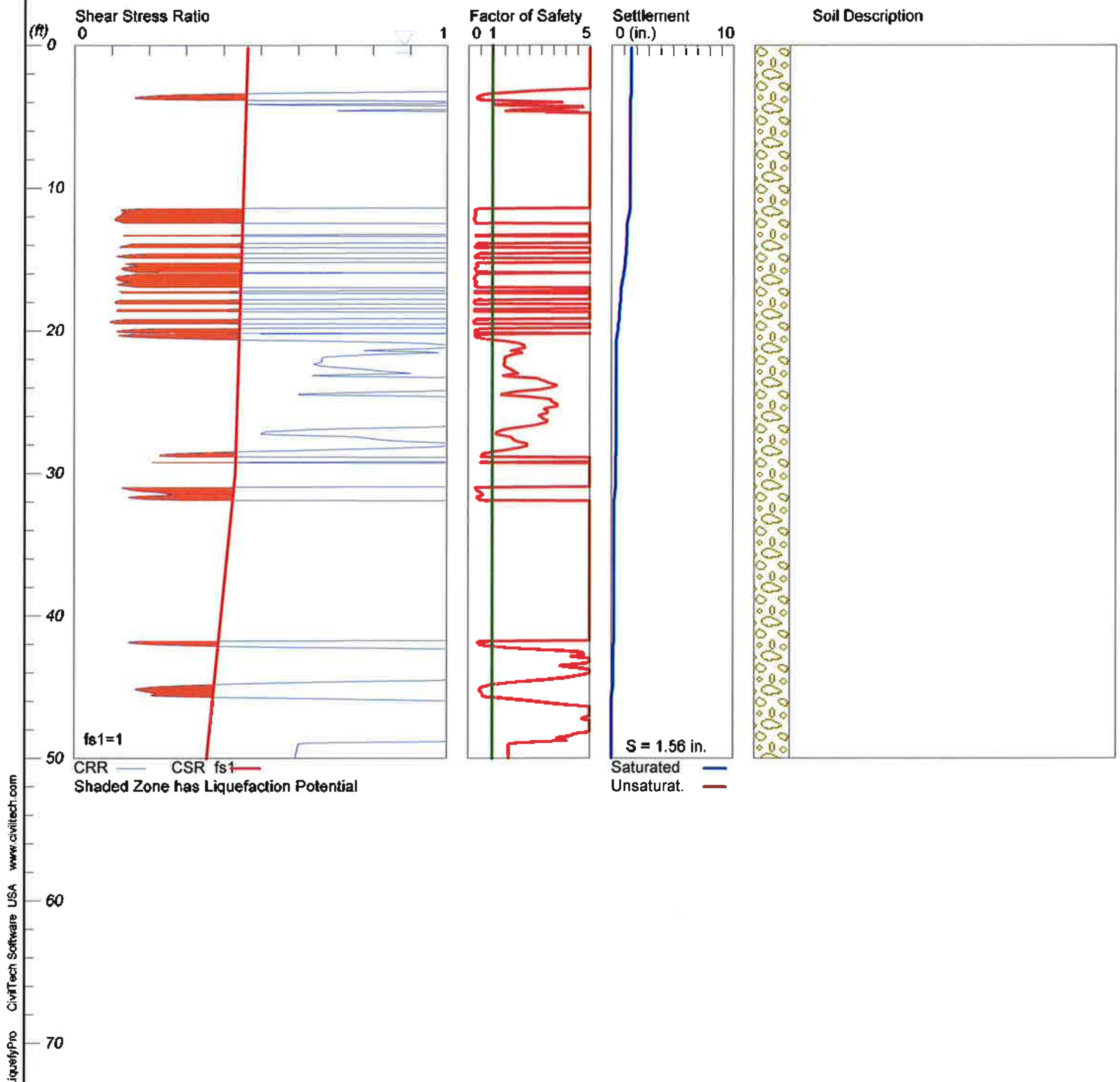
LIQUEFY PRO OUTPUT

LIQUEFACTION ANALYSIS

Taylor Way and Lincoln Ave

Hole No.=CPT-4 ***Water Depth=0 ft*** ***Magnitude=7***

Acceleration=.31g

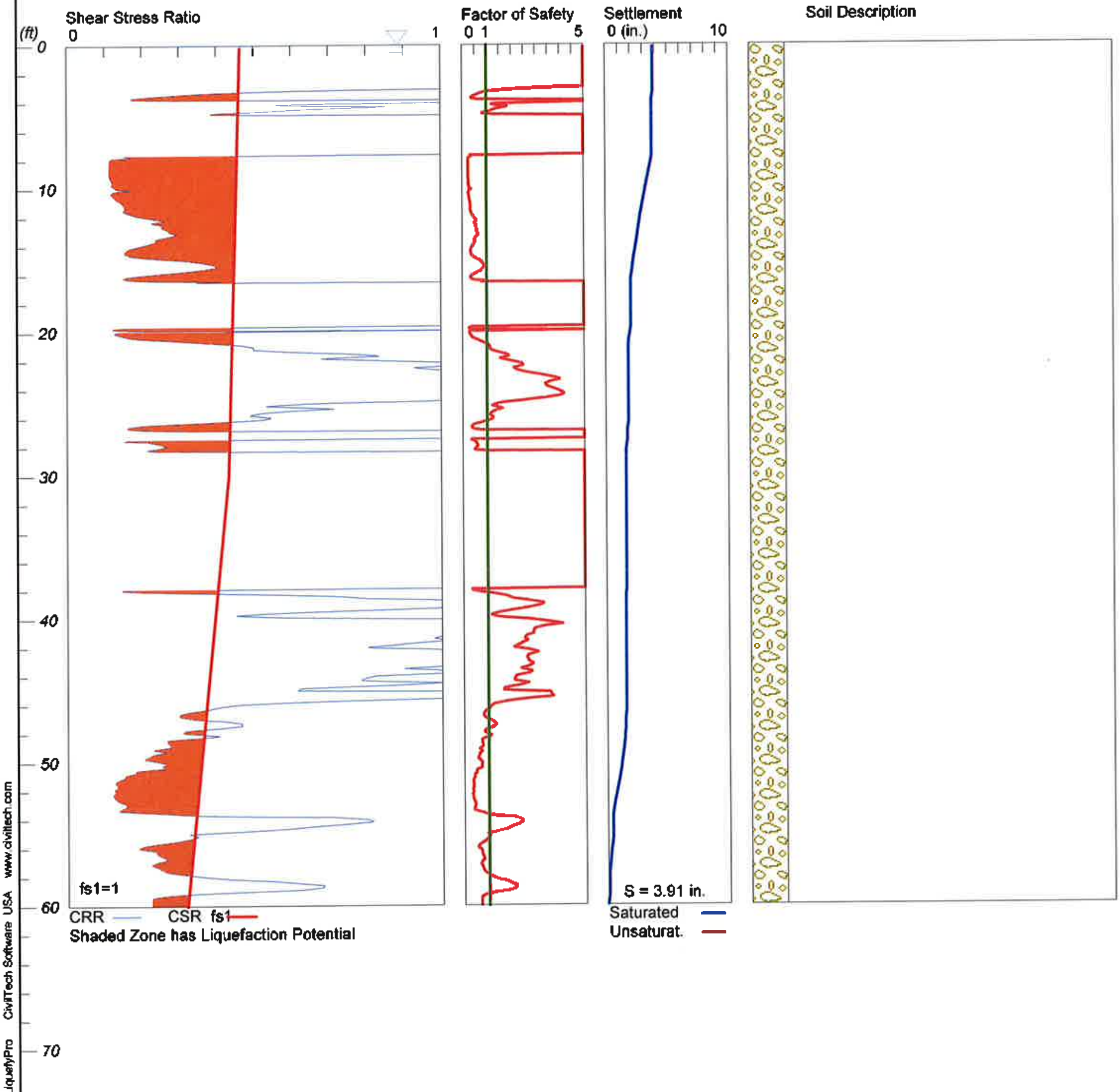


LIQUEFACTION ANALYSIS

Taylor Way and Lincoln Ave

Hole No.=CPT-3 Water Depth=0 ft

Magnitude=7
Acceleration=.31g

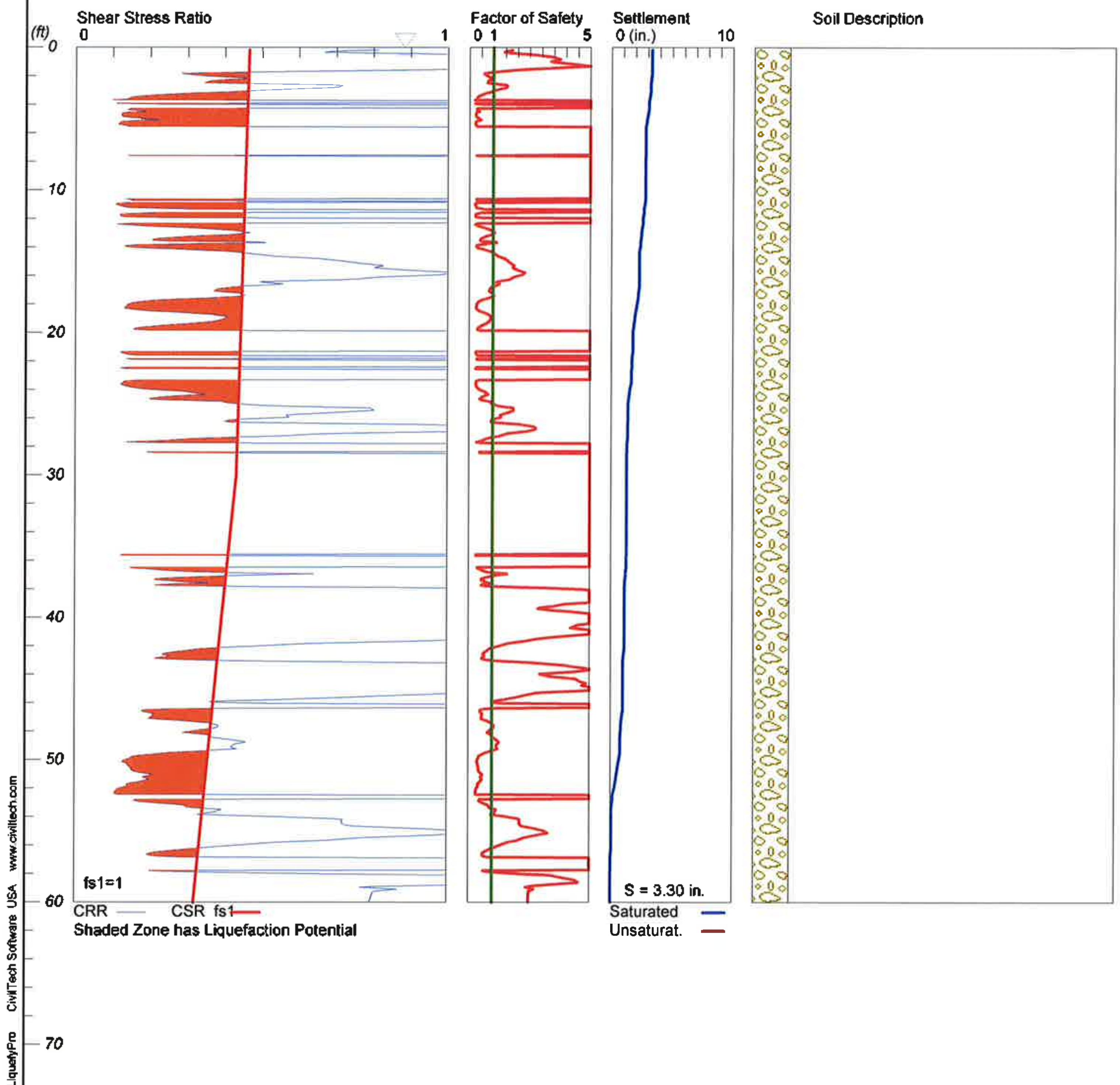


LIQUEFACTION ANALYSIS

Taylor Way and Lincoln Ave

Hole No.=CPT-2   Water Depth=0 ft

Magnitude=7
Acceleration=.31g

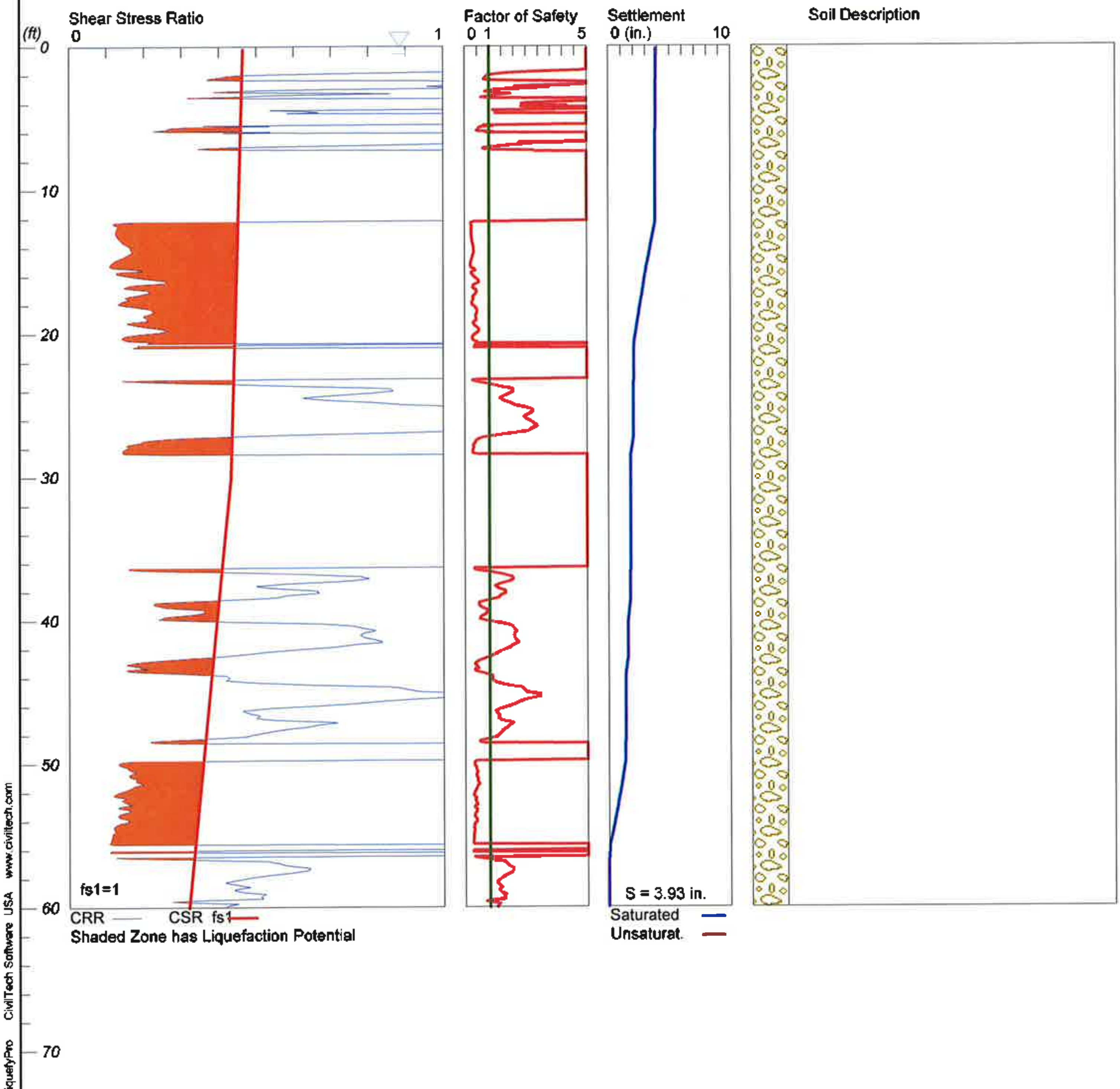


LIQUEFACTION ANALYSIS

Taylor Way and Lincoln Ave

Hole No.=CPT-1 ***Water Depth=0 ft*** ***Magnitude=7***

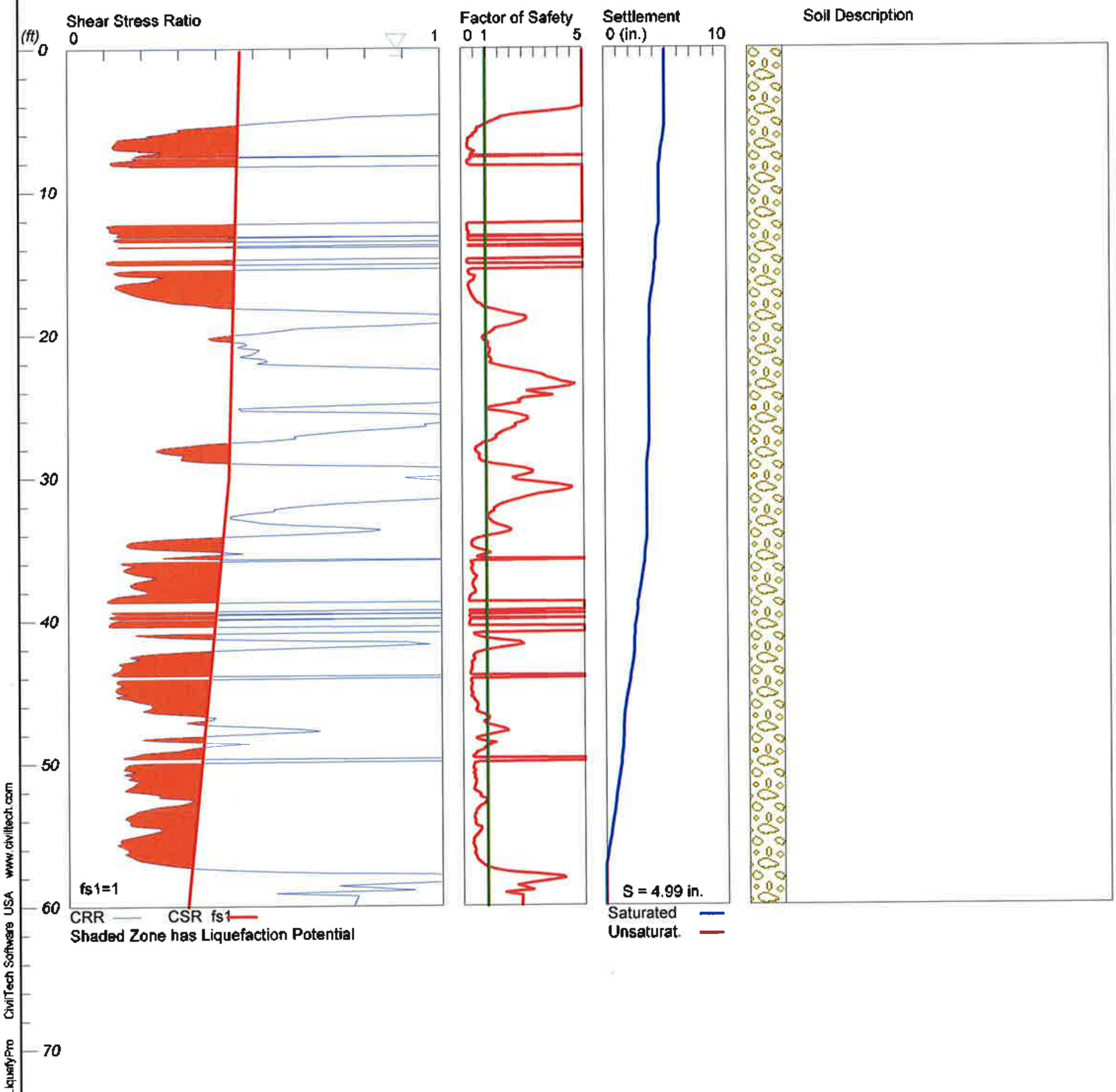
Acceleration=.31g



LIQUEFACTION ANALYSIS
Taylor Way and Lincoln Ave

Hole No.=CPT-6   Water Depth=0 ft

Magnitude=7
Acceleration=.31g

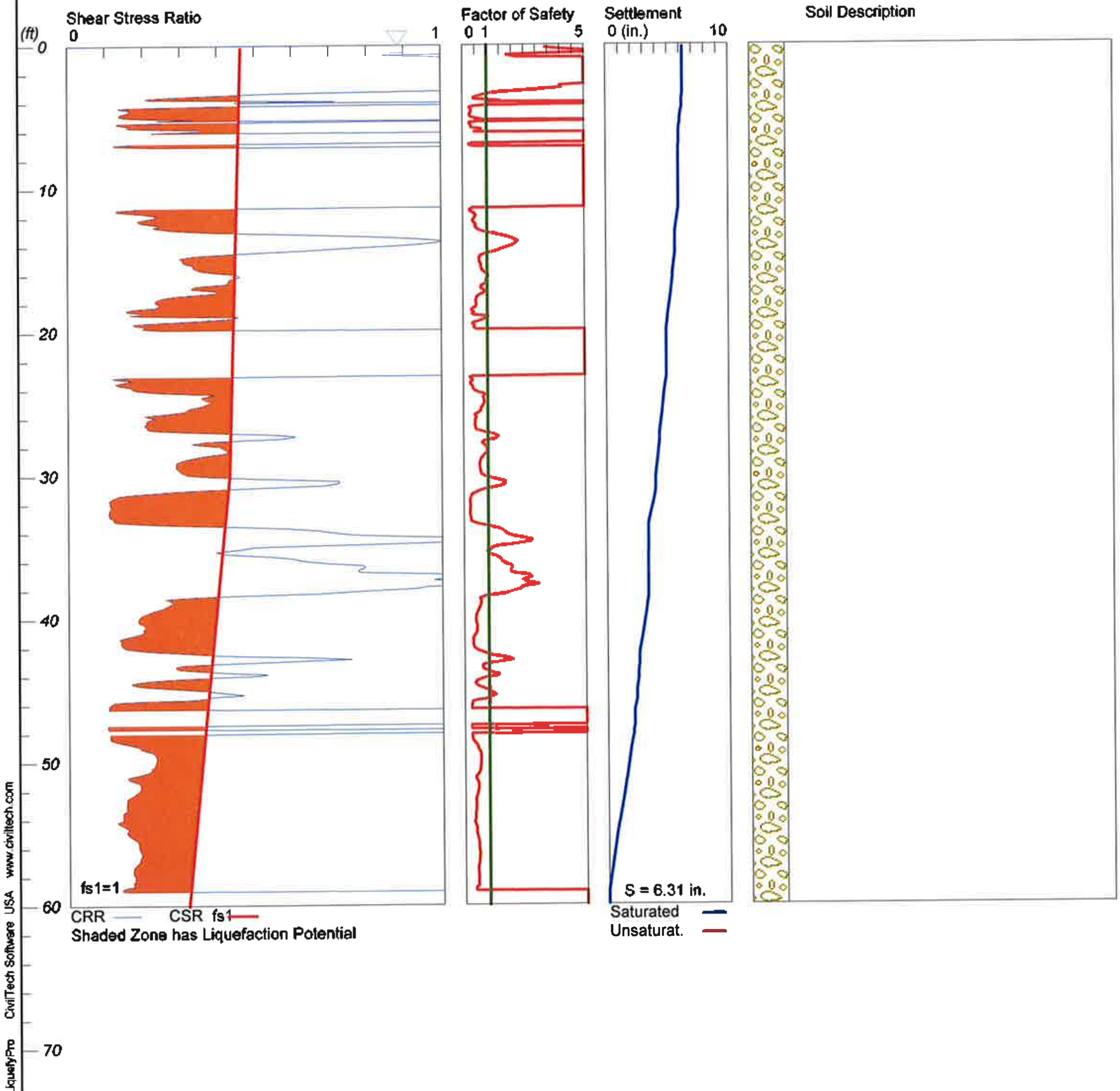


LIQUEFACTION ANALYSIS

Taylor Way and Lincoln Ave

Hole No.=CPT-7 Water Depth=0 ft

Magnitude=7
Acceleration=.31g

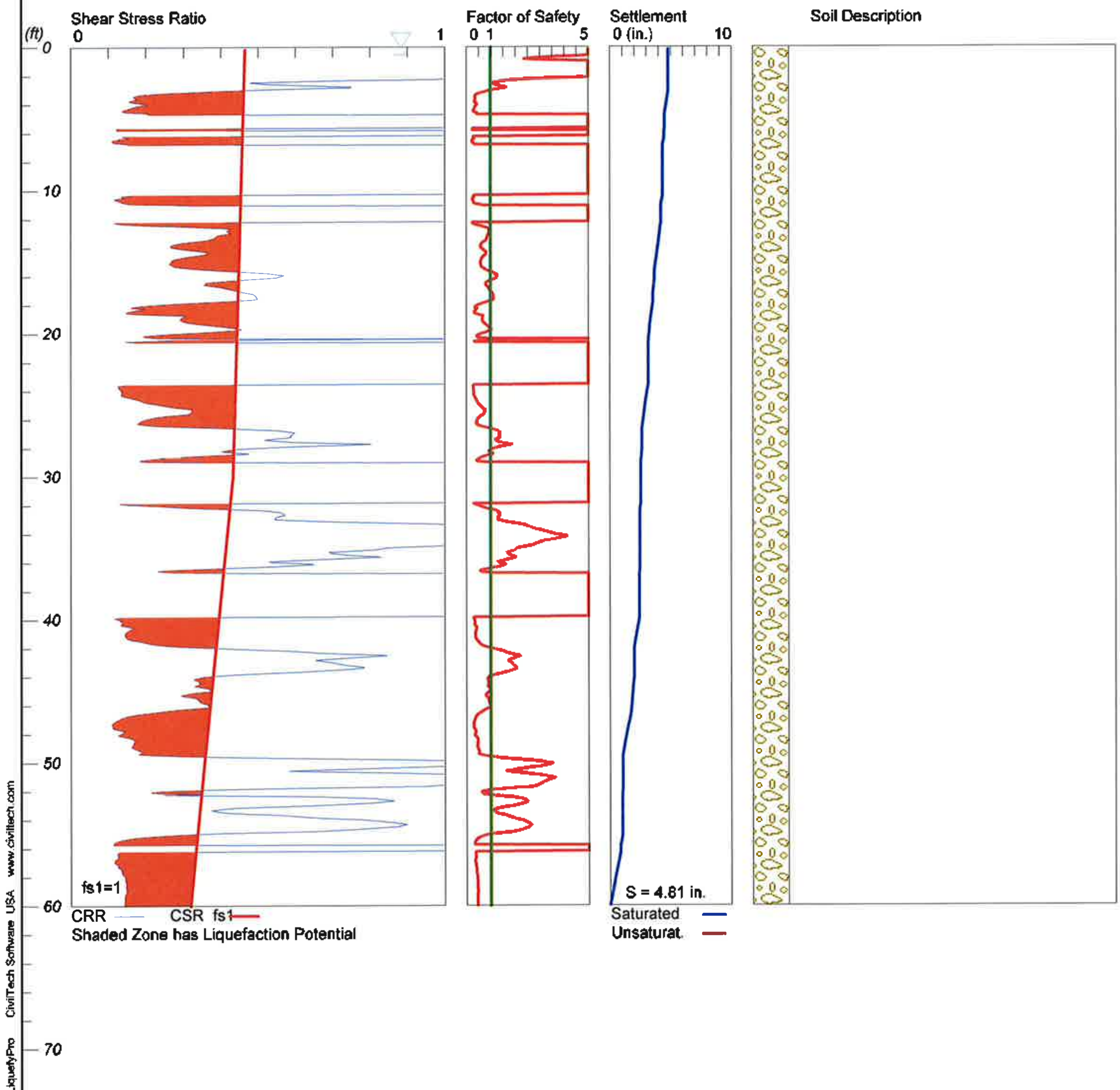


LIQUEFACTION ANALYSIS

Taylor Way and Lincoln Ave

Hole No.=CPT-8 ***Water Depth=0 ft***

Magnitude=7
Acceleration=.31g

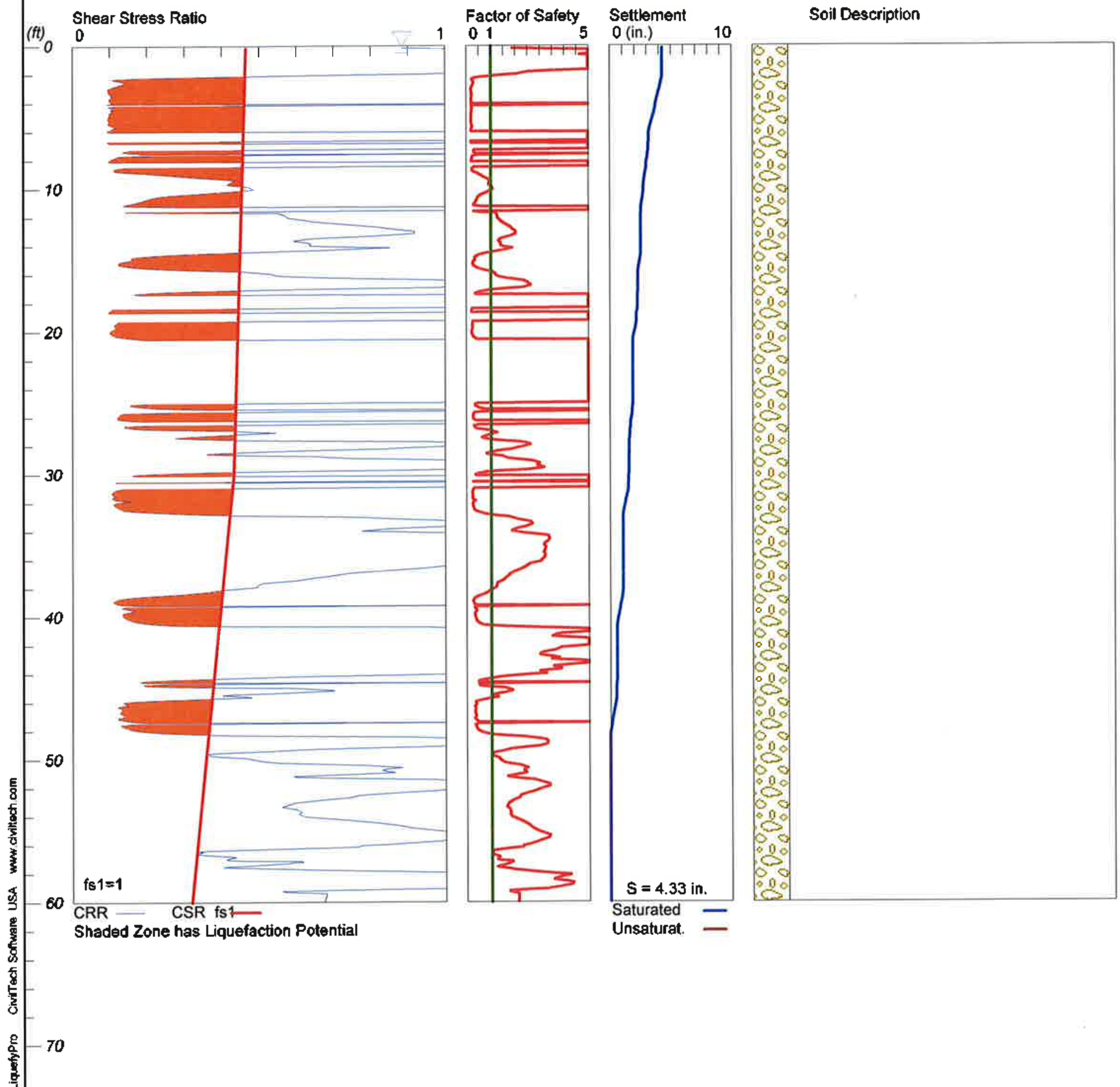


LIQUEFACTION ANALYSIS

Taylor Way and Lincoln Ave

Hole No.=CPT-9 Water Depth=0 ft

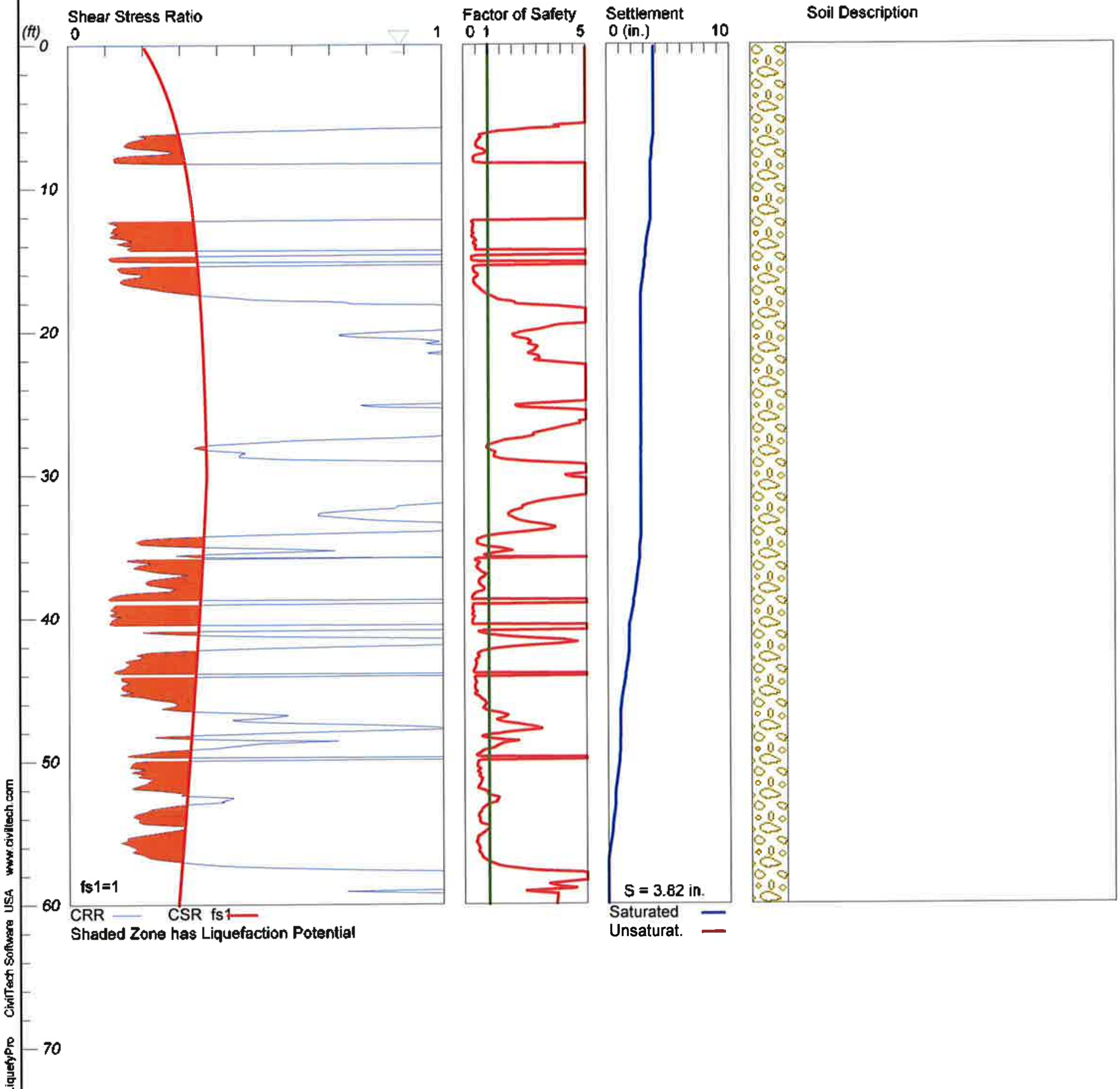
Magnitude=7
Acceleration=.31g



LIQUEFACTION ANALYSIS
Taylor Way and Lincoln Ave

Hole No.=CPT-6 Water Depth=0 ft
Ground Improvement of Fill=4 ft

Magnitude=7
Acceleration=.31g

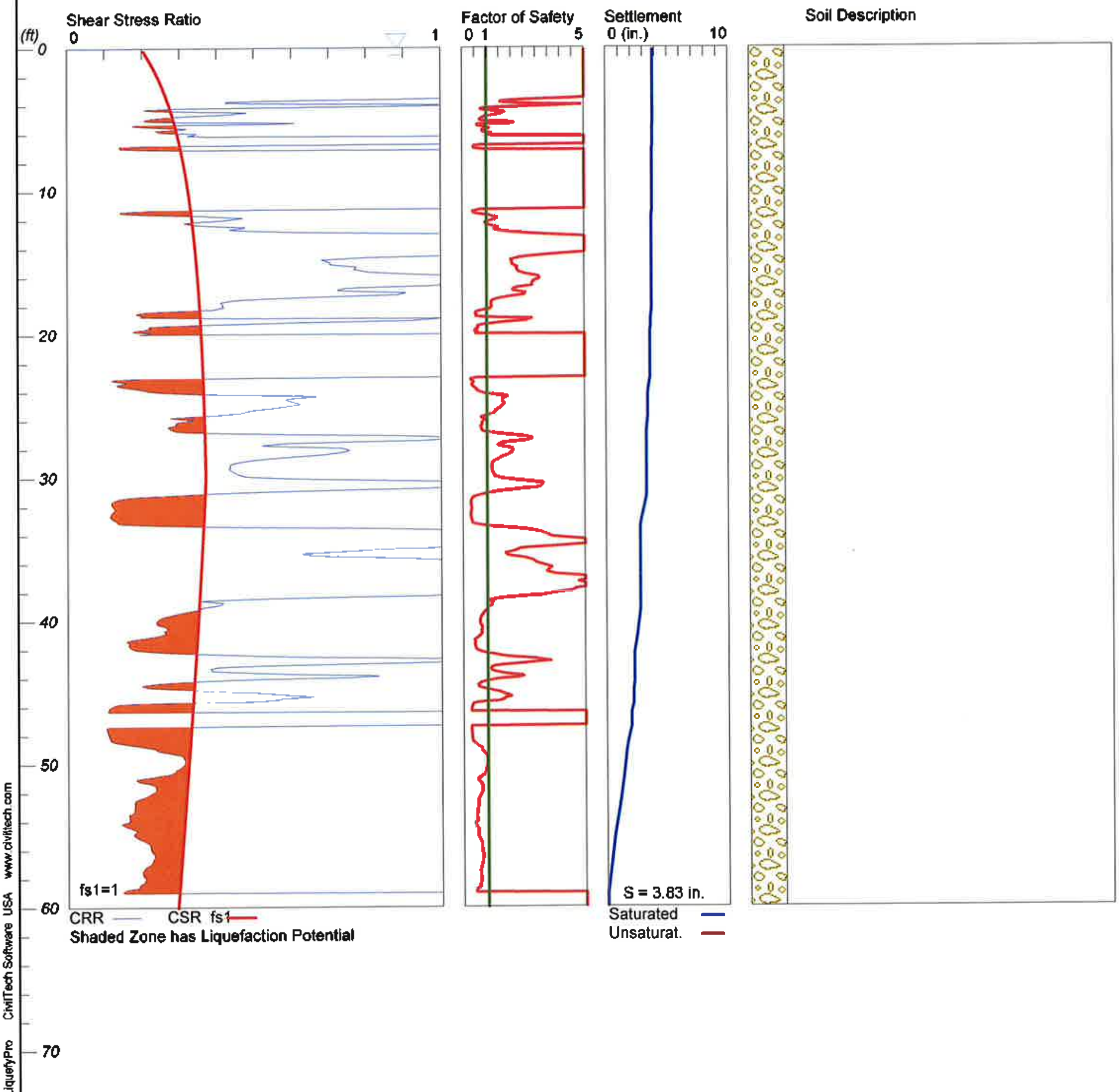


LIQUEFACTION ANALYSIS

Taylor Way and Lincoln Ave

Hole No.=CPT-7 Water Depth=0 ft
Ground Improvement of Fill=4 ft

Magnitude=7
Acceleration=.31g



LIQUEFACTION ANALYSIS

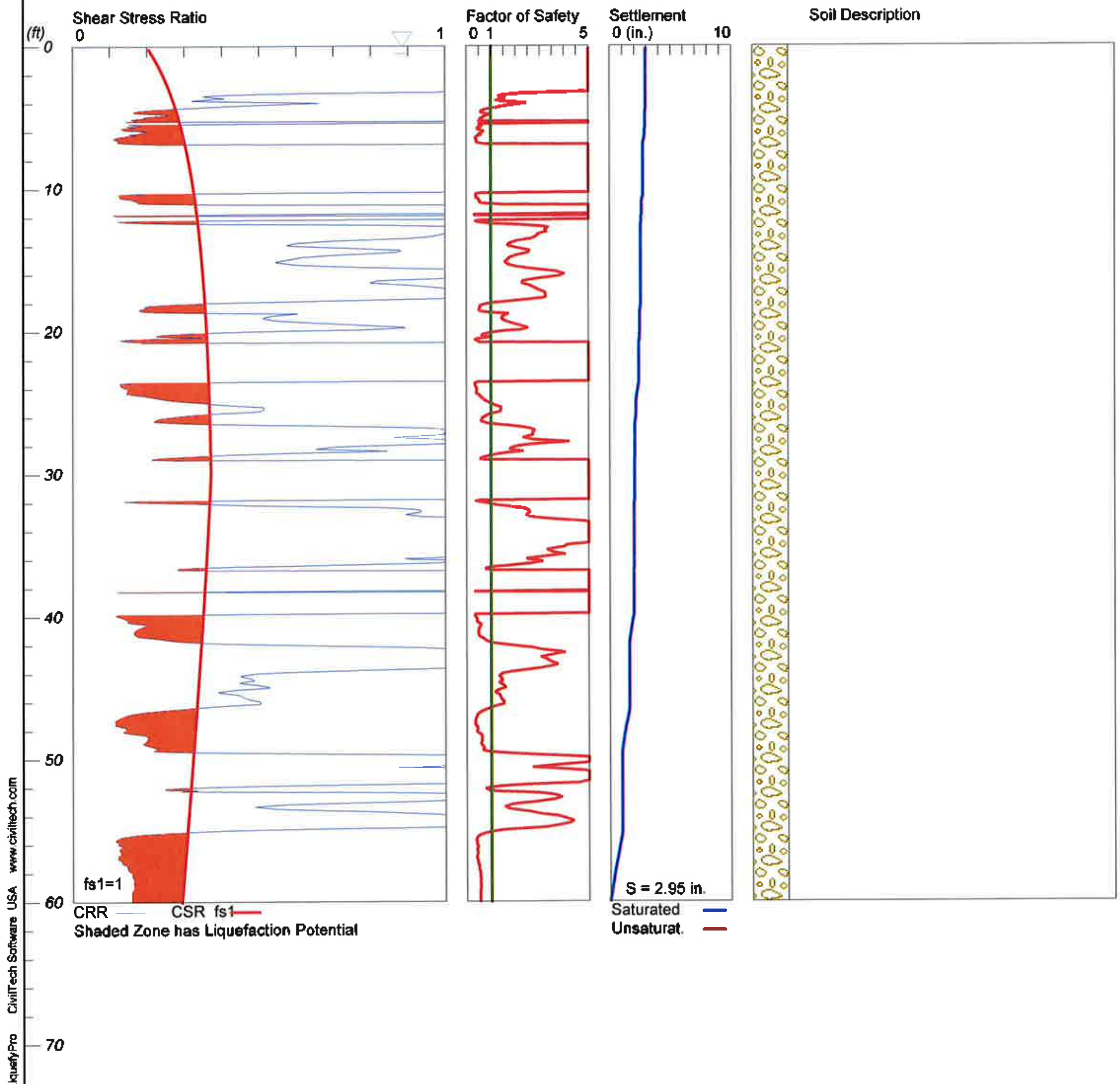
Taylor Way and Lincoln Ave

Hole No.=CPT-8 Water Depth=0 ft

Ground Improvement of Fill=4 ft

Magnitude=7

Acceleration=.31g

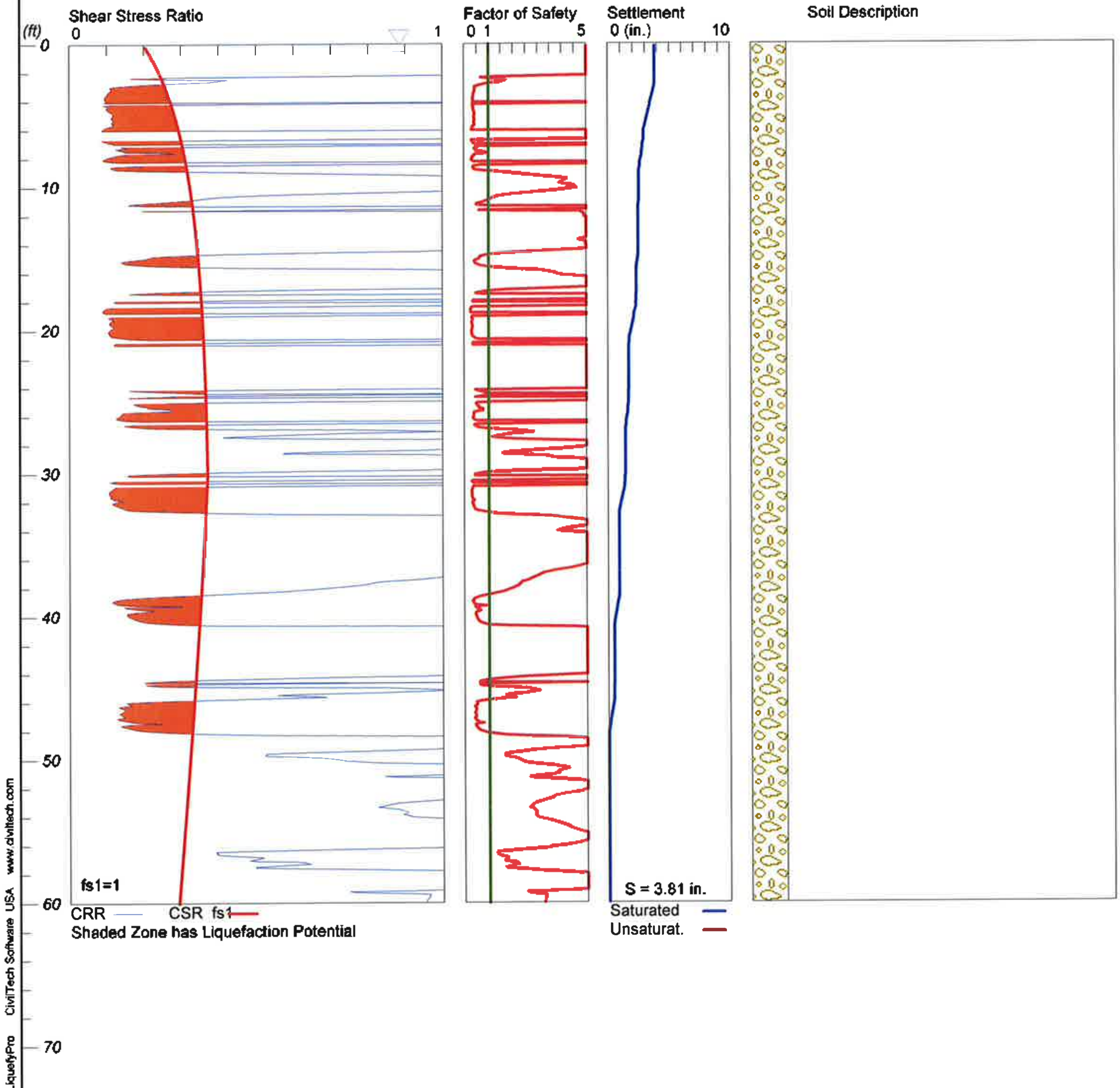


LIQUEFACTION ANALYSIS

Taylor Way and Lincoln Ave

Hole No.=CPT-9 Water Depth=0 ft ***Magnitude=7***

Ground Improvement of Fill=4 ft ***Acceleration=.31g***



CivilTech Corporation **CPT-9** **Plate A-1**

1514 Taylor Way Development

Interim Action Work Plan

Appendix F
2016 Groundwater Sampling
Laboratory Report

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Floyd | Snider
Tom Colligan
601 Union St., Suite 600
Seattle, WA 98101

RE: Ave 55 - Taylor Way
Work Order Number: 1612278

January 09, 2017

Attention Tom Colligan:

Fremont Analytical, Inc. received 12 sample(s) on 12/28/2016 for the analyses presented in the following report.

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.
Dissolved Gases by RSK-175
Dissolved Mercury by EPA Method 245.1
Dissolved Metals by EPA Method 200.8
Gasoline by NWTPH-Gx
Hexavalent Chromium by EPA 7196 / SM 3500 Cr B
Semi-Volatile Organic Compounds by EPA Method 8270
Volatile Organic Compounds by EPA Method 8260C

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Mike Ridgeway
Laboratory Director

DoD/ELAP Certification #L2371, ISO/IEC 17025:2005
ORELAP Certification: WA 100009-007 (NELAP Recognized)

Fremont Analytical

Date: *02/06/2017*

CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way
Work Order: 1612278

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1612278-001	TWP16-PMW1A	12/28/2016 10:20 AM	12/28/2016 5:24 PM
1612278-002	TWP16-PMW1B	12/28/2016 10:30 AM	12/28/2016 5:24 PM
1612278-003	TWP16-PMW2B	12/28/2016 12:00 PM	12/28/2016 5:24 PM
1612278-004	TWP16-PMW2X	12/28/2016 12:05 PM	12/28/2016 5:24 PM
1612278-005	TWP16-PMW2A	12/28/2016 12:00 PM	12/28/2016 5:24 PM
1612278-006	TWP16-PMW3A	12/28/2016 1:20 PM	12/28/2016 5:24 PM
1612278-007	TWP16-PMW3B	12/28/2016 1:15 PM	12/28/2016 5:24 PM
1612278-008	TWP16-PMW4A	12/28/2016 2:25 PM	12/28/2016 5:24 PM
1612278-009	TWP16-PMW4B	12/28/2016 2:45 PM	12/28/2016 5:24 PM
1612278-010	TWP16-PMW5A	12/28/2016 3:35 PM	12/28/2016 5:24 PM
1612278-011	TWP16-PMW5B	12/28/2016 4:00 PM	12/28/2016 5:24 PM
1612278-012	Trip Blank	12/20/2016 2:59 PM	12/28/2016 5:24 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Fremont Analytical

Case Narrative

WO#: **1612278**

Date: **1/9/2017**

CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Collection Date: 12/28/2016 10:20:00 AM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-001
Matrix: Groundwater
Client Sample ID: TWP16-PMW1A

Analyses	Result	RL	Qual	Units	DF	Date Analyzed

Dissolved Gases by RSK-175 — Batch ID: R33761 — Analyst: BC

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Methane	7.79	0.100	DE	mg/L	20	1/6/2017 12:01:00 PM

NOTES:
E - Estimated value. The amount exceeds the linear working range of the instrument.

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext. — Batch ID: 15795 — Analyst: WC

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel (Fuel Oil)	ND	49.9		µg/L	1	12/30/2016 3:27:56 PM
Diesel Range Organics (C12-C24)	483	49.9		µg/L	1	12/30/2016 3:27:56 PM
Heavy Oil	943	99.7		µg/L	1	12/30/2016 3:27:56 PM
Surr: 2-Fluorobiphenyl	77.9	50-150		%Rec	1	12/30/2016 3:27:56 PM
Surr: o-Terphenyl	83.9	50-150		%Rec	1	12/30/2016 3:27:56 PM

NOTES:
DRO - Indicates the presence of unresolved compounds eluting from dodecane through tetracosane (C12-C24).

Semi-Volatile Organic Compounds by EPA Method 8270 — Batch ID: 15825 — Analyst: BT

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Phenol	ND	1.98		µg/L	1	1/5/2017 5:35:17 PM
2-Chlorophenol	ND	0.991		µg/L	1	1/5/2017 5:35:17 PM
1,3-Dichlorobenzene	ND	0.991		µg/L	1	1/5/2017 5:35:17 PM
1,4-Dichlorobenzene	ND	0.991		µg/L	1	1/5/2017 5:35:17 PM
1,2-Dichlorobenzene	ND	0.991		µg/L	1	1/5/2017 5:35:17 PM
Benzyl alcohol	ND	0.991		µg/L	1	1/5/2017 5:35:17 PM
Bis(2-chloroethyl) ether	ND	1.98		µg/L	1	1/5/2017 5:35:17 PM
2-Methylphenol (o-cresol)	ND	0.991		µg/L	1	1/5/2017 5:35:17 PM
Hexachloroethane	ND	0.991		µg/L	1	1/5/2017 5:35:17 PM
N-Nitrosodi-n-propylamine	ND	0.991		µg/L	1	1/5/2017 5:35:17 PM
Nitrobenzene	ND	1.98		µg/L	1	1/5/2017 5:35:17 PM
Isophorone	ND	0.991		µg/L	1	1/5/2017 5:35:17 PM
4-Methylphenol (p-cresol)	ND	0.991		µg/L	1	1/5/2017 5:35:17 PM
2-Nitrophenol	ND	1.98		µg/L	1	1/5/2017 5:35:17 PM
2,4-Dimethylphenol	ND	0.991		µg/L	1	1/5/2017 5:35:17 PM
Bis(2-chloroethoxy)methane	ND	0.991		µg/L	1	1/5/2017 5:35:17 PM
2,4-Dichlorophenol	ND	1.98		µg/L	1	1/5/2017 5:35:17 PM
1,2,4-Trichlorobenzene	ND	0.991		µg/L	1	1/5/2017 5:35:17 PM
Naphthalene	ND	0.495		µg/L	1	1/5/2017 5:35:17 PM
4-Chloroaniline	ND	4.95		µg/L	1	1/5/2017 5:35:17 PM
Hexachlorobutadiene	ND	0.991		µg/L	1	1/5/2017 5:35:17 PM
4-Chloro-3-methylphenol	ND	4.95		µg/L	1	1/5/2017 5:35:17 PM
2-Methylnaphthalene	0.593	0.495	Q	µg/L	1	1/5/2017 5:35:17 PM

Client: Floyd | Snider **Collection Date:** 12/28/2016 10:20:00 AM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-001 **Matrix:** Groundwater
Client Sample ID: TWP16-PMW1A

Semi-Volatile Organic Compounds by EPA Method 8270 Batch ID: 15825 Analyst: BT

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
1-Methylnaphthalene	0.777	0.495		µg/L	1	1/5/2017 5:35:17 PM
Hexachlorocyclopentadiene	ND	0.991	Q	µg/L	1	1/5/2017 5:35:17 PM
2,4,6-Trichlorophenol	ND	1.98		µg/L	1	1/5/2017 5:35:17 PM
2,4,5-Trichlorophenol	ND	1.98		µg/L	1	1/5/2017 5:35:17 PM
2-Chloronaphthalene	ND	0.991		µg/L	1	1/5/2017 5:35:17 PM
2-Nitroaniline	ND	4.95		µg/L	1	1/5/2017 5:35:17 PM
Acenaphthene	ND	0.495		µg/L	1	1/5/2017 5:35:17 PM
Dimethylphthalate	ND	0.991		µg/L	1	1/5/2017 5:35:17 PM
2,6-Dinitrotoluene	ND	0.991		µg/L	1	1/5/2017 5:35:17 PM
Acenaphthylene	ND	0.495		µg/L	1	1/5/2017 5:35:17 PM
2,4-Dinitrophenol	ND	1.98	Q	µg/L	1	1/5/2017 5:35:17 PM
Dibenzofuran	ND	0.991		µg/L	1	1/5/2017 5:35:17 PM
2,4-Dinitrotoluene	ND	0.991		µg/L	1	1/5/2017 5:35:17 PM
4-Nitrophenol	ND	4.95		µg/L	1	1/5/2017 5:35:17 PM
Fluorene	ND	0.495		µg/L	1	1/5/2017 5:35:17 PM
4-Chlorophenyl phenyl ether	ND	0.991		µg/L	1	1/5/2017 5:35:17 PM
Diethylphthalate	ND	0.991		µg/L	1	1/5/2017 5:35:17 PM
4,6-Dinitro-2-methylphenol	ND	4.95	Q	µg/L	1	1/5/2017 5:35:17 PM
4-Bromophenyl phenyl ether	ND	0.991		µg/L	1	1/5/2017 5:35:17 PM
Hexachlorobenzene	ND	0.991		µg/L	1	1/5/2017 5:35:17 PM
Pentachlorophenol	ND	1.98		µg/L	1	1/5/2017 5:35:17 PM
Phenanthrene	ND	0.495		µg/L	1	1/5/2017 5:35:17 PM
Anthracene	ND	0.495		µg/L	1	1/5/2017 5:35:17 PM
Carbazole	ND	4.95		µg/L	1	1/5/2017 5:35:17 PM
Di-n-butyl phthalate	ND	0.991		µg/L	1	1/5/2017 5:35:17 PM
Fluoranthene	ND	0.495		µg/L	1	1/5/2017 5:35:17 PM
Pyrene	ND	0.495		µg/L	1	1/5/2017 5:35:17 PM
Benzyl Butylphthalate	ND	0.991		µg/L	1	1/5/2017 5:35:17 PM
bis(2-Ethylhexyl)adipate	ND	0.991		µg/L	1	1/5/2017 5:35:17 PM
Benz[a]anthracene	ND	0.495		µg/L	1	1/5/2017 5:35:17 PM
Chrysene	ND	0.495		µg/L	1	1/5/2017 5:35:17 PM
Bis(2-ethylhexyl) phthalate	ND	0.991		µg/L	1	1/5/2017 5:35:17 PM
Di-n-octyl phthalate	ND	0.991		µg/L	1	1/5/2017 5:35:17 PM
Benzo (b) fluoranthene	ND	0.495		µg/L	1	1/5/2017 5:35:17 PM
Benzo (k) fluoranthene	ND	0.495		µg/L	1	1/5/2017 5:35:17 PM
Benzo[a]pyrene	ND	0.495		µg/L	1	1/5/2017 5:35:17 PM
Indeno (1,2,3-cd) pyrene	ND	0.495		µg/L	1	1/5/2017 5:35:17 PM
Dibenzo (a,h) anthracene	ND	0.495		µg/L	1	1/5/2017 5:35:17 PM
Benzo (g,h,I) perylene	ND	0.495		µg/L	1	1/5/2017 5:35:17 PM

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Collection Date: 12/28/2016 10:20:00 AM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-001
Matrix: Groundwater
Client Sample ID: **TWP16-PMW1A**

Semi-Volatile Organic Compounds by EPA Method 8270

Batch ID: 15825 Analyst: BT

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Surr: 2,4,6-Tribromophenol	96.5	5-127		%Rec	1	1/5/2017 5:35:17 PM
Surr: 2-Fluorobiphenyl	61.1	24.1-139		%Rec	1	1/5/2017 5:35:17 PM
Surr: Nitrobenzene-d5	65.5	21.9-139		%Rec	1	1/5/2017 5:35:17 PM
Surr: Phenol-d6	62.3	10.3-128		%Rec	1	1/5/2017 5:35:17 PM
Surr: p-Terphenyl	60.4	25.2-132		%Rec	1	1/5/2017 5:35:17 PM

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Gasoline by NWTPH-Gx

Batch ID: 15802 Analyst: NG

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Gasoline	55.1	50.0		µg/L	1	1/4/2017 1:40:34 PM
Surr: Toluene-d8	101	65-135		%Rec	1	1/4/2017 1:40:34 PM
Surr: 4-Bromofluorobenzene	96.3	65-135		%Rec	1	1/4/2017 1:40:34 PM

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 15802 Analyst: NG

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dichlorodifluoromethane (CFC-12)	ND	1.00	Q	µg/L	1	1/4/2017 1:40:34 PM
Chloromethane	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
Vinyl chloride	ND	0.200		µg/L	1	1/4/2017 1:40:34 PM
Bromomethane	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
Trichlorofluoromethane (CFC-11)	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
Chloroethane	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
1,1-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
Methylene chloride	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
trans-1,2-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
Methyl tert-butyl ether (MTBE)	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
1,1-Dichloroethane	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
2,2-Dichloropropane	ND	2.00	Q	µg/L	1	1/4/2017 1:40:34 PM
cis-1,2-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
Chloroform	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
1,1,1-Trichloroethane (TCA)	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
1,1-Dichloropropene	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
Carbon tetrachloride	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
1,2-Dichloroethane (EDC)	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
Benzene	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
Trichloroethene (TCE)	ND	0.500		µg/L	1	1/4/2017 1:40:34 PM
1,2-Dichloropropane	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
Bromodichloromethane	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider **Collection Date:** 12/28/2016 10:20:00 AM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-001 **Matrix:** Groundwater
Client Sample ID: TWP16-PMW1A

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 15802		Analyst: NG
Dibromomethane	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
cis-1,3-Dichloropropene	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
Toluene	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
trans-1,3-Dichloropropylene	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
1,1,2-Trichloroethane	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
1,3-Dichloropropane	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
Tetrachloroethene (PCE)	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
Dibromochloromethane	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
1,2-Dibromoethane (EDB)	ND	0.0600		µg/L	1	1/4/2017 1:40:34 PM
Chlorobenzene	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
1,1,1,2-Tetrachloroethane	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
Ethylbenzene	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
m,p-Xylene	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
o-Xylene	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
Styrene	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
Isopropylbenzene	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
Bromoform	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
1,1,2,2-Tetrachloroethane	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
n-Propylbenzene	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
Bromobenzene	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
1,3,5-Trimethylbenzene	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
2-Chlorotoluene	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
4-Chlorotoluene	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
tert-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
1,2,3-Trichloropropane	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
1,2,4-Trichlorobenzene	ND	2.00		µg/L	1	1/4/2017 1:40:34 PM
sec-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
4-Isopropyltoluene	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
1,3-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
1,4-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
n-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
1,2-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
1,2-Dibromo-3-chloropropane	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
1,2,4-Trimethylbenzene	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
Hexachloro-1,3-butadiene	ND	4.00		µg/L	1	1/4/2017 1:40:34 PM
Naphthalene	ND	1.00		µg/L	1	1/4/2017 1:40:34 PM
1,2,3-Trichlorobenzene	ND	4.00		µg/L	1	1/4/2017 1:40:34 PM
Surr: Dibromofluoromethane	101	45.4-152		%Rec	1	1/4/2017 1:40:34 PM
Surr: Toluene-d8	102	40.1-139		%Rec	1	1/4/2017 1:40:34 PM

Fremont Analytical

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Collection Date: 12/28/2016 10:20:00 AM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-001
Matrix: Groundwater
Client Sample ID: TWP16-PMW1A

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 15802		Analyst: NG
Surr: 1-Bromo-4-fluorobenzene	96.7	64.2-128		%Rec	1	1/4/2017 1:40:34 PM

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Mercury by EPA Method 245.1				Batch ID: 15826		Analyst: WF
Mercury	ND	0.100		µg/L	1	1/3/2017 3:17:29 PM
Dissolved Metals by EPA Method 200.8				Batch ID: 15820		Analyst: TN
Arsenic	1.83	1.00		µg/L	1	1/3/2017 12:41:57 PM
Barium	357	0.500		µg/L	1	1/3/2017 12:41:57 PM
Cadmium	ND	0.200		µg/L	1	1/3/2017 12:41:57 PM
Chromium	0.614	0.500		µg/L	1	1/3/2017 12:41:57 PM
Copper	ND	0.500		µg/L	1	1/3/2017 12:41:57 PM
Lead	ND	0.500		µg/L	1	1/3/2017 12:41:57 PM
Nickel	ND	0.500		µg/L	1	1/3/2017 12:41:57 PM
Zinc	2.44	1.50		µg/L	1	1/3/2017 12:41:57 PM
Hexavalent Chromium by EPA 7196 / SM 3500 Cr B				Batch ID: R33688		Analyst: KT
Chromium, Hexavalent	ND	0.0500		mg/L	1	12/29/2016 9:16:00 AM

Client: Floyd | Snider **Collection Date:** 12/28/2016 10:30:00 AM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-002 **Matrix:** Groundwater
Client Sample ID: TWP16-PMW1B

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext. Batch ID: 15795 Analyst: WC

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel (Fuel Oil)	ND	50.3		µg/L	1	12/30/2016 4:29:34 PM
Diesel Range Organics (C12-C24)	416	50.3		µg/L	1	12/30/2016 4:29:34 PM
Heavy Oil	1,170	101		µg/L	1	12/30/2016 4:29:34 PM
Surr: 2-Fluorobiphenyl	71.2	50-150		%Rec	1	12/30/2016 4:29:34 PM
Surr: o-Terphenyl	70.9	50-150		%Rec	1	12/30/2016 4:29:34 PM

NOTES:
DRO - Indicates the presence of unresolved compounds eluting from dodecane through tetracosane (C12-C24).

Semi-Volatile Organic Compounds by EPA Method 8270 Batch ID: 15825 Analyst: BT

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Phenol	ND	1.98		µg/L	1	1/5/2017 5:56:17 PM
2-Chlorophenol	ND	0.992		µg/L	1	1/5/2017 5:56:17 PM
1,3-Dichlorobenzene	ND	0.992		µg/L	1	1/5/2017 5:56:17 PM
1,4-Dichlorobenzene	ND	0.992		µg/L	1	1/5/2017 5:56:17 PM
1,2-Dichlorobenzene	ND	0.992		µg/L	1	1/5/2017 5:56:17 PM
Benzyl alcohol	ND	0.992		µg/L	1	1/5/2017 5:56:17 PM
Bis(2-chloroethyl) ether	ND	1.98		µg/L	1	1/5/2017 5:56:17 PM
2-Methylphenol (o-cresol)	ND	0.992		µg/L	1	1/5/2017 5:56:17 PM
Hexachloroethane	ND	0.992		µg/L	1	1/5/2017 5:56:17 PM
N-Nitrosodi-n-propylamine	ND	0.992		µg/L	1	1/5/2017 5:56:17 PM
Nitrobenzene	ND	1.98		µg/L	1	1/5/2017 5:56:17 PM
Isophorone	ND	0.992		µg/L	1	1/5/2017 5:56:17 PM
4-Methylphenol (p-cresol)	ND	0.992		µg/L	1	1/5/2017 5:56:17 PM
2-Nitrophenol	ND	1.98		µg/L	1	1/5/2017 5:56:17 PM
2,4-Dimethylphenol	ND	0.992		µg/L	1	1/5/2017 5:56:17 PM
Bis(2-chloroethoxy)methane	ND	0.992		µg/L	1	1/5/2017 5:56:17 PM
2,4-Dichlorophenol	ND	1.98		µg/L	1	1/5/2017 5:56:17 PM
1,2,4-Trichlorobenzene	ND	0.992		µg/L	1	1/5/2017 5:56:17 PM
Naphthalene	ND	0.496		µg/L	1	1/5/2017 5:56:17 PM
4-Chloroaniline	ND	4.96		µg/L	1	1/5/2017 5:56:17 PM
Hexachlorobutadiene	ND	0.992		µg/L	1	1/5/2017 5:56:17 PM
4-Chloro-3-methylphenol	ND	4.96		µg/L	1	1/5/2017 5:56:17 PM
2-Methylnaphthalene	ND	0.496	Q	µg/L	1	1/5/2017 5:56:17 PM
1-Methylnaphthalene	ND	0.496		µg/L	1	1/5/2017 5:56:17 PM
Hexachlorocyclopentadiene	ND	0.992	Q	µg/L	1	1/5/2017 5:56:17 PM
2,4,6-Trichlorophenol	ND	1.98		µg/L	1	1/5/2017 5:56:17 PM
2,4,5-Trichlorophenol	ND	1.98		µg/L	1	1/5/2017 5:56:17 PM
2-Chloronaphthalene	ND	0.992		µg/L	1	1/5/2017 5:56:17 PM
2-Nitroaniline	ND	4.96		µg/L	1	1/5/2017 5:56:17 PM

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Collection Date: 12/28/2016 10:30:00 AM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-002
Matrix: Groundwater
Client Sample ID: TWP16-PMW1B

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Semi-Volatile Organic Compounds by EPA Method 8270				Batch ID: 15825		Analyst: BT
Acenaphthene	ND	0.496		µg/L	1	1/5/2017 5:56:17 PM
Dimethylphthalate	ND	0.992		µg/L	1	1/5/2017 5:56:17 PM
2,6-Dinitrotoluene	ND	0.992		µg/L	1	1/5/2017 5:56:17 PM
Acenaphthylene	ND	0.496		µg/L	1	1/5/2017 5:56:17 PM
2,4-Dinitrophenol	ND	1.98	Q	µg/L	1	1/5/2017 5:56:17 PM
Dibenzofuran	ND	0.992		µg/L	1	1/5/2017 5:56:17 PM
2,4-Dinitrotoluene	ND	0.992		µg/L	1	1/5/2017 5:56:17 PM
4-Nitrophenol	ND	4.96		µg/L	1	1/5/2017 5:56:17 PM
Fluorene	ND	0.496		µg/L	1	1/5/2017 5:56:17 PM
4-Chlorophenyl phenyl ether	ND	0.992		µg/L	1	1/5/2017 5:56:17 PM
Diethylphthalate	ND	0.992		µg/L	1	1/5/2017 5:56:17 PM
4,6-Dinitro-2-methylphenol	ND	4.96	Q	µg/L	1	1/5/2017 5:56:17 PM
4-Bromophenyl phenyl ether	ND	0.992		µg/L	1	1/5/2017 5:56:17 PM
Hexachlorobenzene	ND	0.992		µg/L	1	1/5/2017 5:56:17 PM
Pentachlorophenol	ND	1.98		µg/L	1	1/5/2017 5:56:17 PM
Phenanthrene	ND	0.496		µg/L	1	1/5/2017 5:56:17 PM
Anthracene	ND	0.496		µg/L	1	1/5/2017 5:56:17 PM
Carbazole	ND	4.96		µg/L	1	1/5/2017 5:56:17 PM
Di-n-butyl phthalate	ND	0.992		µg/L	1	1/5/2017 5:56:17 PM
Fluoranthene	ND	0.496		µg/L	1	1/5/2017 5:56:17 PM
Pyrene	ND	0.496		µg/L	1	1/5/2017 5:56:17 PM
Benzyl Butylphthalate	ND	0.992		µg/L	1	1/5/2017 5:56:17 PM
bis(2-Ethylhexyl)adipate	ND	0.992		µg/L	1	1/5/2017 5:56:17 PM
Benz[a]anthracene	ND	0.496		µg/L	1	1/5/2017 5:56:17 PM
Chrysene	ND	0.496		µg/L	1	1/5/2017 5:56:17 PM
Bis(2-ethylhexyl) phthalate	ND	0.992		µg/L	1	1/5/2017 5:56:17 PM
Di-n-octyl phthalate	ND	0.992		µg/L	1	1/5/2017 5:56:17 PM
Benzo (b) fluoranthene	ND	0.496		µg/L	1	1/5/2017 5:56:17 PM
Benzo (k) fluoranthene	ND	0.496		µg/L	1	1/5/2017 5:56:17 PM
Benzo[a]pyrene	ND	0.496		µg/L	1	1/5/2017 5:56:17 PM
Indeno (1,2,3-cd) pyrene	ND	0.496		µg/L	1	1/5/2017 5:56:17 PM
Dibenzo (a,h) anthracene	ND	0.496		µg/L	1	1/5/2017 5:56:17 PM
Benzo (g,h,I) perylene	ND	0.496		µg/L	1	1/5/2017 5:56:17 PM
Surr: 2,4,6-Tribromophenol	67.7	5-127		%Rec	1	1/5/2017 5:56:17 PM
Surr: 2-Fluorobiphenyl	64.7	24.1-139		%Rec	1	1/5/2017 5:56:17 PM
Surr: Nitrobenzene-d5	77.6	21.9-139		%Rec	1	1/5/2017 5:56:17 PM
Surr: Phenol-d6	68.6	10.3-128		%Rec	1	1/5/2017 5:56:17 PM
Surr: p-Terphenyl	72.0	25.2-132		%Rec	1	1/5/2017 5:56:17 PM

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Collection Date: 12/28/2016 10:30:00 AM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-002
Matrix: Groundwater
Client Sample ID: TWP16-PMW1B

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Semi-Volatile Organic Compounds by EPA Method 8270				Batch ID: 15825		Analyst: BT

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Gasoline by NWTPH-Gx				Batch ID: 15802		Analyst: NG
Gasoline	ND	50.0		µg/L	1	1/4/2017 2:09:50 PM
Surr: Toluene-d8	101	65-135		%Rec	1	1/4/2017 2:09:50 PM
Surr: 4-Bromofluorobenzene	96.5	65-135		%Rec	1	1/4/2017 2:09:50 PM
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 15802		Analyst: NG
Dichlorodifluoromethane (CFC-12)	ND	1.00	Q	µg/L	1	1/4/2017 2:09:50 PM
Chloromethane	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
Vinyl chloride	ND	0.200		µg/L	1	1/4/2017 2:09:50 PM
Bromomethane	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
Trichlorofluoromethane (CFC-11)	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
Chloroethane	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
1,1-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
Methylene chloride	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
trans-1,2-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
Methyl tert-butyl ether (MTBE)	1.30	1.00		µg/L	1	1/4/2017 2:09:50 PM
1,1-Dichloroethane	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
2,2-Dichloropropane	ND	2.00	Q	µg/L	1	1/4/2017 2:09:50 PM
cis-1,2-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
Chloroform	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
1,1,1-Trichloroethane (TCA)	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
1,1-Dichloropropene	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
Carbon tetrachloride	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
1,2-Dichloroethane (EDC)	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
Benzene	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
Trichloroethene (TCE)	ND	0.500		µg/L	1	1/4/2017 2:09:50 PM
1,2-Dichloropropane	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
Bromodichloromethane	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
Dibromomethane	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
cis-1,3-Dichloropropene	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
Toluene	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
trans-1,3-Dichloropropylene	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
1,1,2-Trichloroethane	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider **Collection Date:** 12/28/2016 10:30:00 AM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-002 **Matrix:** Groundwater
Client Sample ID: TWP16-PMW1B

Volatile Organic Compounds by EPA Method 8260C Batch ID: 15802 Analyst: NG

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
1,3-Dichloropropane	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
Tetrachloroethene (PCE)	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
Dibromochloromethane	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
1,2-Dibromoethane (EDB)	ND	0.0600		µg/L	1	1/4/2017 2:09:50 PM
Chlorobenzene	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
1,1,1,2-Tetrachloroethane	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
Ethylbenzene	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
m,p-Xylene	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
o-Xylene	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
Styrene	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
Isopropylbenzene	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
Bromoform	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
1,1,2,2-Tetrachloroethane	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
n-Propylbenzene	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
Bromobenzene	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
1,3,5-Trimethylbenzene	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
2-Chlorotoluene	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
4-Chlorotoluene	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
tert-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
1,2,3-Trichloropropane	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
1,2,4-Trichlorobenzene	ND	2.00		µg/L	1	1/4/2017 2:09:50 PM
sec-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
4-Isopropyltoluene	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
1,3-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
1,4-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
n-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
1,2-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
1,2-Dibromo-3-chloropropane	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
1,2,4-Trimethylbenzene	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
Hexachloro-1,3-butadiene	ND	4.00		µg/L	1	1/4/2017 2:09:50 PM
Naphthalene	ND	1.00		µg/L	1	1/4/2017 2:09:50 PM
1,2,3-Trichlorobenzene	ND	4.00		µg/L	1	1/4/2017 2:09:50 PM
Surr: Dibromofluoromethane	101	45.4-152		%Rec	1	1/4/2017 2:09:50 PM
Surr: Toluene-d8	103	40.1-139		%Rec	1	1/4/2017 2:09:50 PM
Surr: 1-Bromo-4-fluorobenzene	96.8	64.2-128		%Rec	1	1/4/2017 2:09:50 PM

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Project: Ave 55 - Taylor Way
Lab ID: 1612278-002
Client Sample ID: **TWP16-PMW1B**

Collection Date: 12/28/2016 10:30:00 AM
Matrix: Groundwater

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Mercury by EPA Method 245.1				Batch ID: 15826		Analyst: WF
Mercury	ND	0.100		µg/L	1	1/3/2017 3:19:11 PM
Dissolved Metals by EPA Method 200.8				Batch ID: 15820		Analyst: TN
Arsenic	6.02	1.00		µg/L	1	1/3/2017 12:45:33 PM
Barium	17.5	0.500		µg/L	1	1/3/2017 12:45:33 PM
Cadmium	ND	0.200		µg/L	1	1/3/2017 12:45:33 PM
Chromium	0.894	0.500		µg/L	1	1/3/2017 12:45:33 PM
Copper	ND	0.500		µg/L	1	1/3/2017 12:45:33 PM
Lead	ND	0.500		µg/L	1	1/3/2017 12:45:33 PM
Nickel	ND	0.500		µg/L	1	1/3/2017 12:45:33 PM
Zinc	ND	1.50		µg/L	1	1/3/2017 12:45:33 PM
Hexavalent Chromium by EPA 7196 / SM 3500 Cr B				Batch ID: R33688		Analyst: KT
Chromium, Hexavalent	ND	0.0500		mg/L	1	12/29/2016 9:19:00 AM

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Collection Date: 12/28/2016 12:00:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-003
Matrix: Groundwater
Client Sample ID: TWP16-PMW2B

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 15795 Analyst: WC

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel (Fuel Oil)	ND	50.3		µg/L	1	12/30/2016 5:00:24 PM
Diesel Range Organics (C12-C24)	107	50.3		µg/L	1	12/30/2016 5:00:24 PM
Heavy Oil	ND	101		µg/L	1	12/30/2016 5:00:24 PM
Heavy Oil Range Organics	254	101		µg/L	1	12/30/2016 5:00:24 PM
Surr: 2-Fluorobiphenyl	67.1	50-150		%Rec	1	12/30/2016 5:00:24 PM
Surr: o-Terphenyl	77.3	50-150		%Rec	1	12/30/2016 5:00:24 PM

NOTES:
DRO - Indicates the presence of unresolved compounds eluting from dodecane through tetracosane (C12-C24).
Heavy Oil Range Organics - Indicates the presence of unresolved compounds in the Lube Oil ranges.

Semi-Volatile Organic Compounds by EPA Method 8270

Batch ID: 15825 Analyst: BT

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Phenol	ND	2.02		µg/L	1	1/5/2017 6:17:20 PM
2-Chlorophenol	ND	1.01		µg/L	1	1/5/2017 6:17:20 PM
1,3-Dichlorobenzene	ND	1.01		µg/L	1	1/5/2017 6:17:20 PM
1,4-Dichlorobenzene	ND	1.01		µg/L	1	1/5/2017 6:17:20 PM
1,2-Dichlorobenzene	ND	1.01		µg/L	1	1/5/2017 6:17:20 PM
Benzyl alcohol	ND	1.01		µg/L	1	1/5/2017 6:17:20 PM
Bis(2-chloroethyl) ether	ND	2.02		µg/L	1	1/5/2017 6:17:20 PM
2-Methylphenol (o-cresol)	ND	1.01		µg/L	1	1/5/2017 6:17:20 PM
Hexachloroethane	ND	1.01		µg/L	1	1/5/2017 6:17:20 PM
N-Nitrosodi-n-propylamine	ND	1.01		µg/L	1	1/5/2017 6:17:20 PM
Nitrobenzene	ND	2.02		µg/L	1	1/5/2017 6:17:20 PM
Isophorone	ND	1.01		µg/L	1	1/5/2017 6:17:20 PM
4-Methylphenol (p-cresol)	ND	1.01		µg/L	1	1/5/2017 6:17:20 PM
2-Nitrophenol	ND	2.02		µg/L	1	1/5/2017 6:17:20 PM
2,4-Dimethylphenol	ND	1.01		µg/L	1	1/5/2017 6:17:20 PM
Bis(2-chloroethoxy)methane	ND	1.01		µg/L	1	1/5/2017 6:17:20 PM
2,4-Dichlorophenol	ND	2.02		µg/L	1	1/5/2017 6:17:20 PM
1,2,4-Trichlorobenzene	ND	1.01		µg/L	1	1/5/2017 6:17:20 PM
Naphthalene	ND	0.504		µg/L	1	1/5/2017 6:17:20 PM
4-Chloroaniline	ND	5.04		µg/L	1	1/5/2017 6:17:20 PM
Hexachlorobutadiene	ND	1.01		µg/L	1	1/5/2017 6:17:20 PM
4-Chloro-3-methylphenol	ND	5.04		µg/L	1	1/5/2017 6:17:20 PM
2-Methylnaphthalene	ND	0.504	Q	µg/L	1	1/5/2017 6:17:20 PM
1-Methylnaphthalene	ND	0.504		µg/L	1	1/5/2017 6:17:20 PM
Hexachlorocyclopentadiene	ND	1.01	Q	µg/L	1	1/5/2017 6:17:20 PM
2,4,6-Trichlorophenol	ND	2.02		µg/L	1	1/5/2017 6:17:20 PM
2,4,5-Trichlorophenol	ND	2.02		µg/L	1	1/5/2017 6:17:20 PM

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Collection Date: 12/28/2016 12:00:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-003
Matrix: Groundwater
Client Sample ID: TWP16-PMW2B

Semi-Volatile Organic Compounds by EPA Method 8270 — Batch ID: 15825 — Analyst: BT

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
2-Chloronaphthalene	ND	1.01		µg/L	1	1/5/2017 6:17:20 PM
2-Nitroaniline	ND	5.04		µg/L	1	1/5/2017 6:17:20 PM
Acenaphthene	ND	0.504		µg/L	1	1/5/2017 6:17:20 PM
Dimethylphthalate	ND	1.01		µg/L	1	1/5/2017 6:17:20 PM
2,6-Dinitrotoluene	ND	1.01		µg/L	1	1/5/2017 6:17:20 PM
Acenaphthylene	ND	0.504		µg/L	1	1/5/2017 6:17:20 PM
2,4-Dinitrophenol	ND	2.02	Q	µg/L	1	1/5/2017 6:17:20 PM
Dibenzofuran	ND	1.01		µg/L	1	1/5/2017 6:17:20 PM
2,4-Dinitrotoluene	ND	1.01		µg/L	1	1/5/2017 6:17:20 PM
4-Nitrophenol	ND	5.04		µg/L	1	1/5/2017 6:17:20 PM
Fluorene	ND	0.504		µg/L	1	1/5/2017 6:17:20 PM
4-Chlorophenyl phenyl ether	ND	1.01		µg/L	1	1/5/2017 6:17:20 PM
Diethylphthalate	ND	1.01		µg/L	1	1/5/2017 6:17:20 PM
4,6-Dinitro-2-methylphenol	ND	5.04	Q	µg/L	1	1/5/2017 6:17:20 PM
4-Bromophenyl phenyl ether	ND	1.01		µg/L	1	1/5/2017 6:17:20 PM
Hexachlorobenzene	ND	1.01		µg/L	1	1/5/2017 6:17:20 PM
Pentachlorophenol	ND	2.02		µg/L	1	1/5/2017 6:17:20 PM
Phenanthrene	ND	0.504		µg/L	1	1/5/2017 6:17:20 PM
Anthracene	ND	0.504		µg/L	1	1/5/2017 6:17:20 PM
Carbazole	ND	5.04		µg/L	1	1/5/2017 6:17:20 PM
Di-n-butyl phthalate	ND	1.01		µg/L	1	1/5/2017 6:17:20 PM
Fluoranthene	ND	0.504		µg/L	1	1/5/2017 6:17:20 PM
Pyrene	ND	0.504		µg/L	1	1/5/2017 6:17:20 PM
Benzyl Butylphthalate	ND	1.01		µg/L	1	1/5/2017 6:17:20 PM
bis(2-Ethylhexyl)adipate	ND	1.01		µg/L	1	1/5/2017 6:17:20 PM
Benz[a]anthracene	ND	0.504		µg/L	1	1/5/2017 6:17:20 PM
Chrysene	ND	0.504		µg/L	1	1/5/2017 6:17:20 PM
Bis(2-ethylhexyl) phthalate	ND	1.01		µg/L	1	1/5/2017 6:17:20 PM
Di-n-octyl phthalate	ND	1.01		µg/L	1	1/5/2017 6:17:20 PM
Benzo (b) fluoranthene	ND	0.504		µg/L	1	1/5/2017 6:17:20 PM
Benzo (k) fluoranthene	ND	0.504		µg/L	1	1/5/2017 6:17:20 PM
Benzo[a]pyrene	ND	0.504		µg/L	1	1/5/2017 6:17:20 PM
Indeno (1,2,3-cd) pyrene	ND	0.504		µg/L	1	1/5/2017 6:17:20 PM
Dibenzo (a,h) anthracene	ND	0.504		µg/L	1	1/5/2017 6:17:20 PM
Benzo (g,h,I) perylene	ND	0.504		µg/L	1	1/5/2017 6:17:20 PM
Surr: 2,4,6-Tribromophenol	107	5-127		%Rec	1	1/5/2017 6:17:20 PM
Surr: 2-Fluorobiphenyl	60.3	24.1-139		%Rec	1	1/5/2017 6:17:20 PM
Surr: Nitrobenzene-d5	66.8	21.9-139		%Rec	1	1/5/2017 6:17:20 PM
Surr: Phenol-d6	68.3	10.3-128		%Rec	1	1/5/2017 6:17:20 PM

Fremont Analytical

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider **Collection Date:** 12/28/2016 12:00:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-003 **Matrix:** Groundwater
Client Sample ID: TWP16-PMW2B

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Semi-Volatile Organic Compounds by EPA Method 8270				Batch ID: 15825		Analyst: BT
Surr: p-Terphenyl	75.2	25.2-132		%Rec	1	1/5/2017 6:17:20 PM

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Gasoline by NWTPH-Gx				Batch ID: 15802		Analyst: NG
Gasoline	ND	50.0		µg/L	1	1/4/2017 2:39:06 PM
Surr: Toluene-d8	101	65-135		%Rec	1	1/4/2017 2:39:06 PM
Surr: 4-Bromofluorobenzene	96.5	65-135		%Rec	1	1/4/2017 2:39:06 PM
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 15802		Analyst: NG
Dichlorodifluoromethane (CFC-12)	ND	1.00	Q	µg/L	1	1/4/2017 2:39:06 PM
Chloromethane	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
Vinyl chloride	ND	0.200		µg/L	1	1/4/2017 2:39:06 PM
Bromomethane	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
Trichlorofluoromethane (CFC-11)	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
Chloroethane	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
1,1-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
Methylene chloride	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
trans-1,2-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
Methyl tert-butyl ether (MTBE)	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
1,1-Dichloroethane	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
2,2-Dichloropropane	ND	2.00	Q	µg/L	1	1/4/2017 2:39:06 PM
cis-1,2-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
Chloroform	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
1,1,1-Trichloroethane (TCA)	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
1,1-Dichloropropene	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
Carbon tetrachloride	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
1,2-Dichloroethane (EDC)	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
Benzene	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
Trichloroethene (TCE)	ND	0.500		µg/L	1	1/4/2017 2:39:06 PM
1,2-Dichloropropane	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
Bromodichloromethane	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
Dibromomethane	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
cis-1,3-Dichloropropene	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
Toluene	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
trans-1,3-Dichloropropylene	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM

Fremont Analytical

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Collection Date: 12/28/2016 12:00:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-003
Matrix: Groundwater
Client Sample ID: TWP16-PMW2B

Volatile Organic Compounds by EPA Method 8260C — Batch ID: 15802 — Analyst: NG

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
1,1,2-Trichloroethane	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
1,3-Dichloropropane	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
Tetrachloroethene (PCE)	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
Dibromochloromethane	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
1,2-Dibromoethane (EDB)	ND	0.0600		µg/L	1	1/4/2017 2:39:06 PM
Chlorobenzene	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
1,1,1,2-Tetrachloroethane	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
Ethylbenzene	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
m,p-Xylene	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
o-Xylene	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
Styrene	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
Isopropylbenzene	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
Bromoform	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
1,1,2,2-Tetrachloroethane	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
n-Propylbenzene	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
Bromobenzene	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
1,3,5-Trimethylbenzene	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
2-Chlorotoluene	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
4-Chlorotoluene	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
tert-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
1,2,3-Trichloropropane	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
1,2,4-Trichlorobenzene	ND	2.00		µg/L	1	1/4/2017 2:39:06 PM
sec-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
4-Isopropyltoluene	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
1,3-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
1,4-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
n-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
1,2-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
1,2-Dibromo-3-chloropropane	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
1,2,4-Trimethylbenzene	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
Hexachloro-1,3-butadiene	ND	4.00		µg/L	1	1/4/2017 2:39:06 PM
Naphthalene	ND	1.00		µg/L	1	1/4/2017 2:39:06 PM
1,2,3-Trichlorobenzene	ND	4.00		µg/L	1	1/4/2017 2:39:06 PM
Surr: Dibromofluoromethane	104	45.4-152		%Rec	1	1/4/2017 2:39:06 PM
Surr: Toluene-d8	102	40.1-139		%Rec	1	1/4/2017 2:39:06 PM
Surr: 1-Bromo-4-fluorobenzene	96.9	64.2-128		%Rec	1	1/4/2017 2:39:06 PM

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Client: Floyd | Snider
Collection Date: 12/28/2016 12:00:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-003
Matrix: Groundwater
Client Sample ID: TWP16-PMW2B

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Mercury by EPA Method 245.1				Batch ID: 15826		Analyst: WF
Mercury	ND	0.100		µg/L	1	1/3/2017 3:20:53 PM
Dissolved Metals by EPA Method 200.8				Batch ID: 15820		Analyst: TN
Arsenic	ND	1.00		µg/L	1	1/3/2017 12:49:10 PM
Barium	161	0.500		µg/L	1	1/3/2017 12:49:10 PM
Cadmium	ND	0.200		µg/L	1	1/3/2017 12:49:10 PM
Chromium	ND	0.500		µg/L	1	1/3/2017 12:49:10 PM
Copper	ND	0.500		µg/L	1	1/3/2017 12:49:10 PM
Lead	ND	0.500		µg/L	1	1/3/2017 12:49:10 PM
Nickel	ND	0.500		µg/L	1	1/3/2017 12:49:10 PM
Zinc	ND	1.50		µg/L	1	1/3/2017 12:49:10 PM
Hexavalent Chromium by EPA 7196 / SM 3500 Cr B				Batch ID: R33688		Analyst: KT
Chromium, Hexavalent	ND	0.0500		mg/L	1	12/29/2016 9:22:00 AM

Analytical Report

Fremont Analytical

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Collection Date: 12/28/2016 12:05:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-004
Matrix: Groundwater
Client Sample ID: TWP16-PMW2X

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 15795		Analyst: WC
Diesel (Fuel Oil)	ND	50.0		µg/L	1	12/30/2016 5:31:13 PM
Diesel Range Organics (C12-C24)	136	50.0		µg/L	1	12/30/2016 5:31:13 PM
Heavy Oil	ND	100		µg/L	1	12/30/2016 5:31:13 PM
Heavy Oil Range Organics	133	100		µg/L	1	12/30/2016 5:31:13 PM
Surr: 2-Fluorobiphenyl	77.4	50-150		%Rec	1	12/30/2016 5:31:13 PM
Surr: o-Terphenyl	91.6	50-150		%Rec	1	12/30/2016 5:31:13 PM

NOTES:
DRO - Indicates the presence of unresolved compounds eluting from dodecane through tetracosane (C12-C24).
Heavy Oil Range Organics - Indicates the presence of unresolved compounds in the Lube+ Oil ranges.

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Semi-Volatile Organic Compounds by EPA Method 8270				Batch ID: 15825		Analyst: BT
Phenol	ND	2.01		µg/L	1	1/5/2017 6:38:27 PM
2-Chlorophenol	ND	1.01		µg/L	1	1/5/2017 6:38:27 PM
1,3-Dichlorobenzene	ND	1.01		µg/L	1	1/5/2017 6:38:27 PM
1,4-Dichlorobenzene	ND	1.01		µg/L	1	1/5/2017 6:38:27 PM
1,2-Dichlorobenzene	ND	1.01		µg/L	1	1/5/2017 6:38:27 PM
Benzyl alcohol	ND	1.01		µg/L	1	1/5/2017 6:38:27 PM
Bis(2-chloroethyl) ether	ND	2.01		µg/L	1	1/5/2017 6:38:27 PM
2-Methylphenol (o-cresol)	ND	1.01		µg/L	1	1/5/2017 6:38:27 PM
Hexachloroethane	ND	1.01		µg/L	1	1/5/2017 6:38:27 PM
N-Nitrosodi-n-propylamine	ND	1.01		µg/L	1	1/5/2017 6:38:27 PM
Nitrobenzene	ND	2.01		µg/L	1	1/5/2017 6:38:27 PM
Isophorone	ND	1.01		µg/L	1	1/5/2017 6:38:27 PM
4-Methylphenol (p-cresol)	ND	1.01		µg/L	1	1/5/2017 6:38:27 PM
2-Nitrophenol	ND	2.01		µg/L	1	1/5/2017 6:38:27 PM
2,4-Dimethylphenol	ND	1.01		µg/L	1	1/5/2017 6:38:27 PM
Bis(2-chloroethoxy)methane	ND	1.01		µg/L	1	1/5/2017 6:38:27 PM
2,4-Dichlorophenol	ND	2.01		µg/L	1	1/5/2017 6:38:27 PM
1,2,4-Trichlorobenzene	ND	1.01		µg/L	1	1/5/2017 6:38:27 PM
Naphthalene	ND	0.504		µg/L	1	1/5/2017 6:38:27 PM
4-Chloroaniline	ND	5.04		µg/L	1	1/5/2017 6:38:27 PM
Hexachlorobutadiene	ND	1.01		µg/L	1	1/5/2017 6:38:27 PM
4-Chloro-3-methylphenol	ND	5.04		µg/L	1	1/5/2017 6:38:27 PM
2-Methylnaphthalene	ND	0.504	Q	µg/L	1	1/5/2017 6:38:27 PM
1-Methylnaphthalene	ND	0.504		µg/L	1	1/5/2017 6:38:27 PM
Hexachlorocyclopentadiene	ND	1.01	Q	µg/L	1	1/5/2017 6:38:27 PM
2,4,6-Trichlorophenol	ND	2.01		µg/L	1	1/5/2017 6:38:27 PM
2,4,5-Trichlorophenol	ND	2.01		µg/L	1	1/5/2017 6:38:27 PM

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Collection Date: 12/28/2016 12:05:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-004
Matrix: Groundwater
Client Sample ID: TWP16-PMW2X

Semi-Volatile Organic Compounds by EPA Method 8270 Batch ID: 15825 Analyst: BT

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
2-Chloronaphthalene	ND	1.01		µg/L	1	1/5/2017 6:38:27 PM
2-Nitroaniline	ND	5.04		µg/L	1	1/5/2017 6:38:27 PM
Acenaphthene	ND	0.504		µg/L	1	1/5/2017 6:38:27 PM
Dimethylphthalate	ND	1.01		µg/L	1	1/5/2017 6:38:27 PM
2,6-Dinitrotoluene	ND	1.01		µg/L	1	1/5/2017 6:38:27 PM
Acenaphthylene	ND	0.504		µg/L	1	1/5/2017 6:38:27 PM
2,4-Dinitrophenol	ND	2.01	Q	µg/L	1	1/5/2017 6:38:27 PM
Dibenzofuran	ND	1.01		µg/L	1	1/5/2017 6:38:27 PM
2,4-Dinitrotoluene	ND	1.01		µg/L	1	1/5/2017 6:38:27 PM
4-Nitrophenol	ND	5.04		µg/L	1	1/5/2017 6:38:27 PM
Fluorene	ND	0.504		µg/L	1	1/5/2017 6:38:27 PM
4-Chlorophenyl phenyl ether	ND	1.01		µg/L	1	1/5/2017 6:38:27 PM
Diethylphthalate	ND	1.01		µg/L	1	1/5/2017 6:38:27 PM
4,6-Dinitro-2-methylphenol	ND	5.04	Q	µg/L	1	1/5/2017 6:38:27 PM
4-Bromophenyl phenyl ether	ND	1.01		µg/L	1	1/5/2017 6:38:27 PM
Hexachlorobenzene	ND	1.01		µg/L	1	1/5/2017 6:38:27 PM
Pentachlorophenol	ND	2.01		µg/L	1	1/5/2017 6:38:27 PM
Phenanthrene	ND	0.504		µg/L	1	1/5/2017 6:38:27 PM
Anthracene	ND	0.504		µg/L	1	1/5/2017 6:38:27 PM
Carbazole	ND	5.04		µg/L	1	1/5/2017 6:38:27 PM
Di-n-butyl phthalate	ND	1.01		µg/L	1	1/5/2017 6:38:27 PM
Fluoranthene	ND	0.504		µg/L	1	1/5/2017 6:38:27 PM
Pyrene	ND	0.504		µg/L	1	1/5/2017 6:38:27 PM
Benzyl Butylphthalate	ND	1.01		µg/L	1	1/5/2017 6:38:27 PM
bis(2-Ethylhexyl)adipate	ND	1.01		µg/L	1	1/5/2017 6:38:27 PM
Benz[a]anthracene	ND	0.504		µg/L	1	1/5/2017 6:38:27 PM
Chrysene	ND	0.504		µg/L	1	1/5/2017 6:38:27 PM
Bis(2-ethylhexyl) phthalate	ND	1.01		µg/L	1	1/5/2017 6:38:27 PM
Di-n-octyl phthalate	ND	1.01		µg/L	1	1/5/2017 6:38:27 PM
Benzo (b) fluoranthene	ND	0.504		µg/L	1	1/5/2017 6:38:27 PM
Benzo (k) fluoranthene	ND	0.504		µg/L	1	1/5/2017 6:38:27 PM
Benzo[a]pyrene	ND	0.504		µg/L	1	1/5/2017 6:38:27 PM
Indeno (1,2,3-cd) pyrene	ND	0.504		µg/L	1	1/5/2017 6:38:27 PM
Dibenzo (a,h) anthracene	ND	0.504		µg/L	1	1/5/2017 6:38:27 PM
Benzo (g,h,I) perylene	ND	0.504		µg/L	1	1/5/2017 6:38:27 PM
Surr: 2,4,6-Tribromophenol	99.3	5-127		%Rec	1	1/5/2017 6:38:27 PM
Surr: 2-Fluorobiphenyl	59.9	24.1-139		%Rec	1	1/5/2017 6:38:27 PM
Surr: Nitrobenzene-d5	71.0	21.9-139		%Rec	1	1/5/2017 6:38:27 PM
Surr: Phenol-d6	62.0	10.3-128		%Rec	1	1/5/2017 6:38:27 PM

Fremont Analytical

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider **Collection Date:** 12/28/2016 12:05:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-004 **Matrix:** Groundwater
Client Sample ID: TWP16-PMW2X

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Semi-Volatile Organic Compounds by EPA Method 8270				Batch ID: 15825		Analyst: BT
Surr: p-Terphenyl	66.7	25.2-132		%Rec	1	1/5/2017 6:38:27 PM

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Gasoline by NWTPH-Gx				Batch ID: 15802		Analyst: NG
Gasoline	ND	50.0		µg/L	1	1/4/2017 3:08:27 PM
Surr: Toluene-d8	101	65-135		%Rec	1	1/4/2017 3:08:27 PM
Surr: 4-Bromofluorobenzene	95.8	65-135		%Rec	1	1/4/2017 3:08:27 PM
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 15802		Analyst: NG
Dichlorodifluoromethane (CFC-12)	ND	1.00	Q	µg/L	1	1/4/2017 3:08:27 PM
Chloromethane	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
Vinyl chloride	ND	0.200		µg/L	1	1/4/2017 3:08:27 PM
Bromomethane	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
Trichlorofluoromethane (CFC-11)	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
Chloroethane	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
1,1-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
Methylene chloride	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
trans-1,2-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
Methyl tert-butyl ether (MTBE)	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
1,1-Dichloroethane	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
2,2-Dichloropropane	ND	2.00	Q	µg/L	1	1/4/2017 3:08:27 PM
cis-1,2-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
Chloroform	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
1,1,1-Trichloroethane (TCA)	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
1,1-Dichloropropene	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
Carbon tetrachloride	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
1,2-Dichloroethane (EDC)	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
Benzene	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
Trichloroethene (TCE)	ND	0.500		µg/L	1	1/4/2017 3:08:27 PM
1,2-Dichloropropane	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
Bromodichloromethane	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
Dibromomethane	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
cis-1,3-Dichloropropene	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
Toluene	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
trans-1,3-Dichloropropylene	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Project: Ave 55 - Taylor Way
Lab ID: 1612278-004
Client Sample ID: **TWP16-PMW2X**
Collection Date: 12/28/2016 12:05:00 PM
Matrix: Groundwater

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 15802 Analyst: NG

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
1,1,2-Trichloroethane	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
1,3-Dichloropropane	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
Tetrachloroethene (PCE)	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
Dibromochloromethane	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
1,2-Dibromoethane (EDB)	ND	0.0600		µg/L	1	1/4/2017 3:08:27 PM
Chlorobenzene	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
1,1,1,2-Tetrachloroethane	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
Ethylbenzene	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
m,p-Xylene	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
o-Xylene	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
Styrene	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
Isopropylbenzene	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
Bromoform	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
1,1,2,2-Tetrachloroethane	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
n-Propylbenzene	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
Bromobenzene	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
1,3,5-Trimethylbenzene	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
2-Chlorotoluene	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
4-Chlorotoluene	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
tert-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
1,2,3-Trichloropropane	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
1,2,4-Trichlorobenzene	ND	2.00		µg/L	1	1/4/2017 3:08:27 PM
sec-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
4-Isopropyltoluene	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
1,3-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
1,4-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
n-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
1,2-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
1,2-Dibromo-3-chloropropane	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
1,2,4-Trimethylbenzene	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
Hexachloro-1,3-butadiene	ND	4.00		µg/L	1	1/4/2017 3:08:27 PM
Naphthalene	ND	1.00		µg/L	1	1/4/2017 3:08:27 PM
1,2,3-Trichlorobenzene	ND	4.00		µg/L	1	1/4/2017 3:08:27 PM
Surr: Dibromofluoromethane	103	45.4-152		%Rec	1	1/4/2017 3:08:27 PM
Surr: Toluene-d8	102	40.1-139		%Rec	1	1/4/2017 3:08:27 PM
Surr: 1-Bromo-4-fluorobenzene	96.2	64.2-128		%Rec	1	1/4/2017 3:08:27 PM

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Project: Ave 55 - Taylor Way
Lab ID: 1612278-004
Client Sample ID: **TWP16-PMW2X**
Collection Date: 12/28/2016 12:05:00 PM
Matrix: Groundwater

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Mercury by EPA Method 245.1				Batch ID: 15826		Analyst: WF
Mercury	ND	0.100		µg/L	1	1/3/2017 3:22:36 PM
Dissolved Metals by EPA Method 200.8				Batch ID: 15820		Analyst: TN
Arsenic	ND	1.00		µg/L	1	1/3/2017 12:52:46 PM
Barium	165	0.500		µg/L	1	1/3/2017 12:52:46 PM
Cadmium	ND	0.200		µg/L	1	1/3/2017 12:52:46 PM
Chromium	ND	0.500		µg/L	1	1/3/2017 12:52:46 PM
Copper	ND	0.500		µg/L	1	1/3/2017 12:52:46 PM
Lead	ND	0.500		µg/L	1	1/3/2017 12:52:46 PM
Nickel	ND	0.500		µg/L	1	1/3/2017 12:52:46 PM
Zinc	ND	1.50		µg/L	1	1/3/2017 12:52:46 PM
Hexavalent Chromium by EPA 7196 / SM 3500 Cr B				Batch ID: R33688		Analyst: KT
Chromium, Hexavalent	ND	0.0500		mg/L	1	12/29/2016 9:26:00 AM

Fremont Analytical

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Project: Ave 55 - Taylor Way
Lab ID: 1612278-005
Client Sample ID: **TWP16-PMW2A**

Collection Date: 12/28/2016 12:00:00 PM
Matrix: Groundwater

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Gases by RSK-175				Batch ID: R33761		Analyst: BC
Methane	0.191	0.00500		mg/L	1	1/6/2017 11:51:00 AM
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 15795		Analyst: WC
Diesel (Fuel Oil)	ND	50.2		µg/L	1	12/30/2016 6:01:59 PM
Diesel Range Organics (C12-C24)	82.1	50.2		µg/L	1	12/30/2016 6:01:59 PM
Heavy Oil	ND	100		µg/L	1	12/30/2016 6:01:59 PM
Heavy Oil Range Organics	109	100		µg/L	1	12/30/2016 6:01:59 PM
Surr: 2-Fluorobiphenyl	72.8	50-150		%Rec	1	12/30/2016 6:01:59 PM
Surr: o-Terphenyl	87.8	50-150		%Rec	1	12/30/2016 6:01:59 PM

NOTES:
DRO - Indicates the presence of unresolved compounds eluting from dodecane through tetracosane (C12-C24).
Heavy Oil Range Organics - Indicates the presence of unresolved compounds in the Lube+ Oil ranges.

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Semi-Volatile Organic Compounds by EPA Method 8270				Batch ID: 15825		Analyst: BT
Phenol	ND	2.01		µg/L	1	1/5/2017 6:59:28 PM
2-Chlorophenol	ND	1.00		µg/L	1	1/5/2017 6:59:28 PM
1,3-Dichlorobenzene	ND	1.00		µg/L	1	1/5/2017 6:59:28 PM
1,4-Dichlorobenzene	ND	1.00		µg/L	1	1/5/2017 6:59:28 PM
1,2-Dichlorobenzene	ND	1.00		µg/L	1	1/5/2017 6:59:28 PM
Benzyl alcohol	ND	1.00		µg/L	1	1/5/2017 6:59:28 PM
Bis(2-chloroethyl) ether	ND	2.01		µg/L	1	1/5/2017 6:59:28 PM
2-Methylphenol (o-cresol)	ND	1.00		µg/L	1	1/5/2017 6:59:28 PM
Hexachloroethane	ND	1.00		µg/L	1	1/5/2017 6:59:28 PM
N-Nitrosodi-n-propylamine	ND	1.00		µg/L	1	1/5/2017 6:59:28 PM
Nitrobenzene	ND	2.01		µg/L	1	1/5/2017 6:59:28 PM
Isophorone	ND	1.00		µg/L	1	1/5/2017 6:59:28 PM
4-Methylphenol (p-cresol)	ND	1.00		µg/L	1	1/5/2017 6:59:28 PM
2-Nitrophenol	ND	2.01		µg/L	1	1/5/2017 6:59:28 PM
2,4-Dimethylphenol	ND	1.00		µg/L	1	1/5/2017 6:59:28 PM
Bis(2-chloroethoxy)methane	ND	1.00		µg/L	1	1/5/2017 6:59:28 PM
2,4-Dichlorophenol	ND	2.01		µg/L	1	1/5/2017 6:59:28 PM
1,2,4-Trichlorobenzene	ND	1.00		µg/L	1	1/5/2017 6:59:28 PM
Naphthalene	ND	0.502		µg/L	1	1/5/2017 6:59:28 PM
4-Chloroaniline	ND	5.02		µg/L	1	1/5/2017 6:59:28 PM
Hexachlorobutadiene	ND	1.00		µg/L	1	1/5/2017 6:59:28 PM
4-Chloro-3-methylphenol	ND	5.02		µg/L	1	1/5/2017 6:59:28 PM
2-Methylnaphthalene	ND	0.502	Q	µg/L	1	1/5/2017 6:59:28 PM

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider **Collection Date:** 12/28/2016 12:00:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-005 **Matrix:** Groundwater
Client Sample ID: TWP16-PMW2A

Analyses	Result	RL	Qual	Units	DF	Date Analyzed

Semi-Volatile Organic Compounds by EPA Method 8270 Batch ID: 15825 Analyst: BT

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
1-Methylnaphthalene	ND	0.502		µg/L	1	1/5/2017 6:59:28 PM
Hexachlorocyclopentadiene	ND	1.00	Q	µg/L	1	1/5/2017 6:59:28 PM
2,4,6-Trichlorophenol	ND	2.01		µg/L	1	1/5/2017 6:59:28 PM
2,4,5-Trichlorophenol	ND	2.01		µg/L	1	1/5/2017 6:59:28 PM
2-Chloronaphthalene	ND	1.00		µg/L	1	1/5/2017 6:59:28 PM
2-Nitroaniline	ND	5.02		µg/L	1	1/5/2017 6:59:28 PM
Acenaphthene	ND	0.502		µg/L	1	1/5/2017 6:59:28 PM
Dimethylphthalate	ND	1.00		µg/L	1	1/5/2017 6:59:28 PM
2,6-Dinitrotoluene	ND	1.00		µg/L	1	1/5/2017 6:59:28 PM
Acenaphthylene	ND	0.502		µg/L	1	1/5/2017 6:59:28 PM
2,4-Dinitrophenol	ND	2.01	Q	µg/L	1	1/5/2017 6:59:28 PM
Dibenzofuran	ND	1.00		µg/L	1	1/5/2017 6:59:28 PM
2,4-Dinitrotoluene	ND	1.00		µg/L	1	1/5/2017 6:59:28 PM
4-Nitrophenol	ND	5.02		µg/L	1	1/5/2017 6:59:28 PM
Fluorene	ND	0.502		µg/L	1	1/5/2017 6:59:28 PM
4-Chlorophenyl phenyl ether	ND	1.00		µg/L	1	1/5/2017 6:59:28 PM
Diethylphthalate	ND	1.00		µg/L	1	1/5/2017 6:59:28 PM
4,6-Dinitro-2-methylphenol	ND	5.02	Q	µg/L	1	1/5/2017 6:59:28 PM
4-Bromophenyl phenyl ether	ND	1.00		µg/L	1	1/5/2017 6:59:28 PM
Hexachlorobenzene	ND	1.00		µg/L	1	1/5/2017 6:59:28 PM
Pentachlorophenol	ND	2.01		µg/L	1	1/5/2017 6:59:28 PM
Phenanthrene	ND	0.502		µg/L	1	1/5/2017 6:59:28 PM
Anthracene	ND	0.502		µg/L	1	1/5/2017 6:59:28 PM
Carbazole	ND	5.02		µg/L	1	1/5/2017 6:59:28 PM
Di-n-butyl phthalate	ND	1.00		µg/L	1	1/5/2017 6:59:28 PM
Fluoranthene	ND	0.502		µg/L	1	1/5/2017 6:59:28 PM
Pyrene	ND	0.502		µg/L	1	1/5/2017 6:59:28 PM
Benzyl Butylphthalate	ND	1.00		µg/L	1	1/5/2017 6:59:28 PM
bis(2-Ethylhexyl)adipate	ND	1.00		µg/L	1	1/5/2017 6:59:28 PM
Benz[a]anthracene	ND	0.502		µg/L	1	1/5/2017 6:59:28 PM
Chrysene	ND	0.502		µg/L	1	1/5/2017 6:59:28 PM
Bis(2-ethylhexyl) phthalate	ND	1.00		µg/L	1	1/5/2017 6:59:28 PM
Di-n-octyl phthalate	ND	1.00		µg/L	1	1/5/2017 6:59:28 PM
Benzo (b) fluoranthene	ND	0.502		µg/L	1	1/5/2017 6:59:28 PM
Benzo (k) fluoranthene	ND	0.502		µg/L	1	1/5/2017 6:59:28 PM
Benzo[a]pyrene	ND	0.502		µg/L	1	1/5/2017 6:59:28 PM
Indeno (1,2,3-cd) pyrene	ND	0.502		µg/L	1	1/5/2017 6:59:28 PM
Dibenzo (a,h) anthracene	ND	0.502		µg/L	1	1/5/2017 6:59:28 PM
Benzo (g,h,I) perylene	ND	0.502		µg/L	1	1/5/2017 6:59:28 PM

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Collection Date: 12/28/2016 12:00:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-005
Matrix: Groundwater
Client Sample ID: TWP16-PMW2A

Analyses	Result	RL	Qual	Units	DF	Date Analyzed

Semi-Volatile Organic Compounds by EPA Method 8270

Batch ID: 15825 Analyst: BT

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Surr: 2,4,6-Tribromophenol	88.0	5-127		%Rec	1	1/5/2017 6:59:28 PM
Surr: 2-Fluorobiphenyl	59.2	24.1-139		%Rec	1	1/5/2017 6:59:28 PM
Surr: Nitrobenzene-d5	74.5	21.9-139		%Rec	1	1/5/2017 6:59:28 PM
Surr: Phenol-d6	64.9	10.3-128		%Rec	1	1/5/2017 6:59:28 PM
Surr: p-Terphenyl	65.3	25.2-132		%Rec	1	1/5/2017 6:59:28 PM

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Gasoline by NWTPH-Gx

Batch ID: 15802 Analyst: NG

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Gasoline	ND	50.0		µg/L	1	1/4/2017 3:37:49 PM
Surr: Toluene-d8	101	65-135		%Rec	1	1/4/2017 3:37:49 PM
Surr: 4-Bromofluorobenzene	97.2	65-135		%Rec	1	1/4/2017 3:37:49 PM

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 15802 Analyst: NG

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dichlorodifluoromethane (CFC-12)	ND	1.00	Q	µg/L	1	1/4/2017 3:37:49 PM
Chloromethane	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
Vinyl chloride	ND	0.200		µg/L	1	1/4/2017 3:37:49 PM
Bromomethane	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
Trichlorofluoromethane (CFC-11)	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
Chloroethane	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
1,1-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
Methylene chloride	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
trans-1,2-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
Methyl tert-butyl ether (MTBE)	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
1,1-Dichloroethane	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
2,2-Dichloropropane	ND	2.00	Q	µg/L	1	1/4/2017 3:37:49 PM
cis-1,2-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
Chloroform	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
1,1,1-Trichloroethane (TCA)	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
1,1-Dichloropropene	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
Carbon tetrachloride	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
1,2-Dichloroethane (EDC)	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
Benzene	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
Trichloroethene (TCE)	ND	0.500		µg/L	1	1/4/2017 3:37:49 PM
1,2-Dichloropropane	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
Bromodichloromethane	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider **Collection Date:** 12/28/2016 12:00:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-005 **Matrix:** Groundwater
Client Sample ID: TWP16-PMW2A

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 15802		Analyst: NG
Dibromomethane	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
cis-1,3-Dichloropropene	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
Toluene	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
trans-1,3-Dichloropropylene	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
1,1,2-Trichloroethane	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
1,3-Dichloropropane	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
Tetrachloroethene (PCE)	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
Dibromochloromethane	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
1,2-Dibromoethane (EDB)	ND	0.0600		µg/L	1	1/4/2017 3:37:49 PM
Chlorobenzene	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
1,1,1,2-Tetrachloroethane	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
Ethylbenzene	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
m,p-Xylene	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
o-Xylene	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
Styrene	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
Isopropylbenzene	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
Bromoform	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
1,1,2,2-Tetrachloroethane	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
n-Propylbenzene	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
Bromobenzene	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
1,3,5-Trimethylbenzene	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
2-Chlorotoluene	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
4-Chlorotoluene	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
tert-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
1,2,3-Trichloropropane	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
1,2,4-Trichlorobenzene	ND	2.00		µg/L	1	1/4/2017 3:37:49 PM
sec-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
4-Isopropyltoluene	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
1,3-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
1,4-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
n-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
1,2-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
1,2-Dibromo-3-chloropropane	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
1,2,4-Trimethylbenzene	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
Hexachloro-1,3-butadiene	ND	4.00		µg/L	1	1/4/2017 3:37:49 PM
Naphthalene	ND	1.00		µg/L	1	1/4/2017 3:37:49 PM
1,2,3-Trichlorobenzene	ND	4.00		µg/L	1	1/4/2017 3:37:49 PM
Surr: Dibromofluoromethane	103	45.4-152		%Rec	1	1/4/2017 3:37:49 PM
Surr: Toluene-d8	102	40.1-139		%Rec	1	1/4/2017 3:37:49 PM

Analytical Report

Fremont Analytical

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Collection Date: 12/28/2016 12:00:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-005
Matrix: Groundwater
Client Sample ID: TWP16-PMW2A

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 15802		Analyst: NG
Surr: 1-Bromo-4-fluorobenzene	97.5	64.2-128		%Rec	1	1/4/2017 3:37:49 PM

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Mercury by EPA Method 245.1				Batch ID: 15826		Analyst: WF
Mercury	ND	0.100		µg/L	1	1/3/2017 3:24:19 PM
Dissolved Metals by EPA Method 200.8				Batch ID: 15820		Analyst: TN
Arsenic	1.65	1.00		µg/L	1	1/3/2017 12:20:18 PM
Barium	235	0.500		µg/L	1	1/3/2017 12:20:18 PM
Cadmium	ND	0.200		µg/L	1	1/3/2017 12:20:18 PM
Chromium	ND	0.500		µg/L	1	1/3/2017 12:20:18 PM
Copper	0.695	0.500		µg/L	1	1/3/2017 12:20:18 PM
Lead	ND	0.500		µg/L	1	1/3/2017 12:20:18 PM
Nickel	1.09	0.500		µg/L	1	1/3/2017 12:20:18 PM
Zinc	24.0	1.50		µg/L	1	1/3/2017 12:20:18 PM
Hexavalent Chromium by EPA 7196 / SM 3500 Cr B				Batch ID: R33688		Analyst: KT
Chromium, Hexavalent	ND	0.0500		mg/L	1	12/29/2016 9:30:00 AM

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider **Collection Date:** 12/28/2016 1:20:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-006 **Matrix:** Groundwater
Client Sample ID: TWP16-PMW3A

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Gases by RSK-175				Batch ID: R33761		Analyst: BC
Methane	0.171	0.00500		mg/L	1	1/6/2017 11:54:00 AM
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 15795		Analyst: WC
Diesel (Fuel Oil)	ND	50.1		µg/L	1	12/30/2016 8:35:05 PM
Diesel Range Organics (C12-C24)	78.9	50.1		µg/L	1	12/30/2016 8:35:05 PM
Heavy Oil	ND	100		µg/L	1	12/30/2016 8:35:05 PM
Surr: 2-Fluorobiphenyl	71.7	50-150		%Rec	1	12/30/2016 8:35:05 PM
Surr: o-Terphenyl	81.0	50-150		%Rec	1	12/30/2016 8:35:05 PM

NOTES:
DRO - Indicates the presence of unresolved compounds eluting from dodecane through tetracosane (C12-C24).

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Semi-Volatile Organic Compounds by EPA Method 8270				Batch ID: 15825		Analyst: BT
Phenol	ND	1.99		µg/L	1	1/5/2017 7:20:28 PM
2-Chlorophenol	ND	0.997		µg/L	1	1/5/2017 7:20:28 PM
1,3-Dichlorobenzene	ND	0.997		µg/L	1	1/5/2017 7:20:28 PM
1,4-Dichlorobenzene	ND	0.997		µg/L	1	1/5/2017 7:20:28 PM
1,2-Dichlorobenzene	ND	0.997		µg/L	1	1/5/2017 7:20:28 PM
Benzyl alcohol	ND	0.997		µg/L	1	1/5/2017 7:20:28 PM
Bis(2-chloroethyl) ether	ND	1.99		µg/L	1	1/5/2017 7:20:28 PM
2-Methylphenol (o-cresol)	ND	0.997		µg/L	1	1/5/2017 7:20:28 PM
Hexachloroethane	ND	0.997		µg/L	1	1/5/2017 7:20:28 PM
N-Nitrosodi-n-propylamine	ND	0.997		µg/L	1	1/5/2017 7:20:28 PM
Nitrobenzene	ND	1.99		µg/L	1	1/5/2017 7:20:28 PM
Isophorone	ND	0.997		µg/L	1	1/5/2017 7:20:28 PM
4-Methylphenol (p-cresol)	ND	0.997		µg/L	1	1/5/2017 7:20:28 PM
2-Nitrophenol	ND	1.99		µg/L	1	1/5/2017 7:20:28 PM
2,4-Dimethylphenol	ND	0.997		µg/L	1	1/5/2017 7:20:28 PM
Bis(2-chloroethoxy)methane	ND	0.997		µg/L	1	1/5/2017 7:20:28 PM
2,4-Dichlorophenol	ND	1.99		µg/L	1	1/5/2017 7:20:28 PM
1,2,4-Trichlorobenzene	ND	0.997		µg/L	1	1/5/2017 7:20:28 PM
Naphthalene	ND	0.498		µg/L	1	1/5/2017 7:20:28 PM
4-Chloroaniline	ND	4.98		µg/L	1	1/5/2017 7:20:28 PM
Hexachlorobutadiene	ND	0.997		µg/L	1	1/5/2017 7:20:28 PM
4-Chloro-3-methylphenol	ND	4.98		µg/L	1	1/5/2017 7:20:28 PM
2-Methylnaphthalene	ND	0.498	Q	µg/L	1	1/5/2017 7:20:28 PM
1-Methylnaphthalene	ND	0.498		µg/L	1	1/5/2017 7:20:28 PM
Hexachlorocyclopentadiene	ND	0.997	Q	µg/L	1	1/5/2017 7:20:28 PM

Client: Floyd | Snider **Collection Date:** 12/28/2016 1:20:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-006 **Matrix:** Groundwater
Client Sample ID: TWP16-PMW3A

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Semi-Volatile Organic Compounds by EPA Method 8270				Batch ID: 15825		Analyst: BT
2,4,6-Trichlorophenol	ND	1.99		µg/L	1	1/5/2017 7:20:28 PM
2,4,5-Trichlorophenol	ND	1.99		µg/L	1	1/5/2017 7:20:28 PM
2-Chloronaphthalene	ND	0.997		µg/L	1	1/5/2017 7:20:28 PM
2-Nitroaniline	ND	4.98		µg/L	1	1/5/2017 7:20:28 PM
Acenaphthene	ND	0.498		µg/L	1	1/5/2017 7:20:28 PM
Dimethylphthalate	ND	0.997		µg/L	1	1/5/2017 7:20:28 PM
2,6-Dinitrotoluene	ND	0.997		µg/L	1	1/5/2017 7:20:28 PM
Acenaphthylene	ND	0.498		µg/L	1	1/5/2017 7:20:28 PM
2,4-Dinitrophenol	ND	1.99	Q	µg/L	1	1/5/2017 7:20:28 PM
Dibenzofuran	ND	0.997		µg/L	1	1/5/2017 7:20:28 PM
2,4-Dinitrotoluene	ND	0.997		µg/L	1	1/5/2017 7:20:28 PM
4-Nitrophenol	ND	4.98		µg/L	1	1/5/2017 7:20:28 PM
Fluorene	ND	0.498		µg/L	1	1/5/2017 7:20:28 PM
4-Chlorophenyl phenyl ether	ND	0.997		µg/L	1	1/5/2017 7:20:28 PM
Diethylphthalate	ND	0.997		µg/L	1	1/5/2017 7:20:28 PM
4,6-Dinitro-2-methylphenol	ND	4.98	Q	µg/L	1	1/5/2017 7:20:28 PM
4-Bromophenyl phenyl ether	ND	0.997		µg/L	1	1/5/2017 7:20:28 PM
Hexachlorobenzene	ND	0.997		µg/L	1	1/5/2017 7:20:28 PM
Pentachlorophenol	ND	1.99		µg/L	1	1/5/2017 7:20:28 PM
Phenanthrene	ND	0.498		µg/L	1	1/5/2017 7:20:28 PM
Anthracene	ND	0.498		µg/L	1	1/5/2017 7:20:28 PM
Carbazole	ND	4.98		µg/L	1	1/5/2017 7:20:28 PM
Di-n-butyl phthalate	ND	0.997		µg/L	1	1/5/2017 7:20:28 PM
Fluoranthene	ND	0.498		µg/L	1	1/5/2017 7:20:28 PM
Pyrene	ND	0.498		µg/L	1	1/5/2017 7:20:28 PM
Benzyl Butylphthalate	ND	0.997		µg/L	1	1/5/2017 7:20:28 PM
bis(2-Ethylhexyl)adipate	ND	0.997		µg/L	1	1/5/2017 7:20:28 PM
Benz[a]anthracene	ND	0.498		µg/L	1	1/5/2017 7:20:28 PM
Chrysene	ND	0.498		µg/L	1	1/5/2017 7:20:28 PM
Bis(2-ethylhexyl) phthalate	ND	0.997		µg/L	1	1/5/2017 7:20:28 PM
Di-n-octyl phthalate	ND	0.997		µg/L	1	1/5/2017 7:20:28 PM
Benzo (b) fluoranthene	ND	0.498		µg/L	1	1/5/2017 7:20:28 PM
Benzo (k) fluoranthene	ND	0.498		µg/L	1	1/5/2017 7:20:28 PM
Benzo[a]pyrene	ND	0.498		µg/L	1	1/5/2017 7:20:28 PM
Indeno (1,2,3-cd) pyrene	ND	0.498		µg/L	1	1/5/2017 7:20:28 PM
Dibenzo (a,h) anthracene	ND	0.498		µg/L	1	1/5/2017 7:20:28 PM
Benzo (g,h,I) perylene	ND	0.498		µg/L	1	1/5/2017 7:20:28 PM
Surr: 2,4,6-Tribromophenol	71.6	5-127		%Rec	1	1/5/2017 7:20:28 PM
Surr: 2-Fluorobiphenyl	57.5	24.1-139		%Rec	1	1/5/2017 7:20:28 PM

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Project: Ave 55 - Taylor Way
Lab ID: 1612278-006
Client Sample ID: **TWP16-PMW3A**

Collection Date: 12/28/2016 1:20:00 PM
Matrix: Groundwater

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Semi-Volatile Organic Compounds by EPA Method 8270				Batch ID: 15825		Analyst: BT
Surr: Nitrobenzene-d5	54.7	21.9-139		%Rec	1	1/5/2017 7:20:28 PM
Surr: Phenol-d6	44.6	10.3-128		%Rec	1	1/5/2017 7:20:28 PM
Surr: p-Terphenyl	70.6	25.2-132		%Rec	1	1/5/2017 7:20:28 PM

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Gasoline by NWTPH-Gx				Batch ID: 15802		Analyst: NG
Gasoline	ND	50.0		µg/L	1	1/4/2017 4:07:10 PM
Surr: Toluene-d8	101	65-135		%Rec	1	1/4/2017 4:07:10 PM
Surr: 4-Bromofluorobenzene	96.5	65-135		%Rec	1	1/4/2017 4:07:10 PM
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 15802		Analyst: NG
Dichlorodifluoromethane (CFC-12)	ND	1.00	Q	µg/L	1	1/4/2017 4:07:10 PM
Chloromethane	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
Vinyl chloride	ND	0.200		µg/L	1	1/4/2017 4:07:10 PM
Bromomethane	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
Trichlorofluoromethane (CFC-11)	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
Chloroethane	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
1,1-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
Methylene chloride	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
trans-1,2-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
Methyl tert-butyl ether (MTBE)	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
1,1-Dichloroethane	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
2,2-Dichloropropane	ND	2.00	Q	µg/L	1	1/4/2017 4:07:10 PM
cis-1,2-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
Chloroform	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
1,1,1-Trichloroethane (TCA)	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
1,1-Dichloropropene	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
Carbon tetrachloride	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
1,2-Dichloroethane (EDC)	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
Benzene	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
Trichloroethene (TCE)	ND	0.500		µg/L	1	1/4/2017 4:07:10 PM
1,2-Dichloropropane	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
Bromodichloromethane	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
Dibromomethane	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
cis-1,3-Dichloropropene	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM

Client: Floyd | Snider
Project: Ave 55 - Taylor Way
Lab ID: 1612278-006
Client Sample ID: **TWP16-PMW3A**
Collection Date: 12/28/2016 1:20:00 PM
Matrix: Groundwater

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 15802 Analyst: NG

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Toluene	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
trans-1,3-Dichloropropylene	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
1,1,2-Trichloroethane	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
1,3-Dichloropropane	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
Tetrachloroethene (PCE)	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
Dibromochloromethane	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
1,2-Dibromoethane (EDB)	ND	0.0600		µg/L	1	1/4/2017 4:07:10 PM
Chlorobenzene	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
1,1,1,2-Tetrachloroethane	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
Ethylbenzene	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
m,p-Xylene	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
o-Xylene	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
Styrene	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
Isopropylbenzene	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
Bromoform	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
1,1,2,2-Tetrachloroethane	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
n-Propylbenzene	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
Bromobenzene	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
1,3,5-Trimethylbenzene	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
2-Chlorotoluene	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
4-Chlorotoluene	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
tert-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
1,2,3-Trichloropropane	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
1,2,4-Trichlorobenzene	ND	2.00		µg/L	1	1/4/2017 4:07:10 PM
sec-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
4-Isopropyltoluene	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
1,3-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
1,4-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
n-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
1,2-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
1,2-Dibromo-3-chloropropane	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
1,2,4-Trimethylbenzene	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
Hexachloro-1,3-butadiene	ND	4.00		µg/L	1	1/4/2017 4:07:10 PM
Naphthalene	ND	1.00		µg/L	1	1/4/2017 4:07:10 PM
1,2,3-Trichlorobenzene	ND	4.00		µg/L	1	1/4/2017 4:07:10 PM
Surr: Dibromofluoromethane	103	45.4-152		%Rec	1	1/4/2017 4:07:10 PM
Surr: Toluene-d8	102	40.1-139		%Rec	1	1/4/2017 4:07:10 PM
Surr: 1-Bromo-4-fluorobenzene	97.0	64.2-128		%Rec	1	1/4/2017 4:07:10 PM

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider **Collection Date:** 12/28/2016 1:20:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-006 **Matrix:** Groundwater
Client Sample ID: TWP16-PMW3A

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 15802		Analyst: NG

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Mercury by EPA Method 245.1				Batch ID: 15826		Analyst: WF
Mercury	ND	0.100		µg/L	1	1/3/2017 3:34:27 PM
Dissolved Metals by EPA Method 200.8				Batch ID: 15820		Analyst: TN
Arsenic	2.02	1.00		µg/L	1	1/3/2017 12:56:22 PM
Barium	22.7	0.500		µg/L	1	1/3/2017 12:56:22 PM
Cadmium	ND	0.200		µg/L	1	1/3/2017 12:56:22 PM
Chromium	ND	0.500		µg/L	1	1/3/2017 12:56:22 PM
Copper	ND	0.500		µg/L	1	1/3/2017 12:56:22 PM
Lead	ND	0.500		µg/L	1	1/3/2017 12:56:22 PM
Nickel	11.7	0.500		µg/L	1	1/3/2017 12:56:22 PM
Zinc	4.41	1.50		µg/L	1	1/3/2017 12:56:22 PM
Hexavalent Chromium by EPA 7196 / SM 3500 Cr B				Batch ID: R33688		Analyst: KT
Chromium, Hexavalent	ND	0.0500		mg/L	1	12/29/2016 9:33:00 AM

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Collection Date: 12/28/2016 1:15:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-007
Matrix: Groundwater
Client Sample ID: TWP16-PMW3B

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 15795		Analyst: WC
Diesel (Fuel Oil)	ND	49.7		µg/L	1	12/30/2016 9:05:33 PM
Heavy Oil	ND	99.4		µg/L	1	12/30/2016 9:05:33 PM
Heavy Oil Range Organics	491	99.4		µg/L	1	12/30/2016 9:05:33 PM
Surr: 2-Fluorobiphenyl	64.0	50-150		%Rec	1	12/30/2016 9:05:33 PM
Surr: o-Terphenyl	65.1	50-150		%Rec	1	12/30/2016 9:05:33 PM

NOTES:
Heavy Oil Range Organics - Indicates the presence of unresolved compounds in the Lube+ Oil ranges.

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Semi-Volatile Organic Compounds by EPA Method 8270				Batch ID: 15825		Analyst: BT
Phenol	ND	2.00		µg/L	1	1/5/2017 7:41:31 PM
2-Chlorophenol	ND	0.998		µg/L	1	1/5/2017 7:41:31 PM
1,3-Dichlorobenzene	ND	0.998		µg/L	1	1/5/2017 7:41:31 PM
1,4-Dichlorobenzene	ND	0.998		µg/L	1	1/5/2017 7:41:31 PM
1,2-Dichlorobenzene	ND	0.998		µg/L	1	1/5/2017 7:41:31 PM
Benzyl alcohol	ND	0.998		µg/L	1	1/5/2017 7:41:31 PM
Bis(2-chloroethyl) ether	ND	2.00		µg/L	1	1/5/2017 7:41:31 PM
2-Methylphenol (o-cresol)	ND	0.998		µg/L	1	1/5/2017 7:41:31 PM
Hexachloroethane	ND	0.998		µg/L	1	1/5/2017 7:41:31 PM
N-Nitrosodi-n-propylamine	ND	0.998		µg/L	1	1/5/2017 7:41:31 PM
Nitrobenzene	ND	2.00		µg/L	1	1/5/2017 7:41:31 PM
Isophorone	ND	0.998		µg/L	1	1/5/2017 7:41:31 PM
4-Methylphenol (p-cresol)	ND	0.998		µg/L	1	1/5/2017 7:41:31 PM
2-Nitrophenol	ND	2.00		µg/L	1	1/5/2017 7:41:31 PM
2,4-Dimethylphenol	ND	0.998		µg/L	1	1/5/2017 7:41:31 PM
Bis(2-chloroethoxy)methane	ND	0.998		µg/L	1	1/5/2017 7:41:31 PM
2,4-Dichlorophenol	ND	2.00		µg/L	1	1/5/2017 7:41:31 PM
1,2,4-Trichlorobenzene	ND	0.998		µg/L	1	1/5/2017 7:41:31 PM
Naphthalene	ND	0.499		µg/L	1	1/5/2017 7:41:31 PM
4-Chloroaniline	ND	4.99		µg/L	1	1/5/2017 7:41:31 PM
Hexachlorobutadiene	ND	0.998		µg/L	1	1/5/2017 7:41:31 PM
4-Chloro-3-methylphenol	ND	4.99		µg/L	1	1/5/2017 7:41:31 PM
2-Methylnaphthalene	ND	0.499	Q	µg/L	1	1/5/2017 7:41:31 PM
1-Methylnaphthalene	ND	0.499		µg/L	1	1/5/2017 7:41:31 PM
Hexachlorocyclopentadiene	ND	0.998	Q	µg/L	1	1/5/2017 7:41:31 PM
2,4,6-Trichlorophenol	ND	2.00		µg/L	1	1/5/2017 7:41:31 PM
2,4,5-Trichlorophenol	ND	2.00		µg/L	1	1/5/2017 7:41:31 PM
2-Chloronaphthalene	ND	0.998		µg/L	1	1/5/2017 7:41:31 PM
2-Nitroaniline	ND	4.99		µg/L	1	1/5/2017 7:41:31 PM

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Collection Date: 12/28/2016 1:15:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-007
Matrix: Groundwater
Client Sample ID: TWP16-PMW3B

Semi-Volatile Organic Compounds by EPA Method 8270

Batch ID: 15825 Analyst: BT

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Acenaphthene	ND	0.499		µg/L	1	1/5/2017 7:41:31 PM
Dimethylphthalate	ND	0.998		µg/L	1	1/5/2017 7:41:31 PM
2,6-Dinitrotoluene	ND	0.998		µg/L	1	1/5/2017 7:41:31 PM
Acenaphthylene	ND	0.499		µg/L	1	1/5/2017 7:41:31 PM
2,4-Dinitrophenol	ND	2.00	Q	µg/L	1	1/5/2017 7:41:31 PM
Dibenzofuran	ND	0.998		µg/L	1	1/5/2017 7:41:31 PM
2,4-Dinitrotoluene	ND	0.998		µg/L	1	1/5/2017 7:41:31 PM
4-Nitrophenol	ND	4.99		µg/L	1	1/5/2017 7:41:31 PM
Fluorene	ND	0.499		µg/L	1	1/5/2017 7:41:31 PM
4-Chlorophenyl phenyl ether	ND	0.998		µg/L	1	1/5/2017 7:41:31 PM
Diethylphthalate	ND	0.998		µg/L	1	1/5/2017 7:41:31 PM
4,6-Dinitro-2-methylphenol	ND	4.99	Q	µg/L	1	1/5/2017 7:41:31 PM
4-Bromophenyl phenyl ether	ND	0.998		µg/L	1	1/5/2017 7:41:31 PM
Hexachlorobenzene	ND	0.998		µg/L	1	1/5/2017 7:41:31 PM
Pentachlorophenol	ND	2.00		µg/L	1	1/5/2017 7:41:31 PM
Phenanthrene	ND	0.499		µg/L	1	1/5/2017 7:41:31 PM
Anthracene	ND	0.499		µg/L	1	1/5/2017 7:41:31 PM
Carbazole	ND	4.99		µg/L	1	1/5/2017 7:41:31 PM
Di-n-butyl phthalate	ND	0.998		µg/L	1	1/5/2017 7:41:31 PM
Fluoranthene	ND	0.499		µg/L	1	1/5/2017 7:41:31 PM
Pyrene	ND	0.499		µg/L	1	1/5/2017 7:41:31 PM
Benzyl Butylphthalate	ND	0.998		µg/L	1	1/5/2017 7:41:31 PM
bis(2-Ethylhexyl)adipate	ND	0.998		µg/L	1	1/5/2017 7:41:31 PM
Benz[a]anthracene	ND	0.499		µg/L	1	1/5/2017 7:41:31 PM
Chrysene	ND	0.499		µg/L	1	1/5/2017 7:41:31 PM
Bis(2-ethylhexyl) phthalate	ND	0.998		µg/L	1	1/5/2017 7:41:31 PM
Di-n-octyl phthalate	ND	0.998		µg/L	1	1/5/2017 7:41:31 PM
Benzo (b) fluoranthene	ND	0.499		µg/L	1	1/5/2017 7:41:31 PM
Benzo (k) fluoranthene	ND	0.499		µg/L	1	1/5/2017 7:41:31 PM
Benzo[a]pyrene	ND	0.499		µg/L	1	1/5/2017 7:41:31 PM
Indeno (1,2,3-cd) pyrene	ND	0.499		µg/L	1	1/5/2017 7:41:31 PM
Dibenzo (a,h) anthracene	ND	0.499		µg/L	1	1/5/2017 7:41:31 PM
Benzo (g,h,I) perylene	ND	0.499		µg/L	1	1/5/2017 7:41:31 PM
Surr: 2,4,6-Tribromophenol	113	5-127		%Rec	1	1/5/2017 7:41:31 PM
Surr: 2-Fluorobiphenyl	55.7	24.1-139		%Rec	1	1/5/2017 7:41:31 PM
Surr: Nitrobenzene-d5	64.2	21.9-139		%Rec	1	1/5/2017 7:41:31 PM
Surr: Phenol-d6	61.0	10.3-128		%Rec	1	1/5/2017 7:41:31 PM
Surr: p-Terphenyl	75.4	25.2-132		%Rec	1	1/5/2017 7:41:31 PM

Fremont Analytical

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Collection Date: 12/28/2016 1:15:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-007
Matrix: Groundwater
Client Sample ID: **TWP16-PMW3B**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed

Semi-Volatile Organic Compounds by EPA Method 8270 Batch ID: 15825 Analyst: BT

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Gasoline by NWTPH-Gx Batch ID: 15802 Analyst: NG

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Gasoline	ND	50.0		µg/L	1	1/4/2017 4:36:32 PM
Surr: Toluene-d8	102	65-135		%Rec	1	1/4/2017 4:36:32 PM
Surr: 4-Bromofluorobenzene	96.4	65-135		%Rec	1	1/4/2017 4:36:32 PM

Volatile Organic Compounds by EPA Method 8260C Batch ID: 15802 Analyst: NG

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dichlorodifluoromethane (CFC-12)	ND	1.00	Q	µg/L	1	1/4/2017 4:36:32 PM
Chloromethane	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
Vinyl chloride	ND	0.200		µg/L	1	1/4/2017 4:36:32 PM
Bromomethane	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
Trichlorofluoromethane (CFC-11)	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
Chloroethane	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
1,1-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
Methylene chloride	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
trans-1,2-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
Methyl tert-butyl ether (MTBE)	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
1,1-Dichloroethane	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
2,2-Dichloropropane	ND	2.00	Q	µg/L	1	1/4/2017 4:36:32 PM
cis-1,2-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
Chloroform	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
1,1,1-Trichloroethane (TCA)	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
1,1-Dichloropropene	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
Carbon tetrachloride	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
1,2-Dichloroethane (EDC)	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
Benzene	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
Trichloroethene (TCE)	ND	0.500		µg/L	1	1/4/2017 4:36:32 PM
1,2-Dichloropropane	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
Bromodichloromethane	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
Dibromomethane	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
cis-1,3-Dichloropropene	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
Toluene	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
trans-1,3-Dichloropropylene	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
1,1,2-Trichloroethane	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Collection Date: 12/28/2016 1:15:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-007
Matrix: Groundwater
Client Sample ID: TWP16-PMW3B

Volatile Organic Compounds by EPA Method 8260C Batch ID: 15802 Analyst: NG

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
1,3-Dichloropropane	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
Tetrachloroethene (PCE)	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
Dibromochloromethane	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
1,2-Dibromoethane (EDB)	ND	0.0600		µg/L	1	1/4/2017 4:36:32 PM
Chlorobenzene	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
1,1,1,2-Tetrachloroethane	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
Ethylbenzene	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
m,p-Xylene	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
o-Xylene	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
Styrene	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
Isopropylbenzene	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
Bromoform	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
1,1,2,2-Tetrachloroethane	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
n-Propylbenzene	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
Bromobenzene	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
1,3,5-Trimethylbenzene	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
2-Chlorotoluene	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
4-Chlorotoluene	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
tert-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
1,2,3-Trichloropropane	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
1,2,4-Trichlorobenzene	ND	2.00		µg/L	1	1/4/2017 4:36:32 PM
sec-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
4-Isopropyltoluene	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
1,3-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
1,4-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
n-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
1,2-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
1,2-Dibromo-3-chloropropane	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
1,2,4-Trimethylbenzene	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
Hexachloro-1,3-butadiene	ND	4.00		µg/L	1	1/4/2017 4:36:32 PM
Naphthalene	ND	1.00		µg/L	1	1/4/2017 4:36:32 PM
1,2,3-Trichlorobenzene	ND	4.00		µg/L	1	1/4/2017 4:36:32 PM
Surr: Dibromofluoromethane	103	45.4-152		%Rec	1	1/4/2017 4:36:32 PM
Surr: Toluene-d8	102	40.1-139		%Rec	1	1/4/2017 4:36:32 PM
Surr: 1-Bromo-4-fluorobenzene	96.8	64.2-128		%Rec	1	1/4/2017 4:36:32 PM

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Project: Ave 55 - Taylor Way
Lab ID: 1612278-007
Client Sample ID: **TWP16-PMW3B**

Collection Date: 12/28/2016 1:15:00 PM
Matrix: Groundwater

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Mercury by EPA Method 245.1				Batch ID: 15826		Analyst: WF
Mercury	ND	0.100		µg/L	1	1/3/2017 3:36:09 PM
Dissolved Metals by EPA Method 200.8				Batch ID: 15820		Analyst: TN
Arsenic	25.1	1.00		µg/L	1	1/3/2017 12:59:59 PM
Barium	16.1	0.500		µg/L	1	1/3/2017 12:59:59 PM
Cadmium	ND	0.200		µg/L	1	1/3/2017 12:59:59 PM
Chromium	ND	0.500		µg/L	1	1/3/2017 12:59:59 PM
Copper	ND	0.500		µg/L	1	1/3/2017 12:59:59 PM
Lead	ND	0.500		µg/L	1	1/3/2017 12:59:59 PM
Nickel	1.05	0.500		µg/L	1	1/3/2017 12:59:59 PM
Zinc	ND	1.50		µg/L	1	1/3/2017 12:59:59 PM

NOTES:
Chromium results should be considered an estimated value. Potential matrix effect prevents accurate quantitation.

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Hexavalent Chromium by EPA 7196 / SM 3500 Cr B				Batch ID: R33688		Analyst: KT
Chromium, Hexavalent	0.0642	0.0500		mg/L	1	12/29/2016 9:37:00 AM

NOTES:
Chromium results should be considered an estimated value. Potential matrix effect prevents accurate quantitation.

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Collection Date: 12/28/2016 2:25:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-008
Matrix: Groundwater
Client Sample ID: **TWP16-PMW4A**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Gases by RSK-175				Batch ID: R33761		Analyst: BC
Methane	14.6	0.100	DE	mg/L	20	1/6/2017 12:03:00 PM
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 15795		Analyst: WC
Diesel (Fuel Oil)	ND	50.3		µg/L	1	1/3/2017 11:02:05 PM
Heavy Oil	3,750	101		µg/L	1	1/3/2017 11:02:05 PM
Surr: 2-Fluorobiphenyl	74.6	50-150		%Rec	1	1/3/2017 11:02:05 PM
Surr: o-Terphenyl	78.5	50-150		%Rec	1	1/3/2017 11:02:05 PM
Semi-Volatile Organic Compounds by EPA Method 8270				Batch ID: 15825		Analyst: BT
Phenol	ND	2.00		µg/L	1	1/5/2017 8:02:25 PM
2-Chlorophenol	ND	1.00		µg/L	1	1/5/2017 8:02:25 PM
1,3-Dichlorobenzene	ND	1.00		µg/L	1	1/5/2017 8:02:25 PM
1,4-Dichlorobenzene	ND	1.00		µg/L	1	1/5/2017 8:02:25 PM
1,2-Dichlorobenzene	ND	1.00		µg/L	1	1/5/2017 8:02:25 PM
Benzyl alcohol	ND	1.00		µg/L	1	1/5/2017 8:02:25 PM
Bis(2-chloroethyl) ether	ND	2.00		µg/L	1	1/5/2017 8:02:25 PM
2-Methylphenol (o-cresol)	ND	1.00		µg/L	1	1/5/2017 8:02:25 PM
Hexachloroethane	ND	1.00		µg/L	1	1/5/2017 8:02:25 PM
N-Nitrosodi-n-propylamine	ND	1.00		µg/L	1	1/5/2017 8:02:25 PM
Nitrobenzene	ND	2.00		µg/L	1	1/5/2017 8:02:25 PM
Isophorone	ND	1.00		µg/L	1	1/5/2017 8:02:25 PM
4-Methylphenol (p-cresol)	ND	1.00		µg/L	1	1/5/2017 8:02:25 PM
2-Nitrophenol	ND	2.00		µg/L	1	1/5/2017 8:02:25 PM
2,4-Dimethylphenol	ND	1.00		µg/L	1	1/5/2017 8:02:25 PM
Bis(2-chloroethoxy)methane	ND	1.00		µg/L	1	1/5/2017 8:02:25 PM
2,4-Dichlorophenol	ND	2.00		µg/L	1	1/5/2017 8:02:25 PM
1,2,4-Trichlorobenzene	ND	1.00		µg/L	1	1/5/2017 8:02:25 PM
Naphthalene	ND	0.500		µg/L	1	1/5/2017 8:02:25 PM
4-Chloroaniline	ND	5.00		µg/L	1	1/5/2017 8:02:25 PM
Hexachlorobutadiene	ND	1.00		µg/L	1	1/5/2017 8:02:25 PM
4-Chloro-3-methylphenol	ND	5.00		µg/L	1	1/5/2017 8:02:25 PM
2-Methylnaphthalene	ND	0.500	Q	µg/L	1	1/5/2017 8:02:25 PM
1-Methylnaphthalene	ND	0.500		µg/L	1	1/5/2017 8:02:25 PM
Hexachlorocyclopentadiene	ND	1.00	Q	µg/L	1	1/5/2017 8:02:25 PM
2,4,6-Trichlorophenol	ND	2.00		µg/L	1	1/5/2017 8:02:25 PM
2,4,5-Trichlorophenol	ND	2.00		µg/L	1	1/5/2017 8:02:25 PM
2-Chloronaphthalene	ND	1.00		µg/L	1	1/5/2017 8:02:25 PM

Client: Floyd | Snider **Collection Date:** 12/28/2016 2:25:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-008 **Matrix:** Groundwater
Client Sample ID: TWP16-PMW4A

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Semi-Volatile Organic Compounds by EPA Method 8270				Batch ID: 15825		Analyst: BT
2-Nitroaniline	ND	5.00		µg/L	1	1/5/2017 8:02:25 PM
Acenaphthene	1.57	0.500		µg/L	1	1/5/2017 8:02:25 PM
Dimethylphthalate	ND	1.00		µg/L	1	1/5/2017 8:02:25 PM
2,6-Dinitrotoluene	ND	1.00		µg/L	1	1/5/2017 8:02:25 PM
Acenaphthylene	ND	0.500		µg/L	1	1/5/2017 8:02:25 PM
2,4-Dinitrophenol	ND	2.00	Q	µg/L	1	1/5/2017 8:02:25 PM
Dibenzofuran	ND	1.00		µg/L	1	1/5/2017 8:02:25 PM
2,4-Dinitrotoluene	ND	1.00		µg/L	1	1/5/2017 8:02:25 PM
4-Nitrophenol	ND	5.00		µg/L	1	1/5/2017 8:02:25 PM
Fluorene	0.808	0.500		µg/L	1	1/5/2017 8:02:25 PM
4-Chlorophenyl phenyl ether	ND	1.00		µg/L	1	1/5/2017 8:02:25 PM
Diethylphthalate	ND	1.00		µg/L	1	1/5/2017 8:02:25 PM
4,6-Dinitro-2-methylphenol	ND	5.00	Q	µg/L	1	1/5/2017 8:02:25 PM
4-Bromophenyl phenyl ether	ND	1.00		µg/L	1	1/5/2017 8:02:25 PM
Hexachlorobenzene	ND	1.00		µg/L	1	1/5/2017 8:02:25 PM
Pentachlorophenol	ND	2.00		µg/L	1	1/5/2017 8:02:25 PM
Phenanthrene	0.631	0.500		µg/L	1	1/5/2017 8:02:25 PM
Anthracene	ND	0.500		µg/L	1	1/5/2017 8:02:25 PM
Carbazole	ND	5.00		µg/L	1	1/5/2017 8:02:25 PM
Di-n-butyl phthalate	ND	1.00		µg/L	1	1/5/2017 8:02:25 PM
Fluoranthene	ND	0.500		µg/L	1	1/5/2017 8:02:25 PM
Pyrene	ND	0.500		µg/L	1	1/5/2017 8:02:25 PM
Benzyl Butylphthalate	ND	1.00		µg/L	1	1/5/2017 8:02:25 PM
bis(2-Ethylhexyl)adipate	ND	1.00		µg/L	1	1/5/2017 8:02:25 PM
Benz[a]anthracene	ND	0.500		µg/L	1	1/5/2017 8:02:25 PM
Chrysene	ND	0.500		µg/L	1	1/5/2017 8:02:25 PM
Bis(2-ethylhexyl) phthalate	ND	1.00		µg/L	1	1/5/2017 8:02:25 PM
Di-n-octyl phthalate	ND	1.00		µg/L	1	1/5/2017 8:02:25 PM
Benzo (b) fluoranthene	ND	0.500		µg/L	1	1/5/2017 8:02:25 PM
Benzo (k) fluoranthene	ND	0.500		µg/L	1	1/5/2017 8:02:25 PM
Benzo[a]pyrene	ND	0.500		µg/L	1	1/5/2017 8:02:25 PM
Indeno (1,2,3-cd) pyrene	ND	0.500		µg/L	1	1/5/2017 8:02:25 PM
Dibenzo (a,h) anthracene	ND	0.500		µg/L	1	1/5/2017 8:02:25 PM
Benzo (g,h,I) perylene	ND	0.500		µg/L	1	1/5/2017 8:02:25 PM
Surr: 2,4,6-Tribromophenol	106	5-127		%Rec	1	1/5/2017 8:02:25 PM
Surr: 2-Fluorobiphenyl	63.3	24.1-139		%Rec	1	1/5/2017 8:02:25 PM
Surr: Nitrobenzene-d5	62.4	21.9-139		%Rec	1	1/5/2017 8:02:25 PM
Surr: Phenol-d6	58.6	10.3-128		%Rec	1	1/5/2017 8:02:25 PM
Surr: p-Terphenyl	54.8	25.2-132		%Rec	1	1/5/2017 8:02:25 PM

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Collection Date: 12/28/2016 2:25:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-008
Matrix: Groundwater
Client Sample ID: TWP16-PMW4A

Analyses	Result	RL	Qual	Units	DF	Date Analyzed

Semi-Volatile Organic Compounds by EPA Method 8270

Batch ID: 15825 Analyst: BT

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Gasoline by NWTPH-Gx

Batch ID: 15802 Analyst: NG

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Gasoline	189	50.0		µg/L	1	1/4/2017 5:05:48 PM
Surr: Toluene-d8	102	65-135		%Rec	1	1/4/2017 5:05:48 PM
Surr: 4-Bromofluorobenzene	98.5	65-135		%Rec	1	1/4/2017 5:05:48 PM

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 15802 Analyst: NG

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dichlorodifluoromethane (CFC-12)	ND	1.00	Q	µg/L	1	1/4/2017 5:05:48 PM
Chloromethane	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
Vinyl chloride	ND	0.200		µg/L	1	1/4/2017 5:05:48 PM
Bromomethane	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
Trichlorofluoromethane (CFC-11)	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
Chloroethane	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
1,1-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
Methylene chloride	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
trans-1,2-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
Methyl tert-butyl ether (MTBE)	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
1,1-Dichloroethane	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
2,2-Dichloropropane	ND	2.00	Q	µg/L	1	1/4/2017 5:05:48 PM
cis-1,2-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
Chloroform	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
1,1,1-Trichloroethane (TCA)	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
1,1-Dichloropropene	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
Carbon tetrachloride	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
1,2-Dichloroethane (EDC)	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
Benzene	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
Trichloroethene (TCE)	ND	0.500		µg/L	1	1/4/2017 5:05:48 PM
1,2-Dichloropropane	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
Bromodichloromethane	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
Dibromomethane	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
cis-1,3-Dichloropropene	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
Toluene	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
trans-1,3-Dichloropropylene	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
1,1,2-Trichloroethane	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider **Collection Date:** 12/28/2016 2:25:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-008 **Matrix:** Groundwater
Client Sample ID: TWP16-PMW4A

Volatile Organic Compounds by EPA Method 8260C Batch ID: 15802 Analyst: NG

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
1,3-Dichloropropane	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
Tetrachloroethene (PCE)	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
Dibromochloromethane	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
1,2-Dibromoethane (EDB)	ND	0.0600		µg/L	1	1/4/2017 5:05:48 PM
Chlorobenzene	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
1,1,1,2-Tetrachloroethane	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
Ethylbenzene	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
m,p-Xylene	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
o-Xylene	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
Styrene	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
Isopropylbenzene	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
Bromoform	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
1,1,2,2-Tetrachloroethane	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
n-Propylbenzene	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
Bromobenzene	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
1,3,5-Trimethylbenzene	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
2-Chlorotoluene	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
4-Chlorotoluene	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
tert-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
1,2,3-Trichloropropane	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
1,2,4-Trichlorobenzene	ND	2.00		µg/L	1	1/4/2017 5:05:48 PM
sec-Butylbenzene	1.00	1.00		µg/L	1	1/4/2017 5:05:48 PM
4-Isopropyltoluene	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
1,3-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
1,4-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
n-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
1,2-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
1,2-Dibromo-3-chloropropane	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
1,2,4-Trimethylbenzene	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
Hexachloro-1,3-butadiene	ND	4.00		µg/L	1	1/4/2017 5:05:48 PM
Naphthalene	ND	1.00		µg/L	1	1/4/2017 5:05:48 PM
1,2,3-Trichlorobenzene	ND	4.00		µg/L	1	1/4/2017 5:05:48 PM
Surr: Dibromofluoromethane	103	45.4-152		%Rec	1	1/4/2017 5:05:48 PM
Surr: Toluene-d8	102	40.1-139		%Rec	1	1/4/2017 5:05:48 PM
Surr: 1-Bromo-4-fluorobenzene	98.3	64.2-128		%Rec	1	1/4/2017 5:05:48 PM

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Project: Ave 55 - Taylor Way
Lab ID: 1612278-008
Client Sample ID: **TWP16-PMW4A**

Collection Date: 12/28/2016 2:25:00 PM
Matrix: Groundwater

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Mercury by EPA Method 245.1				Batch ID: 15826		Analyst: WF
Mercury	ND	0.100		µg/L	1	1/3/2017 3:37:51 PM
Dissolved Metals by EPA Method 200.8				Batch ID: 15820		Analyst: TN
Arsenic	3.78	1.00		µg/L	1	1/3/2017 1:03:35 PM
Barium	38.5	0.500		µg/L	1	1/3/2017 1:03:35 PM
Cadmium	ND	0.200		µg/L	1	1/3/2017 1:03:35 PM
Chromium	ND	0.500		µg/L	1	1/3/2017 1:03:35 PM
Copper	ND	0.500		µg/L	1	1/3/2017 1:03:35 PM
Lead	ND	0.500		µg/L	1	1/3/2017 1:03:35 PM
Nickel	1.15	0.500		µg/L	1	1/3/2017 1:03:35 PM
Zinc	1.92	1.50		µg/L	1	1/3/2017 1:03:35 PM
Hexavalent Chromium by EPA 7196 / SM 3500 Cr B				Batch ID: R33688		Analyst: KT
Chromium, Hexavalent	ND	0.0500		mg/L	1	12/29/2016 9:40:00 AM

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Collection Date: 12/28/2016 2:45:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-009
Matrix: Groundwater
Client Sample ID: TWP16-PMW4B

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Gasoline by NWTPH-Gx				Batch ID: 15802		Analyst: NG
Gasoline	ND	50.0		µg/L	1	1/4/2017 5:35:04 PM
Surr: Toluene-d8	101	65-135		%Rec	1	1/4/2017 5:35:04 PM
Surr: 4-Bromofluorobenzene	96.3	65-135		%Rec	1	1/4/2017 5:35:04 PM
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 15802		Analyst: NG
Dichlorodifluoromethane (CFC-12)	ND	1.00	Q	µg/L	1	1/4/2017 5:35:04 PM
Chloromethane	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
Vinyl chloride	ND	0.200		µg/L	1	1/4/2017 5:35:04 PM
Bromomethane	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
Trichlorofluoromethane (CFC-11)	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
Chloroethane	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
1,1-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
Methylene chloride	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
trans-1,2-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
Methyl tert-butyl ether (MTBE)	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
1,1-Dichloroethane	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
2,2-Dichloropropane	ND	2.00	Q	µg/L	1	1/4/2017 5:35:04 PM
cis-1,2-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
Chloroform	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
1,1,1-Trichloroethane (TCA)	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
1,1-Dichloropropene	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
Carbon tetrachloride	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
1,2-Dichloroethane (EDC)	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
Benzene	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
Trichloroethene (TCE)	ND	0.500		µg/L	1	1/4/2017 5:35:04 PM
1,2-Dichloropropane	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
Bromodichloromethane	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
Dibromomethane	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
cis-1,3-Dichloropropene	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
Toluene	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
trans-1,3-Dichloropropylene	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
1,1,2-Trichloroethane	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
1,3-Dichloropropane	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
Tetrachloroethene (PCE)	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
Dibromochloromethane	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
1,2-Dibromoethane (EDB)	ND	0.0600		µg/L	1	1/4/2017 5:35:04 PM
Chlorobenzene	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
1,1,1,2-Tetrachloroethane	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Project: Ave 55 - Taylor Way
Lab ID: 1612278-009
Client Sample ID: **TWP16-PMW4B**

Collection Date: 12/28/2016 2:45:00 PM
Matrix: Groundwater

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 15802		Analyst: NG
Ethylbenzene	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
m,p-Xylene	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
o-Xylene	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
Styrene	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
Isopropylbenzene	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
Bromoform	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
1,1,2,2-Tetrachloroethane	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
n-Propylbenzene	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
Bromobenzene	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
1,3,5-Trimethylbenzene	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
2-Chlorotoluene	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
4-Chlorotoluene	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
tert-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
1,2,3-Trichloropropane	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
1,2,4-Trichlorobenzene	ND	2.00		µg/L	1	1/4/2017 5:35:04 PM
sec-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
4-Isopropyltoluene	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
1,3-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
1,4-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
n-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
1,2-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
1,2-Dibromo-3-chloropropane	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
1,2,4-Trimethylbenzene	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
Hexachloro-1,3-butadiene	ND	4.00		µg/L	1	1/4/2017 5:35:04 PM
Naphthalene	ND	1.00		µg/L	1	1/4/2017 5:35:04 PM
1,2,3-Trichlorobenzene	ND	4.00		µg/L	1	1/4/2017 5:35:04 PM
Surr: Dibromofluoromethane	103	45.4-152		%Rec	1	1/4/2017 5:35:04 PM
Surr: Toluene-d8	102	40.1-139		%Rec	1	1/4/2017 5:35:04 PM
Surr: 1-Bromo-4-fluorobenzene	96.8	64.2-128		%Rec	1	1/4/2017 5:35:04 PM

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Fremont Analytical

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Collection Date: 12/28/2016 3:35:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-010
Matrix: Groundwater
Client Sample ID: TWP16-PMW5A

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Gases by RSK-175				Batch ID: R33761		Analyst: BC
Methane	4.15	0.100	D	mg/L	20	1/6/2017 12:05:00 PM
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 15795		Analyst: WC
Diesel (Fuel Oil)	ND	50.3		µg/L	1	1/3/2017 11:32:08 PM
Diesel Range Organics (C12-C24)	128	50.3		µg/L	1	1/3/2017 11:32:08 PM
Heavy Oil	668	101		µg/L	1	1/3/2017 11:32:08 PM
Surr: 2-Fluorobiphenyl	77.3	50-150		%Rec	1	1/3/2017 11:32:08 PM
Surr: o-Terphenyl	80.6	50-150		%Rec	1	1/3/2017 11:32:08 PM

NOTES:
DRO - Indicates the presence of unresolved compounds eluting from dodecane through tetracosane (C12-C24).

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Semi-Volatile Organic Compounds by EPA Method 8270				Batch ID: 15825		Analyst: BT
Phenol	ND	2.00		µg/L	1	1/5/2017 8:23:19 PM
2-Chlorophenol	ND	0.999		µg/L	1	1/5/2017 8:23:19 PM
1,3-Dichlorobenzene	ND	0.999		µg/L	1	1/5/2017 8:23:19 PM
1,4-Dichlorobenzene	ND	0.999		µg/L	1	1/5/2017 8:23:19 PM
1,2-Dichlorobenzene	ND	0.999		µg/L	1	1/5/2017 8:23:19 PM
Benzyl alcohol	ND	0.999		µg/L	1	1/5/2017 8:23:19 PM
Bis(2-chloroethyl) ether	ND	2.00		µg/L	1	1/5/2017 8:23:19 PM
2-Methylphenol (o-cresol)	ND	0.999		µg/L	1	1/5/2017 8:23:19 PM
Hexachloroethane	ND	0.999		µg/L	1	1/5/2017 8:23:19 PM
N-Nitrosodi-n-propylamine	ND	0.999		µg/L	1	1/5/2017 8:23:19 PM
Nitrobenzene	ND	2.00		µg/L	1	1/5/2017 8:23:19 PM
Isophorone	ND	0.999		µg/L	1	1/5/2017 8:23:19 PM
4-Methylphenol (p-cresol)	ND	0.999		µg/L	1	1/5/2017 8:23:19 PM
2-Nitrophenol	ND	2.00		µg/L	1	1/5/2017 8:23:19 PM
2,4-Dimethylphenol	ND	0.999		µg/L	1	1/5/2017 8:23:19 PM
Bis(2-chloroethoxy)methane	ND	0.999		µg/L	1	1/5/2017 8:23:19 PM
2,4-Dichlorophenol	ND	2.00		µg/L	1	1/5/2017 8:23:19 PM
1,2,4-Trichlorobenzene	ND	0.999		µg/L	1	1/5/2017 8:23:19 PM
Naphthalene	1.03	0.499		µg/L	1	1/5/2017 8:23:19 PM
4-Chloroaniline	ND	4.99		µg/L	1	1/5/2017 8:23:19 PM
Hexachlorobutadiene	ND	0.999		µg/L	1	1/5/2017 8:23:19 PM
4-Chloro-3-methylphenol	ND	4.99		µg/L	1	1/5/2017 8:23:19 PM
2-Methylnaphthalene	ND	0.499	Q	µg/L	1	1/5/2017 8:23:19 PM
1-Methylnaphthalene	ND	0.499		µg/L	1	1/5/2017 8:23:19 PM
Hexachlorocyclopentadiene	ND	0.999	Q	µg/L	1	1/5/2017 8:23:19 PM

Fremont Analytical

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider **Collection Date:** 12/28/2016 3:35:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-010 **Matrix:** Groundwater
Client Sample ID: TWP16-PMW5A

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Semi-Volatile Organic Compounds by EPA Method 8270				Batch ID: 15825		Analyst: BT
2,4,6-Trichlorophenol	ND	2.00		µg/L	1	1/5/2017 8:23:19 PM
2,4,5-Trichlorophenol	ND	2.00		µg/L	1	1/5/2017 8:23:19 PM
2-Chloronaphthalene	ND	0.999		µg/L	1	1/5/2017 8:23:19 PM
2-Nitroaniline	ND	4.99		µg/L	1	1/5/2017 8:23:19 PM
Acenaphthene	0.807	0.499		µg/L	1	1/5/2017 8:23:19 PM
Dimethylphthalate	ND	0.999		µg/L	1	1/5/2017 8:23:19 PM
2,6-Dinitrotoluene	ND	0.999		µg/L	1	1/5/2017 8:23:19 PM
Acenaphthylene	ND	0.499		µg/L	1	1/5/2017 8:23:19 PM
2,4-Dinitrophenol	ND	2.00	Q	µg/L	1	1/5/2017 8:23:19 PM
Dibenzofuran	ND	0.999		µg/L	1	1/5/2017 8:23:19 PM
2,4-Dinitrotoluene	ND	0.999		µg/L	1	1/5/2017 8:23:19 PM
4-Nitrophenol	ND	4.99		µg/L	1	1/5/2017 8:23:19 PM
Fluorene	ND	0.499		µg/L	1	1/5/2017 8:23:19 PM
4-Chlorophenyl phenyl ether	ND	0.999		µg/L	1	1/5/2017 8:23:19 PM
Diethylphthalate	ND	0.999		µg/L	1	1/5/2017 8:23:19 PM
4,6-Dinitro-2-methylphenol	ND	4.99	Q	µg/L	1	1/5/2017 8:23:19 PM
4-Bromophenyl phenyl ether	ND	0.999		µg/L	1	1/5/2017 8:23:19 PM
Hexachlorobenzene	ND	0.999		µg/L	1	1/5/2017 8:23:19 PM
Pentachlorophenol	ND	2.00		µg/L	1	1/5/2017 8:23:19 PM
Phenanthrene	ND	0.499		µg/L	1	1/5/2017 8:23:19 PM
Anthracene	ND	0.499		µg/L	1	1/5/2017 8:23:19 PM
Carbazole	ND	4.99		µg/L	1	1/5/2017 8:23:19 PM
Di-n-butyl phthalate	ND	0.999		µg/L	1	1/5/2017 8:23:19 PM
Fluoranthene	ND	0.499		µg/L	1	1/5/2017 8:23:19 PM
Pyrene	ND	0.499		µg/L	1	1/5/2017 8:23:19 PM
Benzyl Butylphthalate	ND	0.999		µg/L	1	1/5/2017 8:23:19 PM
bis(2-Ethylhexyl)adipate	ND	0.999		µg/L	1	1/5/2017 8:23:19 PM
Benz[a]anthracene	ND	0.499		µg/L	1	1/5/2017 8:23:19 PM
Chrysene	ND	0.499		µg/L	1	1/5/2017 8:23:19 PM
Bis(2-ethylhexyl) phthalate	ND	0.999		µg/L	1	1/5/2017 8:23:19 PM
Di-n-octyl phthalate	ND	0.999		µg/L	1	1/5/2017 8:23:19 PM
Benzo (b) fluoranthene	ND	0.499		µg/L	1	1/5/2017 8:23:19 PM
Benzo (k) fluoranthene	ND	0.499		µg/L	1	1/5/2017 8:23:19 PM
Benzo[a]pyrene	ND	0.499		µg/L	1	1/5/2017 8:23:19 PM
Indeno (1,2,3-cd) pyrene	ND	0.499		µg/L	1	1/5/2017 8:23:19 PM
Dibenzo (a,h) anthracene	ND	0.499		µg/L	1	1/5/2017 8:23:19 PM
Benzo (g,h,I) perylene	ND	0.499		µg/L	1	1/5/2017 8:23:19 PM
Surr: 2,4,6-Tribromophenol	96.2	5-127		%Rec	1	1/5/2017 8:23:19 PM
Surr: 2-Fluorobiphenyl	52.5	24.1-139		%Rec	1	1/5/2017 8:23:19 PM

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Collection Date: 12/28/2016 3:35:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-010
Matrix: Groundwater
Client Sample ID: **TWP16-PMW5A**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Semi-Volatile Organic Compounds by EPA Method 8270				Batch ID: 15825		Analyst: BT
Surr: Nitrobenzene-d5	66.3	21.9-139		%Rec	1	1/5/2017 8:23:19 PM
Surr: Phenol-d6	62.6	10.3-128		%Rec	1	1/5/2017 8:23:19 PM
Surr: p-Terphenyl	53.5	25.2-132		%Rec	1	1/5/2017 8:23:19 PM

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Gasoline by NWTPH-Gx				Batch ID: 15802		Analyst: NG
Gasoline	ND	50.0		µg/L	1	1/4/2017 6:04:21 PM
Surr: Toluene-d8	101	65-135		%Rec	1	1/4/2017 6:04:21 PM
Surr: 4-Bromofluorobenzene	97.4	65-135		%Rec	1	1/4/2017 6:04:21 PM
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 15802		Analyst: NG
Dichlorodifluoromethane (CFC-12)	ND	1.00	Q	µg/L	1	1/4/2017 6:04:21 PM
Chloromethane	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
Vinyl chloride	ND	0.200		µg/L	1	1/4/2017 6:04:21 PM
Bromomethane	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
Trichlorofluoromethane (CFC-11)	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
Chloroethane	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
1,1-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
Methylene chloride	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
trans-1,2-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
Methyl tert-butyl ether (MTBE)	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
1,1-Dichloroethane	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
2,2-Dichloropropane	ND	2.00	Q	µg/L	1	1/4/2017 6:04:21 PM
cis-1,2-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
Chloroform	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
1,1,1-Trichloroethane (TCA)	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
1,1-Dichloropropene	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
Carbon tetrachloride	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
1,2-Dichloroethane (EDC)	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
Benzene	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
Trichloroethene (TCE)	ND	0.500		µg/L	1	1/4/2017 6:04:21 PM
1,2-Dichloropropane	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
Bromodichloromethane	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
Dibromomethane	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
cis-1,3-Dichloropropene	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider **Collection Date:** 12/28/2016 3:35:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-010 **Matrix:** Groundwater
Client Sample ID: TWP16-PMW5A

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 15802		Analyst: NG
Toluene	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
trans-1,3-Dichloropropylene	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
1,1,2-Trichloroethane	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
1,3-Dichloropropane	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
Tetrachloroethene (PCE)	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
Dibromochloromethane	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
1,2-Dibromoethane (EDB)	ND	0.0600		µg/L	1	1/4/2017 6:04:21 PM
Chlorobenzene	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
1,1,1,2-Tetrachloroethane	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
Ethylbenzene	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
m,p-Xylene	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
o-Xylene	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
Styrene	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
Isopropylbenzene	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
Bromoform	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
1,1,2,2-Tetrachloroethane	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
n-Propylbenzene	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
Bromobenzene	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
1,3,5-Trimethylbenzene	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
2-Chlorotoluene	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
4-Chlorotoluene	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
tert-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
1,2,3-Trichloropropane	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
1,2,4-Trichlorobenzene	ND	2.00		µg/L	1	1/4/2017 6:04:21 PM
sec-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
4-Isopropyltoluene	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
1,3-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
1,4-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
n-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
1,2-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
1,2-Dibromo-3-chloropropane	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
1,2,4-Trimethylbenzene	ND	1.00		µg/L	1	1/4/2017 6:04:21 PM
Hexachloro-1,3-butadiene	ND	4.00		µg/L	1	1/4/2017 6:04:21 PM
Naphthalene	2.23	1.00		µg/L	1	1/4/2017 6:04:21 PM
1,2,3-Trichlorobenzene	ND	4.00		µg/L	1	1/4/2017 6:04:21 PM
Surr: Dibromofluoromethane	104	45.4-152		%Rec	1	1/4/2017 6:04:21 PM
Surr: Toluene-d8	102	40.1-139		%Rec	1	1/4/2017 6:04:21 PM
Surr: 1-Bromo-4-fluorobenzene	97.7	64.2-128		%Rec	1	1/4/2017 6:04:21 PM

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Collection Date: 12/28/2016 3:35:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-010
Matrix: Groundwater
Client Sample ID: TWP16-PMW5A

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 15802		Analyst: NG

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Mercury by EPA Method 245.1				Batch ID: 15826		Analyst: WF
Mercury	ND	0.100		µg/L	1	1/3/2017 3:39:34 PM
Dissolved Metals by EPA Method 200.8				Batch ID: 15820		Analyst: TN
Arsenic	ND	1.00		µg/L	1	1/3/2017 1:07:11 PM
Barium	47.0	0.500		µg/L	1	1/3/2017 1:07:11 PM
Cadmium	ND	0.200		µg/L	1	1/3/2017 1:07:11 PM
Chromium	1.34	0.500		µg/L	1	1/3/2017 1:07:11 PM
Copper	1.06	0.500		µg/L	1	1/3/2017 1:07:11 PM
Lead	ND	0.500		µg/L	1	1/3/2017 1:07:11 PM
Nickel	0.963	0.500		µg/L	1	1/3/2017 1:07:11 PM
Zinc	5.57	1.50		µg/L	1	1/3/2017 1:07:11 PM
Hexavalent Chromium by EPA 7196 / SM 3500 Cr B				Batch ID: R33688		Analyst: KT
Chromium, Hexavalent	ND	0.0500		mg/L	1	12/29/2016 9:44:00 AM

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Collection Date: 12/28/2016 4:00:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-011
Matrix: Groundwater
Client Sample ID: TWP16-PMW5B

Analyses	Result	RL	Qual	Units	DF	Date Analyzed

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext. Batch ID: 15795 Analyst: WC

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel (Fuel Oil)	ND	50.3		µg/L	1	1/4/2017 12:02:14 AM
Diesel Range Organics (C12-C24)	125	50.3		µg/L	1	1/4/2017 12:02:14 AM
Heavy Oil	1,210	101		µg/L	1	1/4/2017 12:02:14 AM
Surr: 2-Fluorobiphenyl	69.6	50-150		%Rec	1	1/4/2017 12:02:14 AM
Surr: o-Terphenyl	59.9	50-150		%Rec	1	1/4/2017 12:02:14 AM

NOTES:
DRO - Indicates the presence of unresolved compounds eluting from dodecane through tetracosane (C12-C24).

Semi-Volatile Organic Compounds by EPA Method 8270 Batch ID: 15825 Analyst: BT

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Phenol	ND	1.99		µg/L	1	1/5/2017 8:44:19 PM
2-Chlorophenol	ND	0.997		µg/L	1	1/5/2017 8:44:19 PM
1,3-Dichlorobenzene	ND	0.997		µg/L	1	1/5/2017 8:44:19 PM
1,4-Dichlorobenzene	ND	0.997		µg/L	1	1/5/2017 8:44:19 PM
1,2-Dichlorobenzene	ND	0.997		µg/L	1	1/5/2017 8:44:19 PM
Benzyl alcohol	ND	0.997		µg/L	1	1/5/2017 8:44:19 PM
Bis(2-chloroethyl) ether	ND	1.99		µg/L	1	1/5/2017 8:44:19 PM
2-Methylphenol (o-cresol)	ND	0.997		µg/L	1	1/5/2017 8:44:19 PM
Hexachloroethane	ND	0.997		µg/L	1	1/5/2017 8:44:19 PM
N-Nitrosodi-n-propylamine	ND	0.997		µg/L	1	1/5/2017 8:44:19 PM
Nitrobenzene	ND	1.99		µg/L	1	1/5/2017 8:44:19 PM
Isophorone	ND	0.997		µg/L	1	1/5/2017 8:44:19 PM
4-Methylphenol (p-cresol)	ND	0.997		µg/L	1	1/5/2017 8:44:19 PM
2-Nitrophenol	ND	1.99		µg/L	1	1/5/2017 8:44:19 PM
2,4-Dimethylphenol	ND	0.997		µg/L	1	1/5/2017 8:44:19 PM
Bis(2-chloroethoxy)methane	ND	0.997		µg/L	1	1/5/2017 8:44:19 PM
2,4-Dichlorophenol	ND	1.99		µg/L	1	1/5/2017 8:44:19 PM
1,2,4-Trichlorobenzene	ND	0.997		µg/L	1	1/5/2017 8:44:19 PM
Naphthalene	ND	0.498		µg/L	1	1/5/2017 8:44:19 PM
4-Chloroaniline	ND	4.98		µg/L	1	1/5/2017 8:44:19 PM
Hexachlorobutadiene	ND	0.997		µg/L	1	1/5/2017 8:44:19 PM
4-Chloro-3-methylphenol	ND	4.98		µg/L	1	1/5/2017 8:44:19 PM
2-Methylnaphthalene	ND	0.498	Q	µg/L	1	1/5/2017 8:44:19 PM
1-Methylnaphthalene	ND	0.498		µg/L	1	1/5/2017 8:44:19 PM
Hexachlorocyclopentadiene	ND	0.997	Q	µg/L	1	1/5/2017 8:44:19 PM
2,4,6-Trichlorophenol	ND	1.99		µg/L	1	1/5/2017 8:44:19 PM
2,4,5-Trichlorophenol	ND	1.99		µg/L	1	1/5/2017 8:44:19 PM
2-Chloronaphthalene	ND	0.997		µg/L	1	1/5/2017 8:44:19 PM
2-Nitroaniline	ND	4.98		µg/L	1	1/5/2017 8:44:19 PM

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Collection Date: 12/28/2016 4:00:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-011
Matrix: Groundwater
Client Sample ID: TWP16-PMW5B

Semi-Volatile Organic Compounds by EPA Method 8270 — Batch ID: 15825 — Analyst: BT

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Acenaphthene	ND	0.498		µg/L	1	1/5/2017 8:44:19 PM
Dimethylphthalate	ND	0.997		µg/L	1	1/5/2017 8:44:19 PM
2,6-Dinitrotoluene	ND	0.997		µg/L	1	1/5/2017 8:44:19 PM
Acenaphthylene	ND	0.498		µg/L	1	1/5/2017 8:44:19 PM
2,4-Dinitrophenol	ND	1.99	Q	µg/L	1	1/5/2017 8:44:19 PM
Dibenzofuran	ND	0.997		µg/L	1	1/5/2017 8:44:19 PM
2,4-Dinitrotoluene	ND	0.997		µg/L	1	1/5/2017 8:44:19 PM
4-Nitrophenol	ND	4.98		µg/L	1	1/5/2017 8:44:19 PM
Fluorene	ND	0.498		µg/L	1	1/5/2017 8:44:19 PM
4-Chlorophenyl phenyl ether	ND	0.997		µg/L	1	1/5/2017 8:44:19 PM
Diethylphthalate	ND	0.997		µg/L	1	1/5/2017 8:44:19 PM
4,6-Dinitro-2-methylphenol	ND	4.98	Q	µg/L	1	1/5/2017 8:44:19 PM
4-Bromophenyl phenyl ether	ND	0.997		µg/L	1	1/5/2017 8:44:19 PM
Hexachlorobenzene	ND	0.997		µg/L	1	1/5/2017 8:44:19 PM
Pentachlorophenol	ND	1.99		µg/L	1	1/5/2017 8:44:19 PM
Phenanthrene	ND	0.498		µg/L	1	1/5/2017 8:44:19 PM
Anthracene	ND	0.498		µg/L	1	1/5/2017 8:44:19 PM
Carbazole	ND	4.98		µg/L	1	1/5/2017 8:44:19 PM
Di-n-butyl phthalate	ND	0.997		µg/L	1	1/5/2017 8:44:19 PM
Fluoranthene	ND	0.498		µg/L	1	1/5/2017 8:44:19 PM
Pyrene	ND	0.498		µg/L	1	1/5/2017 8:44:19 PM
Benzyl Butylphthalate	ND	0.997		µg/L	1	1/5/2017 8:44:19 PM
bis(2-Ethylhexyl)adipate	ND	0.997		µg/L	1	1/5/2017 8:44:19 PM
Benz[a]anthracene	ND	0.498		µg/L	1	1/5/2017 8:44:19 PM
Chrysene	ND	0.498		µg/L	1	1/5/2017 8:44:19 PM
Bis(2-ethylhexyl) phthalate	ND	0.997		µg/L	1	1/5/2017 8:44:19 PM
Di-n-octyl phthalate	ND	0.997		µg/L	1	1/5/2017 8:44:19 PM
Benzo (b) fluoranthene	ND	0.498		µg/L	1	1/5/2017 8:44:19 PM
Benzo (k) fluoranthene	ND	0.498		µg/L	1	1/5/2017 8:44:19 PM
Benzo[a]pyrene	ND	0.498		µg/L	1	1/5/2017 8:44:19 PM
Indeno (1,2,3-cd) pyrene	ND	0.498		µg/L	1	1/5/2017 8:44:19 PM
Dibenzo (a,h) anthracene	ND	0.498		µg/L	1	1/5/2017 8:44:19 PM
Benzo (g,h,I) perylene	ND	0.498		µg/L	1	1/5/2017 8:44:19 PM
Surr: 2,4,6-Tribromophenol	110	5-127		%Rec	1	1/5/2017 8:44:19 PM
Surr: 2-Fluorobiphenyl	60.7	24.1-139		%Rec	1	1/5/2017 8:44:19 PM
Surr: Nitrobenzene-d5	79.7	21.9-139		%Rec	1	1/5/2017 8:44:19 PM
Surr: Phenol-d6	70.3	10.3-128		%Rec	1	1/5/2017 8:44:19 PM
Surr: p-Terphenyl	59.1	25.2-132		%Rec	1	1/5/2017 8:44:19 PM

Fremont Analytical

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Collection Date: 12/28/2016 4:00:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-011
Matrix: Groundwater
Client Sample ID: TWP16-PMW5B

Analyses	Result	RL	Qual	Units	DF	Date Analyzed

Semi-Volatile Organic Compounds by EPA Method 8270

Batch ID: 15825 Analyst: BT

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Gasoline by NWTPH-Gx

Batch ID: 15802 Analyst: NG

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Gasoline	ND	50.0		µg/L	1	1/4/2017 6:33:38 PM
Surr: Toluene-d8	101	65-135		%Rec	1	1/4/2017 6:33:38 PM
Surr: 4-Bromofluorobenzene	97.0	65-135		%Rec	1	1/4/2017 6:33:38 PM

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 15802 Analyst: NG

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dichlorodifluoromethane (CFC-12)	ND	1.00	Q	µg/L	1	1/4/2017 6:33:38 PM
Chloromethane	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
Vinyl chloride	ND	0.200		µg/L	1	1/4/2017 6:33:38 PM
Bromomethane	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
Trichlorofluoromethane (CFC-11)	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
Chloroethane	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
1,1-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
Methylene chloride	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
trans-1,2-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
Methyl tert-butyl ether (MTBE)	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
1,1-Dichloroethane	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
2,2-Dichloropropane	ND	2.00	Q	µg/L	1	1/4/2017 6:33:38 PM
cis-1,2-Dichloroethene	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
Chloroform	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
1,1,1-Trichloroethane (TCA)	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
1,1-Dichloropropene	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
Carbon tetrachloride	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
1,2-Dichloroethane (EDC)	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
Benzene	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
Trichloroethene (TCE)	ND	0.500		µg/L	1	1/4/2017 6:33:38 PM
1,2-Dichloropropane	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
Bromodichloromethane	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
Dibromomethane	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
cis-1,3-Dichloropropene	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
Toluene	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
trans-1,3-Dichloropropylene	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
1,1,2-Trichloroethane	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Collection Date: 12/28/2016 4:00:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-011
Matrix: Groundwater
Client Sample ID: TWP16-PMW5B

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 15802 Analyst: NG

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
1,3-Dichloropropane	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
Tetrachloroethene (PCE)	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
Dibromochloromethane	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
1,2-Dibromoethane (EDB)	ND	0.0600		µg/L	1	1/4/2017 6:33:38 PM
Chlorobenzene	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
1,1,1,2-Tetrachloroethane	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
Ethylbenzene	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
m,p-Xylene	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
o-Xylene	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
Styrene	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
Isopropylbenzene	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
Bromoform	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
1,1,2,2-Tetrachloroethane	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
n-Propylbenzene	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
Bromobenzene	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
1,3,5-Trimethylbenzene	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
2-Chlorotoluene	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
4-Chlorotoluene	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
tert-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
1,2,3-Trichloropropane	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
1,2,4-Trichlorobenzene	ND	2.00		µg/L	1	1/4/2017 6:33:38 PM
sec-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
4-Isopropyltoluene	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
1,3-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
1,4-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
n-Butylbenzene	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
1,2-Dichlorobenzene	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
1,2-Dibromo-3-chloropropane	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
1,2,4-Trimethylbenzene	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
Hexachloro-1,3-butadiene	ND	4.00		µg/L	1	1/4/2017 6:33:38 PM
Naphthalene	ND	1.00		µg/L	1	1/4/2017 6:33:38 PM
1,2,3-Trichlorobenzene	ND	4.00		µg/L	1	1/4/2017 6:33:38 PM
Surr: Dibromofluoromethane	103	45.4-152		%Rec	1	1/4/2017 6:33:38 PM
Surr: Toluene-d8	102	40.1-139		%Rec	1	1/4/2017 6:33:38 PM
Surr: 1-Bromo-4-fluorobenzene	97.3	64.2-128		%Rec	1	1/4/2017 6:33:38 PM

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Project: Ave 55 - Taylor Way
Lab ID: 1612278-011
Client Sample ID: **TWP16-PMW5B**

Collection Date: 12/28/2016 4:00:00 PM
Matrix: Groundwater

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Mercury by EPA Method 245.1				Batch ID: 15826		Analyst: WF
Mercury	ND	0.100		µg/L	1	1/3/2017 3:41:15 PM
Dissolved Metals by EPA Method 200.8				Batch ID: 15820		Analyst: TN
Arsenic	2.41	1.00		µg/L	1	1/3/2017 1:10:48 PM
Barium	3.43	0.500		µg/L	1	1/3/2017 1:10:48 PM
Cadmium	ND	0.200		µg/L	1	1/3/2017 1:10:48 PM
Chromium	4.58	0.500		µg/L	1	1/3/2017 1:10:48 PM
Copper	ND	0.500		µg/L	1	1/3/2017 1:10:48 PM
Lead	ND	0.500		µg/L	1	1/3/2017 1:10:48 PM
Nickel	0.706	0.500		µg/L	1	1/3/2017 1:10:48 PM
Zinc	ND	1.50		µg/L	1	1/3/2017 1:10:48 PM
Hexavalent Chromium by EPA 7196 / SM 3500 Cr B				Batch ID: R33688		Analyst: KT
Chromium, Hexavalent	0.0557	0.0500		mg/L	1	12/29/2016 10:21:00 AM

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Collection Date: 12/20/2016 2:59:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-012
Matrix: Water
Client Sample ID: Trip Blank

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Gasoline by NWTPH-Gx				Batch ID: 15802		Analyst: NG
Gasoline	ND	50.0	H	µg/L	1	1/4/2017 10:46:10 AM
Surr: Toluene-d8	101	65-135	H	%Rec	1	1/4/2017 10:46:10 AM
Surr: 4-Bromofluorobenzene	96.0	65-135	H	%Rec	1	1/4/2017 10:46:10 AM
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 15802		Analyst: NG
Dichlorodifluoromethane (CFC-12)	ND	1.00	QH	µg/L	1	1/4/2017 10:46:10 AM
Chloromethane	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
Vinyl chloride	ND	0.200	H	µg/L	1	1/4/2017 10:46:10 AM
Bromomethane	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
Trichlorofluoromethane (CFC-11)	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
Chloroethane	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
1,1-Dichloroethene	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
Methylene chloride	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
trans-1,2-Dichloroethene	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
Methyl tert-butyl ether (MTBE)	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
1,1-Dichloroethane	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
2,2-Dichloropropane	ND	2.00	QH	µg/L	1	1/4/2017 10:46:10 AM
cis-1,2-Dichloroethene	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
Chloroform	3.67	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
1,1,1-Trichloroethane (TCA)	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
1,1-Dichloropropene	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
Carbon tetrachloride	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
1,2-Dichloroethane (EDC)	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
Benzene	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
Trichloroethene (TCE)	ND	0.500	H	µg/L	1	1/4/2017 10:46:10 AM
1,2-Dichloropropane	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
Bromodichloromethane	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
Dibromomethane	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
cis-1,3-Dichloropropene	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
Toluene	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
trans-1,3-Dichloropropylene	ND	1.00	QH	µg/L	1	1/4/2017 10:46:10 AM
1,1,2-Trichloroethane	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
1,3-Dichloropropane	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
Tetrachloroethene (PCE)	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
Dibromochloromethane	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
1,2-Dibromoethane (EDB)	ND	0.0600	H	µg/L	1	1/4/2017 10:46:10 AM
Chlorobenzene	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
1,1,1,2-Tetrachloroethane	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM

Fremont Analytical

Analytical Report

Work Order: **1612278**
Date Reported: **1/9/2017**

Client: Floyd | Snider
Collection Date: 12/20/2016 2:59:00 PM
Project: Ave 55 - Taylor Way
Lab ID: 1612278-012
Matrix: Water
Client Sample ID: Trip Blank

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA Method 8260C				Batch ID: 15802		Analyst: NG
Ethylbenzene	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
m,p-Xylene	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
o-Xylene	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
Styrene	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
Isopropylbenzene	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
Bromoform	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
1,1,2,2-Tetrachloroethane	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
n-Propylbenzene	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
Bromobenzene	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
1,3,5-Trimethylbenzene	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
2-Chlorotoluene	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
4-Chlorotoluene	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
tert-Butylbenzene	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
1,2,3-Trichloropropane	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
1,2,4-Trichlorobenzene	ND	2.00	H	µg/L	1	1/4/2017 10:46:10 AM
sec-Butylbenzene	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
4-Isopropyltoluene	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
1,3-Dichlorobenzene	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
1,4-Dichlorobenzene	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
n-Butylbenzene	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
1,2-Dichlorobenzene	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
1,2-Dibromo-3-chloropropane	ND	1.00	QH	µg/L	1	1/4/2017 10:46:10 AM
1,2,4-Trimethylbenzene	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
Hexachloro-1,3-butadiene	ND	4.00	H	µg/L	1	1/4/2017 10:46:10 AM
Naphthalene	ND	1.00	H	µg/L	1	1/4/2017 10:46:10 AM
1,2,3-Trichlorobenzene	ND	4.00	H	µg/L	1	1/4/2017 10:46:10 AM
Surr: Dibromofluoromethane	100	45.4-152	H	%Rec	1	1/4/2017 10:46:10 AM
Surr: Toluene-d8	103	40.1-139	H	%Rec	1	1/4/2017 10:46:10 AM
Surr: 1-Bromo-4-fluorobenzene	95.9	64.2-128	H	%Rec	1	1/4/2017 10:46:10 AM

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Date: *1/9/2017*

Work Order: 1612278
CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT

Hexavalent Chromium by EPA 7196 / SM 3500 Cr B

Sample ID **MB-R33688** SampType: **MBLK** Units: **mg/L** Prep Date: **12/29/2016** RunNo: **33688**
Client ID: **MBLKW** Batch ID: **R33688** Analysis Date: **12/29/2016** SeqNo: **639409**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	ND	0.0500									

Sample ID **LCS-R33688** SampType: **LCS** Units: **mg/L** Prep Date: **12/29/2016** RunNo: **33688**
Client ID: **LCSW** Batch ID: **R33688** Analysis Date: **12/29/2016** SeqNo: **639411**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	0.223	0.0500	0.2500	0	89.1	80	120				

Sample ID **1612278-001EDUP** SampType: **DUP** Units: **mg/L** Prep Date: **12/29/2016** RunNo: **33688**
Client ID: **TWP16-PMW1A** Batch ID: **R33688** Analysis Date: **12/29/2016** SeqNo: **639393**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	ND	0.0500						0		30	

Sample ID **1612278-001EMS** SampType: **MS** Units: **mg/L** Prep Date: **12/29/2016** RunNo: **33688**
Client ID: **TWP16-PMW1A** Batch ID: **R33688** Analysis Date: **12/29/2016** SeqNo: **639395**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	0.0228	0.0500	0.2500	0.009700	5.24	65	135				S

NOTES:
S - Spike recovery indicates a possible matrix effect. The method is in control as indicated by the Laboratory Control Sample (LCS).

Sample ID **1612278-001EMSD** SampType: **MSD** Units: **mg/L** Prep Date: **12/29/2016** RunNo: **33688**
Client ID: **TWP16-PMW1A** Batch ID: **R33688** Analysis Date: **12/29/2016** SeqNo: **639397**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	0.0209	0.0500	0.2500	0.009700	4.48	65	135	0		30	S

NOTES:
S - Spike recovery indicates a possible matrix effect. The method is in control as indicated by the Laboratory Control Sample (LCS).

Date: *1/9/2017*

Work Order: 1612278
CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT

Hexavalent Chromium by EPA 7196 / SM 3500 Cr B

Sample ID	1612278-003EMS	SampType:	MS	Units:	mg/L	Prep Date:	12/29/2016	RunNo:	33688			
Client ID:	TWP16-PMW2B	Batch ID:	R33688			Analysis Date:	12/29/2016	SeqNo:	639399			
Analyte	**Result**	**RL**	**SPK value**	**SPK Ref Val**	**%REC**	**LowLimit**	**HighLimit**	**RPD Ref Val**	**%RPD**	**RPDLimit**	**Qual**	
Chromium, Hexavalent	0.192	0.0500	0.2500	0	76.8	65	135					

Sample ID	1612278-003EMSD	SampType:	MSD	Units:	mg/L	Prep Date:	12/29/2016	RunNo:	33688			
Client ID:	TWP16-PMW2B	Batch ID:	R33688			Analysis Date:	12/29/2016	SeqNo:	639400			
Analyte	**Result**	**RL**	**SPK value**	**SPK Ref Val**	**%REC**	**LowLimit**	**HighLimit**	**RPD Ref Val**	**%RPD**	**RPDLimit**	**Qual**	
Chromium, Hexavalent	0.182	0.0500	0.2500	0	72.7	65	135	0.1920	5.46	30		

Fremont Analytical

Date: *1/9/2017*

Work Order: 1612278
CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID **MB-15816FB** SampType: **MBLK** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33704**
Client ID: **MBLKW** Batch ID: **15820** Analysis Date: **1/3/2017** SeqNo: **639666**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	1.00									
Barium	ND	0.500									
Cadmium	ND	0.200									
Chromium	ND	0.500									
Copper	ND	0.500									
Lead	ND	0.500									
Nickel	ND	0.500									
Zinc	ND	1.50									

NOTES:
Filter Blank

Sample ID **MB-15820** SampType: **MBLK** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33704**
Client ID: **MBLKW** Batch ID: **15820** Analysis Date: **1/3/2017** SeqNo: **639667**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	1.00									
Barium	ND	0.500									
Cadmium	ND	0.200									
Chromium	ND	0.500									
Copper	ND	0.500									
Lead	ND	0.500									
Nickel	ND	0.500									
Zinc	ND	1.50									

Sample ID **LCS-15820** SampType: **LCS** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33704**
Client ID: **LCSW** Batch ID: **15820** Analysis Date: **1/3/2017** SeqNo: **639668**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	95.9	1.00	100.0	0	95.9	85	115				
Barium	97.2	0.500	100.0	0	97.2	85	115				
Cadmium	4.81	0.200	5.000	0	96.2	85	115				

Date: *1/9/2017*

Work Order: 1612278
CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID **LCS-15820** SampType: **LCS** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33704**
Client ID: **LCSW** Batch ID: **15820** Analysis Date: **1/3/2017** SeqNo: **639668**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	99.2	0.500	100.0	0	99.2	85	115				
Copper	98.8	0.500	100.0	0	98.8	85	115				
Lead	49.2	0.500	50.00	0	98.4	85	115				
Nickel	98.3	0.500	100.0	0	98.3	85	115				
Zinc	104	1.50	100.0	0	104	85	115				

Sample ID **1612278-005DDUP** SampType: **DUP** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33704**
Client ID: **TWP16-PMW2A** Batch ID: **15820** Analysis Date: **1/3/2017** SeqNo: **639670**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	1.76	1.00						1.650	6.71	30	
Barium	220	0.500						235.0	6.37	30	
Cadmium	ND	0.200						0		30	
Chromium	ND	0.500						0		30	
Copper	0.510	0.500						0.6950	30.7	30	
Lead	ND	0.500						0		30	
Nickel	0.867	0.500						1.092	22.9	30	
Zinc	21.5	1.50						23.98	10.8	30	

Sample ID **1612278-005DMS** SampType: **MS** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33704**
Client ID: **TWP16-PMW2A** Batch ID: **15820** Analysis Date: **1/3/2017** SeqNo: **639671**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	507	1.00	500.0	1.650	101	70	130				
Barium	723	0.500	500.0	235.0	97.6	70	130				
Cadmium	26.3	0.200	25.00	0.02850	105	70	130				
Chromium	502	0.500	500.0	0.09950	100	70	130				
Copper	470	0.500	500.0	0.6950	93.8	70	130				
Lead	229	0.500	250.0	0.1060	91.6	70	130				
Nickel	485	0.500	500.0	1.092	96.7	70	130				

Date: *1/9/2017*

Work Order: 1612278
CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID	1612278-005DMS	SampType:	MS	Units:	µg/L	Prep Date:	1/3/2017	RunNo:	33704			
Client ID:	TWP16-PMW2A	Batch ID:	15820			Analysis Date:	1/3/2017	SeqNo:	639671			
Analyte	**Result**	**RL**	**SPK value**	**SPK Ref Val**	**%REC**	**LowLimit**	**HighLimit**	**RPD Ref Val**	**%RPD**	**RPDLimit**	**Qual**	
Zinc	527	1.50	500.0	23.98	101	70	130					

Sample ID	1612278-005DMSD	SampType:	MSD	Units:	µg/L	Prep Date:	1/3/2017	RunNo:	33704			
Client ID:	TWP16-PMW2A	Batch ID:	15820			Analysis Date:	1/3/2017	SeqNo:	639672			
Analyte	**Result**	**RL**	**SPK value**	**SPK Ref Val**	**%REC**	**LowLimit**	**HighLimit**	**RPD Ref Val**	**%RPD**	**RPDLimit**	**Qual**	
Arsenic	521	1.00	500.0	1.650	104	70	130	506.8	2.74	30		
Barium	721	0.500	500.0	235.0	97.1	70	130	723.0	0.341	30		
Cadmium	26.3	0.200	25.00	0.02850	105	70	130	26.33	0.198	30		
Chromium	500	0.500	500.0	0.09950	100	70	130	502.3	0.477	30		
Copper	477	0.500	500.0	0.6950	95.3	70	130	469.8	1.59	30		
Lead	225	0.500	250.0	0.1060	89.9	70	130	229.1	1.80	30		
Nickel	484	0.500	500.0	1.092	96.5	70	130	484.7	0.223	30		
Zinc	542	1.50	500.0	23.98	104	70	130	527.4	2.69	30		

Date: *1/9/2017*

Work Order: 1612278
CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT

Dissolved Mercury by EPA Method 245.1

Sample ID **MB-15826** SampType: **MBLK** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33698**
Client ID: **MBLKW** Batch ID: **15826** Analysis Date: **1/3/2017** SeqNo: **639816**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.100									

Sample ID **LCS-15826** SampType: **LCS** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33698**
Client ID: **LCSW** Batch ID: **15826** Analysis Date: **1/3/2017** SeqNo: **639817**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	2.67	0.100	2.500	0	107	85	115				

Sample ID **1612278-005DDUP** SampType: **DUP** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33698**
Client ID: **TWP16-PMW2A** Batch ID: **15826** Analysis Date: **1/3/2017** SeqNo: **639823**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.100						0		20	

Sample ID **1612278-005DMS** SampType: **MS** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33698**
Client ID: **TWP16-PMW2A** Batch ID: **15826** Analysis Date: **1/3/2017** SeqNo: **639824**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	2.66	0.100	2.500	0	106	80	120				

Sample ID **1612278-005DMSD** SampType: **MSD** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33698**
Client ID: **TWP16-PMW2A** Batch ID: **15826** Analysis Date: **1/3/2017** SeqNo: **639825**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	2.63	0.100	2.500	0	105	80	120	2.660	1.13	20	

Date: *1/9/2017*

Work Order:	1612278
CLIENT:	Floyd | Snider
Project:	Ave 55 - Taylor Way

QC SUMMARY REPORT

Dissolved Mercury by EPA Method 245.1

Sample ID **MB-15816FB** SampType: **MBLK** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33698**

Client ID: **MBLKW** Batch ID: **15826** Analysis Date: **1/3/2017** SeqNo: **639833**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.100									

NOTES:
Filter Blank

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Date: *1/9/2017*

Work Order: 1612278
CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Sample ID **MB-15795** SampType: **MBLK** Units: **µg/L** Prep Date: **12/29/2016** RunNo: **33723**
Client ID: **MBLKW** Batch ID: **15795** Analysis Date: **12/30/2016** SeqNo: **640128**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	ND	50.0									
Heavy Oil	ND	100									
Surr: 2-Fluorobiphenyl	43.9		80.07		54.8	50	150				
Surr: o-Terphenyl	52.2		80.07		65.2	50	150				

Sample ID **LCS-15795** SampType: **LCS** Units: **µg/L** Prep Date: **12/29/2016** RunNo: **33723**
Client ID: **LCSW** Batch ID: **15795** Analysis Date: **12/30/2016** SeqNo: **640127**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	774	50.0	999.7	0	77.5	65	135				
Surr: 2-Fluorobiphenyl	66.8		79.97		83.6	50	150				
Surr: o-Terphenyl	77.2		79.97		96.6	50	150				

Sample ID **1612278-001BDUP** SampType: **DUP** Units: **µg/L** Prep Date: **12/29/2016** RunNo: **33723**
Client ID: **TWP16-PMW1A** Batch ID: **15795** Analysis Date: **12/30/2016** SeqNo: **640108**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	ND	49.8						0		30	
Diesel Range Organics (C12-C24)	480	49.8						482.5	0.467	30	
Heavy Oil	1,080	99.5						943.2	13.6	30	
Surr: 2-Fluorobiphenyl	61.7		79.62		77.5	50	150		0		
Surr: o-Terphenyl	69.6		79.62		87.4	50	150		0		

NOTES:
DRO - Indicates the presence of unresolved compounds eluting from dodecane through tetracosane (C12-C24).

Sample ID **1612278-005BMS** SampType: **MS** Units: **µg/L** Prep Date: **12/29/2016** RunNo: **33723**
Client ID: **TWP16-PMW2A** Batch ID: **15795** Analysis Date: **12/30/2016** SeqNo: **640113**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	695	50.3	1,005	0	69.1	65	135				

Date: *1/9/2017*

Work Order: 1612278
CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Sample ID **1612278-005BMS** SampType: **MS** Units: **µg/L** Prep Date: **12/29/2016** RunNo: **33723**
Client ID: **TWP16-PMW2A** Batch ID: **15795** Analysis Date: **12/30/2016** SeqNo: **640113**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 2-Fluorobiphenyl	64.6		80.43		80.3	50	150				
Surr: o-Terphenyl	70.2		80.43		87.3	50	150				

Sample ID **1612278-005BMSD** SampType: **MSD** Units: **µg/L** Prep Date: **12/29/2016** RunNo: **33723**
Client ID: **TWP16-PMW2A** Batch ID: **15795** Analysis Date: **12/30/2016** SeqNo: **640114**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	663	50.1	1,002	0	66.1	65	135	694.8	4.77	30	
Surr: 2-Fluorobiphenyl	60.4		80.14		75.4	50	150		0		
Surr: o-Terphenyl	62.9		80.14		78.5	50	150		0		

Work Order: 1612278
CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT

Dissolved Gases by RSK-175

Sample ID **LCS-R33761** SampType: **LCS** Units: **mg/L** Prep Date: **1/6/2017** RunNo: **33761**
Client ID: **LCSW** Batch ID: **R33761** Analysis Date: **1/6/2017** SeqNo: **641164**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methane	0.410	0.00500	0.5000	0	82.0	80	120				

Sample ID **MB-R33761** SampType: **MBLK** Units: **mg/L** Prep Date: **1/6/2017** RunNo: **33761**
Client ID: **MBLKW** Batch ID: **R33761** Analysis Date: **1/6/2017** SeqNo: **641166**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methane	ND	0.00500									

Sample ID **1612278-001AREP** SampType: **REP** Units: **mg/L** Prep Date: **1/6/2017** RunNo: **33761**
Client ID: **TWP16-PMW1A** Batch ID: **R33761** Analysis Date: **1/6/2017** SeqNo: **641148**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methane	6.29	0.00500						6.293	0.119	30	E

NOTES:
E - Estimated value. The amount exceeds the linear working range of the instrument.

Date: *1/9/2017*

Work Order: 1612278
CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA Method 8270

Sample ID **MB-15825** SampType: **MBLK** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33768**
Client ID: **MBLKW** Batch ID: **15825** Analysis Date: **1/5/2017** SeqNo: **641337**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diphenylamine	ND	4.96									
Phenol	ND	1.98									
2-Chlorophenol	ND	0.992									
N-Nitrosodiphenylamine	ND	4.96									
1,3-Dichlorobenzene	ND	0.992									
1,4-Dichlorobenzene	ND	0.992									
1,2-Dichlorobenzene	ND	0.992									
Benzyl alcohol	ND	0.992									
Bis(2-chloroethyl) ether	ND	1.98									
2-Methylphenol (o-cresol)	ND	0.992									
Hexachloroethane	ND	0.992									
N-Nitrosodi-n-propylamine	ND	0.992									
Nitrobenzene	ND	1.98									
Isophorone	ND	0.992									
4-Methylphenol (p-cresol)	ND	0.992									
2-Nitrophenol	ND	1.98									
2,4-Dimethylphenol	ND	0.992									
Bis(2-chloroethoxy)methane	ND	0.992									
2,4-Dichlorophenol	ND	1.98									
1,2,4-Trichlorobenzene	ND	0.992									
Naphthalene	ND	0.496									
4-Chloroaniline	ND	4.96									
Hexachlorobutadiene	ND	0.992									
4-Chloro-3-methylphenol	ND	4.96									
2-Methylnaphthalene	ND	0.496									Q
1-Methylnaphthalene	ND	0.496									
Hexachlorocyclopentadiene	ND	0.992									Q
2,4,6-Trichlorophenol	ND	1.98									
2,4,5-Trichlorophenol	ND	1.98									
2-Chloronaphthalene	ND	0.992									
2-Nitroaniline	ND	4.96									

Work Order: 1612278
CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT
Semi-Volatile Organic Compounds by EPA Method 8270

Sample ID **MB-15825** SampType: **MBLK** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33768**
Client ID: **MBLKW** Batch ID: **15825** Analysis Date: **1/5/2017** SeqNo: **641337**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	ND	0.496									
Dimethylphthalate	ND	0.992									
2,6-Dinitrotoluene	ND	0.992									
Acenaphthylene	ND	0.496									
2,4-Dinitrophenol	ND	1.98									Q
Dibenzofuran	ND	0.992									
2,4-Dinitrotoluene	ND	0.992									
4-Nitrophenol	ND	4.96									
Fluorene	ND	0.496									
4-Chlorophenyl phenyl ether	ND	0.992									
Diethylphthalate	ND	0.992									
4,6-Dinitro-2-methylphenol	ND	4.96									Q
4-Bromophenyl phenyl ether	ND	0.992									
Hexachlorobenzene	ND	0.992									
Pentachlorophenol	ND	1.98									
Phenanthrene	ND	0.496									
Anthracene	ND	0.496									
Carbazole	ND	4.96									
Di-n-butyl phthalate	ND	0.992									
Fluoranthene	ND	0.496									
Pyrene	ND	0.496									
Benzyl Butylphthalate	ND	0.992									
bis(2-Ethylhexyl)adipate	ND	0.992									
Benz[a]anthracene	ND	0.496									
Chrysene	ND	0.496									
Bis(2-ethylhexyl) phthalate	ND	0.992									
Di-n-octyl phthalate	ND	0.992									
Benzo (b) fluoranthene	ND	0.496									
Benzo (k) fluoranthene	ND	0.496									
Benzo[a]pyrene	ND	0.496									
Indeno (1,2,3-cd) pyrene	ND	0.496									

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Date: *1/9/2017*

Work Order: 1612278
CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA Method 8270

Sample ID **MB-15825** SampType: **MBLK** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33768**
Client ID: **MBLKW** Batch ID: **15825** Analysis Date: **1/5/2017** SeqNo: **641337**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dibenzo (a,h) anthracene	ND	0.496									
Benzo (g,h,I) perylene	ND	0.496									
Surr: 2,4,6-Tribromophenol	3.18		3.967		80.2	5	127				
Surr: 2-Fluorobiphenyl	1.26		1.983		63.5	24.1	139				
Surr: Nitrobenzene-d5	1.52		1.983		76.8	21.9	139				
Surr: Phenol-d6	2.36		3.967		59.4	10.3	128				
Surr: p-Terphenyl	1.37		1.983		68.9	25.2	132				

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Sample ID **LCS-15825** SampType: **LCS** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33768**
Client ID: **LCSW** Batch ID: **15825** Analysis Date: **1/5/2017** SeqNo: **641338**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diphenylamine	2.70	5.02	4.012	0	67.3	25	94.9				
Phenol	1.48	2.01	4.012	0	36.8	10	63.1				
2-Chlorophenol	2.04	1.00	4.012	0	50.8	25	112				
N-Nitrosodiphenylamine	N/A	5.02	4.012	0	0	25	94.9				S
1,3-Dichlorobenzene	2.16	1.00	4.012	0	53.7	25	108				
1,4-Dichlorobenzene	2.17	1.00	4.012	0	54.1	25	110				
1,2-Dichlorobenzene	2.18	1.00	4.012	0	54.3	25	109				
Benzyl alcohol	2.05	1.00	4.012	0	51.1	20	96.5				
Bis(2-chloroethyl) ether	2.39	2.01	4.012	0	59.5	25	111				
2-Methylphenol (o-cresol)	1.95	1.00	4.012	0	48.5	25	101				
Hexachloroethane	2.19	1.00	4.012	0	54.6	25	109				
N-Nitrosodi-n-propylamine	2.98	1.00	4.012	0	74.4	25	122				
Nitrobenzene	2.43	2.01	4.012	0	60.7	25	110				
Isophorone	2.58	1.00	4.012	0	64.2	25	126				
4-Methylphenol (p-cresol)	1.02	1.00	2.006	0	51.0	5	100				
2-Nitrophenol	1.93	2.01	4.012	0	48.0	25	126				
2,4-Dimethylphenol	2.38	1.00	4.012	0	59.4	25	124				

Date: *1/9/2017*

Work Order: 1612278
CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA Method 8270

Sample ID **LCS-15825**	SampType: **LCS**	Units: **µg/L**	Prep Date: **1/3/2017**	RunNo: **33768**
Client ID: **LCSW**	Batch ID: **15825**		Analysis Date: **1/5/2017**	SeqNo: **641338**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Bis(2-chloroethoxy)methane	2.49	1.00	4.012	0	62.2	25	121				
2,4-Dichlorophenol	2.51	2.01	4.012	0	62.6	29.1	110				
1,2,4-Trichlorobenzene	2.22	1.00	4.012	0	55.3	25	113				
Naphthalene	2.45	0.502	4.012	0	61.1	25	115				
4-Chloroaniline	2.15	5.02	4.012	0	53.6	10	113				
Hexachlorobutadiene	2.32	1.00	4.012	0	57.7	25	111				
4-Chloro-3-methylphenol	3.51	5.02	4.012	0	87.5	32.3	122				
2-Methylnaphthalene	2.59	0.502	4.012	0	64.6	25	119				
1-Methylnaphthalene	2.50	0.502	4.012	0	62.3	25	117				
Hexachlorocyclopentadiene	2.53	1.00	4.012	0	63.0	25	125				
2,4,6-Trichlorophenol	2.48	2.01	4.012	0	61.7	25	133				
2,4,5-Trichlorophenol	2.86	2.01	4.012	0	71.3	25	125				
2-Chloronaphthalene	2.59	1.00	4.012	0	64.5	25	121				
2-Nitroaniline	3.38	5.02	4.012	0	84.3	25	121				
Acenaphthene	2.72	0.502	4.012	0	67.8	25	120				
Dimethylphthalate	2.86	1.00	4.012	0	71.4	25	133				
2,6-Dinitrotoluene	3.05	1.00	4.012	0	76.1	25	131				
Acenaphthylene	2.67	0.502	4.012	0	66.5	25	128				
2,4-Dinitrophenol	3.25	2.01	8.025	0	40.5	10	121				
Dibenzofuran	2.76	1.00	4.012	0	68.8	25	121				
2,4-Dinitrotoluene	3.17	1.00	4.012	0	79.0	25	132				
4-Nitrophenol	2.55	5.02	4.012	0	63.6	5	141				
Fluorene	2.70	0.502	4.012	0	67.3	25	127				
4-Chlorophenyl phenyl ether	2.66	1.00	4.012	0	66.3	25	124				
Diethylphthalate	3.02	1.00	4.012	0	75.3	31.3	142				
4,6-Dinitro-2-methylphenol	2.72	5.02	4.012	0	67.7	10	118				
4-Bromophenyl phenyl ether	2.63	1.00	4.012	0	65.5	25	130				
Hexachlorobenzene	2.82	1.00	4.012	0	70.3	29	120				
Pentachlorophenol	2.55	2.01	4.012	0	63.6	10	117				
Phenanthrene	2.91	0.502	4.012	0	72.5	32.6	104				
Anthracene	2.81	0.502	4.012	0	69.9	27.7	134				

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Work Order: 1612278
CLIENT: Floyd | Snider
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QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA Method 8270

Sample ID **LCS-15825** SampType: **LCS** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33768**
Client ID: **LCSW** Batch ID: **15825** Analysis Date: **1/5/2017** SeqNo: **641338**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Carbazole	3.06	5.02	4.012	0	76.2	27.9	150				
Di-n-butyl phthalate	3.30	1.00	4.012	0	82.3	28.6	121				
Fluoranthene	3.04	0.502	4.012	0	75.8	34.8	143				
Pyrene	2.99	0.502	4.012	0	74.5	31.9	109				
Benzyl Butylphthalate	3.56	1.00	4.012	0	88.8	43.8	119				
bis(2-Ethylhexyl)adipate	3.20	1.00	4.012	0	79.7	38.1	140				
Benz[a]anthracene	3.17	0.502	4.012	0	78.9	27.2	132				
Chrysene	3.05	0.502	4.012	0	75.9	31.3	107				
Bis(2-ethylhexyl) phthalate	3.35	1.00	4.012	0	83.6	36.2	123				
Di-n-octyl phthalate	3.49	1.00	4.012	0	87.0	40.1	149				
Benzo (b) fluoranthene	3.47	0.502	4.012	0	86.4	32.5	119				
Benzo (k) fluoranthene	3.46	0.502	4.012	0	86.3	25	144				
Benzo[a]pyrene	3.58	0.502	4.012	0	89.3	24.9	125				
Indeno (1,2,3-cd) pyrene	3.40	0.502	4.012	0	84.6	25	127				
Dibenzo (a,h) anthracene	3.50	0.502	4.012	0	87.1	25	132				
Benzo (g,h,I) perylene	3.68	0.502	4.012	0	91.8	25	133				
Surr: 2,4,6-Tribromophenol	3.52		4.012		87.7	5	127				
Surr: 2-Fluorobiphenyl	1.06		2.006		52.7	24.1	139				
Surr: Nitrobenzene-d5	0.996		2.006		49.7	21.9	139				
Surr: Phenol-d6	1.89		4.012		47.2	10.3	128				
Surr: p-Terphenyl	1.16		2.006		57.7	25.2	132				

NOTES:
N/A - N-nitrosodiphenylamine decomposes to Diphenylamine (mix component) in the injector. Please refer to Spike recoveries for Diphenylamine.

Sample ID **1612293-001FDUP** SampType: **DUP** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33768**
Client ID: **BATCH** Batch ID: **15825** Analysis Date: **1/5/2017** SeqNo: **641343**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diphenylamine	ND	5.02						0		50	
Phenol	23.5	2.01						24.15	2.81	50	E
2-Chlorophenol	ND	1.00						0		50	

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CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA Method 8270

Sample ID **1612293-001FDUP** SampType: **DUP** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33768**
Client ID: **BATCH** Batch ID: **15825** Analysis Date: **1/5/2017** SeqNo: **641343**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
N-Nitrosodiphenylamine	ND	5.02						0		50	
1,3-Dichlorobenzene	ND	1.00						0		50	
1,4-Dichlorobenzene	ND	1.00						0		50	
1,2-Dichlorobenzene	ND	1.00						0		50	
Benzyl alcohol	ND	1.00						0		50	
Bis(2-chloroethyl) ether	ND	2.01						0		50	
2-Methylphenol (o-cresol)	ND	1.00						0		50	
Hexachloroethane	ND	1.00						0		50	
N-Nitrosodi-n-propylamine	ND	1.00						0		50	
Nitrobenzene	4.67	2.01						5.506	16.4	50	
Isophorone	1.55	1.00						1.631	5.34	50	
4-Methylphenol (p-cresol)	ND	1.00						0		50	
2-Nitrophenol	ND	2.01						0		50	
2,4-Dimethylphenol	ND	1.00						0		50	
Bis(2-chloroethoxy)methane	ND	1.00						0		50	
2,4-Dichlorophenol	ND	2.01						0		50	
1,2,4-Trichlorobenzene	ND	1.00						0		50	
Naphthalene	ND	0.502						0		50	
4-Chloroaniline	ND	5.02						0		50	
Hexachlorobutadiene	ND	1.00						0		50	
4-Chloro-3-methylphenol	ND	5.02						0		50	
2-Methylnaphthalene	0.820	0.502						1.016	21.4	50	Q
1-Methylnaphthalene	ND	0.502						0.6932	40.8	50	
Hexachlorocyclopentadiene	ND	1.00						0		50	Q
2,4,6-Trichlorophenol	ND	2.01						0		50	
2,4,5-Trichlorophenol	ND	2.01						0		50	
2-Chloronaphthalene	ND	1.00						0		50	
2-Nitroaniline	ND	5.02						0		50	
Acenaphthene	ND	0.502						0		50	
Dimethylphthalate	3.15	1.00						3.280	4.11	50	
2,6-Dinitrotoluene	ND	1.00						0		50	

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QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA Method 8270

Sample ID **1612293-001FDUP** SampType: **DUP** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33768**
Client ID: **BATCH** Batch ID: **15825** Analysis Date: **1/5/2017** SeqNo: **641343**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthylene	ND	0.502						0		50	
2,4-Dinitrophenol	ND	2.01						0		50	Q
Dibenzofuran	ND	1.00						0		50	
2,4-Dinitrotoluene	ND	1.00						0		50	
4-Nitrophenol	ND	5.02						0		50	
Fluorene	ND	0.502						0		50	
4-Chlorophenyl phenyl ether	ND	1.00						0		50	
Diethylphthalate	3.13	1.00						3.684	16.3	50	
4,6-Dinitro-2-methylphenol	ND	5.02						0		50	Q
4-Bromophenyl phenyl ether	ND	1.00						0		50	
Hexachlorobenzene	ND	1.00						0		50	
Pentachlorophenol	ND	2.01						0		50	
Phenanthrene	1.23	0.502						1.365	10.0	50	
Anthracene	ND	0.502						0		50	
Carbazole	ND	5.02						0		50	
Di-n-butyl phthalate	ND	1.00						0		50	
Fluoranthene	1.25	0.502						1.344	7.46	50	
Pyrene	1.03	0.502						1.039	0.893	50	
Benzyl Butylphthalate	ND	1.00						0		50	
bis(2-Ethylhexyl)adipate	ND	1.00						0		50	
Benz[a]anthracene	ND	0.502						0		50	
Chrysene	ND	0.502						0		50	
Di-n-octyl phthalate	1.41	1.00						1.261	11.4	50	
Benzo (b) fluoranthene	ND	0.502						0		50	
Benzo (k) fluoranthene	ND	0.502						0		50	
Benzo[a]pyrene	ND	0.502						0		50	
Indeno (1,2,3-cd) pyrene	ND	0.502						0		50	
Dibenzo (a,h) anthracene	ND	0.502						0		50	
Benzo (g,h,I) perylene	ND	0.502						0		50	
Surr: 2,4,6-Tribromophenol	4.13		4.019		103	5	127		0		
Surr: 2-Fluorobiphenyl	1.31		2.009		65.1	24.1	139		0		

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QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA Method 8270

Sample ID **1612293-001FDUP** SampType: **DUP** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33768**
Client ID: **BATCH** Batch ID: **15825** Analysis Date: **1/5/2017** SeqNo: **641343**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Nitrobenzene-d5	1.57		2.009		77.9	21.9	139		0		
Surr: Phenol-d6	4.31		4.019		107	10.3	128		0		
Surr: p-Terphenyl	1.48		2.009		73.4	25.2	132		0		

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Sample ID **1612293-003FMS** SampType: **MS** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33768**
Client ID: **BATCH** Batch ID: **15825** Analysis Date: **1/5/2017** SeqNo: **641345**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diphenylamine	3.75	5.03	4.025	0.2076	87.9	5	159				
Phenol	24.6	2.01	4.025	21.53	77.1	5	94.5				
2-Chlorophenol	3.16	1.01	4.025	0	78.4	10.4	100				
N-Nitrosodiphenylamine	N/A	5.03	4.025	0	0	5	66.4				S
1,3-Dichlorobenzene	2.92	1.01	4.025	0	72.5	23	94.8				
1,4-Dichlorobenzene	2.82	1.01	4.025	0	70.1	23.8	95.2				
1,2-Dichlorobenzene	2.84	1.01	4.025	0	70.6	25.5	96.9				
Benzyl alcohol	4.23	1.01	4.025	0	105	5	139				
Bis(2-chloroethyl) ether	4.08	2.01	4.025	0	101	22	109				
2-Methylphenol (o-cresol)	4.33	1.01	4.025	0	107	5	106				S
Hexachloroethane	2.83	1.01	4.025	0	70.4	9.62	104				
N-Nitrosodi-n-propylamine	5.01	1.01	4.025	0	125	23.7	124				S
Nitrobenzene	8.89	2.01	4.025	5.032	95.9	10.6	137				
Isophorone	5.31	1.01	4.025	1.400	97.1	22.9	124				
4-Methylphenol (p-cresol)	0.883	1.01	2.012	0	43.9	5	119				
2-Nitrophenol	3.68	2.01	4.025	0	91.4	13.6	125				
2,4-Dimethylphenol	5.78	1.01	4.025	0	144	5	126				S
Bis(2-chloroethoxy)methane	3.72	1.01	4.025	0	92.4	27	115				
2,4-Dichlorophenol	0.261	2.01	4.025	0	6.49	12.1	126				S
1,2,4-Trichlorobenzene	3.00	1.01	4.025	0.01534	74.2	25	110				
Naphthalene	4.72	0.503	4.025	0	117	23.5	108				S

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CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA Method 8270

Sample ID **1612293-003FMS** SampType: **MS** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33768**
Client ID: **BATCH** Batch ID: **15825** Analysis Date: **1/5/2017** SeqNo: **641345**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4-Chloroaniline	1.36	5.03	4.025	0	33.8	5	110				
Hexachlorobutadiene	3.07	1.01	4.025	0	76.4	23.6	98.8				
4-Chloro-3-methylphenol	1.72	5.03	4.025	0	42.8	5	139				
2-Methylnaphthalene	3.49	0.503	4.025	0.5083	74.2	26.1	118				
1-Methylnaphthalene	3.43	0.503	4.025	0.3337	76.9	27.5	116				
Hexachlorocyclopentadiene	ND	1.01	4.025	0	0	5	126				S
2,4,6-Trichlorophenol	3.71	2.01	4.025	0	92.3	10.5	124				
2,4,5-Trichlorophenol	4.06	2.01	4.025	0	101	5	144				
2-Chloronaphthalene	3.29	1.01	4.025	0	81.8	27	117				
2-Nitroaniline	4.94	5.03	4.025	0	123	5.48	142				
Acenaphthene	3.81	0.503	4.025	0	94.7	29.3	117				
Dimethylphthalate	6.15	1.01	4.025	2.846	82.0	24	132				
2,6-Dinitrotoluene	3.80	1.01	4.025	0	94.4	22	129				
Acenaphthylene	3.18	0.503	4.025	0	79.0	25.1	121				
2,4-Dinitrophenol	ND	2.01	8.049	0	0	5	172				S
Dibenzofuran	3.85	1.01	4.025	0	95.7	27.8	116				
2,4-Dinitrotoluene	4.10	1.01	4.025	0	102	24.4	124				
4-Nitrophenol	ND	5.03	4.025	0	0	5	120				S
Fluorene	3.65	0.503	4.025	0.1396	87.2	27.6	123				
4-Chlorophenyl phenyl ether	3.59	1.01	4.025	0	89.3	28.6	117				
Diethylphthalate	7.43	1.01	4.025	3.324	102	27.4	137				
4,6-Dinitro-2-methylphenol	1.92	5.03	4.025	0	47.7	5	134				
4-Bromophenyl phenyl ether	3.81	1.01	4.025	0	94.7	32.2	120				
Hexachlorobenzene	3.54	1.01	4.025	0	87.8	28.3	114				
Pentachlorophenol	6.12	2.01	4.025	0	152	5	153				
Phenanthrene	3.80	0.503	4.025	0.2654	87.9	29.7	120				
Anthracene	3.67	0.503	4.025	0	91.2	22.1	125				
Carbazole	3.89	5.03	4.025	0.1863	92.1	31	133				
Di-n-butyl phthalate	4.87	1.01	4.025	0.8816	99.0	34.3	138				
Fluoranthene	3.70	0.503	4.025	0.3242	83.9	33.3	137				
Pyrene	3.55	0.503	4.025	0.1698	83.9	31.4	132				

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QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA Method 8270

Sample ID **1612293-003FMS** SampType: **MS** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33768**
Client ID: **BATCH** Batch ID: **15825** Analysis Date: **1/5/2017** SeqNo: **641345**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzyl Butylphthalate	4.28	1.01	4.025	0	106	37.7	159				
bis(2-Ethylhexyl)adipate	3.05	1.01	4.025	0	75.7	5	159				
Benz[a]anthracene	3.52	0.503	4.025	0.08903	85.1	26.5	136				
Chrysene	3.29	0.503	4.025	0.1221	78.8	22.2	126				
Bis(2-ethylhexyl) phthalate	7.11	1.01	4.025	4.277	70.3	5	162				
Di-n-octyl phthalate	3.86	1.01	4.025	0.3835	86.3	5	175				
Benzo (b) fluoranthene	3.86	0.503	4.025	0.08677	93.7	20	139				
Benzo (k) fluoranthene	3.17	0.503	4.025	0.09953	76.3	13	134				
Benzo[a]pyrene	3.48	0.503	4.025	0.06363	84.9	5	144				
Indeno (1,2,3-cd) pyrene	2.70	0.503	4.025	0.03918	66.2	5	144				
Dibenzo (a,h) anthracene	2.75	0.503	4.025	0.02940	67.6	10.3	145				
Benzo (g,h,I) perylene	2.68	0.503	4.025	0.04867	65.3	5	135				
Surr: 2,4,6-Tribromophenol	4.49		4.025		112	5	127				
Surr: 2-Fluorobiphenyl	1.21		2.012		60.3	24.1	139				
Surr: Nitrobenzene-d5	1.91		2.012		95.1	21.9	139				
Surr: Phenol-d6	4.42		4.025		110	10.3	128				
Surr: p-Terphenyl	1.31		2.012		65.1	25.2	132				

NOTES:
N/A - N-nitrosodiphenylamine decomposes to Diphenylamine (mix component) in the injector. Please refer to Spike recoveries for Diphenylamine.
S - Spike recovery indicates a possible matrix effect. The method is in control as indicated by the Laboratory Control Sample (LCS).

Sample ID **1612293-003FMSD** SampType: **MSD** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33768**
Client ID: **BATCH** Batch ID: **15825** Analysis Date: **1/5/2017** SeqNo: **641346**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diphenylamine	3.45	4.95	3.959	0.2076	82.0	5	159	0		0	
Phenol	24.1	1.98	3.959	21.53	64.8	5	94.5	24.63	2.20	50	
2-Chlorophenol	2.89	0.990	3.959	0	73.1	10.4	100	3.156	8.67	50	
N-Nitrosodiphenylamine	N/A	4.95	3.959	0	0	5	66.4	0		0	S
1,3-Dichlorobenzene	2.58	0.990	3.959	0	65.2	23	94.8	2.920	12.3	50	
1,4-Dichlorobenzene	2.42	0.990	3.959	0	61.1	23.8	95.2	2.821	15.3	50	

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Work Order:	1612278
CLIENT:	Floyd | Snider
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QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA Method 8270

Sample ID **1612293-003FMSD** SampType: **MSD** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33768**

Client ID: **BATCH** Batch ID: **15825** Analysis Date: **1/5/2017** SeqNo: **641346**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	2.48	0.990	3.959	0	62.7	25.5	96.9	2.841	13.4	50	
Benzyl alcohol	3.99	0.990	3.959	0	101	5	139	4.230	5.72	50	
Bis(2-chloroethyl) ether	4.48	1.98	3.959	0	113	22	109	4.078	9.40	50	S
2-Methylphenol (o-cresol)	3.88	0.990	3.959	0	98.0	5	106	4.326	10.9	50	
Hexachloroethane	2.46	0.990	3.959	0	62.2	9.62	104	2.834	14.1	50	
N-Nitrosodi-n-propylamine	4.70	0.990	3.959	0	119	23.7	124	5.013	6.53	50	
Nitrobenzene	8.51	1.98	3.959	5.032	87.9	10.6	137	8.892	4.35	50	
Isophorone	4.54	0.990	3.959	1.400	79.2	22.9	124	5.309	15.7	50	
4-Methylphenol (p-cresol)	0.868	0.990	1.979	0	43.8	5	119	0		50	
2-Nitrophenol	3.27	1.98	3.959	0	82.6	13.6	125	3.677	11.7	50	
2,4-Dimethylphenol	5.03	0.990	3.959	0	127	5	126	5.777	13.8	50	S
Bis(2-chloroethoxy)methane	3.45	0.990	3.959	0	87.2	27	115	3.719	7.47	50	
2,4-Dichlorophenol	0.190	1.98	3.959	0	4.81	12.1	126	0		50	S
1,2,4-Trichlorobenzene	2.67	0.990	3.959	0.01534	67.1	25	110	3.004	11.6	50	
Naphthalene	3.94	0.495	3.959	0	99.6	23.5	108	4.716	17.9	50	
4-Chloroaniline	1.10	4.95	3.959	0	27.7	5	110	0		50	
Hexachlorobutadiene	2.87	0.990	3.959	0	72.4	23.6	98.8	3.073	6.98	50	
4-Chloro-3-methylphenol	1.21	4.95	3.959	0	30.5	5	139	0		50	
2-Methylnaphthalene	3.22	0.495	3.959	0.5083	68.6	26.1	118	3.493	8.05	50	
1-Methylnaphthalene	3.39	0.495	3.959	0.3337	77.2	27.5	116	3.430	1.19	50	
Hexachlorocyclopentadiene	ND	0.990	3.959	0	0	5	126	0		50	S
2,4,6-Trichlorophenol	3.77	1.98	3.959	0	95.2	10.5	124	3.714	1.46	50	
2,4,5-Trichlorophenol	3.89	1.98	3.959	0	98.3	5	144	4.065	4.41	50	
2-Chloronaphthalene	2.97	0.990	3.959	0	75.1	27	117	3.292	10.2	50	
2-Nitroaniline	5.02	4.95	3.959	0	127	5.48	142	4.940	1.52	50	
Acenaphthene	3.61	0.495	3.959	0	91.1	29.3	117	3.812	5.56	50	
Dimethylphthalate	6.08	0.990	3.959	2.846	81.8	24	132	6.146	1.04	50	
2,6-Dinitrotoluene	3.87	0.990	3.959	0	97.7	22	129	3.800	1.79	50	
Acenaphthylene	2.84	0.495	3.959	0	71.6	25.1	121	3.180	11.4	50	
2,4-Dinitrophenol	ND	1.98	7.917	0	0	5	172	0		50	S
Dibenzofuran	3.38	0.990	3.959	0	85.3	27.8	116	3.852	13.2	50	

Date: *1/9/2017*

Work Order: 1612278
CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA Method 8270

Sample ID **1612293-003FMSD** SampType: **MSD** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33768**
Client ID: **BATCH** Batch ID: **15825** Analysis Date: **1/5/2017** SeqNo: **641346**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2,4-Dinitrotoluene	3.90	0.990	3.959	0	98.5	24.4	124	4.096	4.88	50	
4-Nitrophenol	ND	4.95	3.959	0	0	5	120	0		50	S
Fluorene	3.10	0.495	3.959	0.1396	74.8	27.6	123	3.648	16.2	50	
4-Chlorophenyl phenyl ether	2.96	0.990	3.959	0	74.8	28.6	117	3.593	19.3	50	
Diethylphthalate	6.57	0.990	3.959	3.324	82.0	27.4	137	7.434	12.4	50	
4,6-Dinitro-2-methylphenol	1.08	4.95	3.959	0	27.3	5	134	0		50	
4-Bromophenyl phenyl ether	3.35	0.990	3.959	0	84.6	32.2	120	3.810	12.8	50	
Hexachlorobenzene	3.07	0.990	3.959	0	77.6	28.3	114	3.535	14.0	50	
Pentachlorophenol	4.89	1.98	3.959	0	124	5	153	6.118	22.3	50	
Phenanthrene	3.66	0.495	3.959	0.2654	85.8	29.7	120	3.801	3.78	50	
Anthracene	3.33	0.495	3.959	0	84.1	22.1	125	3.669	9.68	50	
Carbazole	3.47	4.95	3.959	0.1863	82.9	31	133	0		50	
Di-n-butyl phthalate	4.22	0.990	3.959	0.8816	84.3	34.3	138	4.866	14.3	50	
Fluoranthene	3.51	0.495	3.959	0.3242	80.5	33.3	137	3.700	5.24	50	
Pyrene	3.36	0.495	3.959	0.1698	80.5	31.4	132	3.547	5.55	50	
Benzyl Butylphthalate	3.91	0.990	3.959	0	98.9	37.7	159	4.278	8.87	50	
bis(2-Ethylhexyl)adipate	2.82	0.990	3.959	0	71.3	5	159	3.047	7.68	50	
Benz[a]anthracene	3.32	0.495	3.959	0.08903	81.6	26.5	136	3.515	5.73	50	
Chrysene	3.09	0.495	3.959	0.1221	74.9	22.2	126	3.294	6.56	50	
Bis(2-ethylhexyl) phthalate	6.86	0.990	3.959	4.277	65.3	5	162	7.105	3.46	50	
Di-n-octyl phthalate	3.47	0.990	3.959	0.3835	78.0	5	175	3.858	10.6	50	
Benzo (b) fluoranthene	3.36	0.495	3.959	0.08677	82.6	20	139	3.859	13.9	50	
Benzo (k) fluoranthene	2.84	0.495	3.959	0.09953	69.2	13	134	3.171	11.0	50	
Benzo[a]pyrene	3.36	0.495	3.959	0.06363	83.2	5	144	3.479	3.59	50	
Indeno (1,2,3-cd) pyrene	2.21	0.495	3.959	0.03918	54.7	5	144	2.702	20.2	50	
Dibenzo (a,h) anthracene	2.26	0.495	3.959	0.02940	56.2	10.3	145	2.750	19.7	50	
Benzo (g,h,I) perylene	1.96	0.495	3.959	0.04867	48.2	5	135	2.676	31.1	50	
Surr: 2,4,6-Tribromophenol	4.15		3.959		105	5	127		0		
Surr: 2-Fluorobiphenyl	1.24		1.979		62.6	24.1	139		0		
Surr: Nitrobenzene-d5	1.87		1.979		94.6	21.9	139		0		
Surr: Phenol-d6	4.19		3.959		106	10.3	128		0		

Fremont Analytical

Date: *1/9/2017*

Work Order: 1612278
CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA Method 8270

Sample ID **1612293-003FMSD**	SampType: **MSD**	Units: **µg/L**	Prep Date: **1/3/2017**	RunNo: **33768**
Client ID: **BATCH**	Batch ID: **15825**		Analysis Date: **1/5/2017**	SeqNo: **641346**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: p-Terphenyl	1.34		1.979		67.5	25.2	132		0		

NOTES:

N/A - N-nitrosodiphenylamine decomposes to Diphenylamine (mix component) in the injector. Please refer to Spike recoveries for Diphenylamine.

S - Spike recovery indicates a possible matrix effect. The method is in control as indicated by the Laboratory Control Sample (LCS).

Date: *1/9/2017*

Work Order: 1612278
CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID **LCS-15802** SampType: **LCS** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33734**
Client ID: **LCSW** Batch ID: **15802** Analysis Date: **1/4/2017** SeqNo: **640498**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	523	50.0	500.0	0	105	65	135				
Surr: Toluene-d8	25.4		25.00		101	65	135				
Surr: 4-Bromofluorobenzene	24.6		25.00		98.3	65	135				

Sample ID **LCSD-15802** SampType: **LCS** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33734**
Client ID: **LCSW** Batch ID: **15802** Analysis Date: **1/4/2017** SeqNo: **640499**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	505	50.0	500.0	0	101	65	135				
Surr: Toluene-d8	25.5		25.00		102	65	135				
Surr: 4-Bromofluorobenzene	24.5		25.00		97.9	65	135				

Sample ID **MB-15802** SampType: **MBLK** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33734**
Client ID: **MBLKW** Batch ID: **15802** Analysis Date: **1/4/2017** SeqNo: **640500**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	ND	50.0									
Surr: Toluene-d8	25.6		25.00		102	65	135				
Surr: 4-Bromofluorobenzene	23.9		25.00		95.5	65	135				

Sample ID **1612278-011ADUP** SampType: **DUP** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33734**
Client ID: **TWP16-PMW5B** Batch ID: **15802** Analysis Date: **1/4/2017** SeqNo: **640491**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	ND	50.0						0		30	
Surr: Toluene-d8	25.1		25.00		100	65	135		0		
Surr: 4-Bromofluorobenzene	24.3		25.00		97.1	65	135		0		

Date: *1/9/2017*

Work Order: 1612278
CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID **1612283-002BDUP**	SampType: **DUP**		Units: **µg/L**		Prep Date: **1/3/2017**			RunNo: **33734**			
Client ID: **BATCH**	Batch ID: **15802**				Analysis Date: **1/4/2017**			SeqNo: **640494**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	ND	50.0						0		30	
Surr: Toluene-d8	25.3		25.00		101	65	135		0		
Surr: 4-Bromofluorobenzene	24.1		25.00		96.5	65	135		0		

Fremont Analytical

Date: *1/9/2017*

Work Order: 1612278
CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **LCS-15802** SampType: **LCS** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33733**
Client ID: **LCSW** Batch ID: **15802** Analysis Date: **1/4/2017** SeqNo: **640458**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	16.2	1.00	20.00	0	80.8	43	136				
Chloromethane	19.7	1.00	20.00	0	98.7	43.9	139				
Vinyl chloride	20.8	0.200	20.00	0	104	53.6	139				
Bromomethane	23.3	1.00	20.00	0	116	42.5	152				
Trichlorofluoromethane (CFC-11)	20.7	1.00	20.00	0	103	43.5	149				
Chloroethane	22.1	1.00	20.00	0	111	53	141				
1,1-Dichloroethene	21.6	1.00	20.00	0	108	65.6	136				
Methylene chloride	22.1	1.00	20.00	0	110	67.1	131				
trans-1,2-Dichloroethene	21.9	1.00	20.00	0	109	71.7	129				
Methyl tert-butyl ether (MTBE)	17.6	1.00	20.00	0	88.0	67.7	131				
1,1-Dichloroethane	22.2	1.00	20.00	0	111	67.9	134				
2,2-Dichloropropane	13.6	2.00	20.00	0	67.8	33.7	152				
cis-1,2-Dichloroethene	21.8	1.00	20.00	0	109	70.2	139				
Chloroform	21.5	1.00	20.00	0	108	66.3	131				
1,1,1-Trichloroethane (TCA)	20.5	1.00	20.00	0	103	71	131				
1,1-Dichloropropene	22.0	1.00	20.00	0	110	69.9	124				
Carbon tetrachloride	19.8	1.00	20.00	0	98.9	66.2	134				
1,2-Dichloroethane (EDC)	21.0	1.00	20.00	0	105	67	126				
Benzene	22.2	1.00	20.00	0	111	69.3	132				
Trichloroethene (TCE)	22.0	0.500	20.00	0	110	65.2	136				
1,2-Dichloropropane	22.3	1.00	20.00	0	112	70.5	130				
Bromodichloromethane	19.4	1.00	20.00	0	97.0	67.2	137				
Dibromomethane	19.6	1.00	20.00	0	98.0	75.5	126				
cis-1,3-Dichloropropene	18.1	1.00	20.00	0	90.5	62.6	137				
Toluene	22.3	1.00	20.00	0	111	61.3	145				
trans-1,3-Dichloropropylene	16.0	1.00	20.00	0	80.2	56.5	163				
1,1,2-Trichloroethane	21.4	1.00	20.00	0	107	71.7	131				
1,3-Dichloropropane	20.6	1.00	20.00	0	103	73.5	127				
Tetrachloroethene (PCE)	21.3	1.00	20.00	0	107	47.5	147				
Dibromochloromethane	17.4	1.00	20.00	0	87.2	67.2	134				
1,2-Dibromoethane (EDB)	19.4	0.0600	20.00	0	96.9	73.6	125				

Date: *1/9/2017*

Work Order: 1612278
CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **LCS-15802** SampType: **LCS** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33733**
Client ID: **LCSW** Batch ID: **15802** Analysis Date: **1/4/2017** SeqNo: **640458**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	21.1	1.00	20.00	0	106	73.9	126				
1,1,1,2-Tetrachloroethane	19.6	1.00	20.00	0	97.9	76.8	124				
Ethylbenzene	21.9	1.00	20.00	0	109	72	130				
m,p-Xylene	42.8	1.00	40.00	0	107	70.3	134				
o-Xylene	21.3	1.00	20.00	0	107	72.1	131				
Styrene	21.0	1.00	20.00	0	105	64.3	140				
Isopropylbenzene	21.5	1.00	20.00	0	107	73.9	128				
Bromoform	17.0	1.00	20.00	0	85.2	55.3	141				
1,1,2,2-Tetrachloroethane	18.6	1.00	20.00	0	93.0	62.9	132				
n-Propylbenzene	21.6	1.00	20.00	0	108	74.5	127				
Bromobenzene	20.1	1.00	20.00	0	101	71	131				
1,3,5-Trimethylbenzene	21.1	1.00	20.00	0	106	73.1	128				
2-Chlorotoluene	21.4	1.00	20.00	0	107	70.8	130				
4-Chlorotoluene	21.1	1.00	20.00	0	106	70.1	131				
tert-Butylbenzene	21.1	1.00	20.00	0	105	68.2	131				
1,2,3-Trichloropropane	18.5	1.00	20.00	0	92.6	67.7	131				
1,2,4-Trichlorobenzene	19.5	2.00	20.00	0	97.4	51.8	152				
sec-Butylbenzene	21.2	1.00	20.00	0	106	72	129				
4-Isopropyltoluene	20.2	1.00	20.00	0	101	69.2	130				
1,3-Dichlorobenzene	21.5	1.00	20.00	0	107	71	115				
1,4-Dichlorobenzene	21.3	1.00	20.00	0	106	66.8	119				
n-Butylbenzene	21.0	1.00	20.00	0	105	73.8	127				
1,2-Dichlorobenzene	21.1	1.00	20.00	0	105	69.7	119				
1,2-Dibromo-3-chloropropane	14.3	1.00	20.00	0	71.6	63.1	136				
1,2,4-Trimethylbenzene	21.1	1.00	20.00	0	105	73.4	127				
Hexachloro-1,3-butadiene	20.2	4.00	20.00	0	101	58.6	138				
Naphthalene	19.0	1.00	20.00	0	95.2	41.8	165				
1,2,3-Trichlorobenzene	19.4	4.00	20.00	0	97.0	48.7	156				
Surr: Dibromofluoromethane	25.4		25.00		101	45.4	152				
Surr: Toluene-d8	25.5		25.00		102	40.1	139				
Surr: 1-Bromo-4-fluorobenzene	25.3		25.00		101	64.2	128				

Fremont Analytical

Date: *1/9/2017*

Work Order: 1612278
CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID LCS-15802	SampType: LCS			Units: µg/L		Prep Date: 1/3/2017			RunNo: 33733		
Client ID: LCSW	Batch ID: 15802					Analysis Date: 1/4/2017			SeqNo: 640458		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID LCSD-15802	SampType: LCS			Units: µg/L		Prep Date: 1/3/2017			RunNo: 33733		
Client ID: LCSW	Batch ID: 15802					Analysis Date: 1/4/2017			SeqNo: 640459		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	14.7	1.00	20.00	0	73.4	43	136				
Chloromethane	19.5	1.00	20.00	0	97.7	43.9	139				
Vinyl chloride	19.9	0.200	20.00	0	99.5	53.6	139				
Bromomethane	23.3	1.00	20.00	0	116	42.5	152				
Trichlorofluoromethane (CFC-11)	20.1	1.00	20.00	0	101	43.5	149				
Chloroethane	21.9	1.00	20.00	0	109	53	141				
1,1-Dichloroethene	21.3	1.00	20.00	0	107	65.6	136				
Methylene chloride	22.1	1.00	20.00	0	111	67.1	131				
trans-1,2-Dichloroethene	21.7	1.00	20.00	0	108	71.7	129				
Methyl tert-butyl ether (MTBE)	17.4	1.00	20.00	0	86.9	67.7	131				
1,1-Dichloroethane	22.1	1.00	20.00	0	110	67.9	134				
2,2-Dichloropropane	13.3	2.00	20.00	0	66.7	33.7	152				
cis-1,2-Dichloroethene	21.9	1.00	20.00	0	110	70.2	139				
Chloroform	21.6	1.00	20.00	0	108	66.3	131				
1,1,1-Trichloroethane (TCA)	20.5	1.00	20.00	0	102	71	131				
1,1-Dichloropropene	21.9	1.00	20.00	0	110	69.9	124				
Carbon tetrachloride	19.9	1.00	20.00	0	99.5	66.2	134				
1,2-Dichloroethane (EDC)	20.9	1.00	20.00	0	104	67	126				
Benzene	22.3	1.00	20.00	0	112	69.3	132				
Trichloroethene (TCE)	21.6	0.500	20.00	0	108	65.2	136				
1,2-Dichloropropane	22.4	1.00	20.00	0	112	70.5	130				
Bromodichloromethane	19.7	1.00	20.00	0	98.6	67.2	137				
Dibromomethane	19.5	1.00	20.00	0	97.3	75.5	126				
cis-1,3-Dichloropropene	18.1	1.00	20.00	0	90.6	62.6	137				
Toluene	22.1	1.00	20.00	0	110	61.3	145				

Date: *1/9/2017*

Work Order: 1612278
CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **LCSD-15802** SampType: **LCS** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33733**
Client ID: **LCSW** Batch ID: **15802** Analysis Date: **1/4/2017** SeqNo: **640459**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
trans-1,3-Dichloropropylene	16.0	1.00	20.00	0	80.2	56.5	163				
1,1,2-Trichloroethane	21.1	1.00	20.00	0	105	71.7	131				
1,3-Dichloropropane	20.4	1.00	20.00	0	102	73.5	127				
Tetrachloroethene (PCE)	21.1	1.00	20.00	0	106	47.5	147				
Dibromochloromethane	17.6	1.00	20.00	0	88.2	67.2	134				
1,2-Dibromoethane (EDB)	19.5	0.0600	20.00	0	97.3	73.6	125				
Chlorobenzene	21.0	1.00	20.00	0	105	73.9	126				
1,1,1,2-Tetrachloroethane	19.5	1.00	20.00	0	97.7	76.8	124				
Ethylbenzene	21.8	1.00	20.00	0	109	72	130				
m,p-Xylene	42.6	1.00	40.00	0	106	70.3	134				
o-Xylene	21.4	1.00	20.00	0	107	72.1	131				
Styrene	21.1	1.00	20.00	0	106	64.3	140				
Isopropylbenzene	21.3	1.00	20.00	0	107	73.9	128				
Bromoform	17.3	1.00	20.00	0	86.4	55.3	141				
1,1,2,2-Tetrachloroethane	18.7	1.00	20.00	0	93.3	62.9	132				
n-Propylbenzene	21.5	1.00	20.00	0	107	74.5	127				
Bromobenzene	20.1	1.00	20.00	0	101	71	131				
1,3,5-Trimethylbenzene	21.1	1.00	20.00	0	105	73.1	128				
2-Chlorotoluene	21.4	1.00	20.00	0	107	70.8	130				
4-Chlorotoluene	21.1	1.00	20.00	0	106	70.1	131				
tert-Butylbenzene	20.9	1.00	20.00	0	104	68.2	131				
1,2,3-Trichloropropane	17.7	1.00	20.00	0	88.6	67.7	131				
1,2,4-Trichlorobenzene	19.3	2.00	20.00	0	96.6	51.8	152				
sec-Butylbenzene	21.0	1.00	20.00	0	105	72	129				
4-Isopropyltoluene	20.0	1.00	20.00	0	100	69.2	130				
1,3-Dichlorobenzene	21.6	1.00	20.00	0	108	71	115				
1,4-Dichlorobenzene	21.1	1.00	20.00	0	106	66.8	119				
n-Butylbenzene	20.8	1.00	20.00	0	104	73.8	127				
1,2-Dichlorobenzene	21.0	1.00	20.00	0	105	69.7	119				
1,2-Dibromo-3-chloropropane	14.7	1.00	20.00	0	73.6	63.1	136				
1,2,4-Trimethylbenzene	21.0	1.00	20.00	0	105	73.4	127				

Date: *1/9/2017*

Work Order: 1612278
CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **LCSD-15802**	SampType: **LCS**	Units: **µg/L**	Prep Date: **1/3/2017**	RunNo: **33733**
Client ID: **LCSW**	Batch ID: **15802**		Analysis Date: **1/4/2017**	SeqNo: **640459**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hexachloro-1,3-butadiene	19.6	4.00	20.00	0	98.2	58.6	138				
Naphthalene	19.1	1.00	20.00	0	95.6	41.8	165				
1,2,3-Trichlorobenzene	19.4	4.00	20.00	0	97.2	48.7	156				
Surr: Dibromofluoromethane	25.6		25.00		103	45.4	152				
Surr: Toluene-d8	25.5		25.00		102	40.1	139				
Surr: 1-Bromo-4-fluorobenzene	25.2		25.00		101	64.2	128				

Sample ID **MB-15802**	SampType: **MBLK**	Units: **µg/L**	Prep Date: **1/3/2017**	RunNo: **33733**
Client ID: **MBLKW**	Batch ID: **15802**		Analysis Date: **1/4/2017**	SeqNo: **640460**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	ND	1.00									Q
Chloromethane	ND	1.00									
Vinyl chloride	ND	0.200									
Bromomethane	ND	1.00									
Trichlorofluoromethane (CFC-11)	ND	1.00									
Chloroethane	ND	1.00									
1,1-Dichloroethene	ND	1.00									
Methylene chloride	ND	1.00									
trans-1,2-Dichloroethene	ND	1.00									
Methyl tert-butyl ether (MTBE)	ND	1.00									
1,1-Dichloroethane	ND	1.00									
2,2-Dichloropropane	ND	2.00									Q
cis-1,2-Dichloroethene	ND	1.00									
Chloroform	ND	1.00									
1,1,1-Trichloroethane (TCA)	ND	1.00									
1,1-Dichloropropene	ND	1.00									
Carbon tetrachloride	ND	1.00									
1,2-Dichloroethane (EDC)	ND	1.00									
Benzene	ND	1.00									

Date: *1/9/2017*

Work Order: 1612278
CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **MB-15802** SampType: **MBLK** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33733**
Client ID: **MBLKW** Batch ID: **15802** Analysis Date: **1/4/2017** SeqNo: **640460**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Trichloroethene (TCE)	ND	0.500									
1,2-Dichloropropane	ND	1.00									
Bromodichloromethane	ND	1.00									
Dibromomethane	ND	1.00									
cis-1,3-Dichloropropene	ND	1.00									
Toluene	ND	1.00									
trans-1,3-Dichloropropylene	ND	1.00									Q
1,1,2-Trichloroethane	ND	1.00									
1,3-Dichloropropane	ND	1.00									
Tetrachloroethene (PCE)	ND	1.00									
Dibromochloromethane	ND	1.00									
1,2-Dibromoethane (EDB)	ND	0.0600									
Chlorobenzene	ND	1.00									
1,1,1,2-Tetrachloroethane	ND	1.00									
Ethylbenzene	ND	1.00									
m,p-Xylene	ND	1.00									
o-Xylene	ND	1.00									
Styrene	ND	1.00									
Isopropylbenzene	ND	1.00									
Bromoform	ND	1.00									
1,1,2,2-Tetrachloroethane	ND	1.00									
n-Propylbenzene	ND	1.00									
Bromobenzene	ND	1.00									
1,3,5-Trimethylbenzene	ND	1.00									
2-Chlorotoluene	ND	1.00									
4-Chlorotoluene	ND	1.00									
tert-Butylbenzene	ND	1.00									
1,2,3-Trichloropropane	ND	1.00									
1,2,4-Trichlorobenzene	ND	2.00									
sec-Butylbenzene	ND	1.00									
4-Isopropyltoluene	ND	1.00									

Fremont Analytical

Date: *1/9/2017*

Work Order: 1612278
CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **MB-15802**	SampType: **MBLK**				Units: **µg/L**		Prep Date: **1/3/2017**		RunNo: **33733**		
Client ID: **MBLKW**	Batch ID: **15802**						Analysis Date: **1/4/2017**		SeqNo: **640460**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3-Dichlorobenzene	ND	1.00									
1,4-Dichlorobenzene	ND	1.00									
n-Butylbenzene	ND	1.00									
1,2-Dichlorobenzene	ND	1.00									
1,2-Dibromo-3-chloropropane	ND	1.00									Q
1,2,4-Trimethylbenzene	ND	1.00									
Hexachloro-1,3-butadiene	ND	4.00									
Naphthalene	ND	1.00									
1,2,3-Trichlorobenzene	ND	4.00									
Surr: Dibromofluoromethane	24.3		25.00		97.2	45.4	152				
Surr: Toluene-d8	25.3		25.00		101	40.1	139				
Surr: 1-Bromo-4-fluorobenzene	23.7		25.00		94.9	64.2	128				

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Sample ID **1612278-011ADUP**	SampType: **DUP**				Units: **µg/L**		Prep Date: **1/3/2017**		RunNo: **33733**		
Client ID: **TWP16-PMW5B**	Batch ID: **15802**						Analysis Date: **1/4/2017**		SeqNo: **640449**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	ND	1.00						0		30	Q
Chloromethane	ND	1.00						0		30	
Vinyl chloride	ND	0.200						0		30	
Bromomethane	ND	1.00						0		30	
Trichlorofluoromethane (CFC-11)	ND	1.00						0		30	
Chloroethane	ND	1.00						0		30	
1,1-Dichloroethene	ND	1.00						0		30	
Methylene chloride	ND	1.00						0		30	
trans-1,2-Dichloroethene	ND	1.00						0		30	
Methyl tert-butyl ether (MTBE)	ND	1.00						0		30	
1,1-Dichloroethane	ND	1.00						0		30	
2,2-Dichloropropane	ND	2.00						0		30	Q

Date: *1/9/2017*

Work Order: 1612278
CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1612278-011ADUP** SampType: **DUP** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33733**
Client ID: **TWP16-PMW5B** Batch ID: **15802** Analysis Date: **1/4/2017** SeqNo: **640449**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	ND	1.00						0		30	
Chloroform	ND	1.00						0		30	
1,1,1-Trichloroethane (TCA)	ND	1.00						0		30	
1,1-Dichloropropene	ND	1.00						0		30	
Carbon tetrachloride	ND	1.00						0		30	
1,2-Dichloroethane (EDC)	ND	1.00						0		30	
Benzene	ND	1.00						0		30	
Trichloroethene (TCE)	ND	0.500						0		30	
1,2-Dichloropropane	ND	1.00						0		30	
Bromodichloromethane	ND	1.00						0		30	
Dibromomethane	ND	1.00						0		30	
cis-1,3-Dichloropropene	ND	1.00						0		30	
Toluene	ND	1.00						0		30	
trans-1,3-Dichloropropylene	ND	1.00						0		30	
1,1,2-Trichloroethane	ND	1.00						0		30	
1,3-Dichloropropane	ND	1.00						0		30	
Tetrachloroethene (PCE)	ND	1.00						0		30	
Dibromochloromethane	ND	1.00						0		30	
1,2-Dibromoethane (EDB)	ND	0.0600						0		30	
Chlorobenzene	ND	1.00						0		30	
1,1,1,2-Tetrachloroethane	ND	1.00						0		30	
Ethylbenzene	ND	1.00						0		30	
m,p-Xylene	ND	1.00						0		30	
o-Xylene	ND	1.00						0		30	
Styrene	ND	1.00						0		30	
Isopropylbenzene	ND	1.00						0		30	
Bromoform	ND	1.00						0		30	
1,1,2,2-Tetrachloroethane	ND	1.00						0		30	
n-Propylbenzene	ND	1.00						0		30	
Bromobenzene	ND	1.00						0		30	
1,3,5-Trimethylbenzene	ND	1.00						0		30	

Fremont Analytical

Date: *1/9/2017*

Work Order: 1612278
CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1612278-011ADUP** SampType: **DUP** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33733**
Client ID: **TWP16-PMW5B** Batch ID: **15802** Analysis Date: **1/4/2017** SeqNo: **640449**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2-Chlorotoluene	ND	1.00						0		30	
4-Chlorotoluene	ND	1.00						0		30	
tert-Butylbenzene	ND	1.00						0		30	
1,2,3-Trichloropropane	ND	1.00						0		30	
1,2,4-Trichlorobenzene	ND	2.00						0		30	
sec-Butylbenzene	ND	1.00						0		30	
4-Isopropyltoluene	ND	1.00						0		30	
1,3-Dichlorobenzene	ND	1.00						0		30	
1,4-Dichlorobenzene	ND	1.00						0		30	
n-Butylbenzene	ND	1.00						0		30	
1,2-Dichlorobenzene	ND	1.00						0		30	
1,2-Dibromo-3-chloropropane	ND	1.00						0		30	
1,2,4-Trimethylbenzene	ND	1.00						0		30	
Hexachloro-1,3-butadiene	ND	4.00						0		30	
Naphthalene	ND	1.00						0		30	
1,2,3-Trichlorobenzene	ND	4.00						0		30	
Surr: Dibromofluoromethane	25.8		25.00		103	45.4	152		0		
Surr: Toluene-d8	25.7		25.00		103	40.1	139		0		
Surr: 1-Bromo-4-fluorobenzene	24.3		25.00		97.4	64.2	128		0		

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Sample ID **1612283-002BDUP** SampType: **DUP** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33733**
Client ID: **BATCH** Batch ID: **15802** Analysis Date: **1/4/2017** SeqNo: **640453**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	ND	1.00						0		30	Q
Chloromethane	ND	1.00						0		30	
Vinyl chloride	ND	0.200						0		30	
Bromomethane	ND	1.00						0		30	
Trichlorofluoromethane (CFC-11)	ND	1.00						0		30	

Date: *1/9/2017*

Work Order: 1612278
CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1612283-002BDUP** SampType: **DUP** Units: **µg/L** Prep Date: **1/3/2017** RunNo: **33733**
Client ID: **BATCH** Batch ID: **15802** Analysis Date: **1/4/2017** SeqNo: **640453**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloroethane	ND	1.00						0		30	
1,1-Dichloroethene	ND	1.00						0		30	
Methylene chloride	ND	1.00						0		30	
trans-1,2-Dichloroethene	ND	1.00						0		30	
Methyl tert-butyl ether (MTBE)	ND	1.00						0		30	
1,1-Dichloroethane	ND	1.00						0		30	
2,2-Dichloropropane	ND	2.00						0		30	Q
cis-1,2-Dichloroethene	ND	1.00						0		30	
Chloroform	ND	1.00						0		30	
1,1,1-Trichloroethane (TCA)	ND	1.00						0		30	
1,1-Dichloropropene	ND	1.00						0		30	
Carbon tetrachloride	ND	1.00						0		30	
1,2-Dichloroethane (EDC)	ND	1.00						0		30	
Benzene	ND	1.00						0		30	
Trichloroethene (TCE)	ND	0.500						0		30	
1,2-Dichloropropane	ND	1.00						0		30	
Bromodichloromethane	ND	1.00						0		30	
Dibromomethane	ND	1.00						0		30	
cis-1,3-Dichloropropene	ND	1.00						0		30	
Toluene	ND	1.00						0		30	
trans-1,3-Dichloropropylene	ND	1.00						0		30	
1,1,2-Trichloroethane	ND	1.00						0		30	
1,3-Dichloropropane	ND	1.00						0		30	
Tetrachloroethene (PCE)	ND	1.00						0		30	
Dibromochloromethane	ND	1.00						0		30	
1,2-Dibromoethane (EDB)	ND	0.0600						0		30	
Chlorobenzene	ND	1.00						0		30	
1,1,1,2-Tetrachloroethane	ND	1.00						0		30	
Ethylbenzene	ND	1.00						0		30	
m,p-Xylene	ND	1.00						0		30	
o-Xylene	ND	1.00						0		30	

Fremont Analytical

Date: *1/9/2017*

Work Order: 1612278
CLIENT: Floyd | Snider
Project: Ave 55 - Taylor Way

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID **1612283-002BDUP**	SampType: **DUP**	Units: **µg/L**	Prep Date: **1/3/2017**	RunNo: **33733**
Client ID: **BATCH**	Batch ID: **15802**		Analysis Date: **1/4/2017**	SeqNo: **640453**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Styrene	ND	1.00						0		30	
Isopropylbenzene	ND	1.00						0		30	
Bromoform	ND	1.00						0		30	
1,1,2,2-Tetrachloroethane	ND	1.00						0		30	
n-Propylbenzene	ND	1.00						0		30	
Bromobenzene	ND	1.00						0		30	
1,3,5-Trimethylbenzene	ND	1.00						0		30	
2-Chlorotoluene	ND	1.00						0		30	
4-Chlorotoluene	ND	1.00						0		30	
tert-Butylbenzene	ND	1.00						0		30	
1,2,3-Trichloropropane	ND	1.00						0		30	
1,2,4-Trichlorobenzene	ND	2.00						0		30	
sec-Butylbenzene	ND	1.00						0		30	
4-Isopropyltoluene	ND	1.00						0		30	
1,3-Dichlorobenzene	ND	1.00						0		30	
1,4-Dichlorobenzene	ND	1.00						0		30	
n-Butylbenzene	ND	1.00						0		30	
1,2-Dichlorobenzene	ND	1.00						0		30	
1,2-Dibromo-3-chloropropane	ND	1.00						0		30	
1,2,4-Trimethylbenzene	ND	1.00						0		30	
Hexachloro-1,3-butadiene	ND	4.00						0		30	
Naphthalene	ND	1.00						0		30	
1,2,3-Trichlorobenzene	ND	4.00						0		30	
Surr: Dibromofluoromethane	25.5		25.00		102	45.4	152		0		
Surr: Toluene-d8	25.6		25.00		102	40.1	139		0		
Surr: 1-Bromo-4-fluorobenzene	24.2		25.00		96.7	64.2	128		0		

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Fremont Analytical

Sample Log-In Check List

Client Name:	**FS**	Work Order Number:	**1612278**
Logged by:	**Chelsea Ward**	Date Received:	**12/28/2016 5:24:00 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	Client		

Log In

3.	Coolers are present?	Yes ☑	No ☐	NA ☐
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Required ☑
6.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
7.	Were all items received at a temperature of >0°C to 10.0°C *	Yes ☑	No ☐	NA ☐
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10.	Are samples properly preserved?	Yes ☑	No ☐	
11.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes ☐	No ☑	NA ☐
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14.	Does paperwork match bottle labels?	Yes ☑	No ☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16.	Is it clear what analyses were requested?	Yes ☑	No ☐	
17.	Were all holding times able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes ☑	No ☐	NA ☐

Person Notified:	Erin Murray	Date	12/28/2016
By Whom:	Chelsea Ward	Via:	☑ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:	Missing bottles and Total/Dissolved Metals		
Client Instructions:	Only run VOCs/Gx on sample -009 and Dissolved Metals		

19. Additional remarks:

Item Information

Item #	Temp °C
Cooler 1	2.4
Cooler 2	1.7
Cooler 3	0.5
Sample 1	0.7
Sample 2	1.9

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Sample Log-In Check List

Client Name:	**FS**	Work Order Number:	**1612278**
Logged by:	**Chelsea Ward**	Date Received:	**12/28/2016 5:24:00 PM**

Item #	Temp ºC
Sample 3	2.8
Temp Blank 1	0.2
Temp Blank 2	1.7
Temp Blank 3	1.6

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Fremont

Analytical

3600 Fremont Ave N.
Seattle, WA 98103

Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record and Laboratory Services Agreement

Date: 12/28/16

Laboratory Project No (internal): 1612278

Page: 1 of: 2

Client: Floyd Snider
Address: 601 Union Suite 600
City, State, Zip: Seattle, WA 98101
Telephone: 206.292.2078 Fax:

Project Name: Ave 55 - Taylor Way
Project No:
Collected by: L. Wacter & E. Murray
Location: Tacoma, WA
Report To (PM): Tom Colligan
PM Email: tom.colligan@floydsnider.com

*Matrix Codes: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM / 625)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8) Diss.	Total (T) / Dissolved (D)	Anions (IC)***	EDB (8011)	Hx Cromium				Comments
1 TWP16-PMW1A	12/28/16	1020	GW	X	X	####		X	X	X			X	D			X				
2 TWP16-PMW1B		1030		X	X			X	X	X			X				X				
3 TWP16-PMW2B		1200		X	X		4M	X	X	X			X				X				
4 TWP16-PMW2X		1205		X	X			X	X	X			X				X				
5 TWP16-PMW2A		1200		X	X			X	X	X			X				X				
6 TWP16-PMW3A		1320		X	X			X	X	X			X				X				
7 TWP16-PMW3B		1315		X	X			X	X	X			X				X				
8 TWP16-PMW4A		1425		X	X			X	X	X			X				X				
9 TWP16-PMW4B		1445		X	X				~~X~~	~~X~~			~~X~~				~~X~~				Only VOC/Gx per E. Murray
10 TWP16-PMW5A		1535		X	X				X	X			X				X				

12/29 EW

**Metals Analysis (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL *Individual:* Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl U V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

Sample Disposal: ☐ Return to Client ☐ Disposal by Lab (Samples will be held for 30 days unless otherwise noted. A fee may be assessed if samples are retained after 30 days.)

Turn-around times for samples received after 4:00pm will begin on the following business day.

Special Remarks:

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above, that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished	Date/Time	Received	Date/Time
x [signature]	12/28/16 1724	x [signature]	12/28/16 17:24
Relinquished x	Date/Time	Received x	Date/Time

TAT → SameDay^ NextDay^ 2 Day 3 Day STD

^Please coordinate with the lab in advance

Fremont Analytical

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record and Laboratory Services Agreement

Date: 12/28/16
Laboratory Project No (internal): 1612278
Page: 2 of: 2

Client: Floyd / Snider
Address: Same As First
City, State, Zip:
Telephone: Fax:

Project Name: Ave 55 - Taylor
Project No: Collected by:
Location:
Report To (PM):
PM Email:

*Matrix Codes: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM / 625)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) / Dissolved (D)	Anions (IC)***	EDB (8011)	Hex Chromium				Comments
1 TWP16-PMW5B	12/28/16	1600	W	X	X		[illegible]	SH	X	X			X	D			X				
2 Trip Blank			W	X	X																
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					

**Metals Analysis (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL *Individual:* Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl U V Zn

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Relinquished x	Date/Time	Received x	Date/Time

TAT → SameDay^ NextDay^ 2 Day 3 Day STD

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Fremont Analytical

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record and Laboratory Services Agreement

Date: 12/28/16
Laboratory Project No (internal): 1612278
Page: 1 of: 2

Client: Floyd Snider
Address: 601 Union Suite 600
City, State, Zip: Seattle, WA 98101
Telephone: 206.292.2078 Fax:

Project Name: Ave 55 - Taylor Way
Project No:
Collected by: L. Wacter & E. Murray
Location: Tacoma, WA
Report To (PM): Tom Colligan
PM Email: tom.colligan@floydsnider.com

*Matrix Codes: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 SIM / 625)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8) Diss	Total (T) / Dissolved (D)	Anions (IC)***	EDB (8011)	Hx Chromium			Methane	Comments
1 TWP16-PMW1A	12/28/16	1020	GW	X	X	~~X~~		X	X	X			X	D			X			X	X Add Analysis
2 TWP16-PMW1B		1030		X	X			X	X	X			X				X				12/30/16
3 TWP16-PMW2B		1200		X	X		4%	X	X	X			X				X				STANDARD
4 TWP16-PMW2X		1205		X	X			X	X	X			X				X				TAT
5 TWP16-PMW2A		1200		X	X			X	X	X			X				X			X	
6 TWP16-PMW3A		1320		X	X			X	X	X			X				X			X	
7 TWP16-PMW3B		1315		X	X			X	X	X			X				X				
8 TWP16-PMW4A		1425		X	X			X	X	X			X				X			X	
9 TWP16-PMW4B		1445		X	X				~~X~~	~~X~~			~~X~~				~~X~~				Only VOC/Gx per E. Murray 12/29 EM
10 TWP16-PMW5A		1535		X	X				X	X			X				X			X	

**Metals Analysis (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl U V Zn

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x		x	

TAT → SameDay^ NextDay^ 2 Day 3 Day STD

^Please coordinate with the lab in advance

1514 Taylor Way Development

Interim Action Work Plan

Appendix G
Inadvertent Discovery Plan

Inadvertent Discovery Plan for the Avenue 55 Development Project, Lincoln Ave and Taylor Way Sites, Tacoma, Washington
March 2017

Avenue 55 intends to demolish an existing warehouse on the Lincoln Ave property and construct three new warehouses on the Lincoln Ave and Taylor Way properties in the Port of Tacoma area, Pierce County, Washington. The Port of Tacoma (Port) is the land owner and lessor of the property, and Avenue 55 is the developer and lessee for the Project. The Project will be completed in two phases with the first phase involving construction of two warehouses on the Taylor Way property and the second phase involving demolition of an existing warehouse and construction of new warehouse on the Lincoln Ave property. Cultural resources investigations for the project have included background research and field reconnaissance (Cultural Resource Consultants, 2009).

Although the existing building has been inventoried for historic properties and found to be unlikely to be register-eligible on a national, state or local level, it is possible that additional, previously unidentified archaeological resources could be inadvertently discovered during Project activities. In the event that prehistoric or historic-era archaeological sites are inadvertently discovered, appropriate protection measures must be followed. To provide for adequate protection this Inadvertent Discovery Plan provides Protocols for Discovery of Archaeological Resources and Protocols for Discovery of Human Remains.

On-Site Monitoring

The cultural resource study conducted by Cultural Resource Consultants in 2009 (for Grette) concluded that the likelihood of encountering cultural resources at the project site is very low, and is only a risk if excavation occurs in native sediments below the hydraulic fill at the first aquitard. Given that no penetrations into native sediments will occur during this project, there is no need for on-site archeological monitoring.

Protocols for Discovery of Archaeological Resources

In the unlikely event that archaeological resources are encountered within the Project, the following actions will be taken:

All ground disturbing activity at the specific location will stop, and the Contractor's work supervisor and Avenue 55 will be notified immediately. The specific location will be secured from any additional impacts and the supervisor will contact the Port's Environmental Project Manager immediately upon stopping the work.

The Port's Environmental Project Manager will immediately contact the appropriate agencies with ownership/jurisdiction over the lands where the discovery is located (as applicable), as well as the Washington State Department of Archaeology and Historic Preservation (DAHP), the Puyallup Tribe, and as applicable, the U.S. Army Corps of Engineers (Corps) if there is a Corps permit associated with the Project. Upon discovery, Avenue 55 shall expeditiously contract with a consulting firm to provide a Project archeologist to complete coordination and reporting of the discovery. The DAHP archaeologist or the Project archaeologist will determine the size of the work stoppage zone in order to sufficiently protect the resource until further decisions can be made regarding the work site.

The Project archeologist will consult with the DAHP, the Puyallup Tribe, the Port, and as applicable, the Corps regarding the evaluation of the discovery and the appropriate protection measures, if applicable. Once the consultation has been completed, the Project archeologist will request written concurrence from DAHP, the Puyallup Tribe, and as applicable, the Corps that the protection and mitigation measures have been fulfilled. Upon notification of concurrence from the appropriate parties, work can proceed in the work stoppage zone.

Within six months after completion of the above steps, the Project archeologist will prepare a final written report of the discovery. The report will include a description of the contents of the discovery, a summary of consultation, and a description of the treatment or mitigation measures. DAHP, the Puyallup Tribe, and as applicable, the Corps will have 60 days to review and submit comments regarding the final report. The Project archeologist will then revise the document, as necessary, and file final copies with the DAHP, the Puyallup Tribe, and as applicable, the Corps. Drafts of the report will be completed in a timeline mutually acceptable to the parties.

Protocols for Discovery of Human Remains

If human remains are found within the Project by the Port, Avenue 55, or their Contractor(s), the following actions will be taken, consistent with Washington State RCWs 68.50.645, 27.44.055, and 68.60.055:

If ground-disturbing activities encounter human skeletal remains during the course of construction, then all activity will cease that may cause further disturbance to those remains. The area of the find will be secured and protected from further disturbance. Upon discovery, the Contractor’s work supervisor will be notified immediately and the supervisor will contact Avenue 55 and the Port’s Environmental Project Manager immediately upon stopping the work.

The finding of human skeletal remains will be reported to the county medical examiner/coroner and local law enforcement in the most expeditious manner possible by the Port’s Environmental Project Manager. Upon the finding, Avenue 55 shall expeditiously contract with a consulting firm to provide a Project archeologist to complete coordination and reporting of the finding. The remains will not be touched, moved, or further disturbed. The county medical examiner/coroner will assume jurisdiction over the human skeletal remains and make a determination of whether those remains are forensic or non-forensic. If the county medical examiner/coroner determines the remains are non-forensic, then they will report that finding to DAHP, which will then take jurisdiction over the remains. DAHP will notify any appropriate cemeteries and all affected tribes of the find. The State Physical Anthropologist will make a determination of whether the remains are Indian or Non-Indian and report that finding to any appropriate cemeteries and the affected tribes. DAHP will then handle all consultation with the affected parties as to the future preservation, excavation, and disposition of the remains.

Confidentiality of Information

The Port, Avenue 55, and/or their authorized representatives recognize that archaeological properties are of a sensitive nature and sites where cultural resources are discovered can become targets of vandalism and illegal removal activities. The Port, Avenue 55, and/or their authorized representatives shall keep and maintain as confidential all information regarding any discovered cultural resources, particularly the location of known or suspected archaeological property, and exempt all such information from public disclosure consistent with RCW 42.17.300. The Puyallup Tribe is a sovereign government and will determine Tribal policy including matters of the press and confidentiality.

The Port, Avenue 55, and/or their authorized representatives shall make its best efforts to ensure all records indicating the location of known or suspected archaeological properties are permanently secured and confidential.

Both Avenue 55, as developer and lessee, and the Port, as land owner and lessor, and/or their authorized representatives shall ensure that their personnel, contractors, and permittees keep the discovery of any found or suspected human remains, other cultural items, and potential historic properties confidential, including but not limited to, refraining such persons from contacting the media or any third party or otherwise sharing information regarding the discovery with any member of the public. The Port, Avenue 55, and/or their authorized representatives shall require their personnel, contractors and permittees to immediately notify the Project archaeologist (or the Port's Environmental Project Manager if a Project archeologist has not yet been contracted) of any inquiry from the media or public. The Project archaeologist (or the Port's Environmental Project Manager, as applicable) shall immediately notify DAHP of any inquiries it receives. Prior to any public information release, the Port, Avenue 55, and/or their authorized representatives, DAHP, the Puyallup Tribe, and as applicable, the Corps shall concur on the amount of information, if any, to be released to the public, any third party, and the media and the procedures for such a release, to the extent permitted by law.

Lead Representative and Primary Contact

Avenue 55
600 University Street
Seattle WA 98101
Primary Contact- Drew Zaborowski

Port of Tacoma
P.O. Box 1837, Tacoma, WA 98401
Primary Contact: Mark Rettmann, Environmental Project Manager, 253-592-6716

Puyallup Tribe
Attention: Tribal Chairman, 3009 Portland Ave, Tacoma, Washington 98404
Lead Representative: Bill Sterud, Chairmain, 253-573-7800
Primary Contact: Brandon Reynon, Tribal Archaeologist/Cultural Regulatory Specialist, 253-573-7986

Washington Department of Archaeology and Historic Preservation
PO Box 48343, Olympia, Washington 98504-8343
Lead Representative: Allyson Brooks, State Historic Preservation Officer, 360-586-3066
Primary Contact: Gretchen Kaehler, Local Government Archaeologist, 360-586-3088, cell 360-628-2755

U.S. Army Corps of Engineers, Seattle District (if applicable)
Primary Contacts (regular business hours/days):
Regulatory Branch, Archeologist, Chris Jenkins, 206-764-6941
Regulatory Branch Chief, Muffy Walker, 206-764-6915

Tacoma Police Department
3701 South Pine Street, Tacoma, WA 98409
Lead Representative: Don Ramsdell, Chief of Police, 253-591-5900

Pierce County Medical Examiner's Office
3619 Pacific Avenue, Tacoma, Washington 98418
Lead Representative: Thomas B. Clark, M.D.,Chief Medical Examiner, 253-798-6494

City of Tacoma Historic Preservation Office
747 Market Street
Tacoma, WA 98402-3793
Primary Contact: Reuben McKnight, 253-591-5220

References

Cultural Resource Consultants, Inc. 2009. *Cultural Resources Assessment for the Blair-Hylebos Redevelopment Project, Tacoma, Pierce County, Washington*. Prepared for Grette Associates. Originally produced June 30, 2008; revised October 24, 2008. 18 February.

1514 Taylor Way Development

Interim Action Work Plan

Appendix H
Stormwater Pollution Prevention Plan

Construction Stormwater General Permit

Stormwater Pollution Prevention Plan (SWPPP)

for

Avenue 55 -Taylor Way Phase 1

Prepared for:

The Washington State Department of Ecology

Southwest Regional Office

Permittee / Owner	Developer	Operator / Contractor
Avenue 55 600 University St. Suite 2305 Seattle, WA 98101	Avenue 55 600 University St. Suite 2305 Seattle, WA 98101	Sierra Construction

Taylor Way, Port of Tacoma

Certified Erosion and Sediment Control Lead (CESCL)

Name	Organization	Contact Phone Number
Bryan Ploetz	Sierra Construction	206-579-1364

SWPPP Prepared By

Name	Organization	Contact Phone Number
Costa Philippides, PE	Barghausen Consulting Engineers, Inc.	(425) 251-6222
Tom Colligan, LG	Floyd | Snider	(206) 292-2078

SWPPP Preparation Date

4/20/2017

Project Construction Dates

Activity / Phase	Start Date	End Date
Phase 1	May 2017	May 2018

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Appendix/Glossary

List of Acronyms and Abbreviations

Acronym / Abbreviation	Explanation
303(d)	Section of the Clean Water Act pertaining to Impaired Waterbodies
BFO	Bellingham Field Office of the Department of Ecology
BMP(s)	Best Management Practice(s)
CESCL	Certified Erosion and Sediment Control Lead
CO_2	Carbon Dioxide
CRO	Central Regional Office of the Department of Ecology
CSWGP	Construction Stormwater General Permit
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved Oxygen
Ecology	Washington State Department of Ecology
EPA	United States Environmental Protection Agency
ERO	Eastern Regional Office of the Department of Ecology
ERTS	Environmental Report Tracking System
ESC	Erosion and Sediment Control
GULD	General Use Level Designation
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric Turbidity Units
NWRO	Northwest Regional Office of the Department of Ecology
pH	Power of Hydrogen
RCW	Revised Code of Washington
SPCC	Spill Prevention, Control, and Countermeasure
su	Standard Units
SWMMEW	Stormwater Management Manual for Eastern Washington
SWMMWW	Stormwater Management Manual for Western Washington
SWPPP	Stormwater Pollution Prevention Plan
TESC	Temporary Erosion and Sediment Control
SWRO	Southwest Regional Office of the Department of Ecology
TMDL	Total Maximum Daily Load
VFO	Vancouver Field Office of the Department of Ecology
WAC	Washington Administrative Code
WSDOT	Washington Department of Transportation
WWHM	Western Washington Hydrology Model

1 Project Information

Project/Site Name: Avenue 55 - Taylor Way Phase 1
Street/Location: Taylor Way
City: Tacoma **State:** WA **Zip code:** 98421
Subdivision: N/A
Receiving waterbody: Hylebos Waterway-Commencement Bay (Inner)

1.1 Existing Conditions

Total acreage (including support activities such as off-site equipment staging yards, material storage areas, borrow areas).

Total acreage:	10.5 ac
Disturbed acreage:	9.99 ac
Existing structures:	None
Landscape topography:	The existing site is relatively flat with the exception of an existing dirt mound to the south of the site as well as an existing storm detention pond to the south of the mound. The average elevation is approximately 9 with the top elevation of the mound at 15 and 2:1 side slopes
Drainage patterns:	The site currently infiltrates and does not drain into the adjacent streets.
Existing Vegetation:	The existing site is mostly grassy areas with some broken up asphalt to the northeast.
Critical Areas:	There are existing contaminated soils on the site, however sufficient sampling was done to identify the areas of contamination (see figures in Appendix G). The proposed development has been designed in order to minimize the cut into the contaminated soils. The entire acreage will be covered in clean imported fill for a majority of all site preparation and construction. Therefore, stormwater in general will typically not directly contact contaminated soils.

List of known impairments for 303(d) listed or Total Maximum Daily Load (TMDL) for the receiving waterbody: No impairments for 303(d) are known for the receiving waterbody.

Table 1 includes a list of suspected and/or known contaminants associated with the construction activity. However, as the proposed construction of the site has been designed in order to minimize cutting into existing contaminated soils and will be cover the site in clean imported fill, the below listed pollutant constituents should not impact most construction activities.

The following listed pollutant constituents were detected in the 2006 Remedial Investigation for the site. In addition, hydraulic fluid has been added as a new potential contaminant which could result from leaks from construction equipment during the project build out. The location and concentration of the contaminants detected in 2006 are included in the attached figures in Appendix G.

Table 1 – Summary of Site Pollutant Constituents

Constituent (Pollutant)	Location	Depth	Max. Concentration Detected (mg/kg)
Hydraulic Fluid (potential)	Anywhere on site resulting from a Spill or leak from equipment maintenance	Surface Soil	N/A
Oil-Range Organics (ORO)	see **Appendix G** figures	Surface to 4' ft	2,300 mg/kg
Carcinogenic polycyclic aromatic hydrocarbon (cPAH)	see figures	Surface to 4' ft	22.4
Pentachlorophenol	see figures	Surface to 4' ft	11
Arsenic	see figures	Surface to 4' ft	130
Barium	see figures	Surface to 4' ft	330
Cadmium	see figures	Surface to 4' ft	7.8
Chromium	see figures	Surface to 4' ft	100
Copper	see figures	Surface to 4' ft	159
Lead	see figures	Surface to 4' ft	520
Mercury	see figures	Surface to 4' ft	10
Zinc	see figures	Surface to 4' ft	610

1.2 Proposed Construction Activities

Description of site development (example: subdivision):

The proposed conditions for this site will include two commercial warehouse buildings with asphalt parking.

Description of construction activities (example: site preparation, demolition, excavation):

The construction activities will include site preparation, preloading of building footprints, TESC installation, building construction, stormwater and other utility appurtenance installation and asphalt paving.

For the grading of the site, approximately 28,332 total cubic yards of fill is needed to achieve final grades on the site, with approximately 8,343 cubic yards of cut for phase 1 of the project. There will be a 4 foot high preload placed on the building footprints for six weeks prior to building construction and the fill used for this preload will be used as the imported clean fill for grading on this site, which equals 31,000 total cubic yards for both buildings. For phase 2 of the project, 36,596 cubic yards of fill are needed with 2,959 cubic yards of cut at a 15,000 cubic yard preload for the building footprint. Between the two phases, there is no need to export the fill needed to preload the buildings.

Description of site drainage including flow from and onto adjacent properties. Must be consistent with Site Map in Appendix A:

The existing sites surrounding this project have conveyance systems in place, so there is no runoff expected to enter this site from off site properties. There is an existing stormwater detention pond located off-site to the southeast of the project site, along with a storm drainage line that conveys stormwater runoff from the existing pond into the storm system within Taylor Way. This storm pond adjacent to the site will have no additional flow from the proposed site construction or the post-construction development.

Description of final stabilization (example: extent of revegetation, paving, landscaping):
With the completion of construction, the disturbed site area of 9.99 acres will be approximately 85% impervious surfaces with 15% pervious areas. The buildings will comprise of approximately 47% of the site (4.67 ac), with the remaining impervious surfaces 38% (3.88 ac) paved areas of parking and drive aisles.

Contaminated Site Information:
Proposed activities regarding contaminated soils or groundwater (example: on-site treatment system, authorized sanitary sewer discharge):
The construction has been designed to avoid cutting into existing grade soils, which in places are contaminated. Four feet of clean fill will be brought in to cover all site soils prior to building the structures. Therefore, construction activities will occur in this clean fill. Regardless, all stormwater overflows from the TESC pond to an on-site manhole, which in turn is routed to the sanitary sewer line that runs under Taylor Way. Additionally, the Contractor shall monitor excavation activities that occur in existing soils for indications of identified and potentially hazardous, dangerous, and or regulated materials (suspicious material). Indicators of suspicious materials include, but are not limited to, refuse, oily sheen or coloring on soil or water, or oily or chemical odors. If suspicious materials are encountered, the Contractor shall stop all work in that area and notify the Port Environmental Contact and Project Environmental Consultant immediately. Suspicious soil will be placed on plastic sheeting and covered and bermed.

After all digging/trenching into potentially impacted soils is completed, the Environmental Consultant will test the potentially-impacted stockpile for known site contaminants. The required number of discrete samples will be determined using Table 6.9 in Ecology's Guidance for Remediation of Petroleum Contaminated Sites (Ecology 2016). If contaminant levels exceed remediation levels defined in the Interim Action Work Plan, then the soil will be disposed of off site at a facility licensed to receive such wastes or soil.

If dewatering of excavation is necessary, the dewatering water will be managed per permit requirements. Groundwater from dewatering activities will be pumped to a holding tank for testing prior to discharge to the sanitary sewer. .

2 Construction Stormwater Best Management Practices (BMPs)

The SWPPP is a living document reflecting current conditions and changes throughout the life of the project. These changes may be informal (i.e., hand-written notes and deletions). Update the SWPPP when the CESCL has noted a deficiency in BMPs or deviation from original design.

2.1 The 13 Elements

2.1.1 Element 1: Preserve Vegetation / Mark Clearing Limits

To protect adjacent properties and to reduce the area of soil exposed to construction, the limits of construction will be clearly marked before land-disturbing activities begin. Areas that are to be preserved, as well as all sensitive areas and their buffers, shall be clearly delineated, both in the field and on the plans. A silt fence will be installed around the perimeter of the project site to mark the limits of construction as well as protect surrounding properties from any possible sediment laden runoff and grading will occur around the perimeter the site to insure there is no runoff of any ponded stormwater.

List and describe BMPs:

BMP C233: Silt Fence

BMP C200: Interceptor Dike and Swale

Installation Schedules: TBD

Inspection and Maintenance plan:

Silt Fence Maintenance

- Repair any damage immediately.
- Intercept and convey all evident concentrated flows uphill of the silt fence to a sediment pond.
- Check the uphill side of the fence for signs of the fence clogging and acting as a barrier to flow and then causing channelization of flows parallel to the fence. If this occurs, replace the fence or remove the trapped sediment.
- Remove sediment deposits when the deposit reaches approximately one-third the height of the silt fence, or install a second silt fence.
- Replace filter fabric that has deteriorated due to ultraviolet breakdown.

Responsible Staff: Contractor/CESL

2.1.2 Element 2: Establish Construction Access

Access points shall be stabilized to minimize the tracking of sediment onto public roads, street sweeping, and street cleaning shall be employed to prevent sediment from entering state waters. One stabilized construction entrance will be installed to the northeast entrance to the project site. Wheel washing will occur onsite in order to prevent sediment from leaving the site, and because of the large volume of import required for grades to this site. Street sweeping and street cleaning may be necessary if the stabilized construction access is not effective. The roads shall be swept daily should sediment collect on them. All wheel wash wastewater shall be recycled on-site or disposed of to the sanitary sewer under permit.

List and describe BMPs:

BMP C105: Stabilized Construction Entrance

BMP C106: Wheel Wash

Installation Schedules: TBD

Inspection and Maintenance plan:

Stabilized Construction Entrance Maintenance

- Quarry spalls shall be added if the pad is no longer in accordance with the specifications.
- If the entrance is not preventing sediment from being tracked onto pavement, then alternative measures to keep the streets free of sediment shall be used. This may include replacement/cleaning of the existing quarry spalls, street sweeping, an increase in the dimensions of the entrance, or the installation of a wheel wash.
- Any sediment that is tracked onto pavement shall be removed by shoveling or street sweeping. The sediment collected by sweeping shall be removed or stabilized on site. The pavement shall not be cleaned by washing down the street, except when high efficiency sweeping is ineffective and there is a threat to public safety. If it is necessary to wash the streets, the construction of a small sump to contain the wash water shall be considered. The sediment would then be washed into the sump where it can be controlled.
- Perform street sweeping by hand or with a high efficiency sweeper. Do not use a non-high efficiency mechanical sweeper because this creates dust and throws soils into storm systems or conveyance ditches.
- Any quarry spalls that are loosened from the pad, which end up on the roadway shall be removed immediately.
- If vehicles are entering or exiting the site at points other than the construction entrance(s), fencing (see BMP C103) shall be installed to control traffic.
- Upon project completion and site stabilization, all construction accesses intended as permanent access for maintenance shall be permanently stabilized.

Wheel Wash Maintenance

- The wheel wash should start out the day with fresh water.
- The wash water should be changed a minimum of once per day. On large earthwork jobs where more than 10-20 trucks per hour are expected, the wash water will need to be changed more often.

Responsible Staff: Contractor/CESL

2.1.3 Element 3: Control Flow Rates

In order to protect the properties and waterways downstream of the project site, stormwater from the site will be controlled by construction of a temporary sediment pond and a temporary sediment trap as one of the first items of construction (after imported fill has been placed to allow the pond/trap construction). Prior to any import, however, a silt fence will be installed around the property boundary. Once the pond is constructed, stormwater during construction will be captured through v-ditches with rock check dams in order to control the flow of stormwater runoff before reaching the sediment trap or sediment pond. The sediment trap and sediment pond are located at low points on the site with adequate surface area for sediment settlement per the DOE requirements from BMP C240 and C241. The base of the pond and trap will be above existing grade, therefore, no existing and potentially contaminated soils will be disturbed for pond/trap construction. Regardless, as seen on Figure 1, the location of the pond and trap are not in areas of known contamination. Discharge from the pond will go to the sanitary sewer under permit.

Detention facilities must be functioning property before construction of site improvements.

Will you construct stormwater retention and/or detention facilities?
☒ Yes ☐ No

Will you use permanent infiltration ponds or other low impact development (example: rain gardens, bio-retention, porous pavement) to control flow during construction?
☐ Yes ☒ No

List and describe BMPs:
BMP C240: Sediment Trap

BMP C241: Sediment Pond

BMP C207: Check Dams

Installation Schedules: TBD

Inspection and Maintenance plan:

Sediment Pond/Trap Maintenance

- Sediment shall be removed from the trap/pond when it reaches 1-foot in depth.
- Any damage to the pond embankments or slopes shall be repaired.

Check Dam Maintenance

- Check dams shall be monitored for performance and sediment accumulation during and after each runoff producing rainfall.
- Sediment shall be removed when it reaches one half the sump depth.
- Anticipate submergence and deposition above the check dam and erosion from high flows around the edges of the dam.

- If significant erosion occurs between dams, install a protective riprap liner in that portion of the channel.

Responsible Staff: Contractor/CESL

2.1.4 Element 4: Install Sediment Controls

All stormwater runoff from disturbed areas shall pass through an appropriate sediment removal BMP before leaving the construction site or prior to being discharged to the sanitary sewer. Constructing the silt fence followed by the sediment control ponds and traps is one of the first steps to create the necessary gradients for flow to the trap/pond and to prevent off site discharge of sediment. Rock check dams and v-ditches will be used to convey stormwater runoff into the sediment pond and sediment trap to settle out sediment as well. The combination of a sediment trap and pond alone are expected to be adequate for sediment control prior to discharge to the sewer.. The surface area requirements for the TESC pond and trap are met with the designed TESC plan and it is not expected that further treatment or other sediment controlling measures are necessary.

However, if the proposed sediment controls are ineffective as determined by the CESCL, they will promptly initiate the implementation of one or more of the alternative BMPs listed in Appendix B.

List and describe BMPs:

BMP C207: Check Dams

BMP C233: Silt Fence

BMP C240: Sediment Trap

BMP C241: Temporary Sediment Pond

Installation Schedules: TBD

Inspection and Maintenance plan:

Silt Fence Maintenance

- Repair any damage immediately.
- Intercept and convey all evident concentrated flows uphill of the silt fence to a sediment pond.
- Check the uphill side of the fence for signs of the fence clogging and acting as a barrier to flow and then causing channelization of flows parallel to the fence. If this occurs, replace the fence or remove the trapped sediment.
- Remove sediment deposits when the deposit reaches approximately one-third the height of the silt fence, or install a second silt fence.
- Replace filter fabric that has deteriorated due to ultraviolet breakdown.

Sediment Pond/Trap Maintenance

- Sediment shall be removed from the trap/pond when it reaches 1-foot in depth.
- Any damage to the pond embankments or slopes shall be repaired.

Check Dam Maintenance

- Check dams shall be monitored for performance and sediment accumulation during and after each runoff producing rainfall.
- Sediment shall be removed when it reaches one half the sump depth.
- Anticipate submergence and deposition above the check dam and erosion from high flows around the edges of the dam.
- If significant erosion occurs between dams, install a protective riprap liner in that portion of the channel.

Responsible Staff: Contractor/CESL

2.1.5 Element 5: Stabilize Soils

Exposed and unworked soils shall be stabilized with the application of effective BMPs to prevent erosion throughout the life of the project. In general, cut and fill slopes will be stabilized as soon as possible and soil stockpiles will be stabilized through hydroseeding. All stockpiled soils shall be stabilized from erosion, protected with sediment trapping measures, and where possible, be located away from storm drain inlets, waterways, and drainage channels. To minimize the amount of soil exposed through the life of the project, grading will be completed within a reasonable time frame after the preloading of the building footprints is completed. To minimize soil compaction, a construction entrance will be used as well as keeping heavy equipment and machinery off unpaved areas as much as possible.

<u>West of the Cascade Mountains Crest</u>

Season	Dates	Number of Days Soils Can be Left Exposed
During the Dry Season	May 1 – September 30	7 days
During the Wet Season	October 1 – April 30	2 days
Soils must be stabilized at the end of the shift before a holiday or weekend if needed based on the weather forecast.		

Anticipated project dates: Start date: May 2017 **End date:** May 2018

Will you construct during the wet season?
☒ Yes ☐ No

List and describe BMPs:

BMP C121: Mulching

BMP C140: Dust Control

Installation Schedules: TBD

Inspection and Maintenance plan:

Dust Control Maintenance

- Respray area as necessary to keep dust to a minimum.

Mulching Maintenance

- The thickness of the cover must be maintained.
- Any areas that experience erosion shall be remulched and/or protected with a net or blanket. If the erosion problem is drainage related, then the problem shall be fixed and the eroded area remulched.

Responsible Staff: Contractor/CESL

2.1.6 Element 6: Protect Slopes

All cut and fill slopes will be designed, constructed, and protected in a manner that minimizes erosion. It is required that any temporary pipe slope drains must handle the peak 10-minute flow rate from a Type 1A, 10-year, 24-hour frequency storm for the developed condition. Alternatively, the 10-year, 1-hour flow rate predicted by an approved continuous runoff model, increased by a factor of 1.6, may be used. The hydrologic analysis must use the existing land cover condition for predicting flow rates from tributary areas outside the project limits. For tributary areas on the project site, the analysis must use the temporary or permanent project land cover condition, whichever will produce the highest flow rates. For modeling the condition with the Western Washington Hydrology Model (WWHM) to predict flows, bare soil areas have been modeled as “landscaped area”. Scouring will be reduced by using v-ditches with rock check dams to convey stormwater to the sediment pond and trap on site. However, if the proposed BMPs to protect slopes are ineffective as determined by the CESCL, they will promptly initiate the implementation of one or more of the alternative BMPs listed in Appendix B.

Will steep slopes be present at the site during construction?
☐ Yes ☒ No

List and describe BMPs:

BMP C120: Temporary and Permanent Seeding

BMP C207: Check Dams

Installation Schedules: TBD

Inspection and Maintenance plan:

Temporary and Permanent Seeding Maintenance

- Reseed any seeded areas that fail to establish at least 80 percent cover (100 percent cover for areas that receive sheet or concentrated flows). If reseeding is ineffective, use an alternate method such as sodding, mulching, or nets/blankets. If winter weather prevents adequate grass growth, this time limit may be relaxed at the discretion of the local authority when sensitive areas would otherwise be protected.
- Reseed and protect by mulch any areas that experience erosion after achieving adequate cover. Reseed and protect by mulch any eroded area.
- Supply seeded areas with adequate moisture, but do not water to the extent that it causes runoff.

Check Dam Maintenance

- Check dams shall be monitored for performance and sediment accumulation during and after each runoff producing rainfall.
- Sediment shall be removed when it reaches one half the sump depth.

- Anticipate submergence and deposition above the check dam and erosion from high flows around the edges of the dam.
- If significant erosion occurs between dams, install a protective riprap liner in that portion of the channel.

Responsible Staff: Contractor/CESL

2.1.7 Element 7: Protect Drain Inlets

All storm drain inlets and culverts made operable during construction shall be protected to prevent unfiltered or untreated water from entering the drainage conveyance system. However, the first priority is to keep all access roads clean of sediment and keep wash water separate from entering storm drains until treatment can be provided. Storm Drain Inlet Protection (BMP C220) will be implemented for all drainage inlets and culverts that could potentially be impacted by sediment-laden runoff on and near the project site. If this is deemed ineffective by the CESCL, additional BMPs may be necessary, as listed in Appendix B. Inlet protection is the last component of a treatment train and protection of drain inlets include additional sediment and erosion control measures. Inlet protection devices will be cleaned (or removed and replaced), when sediment has filled the device by one third (1/3) or as specified by the manufacturer.

List and describe BMPs:

BMP C220: Storm Drain Inlet Protection

Installation Schedules: TBD

Inspection and Maintenance plan:

Storm Drain Inlet Protection Maintenance

- Inspect catch basin filters frequently, especially after storm events. Clean and replace clogged inserts. For systems with clogged stone filters: pull away the stones from the inlet and clean or replace. An alternative approach would be to use the clogged stone as fill and put fresh stone around the inlet.
- Do not wash sediment into storm drains while cleaning. Spread all excavated material evenly over the surrounding land area or stockpile and stabilize as appropriate.
- Inlets to be inspected weekly and a minimum of daily during storm events

Responsible Staff: Contractor/CESL

2.1.8 Element 8: Stabilize Channels and Outlets

For construction stormwater conveyance, v-ditches with rock check dams will be installed to stabilize channels. Stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent streambanks, slopes, and downstream reaches shall be provided at the outlets of all conveyance systems. The project site is located west of the Cascade Mountain Crest. As such, all temporary on-site conveyance channels shall be designed, constructed, and stabilized to prevent erosion from the expected peak 10 minute velocity of flow from a Type 1A, 10-year, 24-hour frequency storm for the developed condition. Alternatively, the 10-year, 1-hour flow rate predicted by an approved continuous runoff model, increased by a factor of 1.6, may be used. The hydrologic analysis must use the existing land cover condition for predicting flow rates from tributary areas outside the project limits. For tributary areas on the project site, the analysis must use the temporary or permanent project land cover condition, whichever will produce the highest flow rates. If using the WWHM to predict flows, bare soil areas should be modeled as “landscaped area”.

Provide stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent stream banks, slopes, and downstream reaches, will be installed at the outlets of all conveyance systems.

List and describe BMPs:

BMP C207: Check Dams

Installation Schedules: TBD

Inspection and Maintenance plan:

Check Dam Maintenance

- Check dams shall be monitored for performance and sediment accumulation during and after each runoff producing rainfall. Sediment shall be removed when it reaches one half the sump depth.
- Anticipate submergence and deposition above the check dam and erosion from high flows around the edges of the dam.
- If significant erosion occurs between dams, install a protective riprap liner in that portion of the channel.

Responsible Staff: Contractor/CESL

2.1.9 Element 9: Control Pollutants

The following pollutants are anticipated to be present on-site:

Table 2 – Pollutants

Pollutant (List pollutants and source, if applicable)
Hydraulic fluid - May be present on site with construction equipment.
Diesel - May be present on site with construction equipment.
Motor Oil - May be present on site with construction equipment.
Other contaminants listed in Table 1 may be found on site, however as the site is minimizing cut quantities into the contaminated soils, the pollutants should not interfere with a majority of construction, if any.

All pollutants, including waste materials and demolition debris, that occur onsite shall be handled and disposed of in a manner that does not cause contamination of stormwater. Good housekeeping and preventative measures will be taken to ensure that the site will be kept clean, well-organized, and free of debris. Chemicals, liquid products, petroleum products, and other polluting materials will be kept covered, stored appropriately, and locked when not in use to prevent vandalism or misuse of these materials that may pollute state waters.

If required, BMPs to be implemented to control specific sources of pollutants are discussed below. Vehicles, construction equipment, and/or petroleum product storage/dispensing:

- All vehicles, equipment, and petroleum product storage/dispensing areas will be inspected regularly to detect any leaks or spills, and to identify maintenance needs to prevent leaks or spills.
- On-site fueling tanks and petroleum product storage containers shall include secondary containment.
- Spill prevention measures, such as drip pans, will be used when conducting maintenance and repair of vehicles or equipment.
- In order to perform emergency repairs on site, temporary plastic will be placed beneath and, if raining, over the vehicle.
- Contaminated surfaces shall be cleaned immediately following any discharge or spill incident.
- Storm drain inlets vulnerable to stormwater discharge carrying dust, soil, or debris will be protected using Storm Drain Inlet Protection (BMP C220 as described above for Element 7).
- Process water and slurry resulting from sawcutting and surfacing operations will be prevented from entering the waters of the State by implementing Sawcutting and Surfacing Pollution Prevention measures (BMP C152).

Concrete and grout:

- Process water and slurry resulting from concrete work will be prevented from entering the waters of the State by implementing Concrete Handling measures (BMP C151).

List and describe BMPs:

BMP C151: Concrete Handling

Installation Schedules: TBD

Inspection and Maintenance plan:

Concrete Handling Maintenance

- Check containers for holes in the liner daily during concrete pours and repair the same day.

Responsible Staff: Contractor/CESL

Will maintenance, fueling, and/or repair of heavy equipment and vehicles occur on-site?
☒ Yes ☐ No

In order to prevent spills and minimize risk, the following list should be applied

- Temporary storage area should be located away from vehicular traffic, near the construction entrance(s), and away from waterways or storm drains.
- Material Safety Data Sheets (MSDS) should be supplied for all materials stored. Chemicals should be kept in their original labeled containers.
- Hazardous material storage on-site should be minimized.
- Hazardous materials should be handled as infrequently as possible.
- During the wet weather season (Oct 1 – April 30), consider storing materials in a covered area.
- Materials should be stored in secondary containments, such as earthen dike, horse trough, or even a children's wading pool for non-reactive materials such as detergents, oil, grease, and paints. Small amounts of material may be secondarily contained in "bus boy" trays or concrete mixing trays.
- Do not store chemicals, drums, or bagged materials directly on the ground. Place these items on a pallet and, when possible, and within secondary containment.
- If drums must be kept uncovered, store them at a slight angle to reduce ponding of rainwater on the lids to reduce corrosion. Domed plastic covers are inexpensive and snap to the top of drums, preventing water from collecting.
- Liquids, petroleum products, and substances listed in 40 CFR Parts 110, 117, or 302 shall be stored in approved containers and drums and shall not be overfilled. Containers and drums shall be stored in temporary secondary containment facilities.

List and describe BMPs:

BMP C153: Material Delivery, Storage and Containment

Installation Schedules: TBD

Inspection and Maintenance plan:

The spill kit should include, at a minimum:

- 1-Water Resistant Nylon Bag
- 3-Oil Absorbent Socks 3”x 4’
- 2-Oil Absorbent Socks 3”x 10’
- 12-Oil Absorbent Pads 17”x19”
- 1-Pair Splash Resistant Goggles
- 3-Pair Nitrile Gloves
- 10-Disposable Bags with Ties
- Instructions

Responsible Staff: Contractor/CESL

Will wheel wash or tire bath system BMPs be used during construction?
☒ Yes ☐ No

The disposal method is discharging to the sanitary sewer, the approval letter from the sewer district will be filed under Correspondence in Appendix C of this document.

List and describe BMPs:

BMP C106: Wheel Wash

Installation Schedules: TBD

Inspection and Maintenance plan:

Wheel Wash Maintenance

- The wheel wash should start out the day with fresh water.
- The wash water should be changed a minimum of once per day. On large earthwork jobs where more than 10-20 trucks per hour are expected, the wash water will need to be changed more often.

Responsible Staff: Contractor/CESL

Will pH-modifying sources be present on-site?
☐ Yes ☒ No

Table 3 – pH-Modifying Sources

☒	None
☐	Bulk cement
☐	Cement kiln dust
☐	Fly ash
☐	Other cementitious materials
☐	New concrete washing or curing waters
☐	Waste streams generated from concrete grinding and sawing
☐	Exposed aggregate processes
☐	Dewatering concrete vaults
☐	Concrete pumping and mixer washout waters
☐	Recycled concrete
☐	Recycled concrete stockpiles
☐	Other (i.e., calcium lignosulfate) [please describe:]

List and describe BMPs: N/A

Installation Schedules: N/A

Inspection and Maintenance plan: N/A

Responsible Staff: N/A

> Concrete trucks must not be washed out onto the ground, or into storm drains, open ditches, streets, or streams. Excess concrete must not be dumped on-site, except in designated concrete washout areas with appropriate BMPs installed.

Will uncontaminated water from water-only based shaft drilling for construction of building, road, and bridge foundations be infiltrated provided the wastewater is managed in a way that prohibits discharge to surface waters?
☐ Yes ☒ No

List and describe BMPs: N/A

Installation Schedules: N/A

Inspection and Maintenance plan: N/A

Responsible Staff: N/A

2.1.10 Element 10: Control Dewatering

All dewatering water from open cut excavation, tunneling, foundation work, trench, or underground vaults will be collected into a controlled holding tank prior to discharge to the sanitary sewer. Highly turbid dewatering water from soils known or suspected to be contaminated, or from use of construction equipment, may require additional monitoring and treatment as required for the specific pollutants based on the sanitary sewer permit conditions. Such monitoring is the responsibility of the contractor. Because there are contaminated soils on site, any cut into these will be closely monitored and all cut soils will be stockpiled for testing before appropriate disposal or reuse.

If BMP C250: Construction Stormwater Chemical Treatment and BMP C251: Construction Stormwater Filtration are required for treatment, approval from Ecology is required prior,

Table 4 – Dewatering BMPs

☐	Infiltration
☐	Transport off-site in a vehicle (vacuum truck for legal disposal)
☐	Ecology-approved on-site chemical treatment or other suitable treatment technologies
☒	Sanitary or combined sewer discharge with local sewer district approval (last resort)
☐	Use of sedimentation bag with discharge to ditch or swale (small volumes of localized dewatering)

List and describe BMPs:

BMP C251: Construction Stormwater Filtration

Installation Schedules: TBD

Inspection and Maintenance plan:

Construction Stormwater Chemical Treatment Maintenance

<u>Monitoring</u>: At a minimum, the following monitoring shall be conducted. Test results shall be recorded on a daily log kept on site. Additional testing may be required by the NPDES permit based on site conditions.

<u>Operational Monitoring:</u>

- Total volume treated and discharged.
- Flow must be continuously monitored and recorded at not greater than 15-minute intervals.
- Type and amount of chemical used for pH adjustment.
- Amount of polymer used for treatment.
- Settling time.

<u>Compliance Monitoring:</u>

- Influent and effluent pH, flocculent chemical concentration, and turbidity must be continuously monitored and recorded at not greater than 15-minute intervals. pH and turbidity of the receiving water.

<u>Biomonitoring:</u>

Treated stormwater must be non-toxic to aquatic organisms. Treated stormwater must be tested for aquatic toxicity or residual chemicals. Frequency of biomonitoring will be determined by Ecology.

Residual chemical tests must be approved by Ecology prior to their use.

If testing treated stormwater for aquatic toxicity, you must test for acute (lethal) toxicity. Bioassays shall be conducted by a laboratory accredited by Ecology, unless otherwise approved by Ecology. Acute toxicity tests shall be conducted per the CTAPE protocol.

<u>Discharge Compliance:</u> Prior to discharge, treated stormwater must be sampled and tested for compliance with pH, flocculent chemical concentration, and turbidity limits. These limits may be established by the Construction Stormwater General Permit or a site-specific discharge permit. Sampling and testing for other pollutants may also be necessary at some sites. pH must be within the range of 6.5 to 8.5 standard units and not cause a change in the pH of the receiving water of more than 0.2 standard units. Treated stormwater samples and measurements shall be taken from the discharge pipe or another location representative of the nature of the treated stormwater discharge. Samples used for determining compliance with the water quality standards in the receiving water shall not be taken from the treatment pond prior to decanting. Compliance with the water quality standards is determined in the receiving water.

<u>Operator Training:</u> Each contractor who intends to use chemical treatment shall be trained by an experienced contractor . Each site using chemical treatment must have an operator trained and certified by an organization approved by Ecology.

<u>Standard BMPs:</u> Surface stabilization BMPs should be implemented on site to prevent significant erosion. All sites shall use a truck wheel wash to prevent tracking of sediment off site.

Sediment Removal and Disposal:

- Sediment shall be removed from the storage or treatment cells as necessary. Typically, sediment removal is required at least once during a wet season and at the decommissioning of the cells. Sediment remaining in the cells between batches may enhance the settling process and reduce the required chemical dosage.
- Sediment that is known to be non-toxic may be incorporated into the site away from drainages.

Responsible Staff: Contractor/CESL

2.1.11 Element 11: Maintain BMPs

All temporary and permanent Erosion and Sediment Control (ESC) BMPs shall be maintained and repaired as needed to ensure continued performance of their intended function.

Maintenance and repair shall be conducted in accordance with each particular BMP specification (see *Volume II of the SWMMWW or Chapter 7 of the SWMMEW*).

Visual monitoring of all BMPs installed at the site will be conducted at least once every calendar week and within 24 hours of any stormwater or non-stormwater discharge from the site. If the site becomes inactive and is temporarily stabilized, the inspection frequency may be reduced to once every calendar month.

All temporary ESC BMPs shall be removed within 30 days after final site stabilization is achieved or after the temporary BMPs are no longer needed.

Trapped sediment shall be stabilized on-site or removed. Disturbed soil resulting from removal of either BMPs or vegetation shall be permanently stabilized.

Additionally, protection must be provided for all BMPs installed for the permanent control of stormwater from sediment and compaction. BMPs that are to remain in place following completion of construction shall be examined and restored to full operating condition. If sediment enters these BMPs during construction, the sediment shall be removed and the facility shall be returned to conditions specified in the construction documents.

2.1.12 Element 12: Manage the Project

The project will be managed based on the following principles:

- Projects will be phased to the maximum extent practicable and seasonal work limitations will be taken into account.
- Inspection and monitoring:
    - Inspection, maintenance and repair of all BMPs will occur as needed to ensure performance of their intended function.
    - Site inspections and monitoring will be conducted in accordance with Special Condition S4 of the CSWGP. Sampling locations are indicated on the Site Map. Sampling station(s) are located in accordance with applicable requirements of the CSWGP.
- Maintain an updated SWPPP.
    - The SWPPP will be updated, maintained, and implemented in accordance with Special Conditions S3, S4, and S9 of the CSWGP.

As site work progresses the SWPPP will be modified routinely to reflect changing site conditions. The SWPPP will be reviewed monthly to ensure the content is current.

Table 5 – Management

☒	Design the project to fit the existing topography, soils, and drainage patterns
☒	Emphasize erosion control rather than sediment control
☒	Minimize the extent and duration of the area exposed
☒	Keep runoff velocities low
☒	Retain sediment on-site
☒	Thoroughly monitor site and maintain all ESC measures
☒	Schedule major earthwork during the dry season
☐	Other (please describe)

Table 6 – BMP Implementation Schedule

Phase of Construction Project	Stormwater BMPs	Date	Wet/Dry Season
TBD			

2.1.13 Element 13: Protect Permanent Stormwater Control BMPS

In order to protect BMPs during the construction process, many steps can be taken through proper erosion and sedimentation control. For this project, no permanent stormwater BMPs are proposed, however there is an existing detention pond on the site. This is not included in the disturbed area on site and will remain in its existing state. To prevent sediment from entering the existing sediment pond rock check dams (BMP C207) will collect sediment from the runoff occurring on site and the site will be graded to slope away from the existing pond. Other applicable ways to protect permanent stormwater BMPs from the City of Tacoma SWMM (2016) are listed below.

- Protect all permanent stormwater BMPs from sedimentation through installation and maintenance of erosion and sediment control BMPs.

- Protect lawn and landscaped areas from compaction due to construction equipment.

3 Pollution Prevention Team

Table 7 – Team Information

Title	Name(s)	Phone Number
Certified Erosion and Sediment Control Lead (CESCL)	Bryan Ploetz	(206) 579-1364
Resident Engineer	Costa Philippides	(425) 251-6222
Emergency Ecology Contact	Southwest Regional Office: WA Emergency Management Division	1-800-258-5990
Emergency Permittee/ Owner Contact	Drew Zaborowski	(206) 707-9696
Non-Emergency Owner Contact		
Monitoring Personnel	Bryan Ploetz	(206) 579-1364
Ecology Regional Office	Southwest Regional Office	(360) 407-6300

4 Monitoring and Sampling Requirements

Monitoring includes visual inspection, sampling for water quality parameters of concern, and documentation of the inspection and sampling findings in a site log book. A site log book will be maintained for all on-site construction activities and will include:

- A record of the implementation of the SWPPP and other permit requirements
- Site inspections
- Stormwater sampling data

File a blank form under Appendix D.

The site log book must be maintained on-site within reasonable access to the site and be made available upon request to Ecology or the local jurisdiction.

4.1 Site Inspection

Site inspections will be conducted at least once every calendar week and within 24 hours following any discharge from the site. For sites that are temporarily stabilized and inactive, the required frequency is reduced to once per calendar month.

The discharge point(s) to the sanitary sewer are indicated on the Site Map (see Appendix A) and in accordance with the applicable requirements of the CSWGP.

Monitoring will be in accordance with the City of Tacoma Special Approved Discharge Permit, as needed.

5 Reporting and Record Keeping

5.1 Record Keeping

5.1.1 Site Log Book

A site log book will be maintained for all on-site construction activities and will include:

- A record of the implementation of the SWPPP and other permit requirements
- Site inspections
- Sample logs

5.1.2 Records Retention

Records will be retained during the life of the project and for a minimum of three (3) years following the termination of permit coverage in accordance with Special Condition S5.C of the CSWGP.

Permit documentation to be retained on-site:

- CSWGP
- Permit Coverage Letter

- SWPPP
- Site Log Book

Permit documentation will be provided within 14 days of receipt of a written request from Ecology. A copy of the SWPPP or access to the SWPPP will be provided to the public when requested in writing in accordance with Special Condition S5.G.2.b of the CSWGP.

5.1.3 Updating the SWPPP

The SWPPP will be modified if:

- Found ineffective in eliminating or significantly minimizing pollutants in stormwater discharges from the site.
- There is a change in design, construction, operation, or maintenance at the construction site that has, or could have, a significant effect on the discharge of pollutants to waters of the State.

The SWPPP will be modified within seven (7) days if inspection(s) or investigation(s) determine additional or modified BMPs are necessary for compliance. An updated timeline for BMP implementation will be prepared.

5.2 Reporting

5.2.1 Discharge Monitoring Reports

Cumulative soil disturbance is one (1) acre or larger; therefore, Discharge Monitoring Reports (DMRs) will be submitted to Ecology monthly. If there was no discharge during a given monitoring period the DMR will be submitted as required, reporting “No Discharge”. The DMR due date is fifteen (15) days following the end of each calendar month.

DMRs will be reported online through Ecology’s WQWebDMR System.

5.2.2 Notification of Noncompliance

If any of the terms and conditions of the permit is not met, and the resulting noncompliance may cause a threat to human health or the environment, the following actions will be taken:

1. Ecology will be notified within 24-hours of the failure to comply by calling the applicable Regional office ERTS phone number (Regional office numbers listed below).
2. Immediate action will be taken to prevent the discharge/pollution or otherwise stop or correct the noncompliance. If applicable, sampling and analysis of any noncompliance will be repeated immediately and the results submitted to Ecology within five (5) days of becoming aware of the violation.
3. A detailed written report describing the noncompliance will be submitted to Ecology within five (5) days, unless requested earlier by Ecology.

Anytime turbidity sampling indicates turbidity is 250 NTUs or greater, or water transparency is 6 cm or less, the Ecology Regional office will be notified by phone within 24 hours of analysis as required by Special Condition S5.A of the CSWGP.

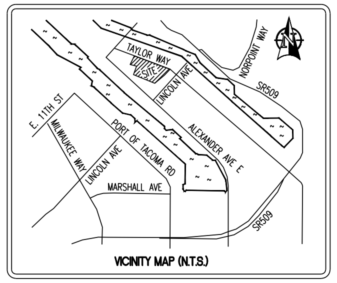
- **Central Region** at (509) 575-2490 for Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, or Yakima County
- **Eastern Region** at (509) 329-3400 for Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, or Whitman County
- **Northwest Region** at (425) 649-7000 for Island, King, Kitsap, San Juan, Skagit, Snohomish, or Whatcom County
- **Southwest Region** at (360) 407-6300 for Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Lewis, Mason, Pacific, Pierce, Skamania, Thurston, or Wahkiakum

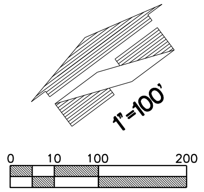
Include the following information:

1. Your name and / Phone number
2. Permit number
3. City / County of project
4. Sample results
5. Date / Time of call
6. Date / Time of sample
7. Project name

In accordance with Special Condition S4.D.5.b of the CSWGP, the Ecology Regional office will be notified if chemical treatment other than CO_2 sparging is planned for adjustment of high pH water.

A. Site Map



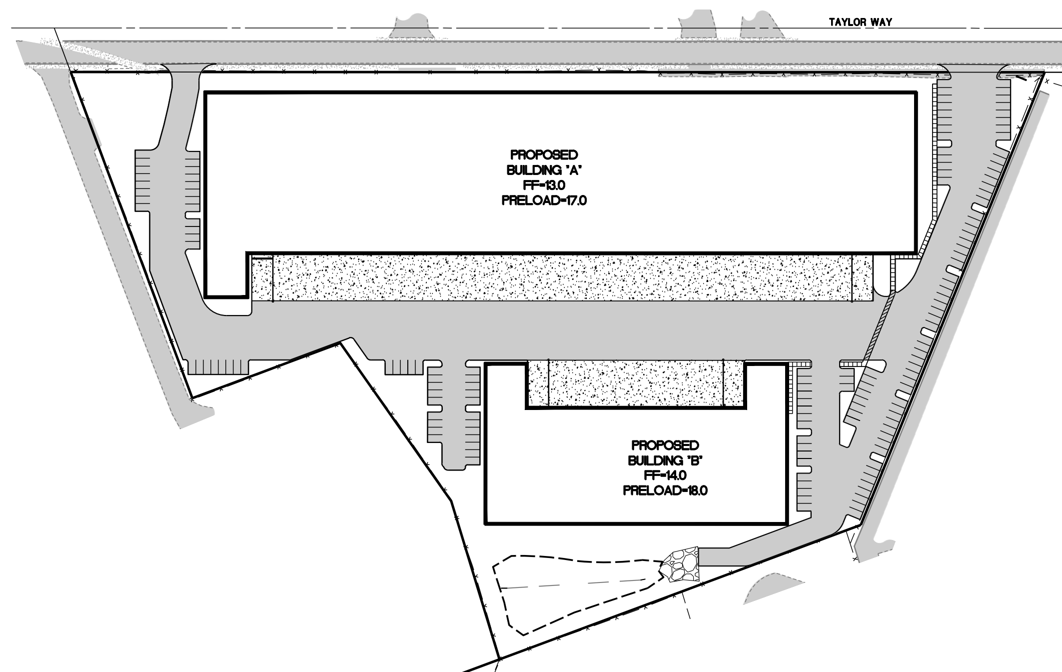


COVER SHEET

FOR

AVENUE 55/TAYLOR WAY PHASE 1

A PORTION OF THE SW 1/4 OF SEC. 26, TOWNSHIP 21N, RANGE 03E
W.M. PIERCE COUNTY, CITY OF TACOMA WASHINGTON



SHEET INDEX

SURVEY INFORMATION:

LEGAL DESCRIPTIONS:
(PER BELOW REFERENCED TITLE REPORT)

LOTS 1, 2 AND 3, PIERCE COUNTY SHORT PLAT NUMBER 200310295007, ACCORDING TO THE MAP THEREOF RECORDED OCTOBER 29, 2003, ALSO KNOWN AS CITY OF TACOMA SHORT PLAT NO. MPD2003-00046, IN PIERCE COUNTY, WASHINGTON.

HORIZONTAL DATUM:
HORIZONTAL DATUM FOR THIS SITE IS NAD83/91 PER CITY OF TACOMA. CITY OF TACOMA HORIZONTAL CONTROL POINT NO. 441 WAS HELD FOR POSITION AND A LINE BETWEEN SAID POINT NO. 441 AND HORIZONTAL CONTROL POINT NO. 552 WAS HELD FOR ROTATION BEING SOUTH 30°50'14" WEST.

VERTICAL DATUM:
VERTICAL DATUM FOR THIS PROJECT IS NGVD29 PER CITY OF TACOMA. CITY OF TACOMA VERTICAL CONTROL POINT NO. 4070, BEING 10.585 FEET (NGVD29)

PROCEDURE / NARRATIVE:
THIS IS A FIELD TRAVERSE SURVEY. TOPCON PS TOTAL STATION, TOPCON GR5 GPS AND TOPCON FC5000 DATA COLLECTOR WAS USED TO MEASURE THE ANGULAR AND DISTANCE RELATIONSHIPS BETWEEN THE CONTROLLING MONUMENTATION AS SHOWN. CLOSURE RATIOS OF THE TRAVERSE MET OR EXCEEDED THOSE SPECIFIED IN WAC 332-130-090. ALL INSTRUMENTS AND EQUIPMENT HAVE BEEN MAINTAINED IN ADJUSTMENT ACCORDING TO MANUFACTURERS' SPECIFICATIONS.

LOT AREA:
461,036 +/- S.F. (10.584 +/- ACRES)

POND EASEMENT AREA:
30,579 +/- S.F. (0.70 +/- ACRES)

ADDRESS:
XXX TAYLOR WAY, TACOMA WA (NOT ASSIGNED)

TAX PARCEL NUMBERS:
0321267005, 0321356008 & 0321355007

REFERENCE SURVEYS:
RECORD OF SURVEY, AFN.8207130252
TACOMA SHORT PLAT, AF.8308190230
TACOMA SHORT PLAT, AF.9002280338
TACOMA BOUNDARY LINE ADJUSTMENT, AFN.9812235001
RECORD OF SURVEY, AFN.200903105001
TACOMA SHORT PLAT, AF.200310295007

ZONING:
NO ZONING REPORT WAS PROVIDED.

FLOOD INFORMATION:
SUBJECT PROPERTY LIES WITHIN ZONE C, AREAS OF MINIMAL FLOODING, PER FEMA FIRM MAP COMMUNITY PANEL NO. 530148 0025 B, DATED DECEMBER 1, 1983. CITY OF TACOMA, PANEL 25 OF 45.

DATE OF SURVEY:
THIS SURVEY REPRESENTS VISIBLE PHYSICAL IMPROVEMENT CONDITIONS EXISTING ON DECEMBER 14, 2016. ALL SURVEY CONTROL INDICATED AS "FOUND" WAS RECOVERED FOR THIS PROJECT IN NOVEMBER & DECEMBER 2016.

TITLE INSURANCE:
ALL TITLE INFORMATION SHOWN ON THIS MAP HAS BEEN EXTRACTED FROM CHICAGO TITLE INSURANCE COMPANY COMMITMENT NO. 0084424-TC, UPDATED SECOND COMMITMENT, DATED NOVEMBER 9, 2016 AT 8:00AM. IN PREPARING THIS MAP, BARGHAUSEN CONSULTING ENGINEERS, INC. HAS CONDUCTED NO INDEPENDENT TITLE SEARCH NOR IS BARGHAUSEN CONSULTING ENGINEERS, INC. AWARE OF ANY TITLE ISSUES AFFECTING THE SURVEYED PROPERTY OTHER THAN THOSE SHOWN ON THE MAP AND DISCLOSED BY THE REFERENCED CHICAGO TITLE INSURANCE COMPANY COMMITMENT. BARGHAUSEN CONSULTING ENGINEERS, INC. HAS RELIED WHOLLY ON CHICAGO TITLE INSURANCE COMPANY'S REPRESENTATIONS OF THE TITLE'S CONDITION TO PREPARE THIS SURVEY AND THEREFORE BARGHAUSEN CONSULTING ENGINEERS, INC. QUALIFIES THE MAP'S ACCURACY AND COMPLETENESS TO THAT EXTENT.

SURVEYOR'S NOTES:
1. ALL DISTANCES SHOWN HEREON ARE IN U.S. SURVEY FEET.
2. THE BOUNDARY CORNERS AND LINES DEPICTED ON THIS MAP REPRESENT DEED LINES ONLY. THEY DO NOT PURPORT TO SHOW OWNERSHIP LINES THAT MAY OTHERWISE BE DETERMINED BY A COURT OF LAW.
3. UNDERGROUND UTILITIES AND FEATURES DEPICTED HEREON ARE BASED ON FIELD OBSERVATION, MARKINGS, DEVELOPMENT PLANS, AND/OR AVAILABLE RECORD DOCUMENTS ONLY. THE TRUE LOCATION, NATURE AND/OR EXISTENCE OF BELOW GROUND FEATURES, DETECTED OR UNDETECTED, SHOULD BE VERIFIED.
4. BARGHAUSEN CONSULTING ENGINEERS, INC. SURVEY CREWS DETECTED NO OBSERVABLE EVIDENCE OF RECENT EARTH MOVING WORK, BUILDING CONSTRUCTION OR BUILDING ADDITIONS ON THE SUBJECT PROPERTY.
5. BARGHAUSEN CONSULTING ENGINEERS, INC. SURVEY CREWS DETECTED NO OBSERVABLE EVIDENCE OF CHANGES IN STREET RIGHT-OF-WAY LINES OR OF RECENT STREET OR SIDEWALK CONSTRUCTION ON OR ADJACENT TO THE SUBJECT PROPERTY, EXCEPT AS SHOWN.
6. THERE WAS NO OBSERVABLE EVIDENCE OF ANY WETLAND DELINEATION, BY A QUALIFIED SPECIALIST.
7. THERE ARE NO BUILDINGS ON SITE

LEGEND:

SURVEY MONUMENT	PROPOSED TYPE II CATCH BASIN
EX. POWER VAULT	PROPOSED TYPE I CATCH BASIN
EX. LUMINAIRE (LUM.)	PROPOSED STORM DRAIN FLOW ARROW
EX. LOT LIGHT	PROPOSED STORM DRAINAGE LINE
EX. POWER POLE	PROPOSED TRENCH DRAIN
EX. JUNCTION BOX	PROPOSED SANITARY SEWER LINE
EX. CATCH BASIN (CB)	PROPOSED SANITARY SEWER CLEANOUT
EX. CATCH BASIN (CB) TYPE 2	PROPOSED WATERMAIN
EX. SANITARY SEWER MANHOLE (SSMH)	PROPOSED FIRE HYDRANT
EX. GAS METER	PROPOSED WATER VALVE
EX. GAS VALVE	PROPOSED CONCRETE BLOCKING
EX. WATER VALVE (WV)	PROPOSED 90° BEND
EX. FIRE HYDRANT (FH)	PROPOSED SPOT ELEVATIONS (23.20)
MAIL BOX	EXISTING SPOT ELEVATIONS
EX. WATER METER	EXISTING CONTOURS
EX. SIGN	PROPOSED CONTOURS
EX. WATER LINE	
EX. SANITARY SEWER LINE	
EX. STORM DRAINAGE LINE	EXISTING PAVEMENT
EX. POWER UNDERGROUND (P(UG))	
EX. POWER OVERHEAD (P(OH))	PROPOSED PAVEMENT
EX. METAL FENCE	
EX. WOOD FENCE	PROPOSED CONCRETE
EX. CONTOURS	

SPECIAL EXCEPTIONS:
(PER ABOVE REFERENCED TITLE REPORT)

1. AGREEMENT, INCLUDING THE TERMS AND PROVISIONS THEREOF:
EXECUTED BY: J. P. SIMPSON
PORT OF TACOMA
RECORDING DATE: FEBRUARY 4, 1958
RECORDING NO.: 1808461
REGARDING: SOLE PURPOSE OF CONDUCTING EXCESS WATER TO A DRAIN TILE OR STORM SEWER INSTALLED PARALLEL WITH ALEXANDER AVENUE
(NOT PLOTTABLE) BLANKET IN NATURE. EASEMENT APPEARS TO BE AN APPURTENANT OFF-SITE EASEMENT

2. EASEMENT GRANTED TO CITY OF TACOMA TO CONSTRUCT, OPERATE AND MAINTAIN A RAILROAD SPUR TRACK WITH NECESSARY APPURTENANCES, WITH THE PRIVILEGE OF PASSING AND REPASSING ITS CARS AND ROLLING STOCK OVER AND UPON A STRIP OF LAND 15 FEET WIDE AS THE SAME IS NOW CONSTRUCTED AND LOCATED IN THE NORTHWEST QUARTER OF THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER OF SECTION 35, TOWNSHIP 21 NORTH, RANGE 3 EAST, WILLAMETTE MERIDIAN, BY INSTRUMENT RECORDED UNDER RECORDING NUMBER 1397319, TO WHICH INSTRUMENT REFERENCE IS MADE FOR FULL PARTICULARS.
(PLOTTED HEREON)

3. THIS ITEM INTENTIONALLY DELETED

4. THIS ITEM INTENTIONALLY DELETED

5. EXISTING PRIVATE RAILROAD SPURS AS DELINEATED ON PIERCE COUNTY SURVEY NO. 2744 RECORDED IN VOLUM.E 28 OF SURVEYS, PAGE 44 AND INSTRUMENT RECORDED UNDER RECORDING NUMBER 8109020004.
(PLOTTED HEREON)

6. THIS ITEM INTENTIONALLY DELETED

7. THIS ITEM INTENTIONALLY DELETED

8. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:
GRANTED TO: CITY OF TACOMA
PURPOSE: CONSTRUCT AND MAINTAIN POLES, ANCHORS, TRANSFORMERS AND GUY, SERVICE AND DISTRIBUTION WIRES AND ALL APPURTENANT EQUIPMENT
RECORDING DATE: JUNE 12, 1996
RECORDING NO.: 9606120323
(PLOTTED HEREON)

9. EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:
GRANTED TO: TAYLOR PROPERTIES, INC., A DELAWARE CORPORATION
PURPOSE: INSPECT, OPERATE, REPAIR, REPLACE AND MAINTAIN UNDERGROUND STORM WATER DRAINAGE CONDUITS AND RELATED FACILITIES AND EASEMENT TO DRAIN SURFACE STORMWATER RUN OFF AND INCIDENTAL PURPOSES
RECORDING DATE: DECEMBER 30, 1998
RECORDING NO.: 9812301057
(PLOTTED HEREON)

10. EASEMENT AGREEMENT FOR SANITARY SEWER, INCLUDING THE TERMS AND PROVISIONS THEREOF:
RECORDING DATE: OCTOBER 23, 2000
RECORDING NO.: 200010230472
MODIFICATION OF EASEMENT AGREEMENT:
RECORDING DATE: APRIL 18, 2001
RECORDING NO.: 200104180467
(PLOTTABLE) EASEMENT IS SOUTHWEST OF SUBJECT PROPERTY AND AFFECTS PHASE 2

11. THIS ITEM INTENTIONALLY DELETED

12. COVENANTS, CONDITIONS, RESTRICTIONS, RECITALS, RESERVATIONS, EASEMENTS, EASEMENT PROVISIONS, DEDICATIONS, BUILDING SETBACK LINES, NOTES, STATEMENTS, AND OTHER MATTERS, IF ANY, BUT OMITTING ANY COVENANTS OR RESTRICTIONS, IF ANY, INCLUDING BUT NOT LIMITED TO THOSE BASED UPON RACE, COLOR, RELIGION, SEX, SEXUAL ORIENTATION, FAMILIAL STATUS, MARITAL STATUS, DISABILITY, HANDICAP, NATIONAL ORIGIN, ANCESTRY, OR SOURCE OF INCOME, AS SET FORTH IN APPLICABLE STATE OR FEDERAL LAWS, EXCEPT TO THE EXTENT THAT SAID COVENANT OR RESTRICTION IS PERMITTED BY APPLICABLE LAW, AS SET FORTH ON PIERCE COUNTY SHORT PLAT NUMBER 200310295007, ALSO KNOWN AS CITY OF TACOMA SHORT PLAT NO. MPD2003-00046.
(PLOTTED HEREON)

13. ANY RIGHTS, INTERESTS, OR CLAIMS WHICH MAY EXIST OR ARISE BY REASON OF THE FOLLOWING MATTERS DISCLOSED BY SURVEY PERFORMED BY DOWN ENGINEERS DATED MARCH 16, 1998 UNDER JOB NO. S014 AND PIERCE COUNTY SHORT PLAT NUMBER 200310295007:
MATTERS SHOWN: FENCE LINES DO NOT CONFORM TO PROPERTY LINES
(GENERALLY PLOTTED HEREON)

14. ANY RIGHTS, INTERESTS, OR CLAIMS WHICH MAY EXIST OR ARISE BY REASON OF THE FOLLOWING SURVEY:
RECORDING DATE: MARCH 10, 2009
RECORDING NO.: 200903105001
(NOT PLOTTABLE)

15. COVENANTS, CONDITIONS, RESTRICTIONS, RECITALS, RESERVATIONS, EASEMENTS, EASEMENT PROVISIONS, DEDICATIONS, BUILDING SETBACK LINES, NOTES, STATEMENTS, AND OTHER MATTERS, IF ANY, BUT OMITTING ANY COVENANTS OR RESTRICTIONS, IF ANY, INCLUDING BUT NOT LIMITED TO THOSE BASED UPON RACE, COLOR, RELIGION, SEX, SEXUAL ORIENTATION, FAMILIAL STATUS, MARITAL STATUS, DISABILITY, HANDICAP, NATIONAL ORIGIN, ANCESTRY, OR SOURCE OF INCOME, AS SET FORTH IN APPLICABLE STATE OR FEDERAL LAWS, EXCEPT TO THE EXTENT THAT SAID COVENANT OR RESTRICTION IS PERMITTED BY APPLICABLE LAW, AS SET FORTH ON SURVEY:
RECORDING NO: 200903105001
(NOT PLOTTABLE)

16. ADDITIONAL TAP OR CONNECTION CHARGES FOR SEWER FACILITIES LEVIED BY THE CITY OF TACOMA, NOTICE THEREOF IS GIVEN BY THE FILING OF MAP RECORDED NOVEMBER 1, 1978 UNDER RECORDING NUMBER 2864651. SAID MAP WAS CORRECTED BY INSTRUMENT RECORDED UNDER RECORDING NUMBER 2881434 AND AMENDED BY INSTRUMENT RECORDED UNDER RECORDING NUMBER 8012010130. INQUIRY SHOULD BE MADE WITH THE CITY OF TACOMA, DEPARTMENT OF PUBLIC WORKS, FOR THE AMOUNT DUE.
(NOT SURVEY RELATED)

17. PAYMENT OF THE REAL ESTATE EXCISE TAX, IF REQUIRED.
THE LAND IS SITUATED WITHIN THE BOUNDARIES OF LOCAL TAXING AUTHORITY OF THE CITY OF TACOMA. PRESENT RATE OF REAL ESTATE EXCISE TAX AS OF THE DATE HEREIN IS 1.78 PERCENT. ANY CONVEYANCE DOCUMENT MUST BE ACCOMPANIED BY THE OFFICIAL WASHINGTON STATE EXCISE TAX AFFIDAVIT. THE APPLICABLE EXCISE TAX MUST BE PAID AND THE AFFIDAVIT APPROVED AT THE TIME OF THE RECORDING OF THE CONVEYANCE DOCUMENTS. (NOTE: REAL ESTATE EXCISE TAX AFFIDAVITS MUST BE PRINTED AS LEGAL SIZE FORMS). AN ADDITIONAL $5.00 ELECTRONIC TECHNOLOGY FEE MUST BE INCLUDED IN ALL EXCISE TAX PAYMENTS. IF THE TRANSACTION IS EXEMPT, AN ADDITIONAL $5.00 AFFIDAVIT PROCESSING FEE IS REQUIRED.
(NOT SURVEY RELATED)

18. THIS ITEM INTENTIONALLY DELETED

19. SPECIAL CHARGES, PAYABLE FEBRUARY 15, DELINQUENT IF FIRST HALF UNPAID ON MAY 1, SECOND HALF DELINQUENT IF UNPAID ON NOVEMBER 1 OF THE TAX YEAR (AMOUNTS DO NOT INCLUDE INTEREST AND PENALTIES):
2016
TAX ACCOUNT NO.: 032126-700-5
LEVY CODE: 005
ASSESSED VALUE-LAND: $768,900.00
ASSESSED VALUE-IMPROVEMENTS: $0.00
GENERAL AND SPECIAL TAXES:
$5.93
$5.93
$0.00
THE LAND IS PRESENTLY CLASSIFIED AS EXEMPT AND MAY BE SUBJECT TO THE COLLECTION OF BACK TAXES FOR A POSSIBLE THERETO TEN YEAR PERIOD, DEPENDING UPON THE ACTUAL USE CLASSIFICATION OF THE PROPERTY DURING ITS EXEMPT STATUS. INQUIRY SHOULD BE MADE TO THE PIERCE COUNTY ASSESSOR'S OFFICE OR THE COMPANY FOR ADDITIONAL INFORMATION.
(NOT SURVEY RELATED)

20. SPECIAL CHARGES, PAYABLE FEBRUARY 15, DELINQUENT IF FIRST HALF UNPAID ON MAY 1, SECOND HALF DELINQUENT IF UNPAID ON NOVEMBER 1 OF THE TAX YEAR (AMOUNTS DO NOT INCLUDE INTEREST AND PENALTIES):
2016
TAX ACCOUNT NO.: 032126-600-8
LEVY CODE: 005
ASSESSED VALUE-LAND: $1,427,800.00
ASSESSED VALUE-IMPROVEMENTS: $0.00
GENERAL AND SPECIAL TAXES:
$6.23
$6.23
$0.00
THE LAND IS PRESENTLY CLASSIFIED AS EXEMPT AND MAY BE SUBJECT TO THE COLLECTION OF BACK TAXES FOR A POSSIBLE THREE TO TEN YEAR PERIOD, DEPENDING UPON THE ACTUAL USE CLASSIFICATION OF THE PROPERTY DURING ITS EXEMPT STATUS. INQUIRY SHOULD BE MADE TO THE PIERCE COUNTY ASSESSOR'S OFFICE OR THE COMPANY FOR ADDITIONAL INFORMATION.
(NOT SURVEY RELATED)

21. SPECIAL CHARGES, PAYABLE FEBRUARY 15, DELINQUENT IF FIRST HALF UNPAID ON MAY 1, SECOND HALF DELINQUENT IF UNPAID ON NOVEMBER 1 OF THE TAX YEAR (AMOUNTS DO NOT INCLUDE INTEREST AND PENALTIES):
2016
TAX ACCOUNT NO.: 032135-500-7
LEVY CODE: 005
ASSESSED VALUE-LAND: $1,742,800.00
ASSESSED VALUE-IMPROVEMENTS: $0.00
GENERAL AND SPECIAL TAXES:
$6.38
$6.38
$0.00
(NOT SURVEY RELATED)

22. THIS ITEM INTENTIONALLY DELETED

23. THE SEARCH DID NOT DISCLOSE ANY OPEN MORTGAGES OR DEEDS OF TRUST OF RECORD, THEREFORE THE COMPANY RESERVES THE RIGHT TO REQUIRE FURTHER EVIDENCE TO CONFIRM THAT THE PROPERTY IS UNENCUMBERED, AND FURTHER RESERVES THE RIGHT TO MAKE ADDITIONAL REQUIREMENTS OR ADD ADDITIONAL ITEMS OR EXCEPTIONS UPON RECEIPT OF THE REQUESTED EVIDENCE.
(NOT SURVEY RELATED)

24. ANY UNRECORDED LEASEHOLDS, RIGHT OF VENDORS AND HOLDERS OF SECURITY INTERESTS ON PERSONAL PROPERTY INSTALLED UPON THE LAND AND RIGHTS OF TENANTS TO REMOVE TRADE FIXTURES AT THE EXPIRATION OF THE TERMS.
(NOT SURVEY RELATED)

25. IT IS OUR UNDERSTANDING THAT THE PROPOSED TRANSACTION WILL INVOLVE THE INSURANCE OF A LEASEHOLD ESTATE WHICH HAS NOT YET BEEN ESTABLISHED OF RECORD. DOCUMENTS NECESSARY TO CREATE SAID INTEREST MUST BE SUBMITTED FOR OUR REVIEW AND APPROVAL. IF ONLY A MEMORANDUM OR SHORT FORM OF LEASE IS TO BE RECORDED, THE FULL INSTRUMENT, TOGETHER WITH ALL AMENDMENTS, MUST BE SUBMITTED.
(NOT SURVEY RELATED)

26. ANY INSTRUMENT TO BE EXECUTED BY PORT OF TACOMA MUST BE IN ACCORDANCE WITH STATUTE. SATISFACTORY EVIDENCE OF AUTHORITY MUST BE SUBMITTED. THE COMPANY RESERVES THE RIGHT TO EXCEPT ADDITIONAL ITEMS AND/OR MAKE ADDITIONAL REQUIREMENTS AFTER REVIEWING SAID DOCUMENTS.
(NOT SURVEY RELATED)

27. IN THE EVENT TITLE TO SAID LAND IS ACQUIRED BY THE PARTY(IES) NAMED BELOW, THE POLICY(S), WHEN ISSUED, WILL SHOW THE
FOLLOWING ADDITIONAL ITEM(S) IN SCHEDULE B, UNLESS DISPOSED OF TO THE SATISFACTION OF THE COMPANY:
PARTY(IES): AVENUE 55 LLC
ITEM(S): FOLLOWING PARAGRAPH
(NOT SURVEY RELATED)

28. THE COMPANY WILL REQUIRE THE FOLLOWING DOCUMENTS FOR REVIEW PRIOR TO THE ISSUANCE OF ANY TITLE INSURANCE PREDICATED UPON A CONVEYANCE OR ENCUMBRANCE FROM THE ENTITY NAMED BELOW. LIMITED LIABILITY COMPANY: AVENUE 55 LLC
A. A COPY OF ITS OPERATING AGREEMENT, IF ANY, AND ANY AND ALL AMENDMENTS, SUPPLEMENTS AND/OR MODIFICATIONS THERETO, CERTIFIED BY THE APPROPRIATE MANAGER OR MEMBER.
B. IF A DOMESTIC LIMITED LIABILITY COMPANY, A COPY OF ITS ARTICLES OF ORGANIZATION AND ALL AMENDMENT THERETO WITH THE APPROPRIATE FILING STAMPS.
C. IF THE LIMITED LIABILITY COMPANY IS MEMBER-MANAGED A FULL AND COMPLETE CURRENT LIST OF MEMBERS CERTIFIED BY THE APPROPRIATE MANAGER OR MEMBER.
D. IF THE LIMITED LIABILITY COMPANY WAS FORMED IN A FOREIGN JURISDICTION, EVIDENCE, SATISFACTORY TO THE COMPANY THAT IT WAS VALIDLY FORMED, IS IN GOOD STANDING AND AUTHORIZED TO DO BUSINESS IN THE STATE OF ORIGIN.
E. IF LESS THAN ALL MEMBERS, OR MANAGERS, AS APPROPRIATE, WILL BE EXECUTING THE CLOSING DOCUMENTS, FURNISH EVIDENCE OF THE AUTHORITY OF THOSE SIGNING.
THE COMPANY RESERVES THE RIGHT TO ADD ADDITIONAL ITEMS OR MAKE FURTHER REQUIREMENTS AFTER REVIEW OF THE REQUESTED DOCUMENTATION.
(NOT SURVEY RELATED)

29. TO PROVIDE AN EXTENDED COVERAGE LENDER'S POLICY, GENERAL EXCEPTIONS B AND C ARE HEREBY ELIMINATED. GENERAL EXCEPTIONS A AND D HAVE NOT BEEN CLEARED. IN CONSIDERATION OF CLEARING PARAGRAPHS A AND D OF SCHEDULE B, PLEASE HAVE THE BORROWER/OWNER COMPLETE THE ENCLOSED AFFIDAVIT AND RETURN TO OUR OFFICE FOR REVIEW.
(NOT SURVEY RELATED)

ENGINEER/SURVEYOR

BARGHAUSEN CONSULTING ENGINEERS
CONTACT: DANIEL K. BALMELLI, P.E.
ADDRESS: 18215 72ND AVENUE SOUTH
KENT, WA 98032
PHONE: (425) 251-622

ARCHITECT

CRAFT ARCHITECTS, LLC.
ADDRESS: 2505 THIRD AVENUE, SUITE 324
SEATTLE, WA 98121
PHONE: (206) 720-7001

CALL BEFORE YOU DIG:
1-800-424-5555

CAUTION:
UTILITY CONFLICT NOTE:
THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATION, DIMENSION, AND DEPTH OF ALL EXISTING UTILITIES WHETHER SHOWN ON THESE PLANS OR NOT BY POTHOLING THE UTILITIES AND SURVEYING THE HORIZONTAL AND VERTICAL LOCATION PRIOR TO CONSTRUCTION. THIS SHALL INCLUDE CALLING UTILITY LOCATE @ 1-800-424-5555 AND THEN POTHOLING ALL OF THE EXISTING UTILITIES AT LOCATIONS OF NEW UTILITY CROSSINGS TO PHYSICALLY VERIFY WHETHER OR NOT CONFLICTS EXIST. LOCATIONS OF SAID UTILITIES AS SHOWN ON THESE PLANS ARE BASED UPON THE UNVERIFIED PUBLIC INFORMATION AND ARE SUBJECT TO VARIATION. IF CONFLICTS SHOULD OCCUR, THE CONTRACTOR SHALL CONSULT BARGHAUSEN CONSULTING ENGINEERS, INC. TO RESOLVE ALL PROBLEMS PRIOR TO PROCEEDING WITH CONSTRUCTION.

CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR OBTAINING PERMITS FROM THE WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES FOR REMOVING AND REPLACING ALL SURVEY MONUMENTATION THAT MAY BE AFFECTED BY CONSTRUCTION ACTIVITY, PURSUANT TO WAC 332-120. APPLICATIONS MUST BE COMPLETED BY A REGISTERED LAND SURVEYOR. APPLICATIONS FOR PERMITS TO REMOVE MONUMENTS MAY BE OBTAINED FROM THE WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES, OR BY CONTACTING THEIR OFFICE BY TELEPHONE AT (206) 902-1190.

WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES
PUBLIC LAND SURVEY OFFICE
1111 WASHINGTON STREET S.E.
P.O. BOX 47060
OLYMPIA, WASHINGTON 98504-7060

UPON COMPLETION OF CONSTRUCTION, ALL MONUMENTS DISPLACED, REMOVED, OR DESTROYED SHALL BE REPLACED BY A REGISTERED LAND SURVEYOR, AT THE COST AND AT THE DIRECTION OF THE CONTRACTOR, PURSUANT TO THESE REGULATIONS. THE APPROPRIATE FORMS FOR REPLACEMENT OF SAID MONUMENTATION SHALL ALSO BE THE RESPONSIBILITY OF THE CONTRACTOR.

Revision
No. | Date | By | Ckd. | Appr.

Title: COVER SHEET FOR AVENUE 55/TAYLOR WAY TACOMA PHASE 1

For: AVENUE 55
600 UNIVERSITY STREET, SUITE 2305
SEATTLE, WA 98101

DANIEL K. BALMELLI
STATE OF WASHINGTON
25672
REGISTERED PROFESSIONAL ENGINEER
6/7/2017

Scale: Horizontal 1"=100'
Vertical -

Designed WED
Drawn WED
Checked CP
Approved DKB
Date 1/11/17

BARGHAUSEN CONSULTING ENGINEERS, INC.
18215 72ND AVENUE SOUTH
KENT, WA 98032
(425)251-6222
(425)251-8782 FAX
CIVIL ENGINEERING, LAND PLANNING, SURVEYING, ENVIRONMENTAL SERVICES

Job Number 18293
Sheet E1 of 5

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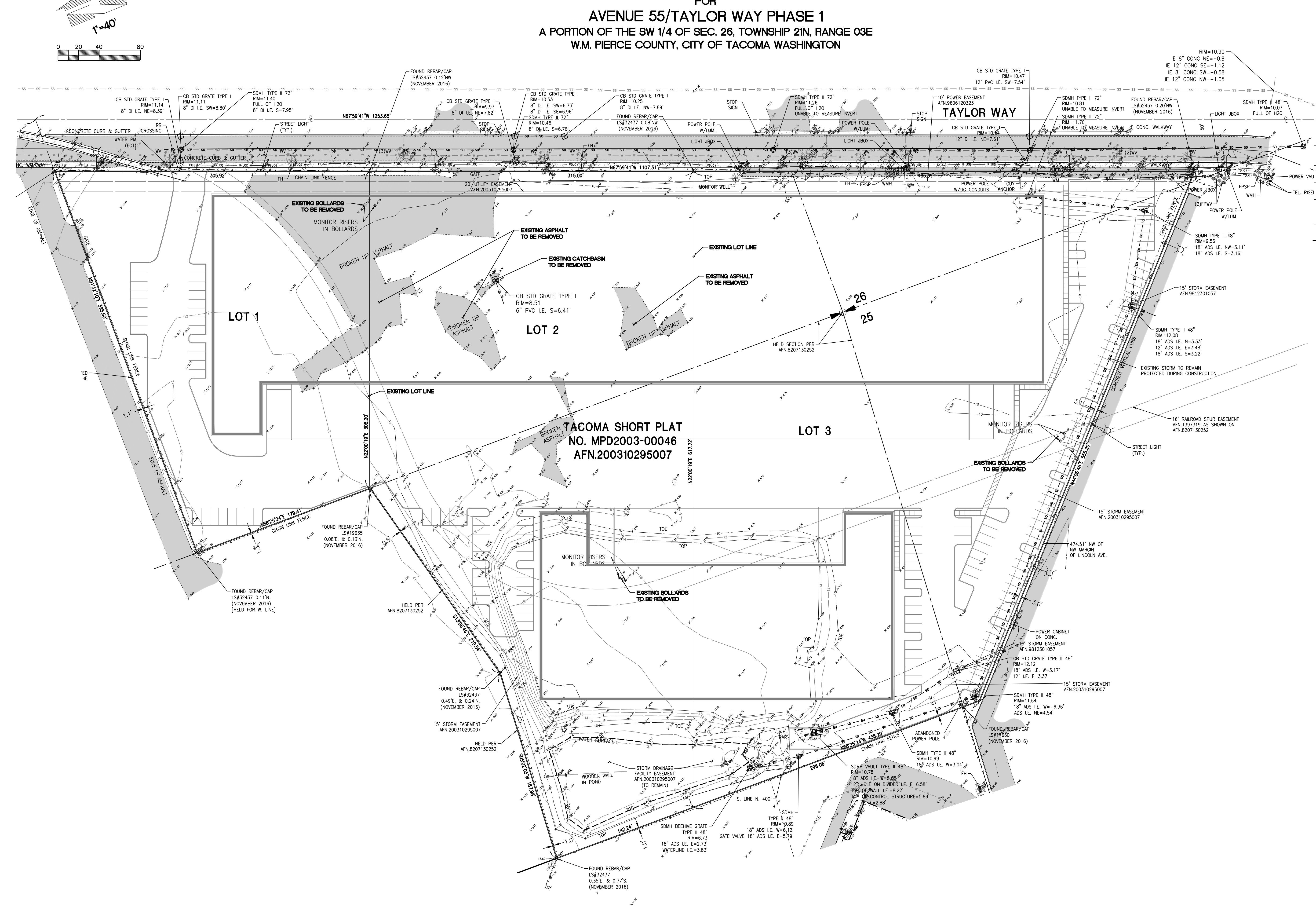
EXISTING CONDITIONS AND DEMOLITION PLAN

FOR

AVENUE 55/TAYLOR WAY PHASE 1

A PORTION OF THE SW 1/4 OF SEC. 26, TOWNSHIP 21N, RANGE 03E
W.M. PIERCE COUNTY, CITY OF TACOMA WASHINGTON



Title:
EXISTING CONDITIONS AND DEMOLITION PLAN
FOR
AVENUE 55/TAYLOR WAY
TACOMA-PHASE 1

For:
AVENUE 55
600 UNIVERSITY STREET, SUITE 2305
SEATTLE, WA 98101

DANIEL K. BALMELLI
STATE OF WASHINGTON
25672
REGISTERED PROFESSIONAL ENGINEER
6/7/2017

Scale: Horizontal 1"=40' Vertical -

Designed WED
Drawn WED
Checked CP
Approved DKB
Date 1/11/17

BARGHAUSEN CONSULTING ENGINEERS, INC.
18215 72ND AVENUE SOUTH
KENT, WA 98032
(425)251-6222
(425)251-8782 FAX
CIVIL ENGINEERING, LAND PLANNING, SURVEYING, ENVIRONMENTAL SERVICES

Job Number 18293

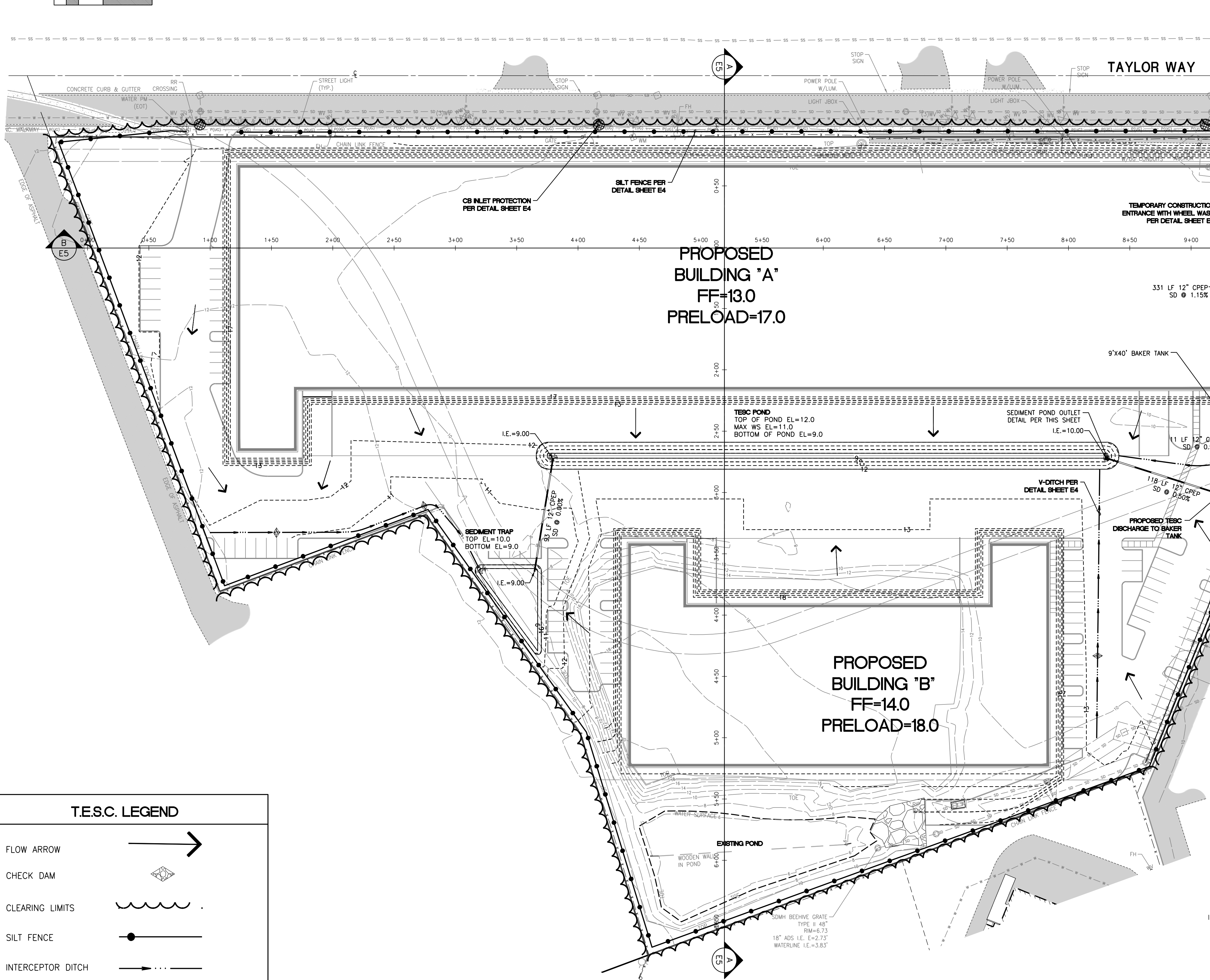
Sheet E2 of 5

TEMPORARY EROSION AND SEDIMENTATION CONTROL PLAN

FOR

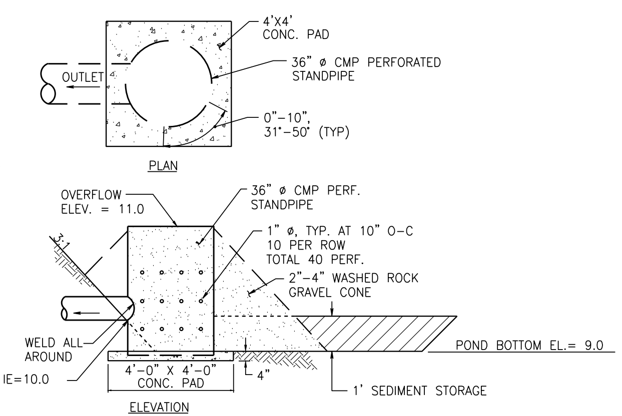
AVENUE 55/TAYLOR WAY PHASE 1

A PORTION OF THE SW 1/4 OF SEC. 26, TOWNSHIP 21N, RANGE 03E
W.M. PIERCE COUNTY, CITY OF TACOMA WASHINGTON



T.E.S.C. LEGEND

- FLOW ARROW
- CHECK DAM
- CLEARING LIMITS
- SILT FENCE
- INTERCEPTOR DITCH
- INLET PROTECTION



TEMPORARY SEDIMENT POND OUTLET CONTROL STRUCTURE

NOT TO SCALE

Title: TEMPORARY EROSION AND SEDIMENTATION CONTROL PLAN FOR AVENUE 55/TAYLOR WAY TACOMA-PHASE 1

For: AVENUE 55
600 UNIVERSITY STREET, SUITE 2305
SEATTLE, WA 98101

DANIEL K. BALMELLI, STATE OF WASHINGTON, 25672, REGISTERED PROFESSIONAL ENGINEER, 6/7/2017

Scale: Horizontal 1"=40' Vertical -

Designed WED
Drawn WED
Checked CP
Approved DKB
Date 1/11/17

BARGHAUSEN CONSULTING ENGINEERS, INC.
18215 72ND AVENUE SOUTH
KENT, WA 98032
(425)251-6222
(425)251-8782 FAX
CIVIL ENGINEERING, LAND PLANNING, SURVEYING, ENVIRONMENTAL SERVICES

Job Number 18293

Sheet E3 of 5

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EROSION CONTROL NOTES AND DETAILS

FOR

AVENUE 55/TAYLOR WAY PHASE 1

A PORTION OF THE SW 1/4 OF SEC. 26, TOWNSHIP 21N, RANGE 03E
W.M. PIERCE COUNTY, CITY OF TACOMA WASHINGTON

STANDARD TESC NOTES

1. THE IMPLEMENTATION OF THESE TESC PLANS AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF TESC FACILITIES IS THE RESPONSIBILITY OF THE APPLICANT/CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED AND APPROVED, VEGETATION/LANDSCAPING IS ESTABLISHED AND THE ENTIRE SITE IS STABILIZED.

2. THE BOUNDARIES OF THE CLEARING LIMITS SHOWN ON THIS PLAN SHALL BE CLEARLY MARKED IN THE FIELD PRIOR TO CONSTRUCTION. DURING THE CONSTRUCTION PERIOD, NO DISTURBANCE BEYOND THE CLEARING LIMITS SHALL BE PERMITTED. THE MARKING SHALL BE MAINTAINED BY THE APPLICANT/CONTRACTOR FOR THE DURATION OF CONSTRUCTION.

3. THE TESC FACILITIES SHOWN ON THIS PLAN SHALL BE CONSTRUCTED PRIOR TO AND/OR IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES, AND IN SUCH A MANNER AS TO ENSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DO NOT ENTER THE DRAINAGE SYSTEM OR ROADWAYS, OR VIOLATE APPLICABLE WATER STANDARDS

4. THE TESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, TESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND TO ENSURE THAT SEDIMENT AND SEDIMENT-LADEN WATER DO NOT LEAVE THE SITE.

5. THE CESCL, CPESC, OR ESC LEAD SHALL BE IDENTIFIED IN THE SWPPP AND SHALL BE ONSITE OR ON-CALL AT ALL TIMES.

6. THE CESCL, CPESC, OR ESC LEAD MUST BE KNOWLEDGEABLE IN THE PRINCIPLES AND PRACTICES OF EROSION AND SEDIMENT CONTROL AND HAVE THE SKILLS TO ASSESS:

   a. SITE CONDITIONS AND CONSTRUCTION ACTIVITIES THAT COULD IMPACT THE QUALITY OF STORMWATER.

   b. EFFECTIVENESS OF EROSION AND SEDIMENT CONTROL MEASURES USED TO CONTROL THE QUALITY OF STORMWATER DISCHARGES.

7. THE CESCL, CPESC, OR ESC LEAD MUST EXAMINE STORMWATER VISUALLY FOR THE PRESENCE OF SUSPENDED SEDIMENT, TURBIDITY, DISCOLORATION, AND OIL SHEEN AND EVALUATE THE EFFECTIVENESS OF BMPS TO DETERMINE IF IT IS NECESSARY TO INSTALL, MAINTAIN, OR REPAIR BMPS.

8. THE CESCL, CPESC, OR ESC LEAD MUST INSPECT ALL AREAS DISTURBED BY CONSTRUCTION ACTIVITIES, ALL BMPS, AND ALL STORMWATER DISCHARGE POINTS AT LEAST ONCE EVERY CALENDAR WEEK AND WITHIN 24 HOURS OF ANY DISCHARGE FROM THE SITE. (INDIVIDUAL DISCHARGE EVENTS THAT LAST MORE THAN ONE DAY DO NOT REQUIRE DAILY INSPECTIONS). THE CESCL OR INSPECTOR MAY REDUCE THE INSPECTION FREQUENCY FOR TEMPORARY STABILIZED, INACTIVE SITES TO ONCE EVERY CALENDAR MONTH.

9. CONSTRUCTION SITE OPERATORS MUST CORRECT ANY PROBLEMS IDENTIFIED BY THE CESCL, CPESC, OR ESC LEAD BY:

   a. REVIEWING THE SWPPP FOR COMPLIANCE WITH THE 13 CONSTRUCTION SWPPP ELEMENTS AND MAKING APPROPRIATE REVISIONS WITHIN 7 DAYS OF THE INSPECTION.

   b. FULLY IMPLEMENT AND MAINTAIN APPROPRIATE SOURCE CONTROL AND/OR TREATMENT BMPS AS SOON AS POSSIBLE BUT CORRECTING THE PROBLEM WITHIN 10 DAYS.

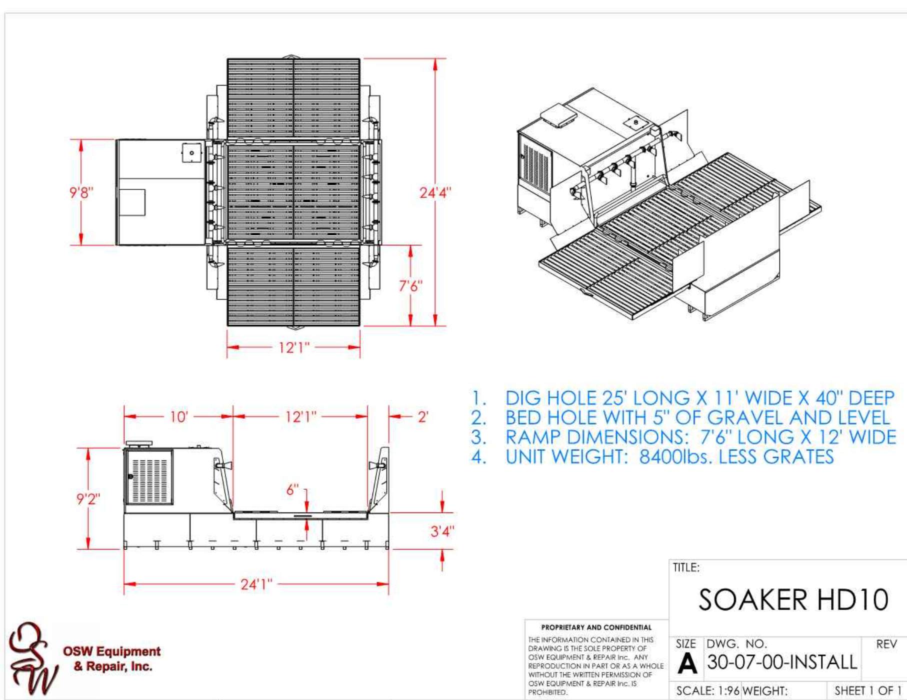
   c. DOCUMENTING BMP IMPLEMENTATION AND MAINTENANCE IN THE SITE LOG BOOK. (REQUIRED FOR SITES LARGER THAN 1 ACRE BUT RECOMMENDED FOR ALL SITES).

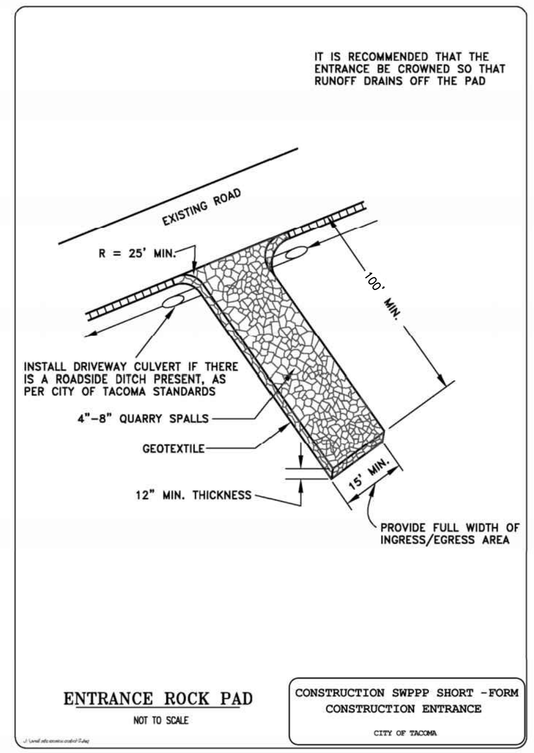
   SAMPLING AND ANALYSIS OF THE STORMWATER DISCHARGES FROM A CONSTRUCTION SITE MAY BE NECESSARY ON A CASE-BY-CASE BASIS TO ENSURE COMPLIANCE WITH STANDARDS. ECOLOGY OR THE CITY WILL ESTABLISH THESE MONITORING AND ASSOCIATED REPORTING REQUIREMENTS.

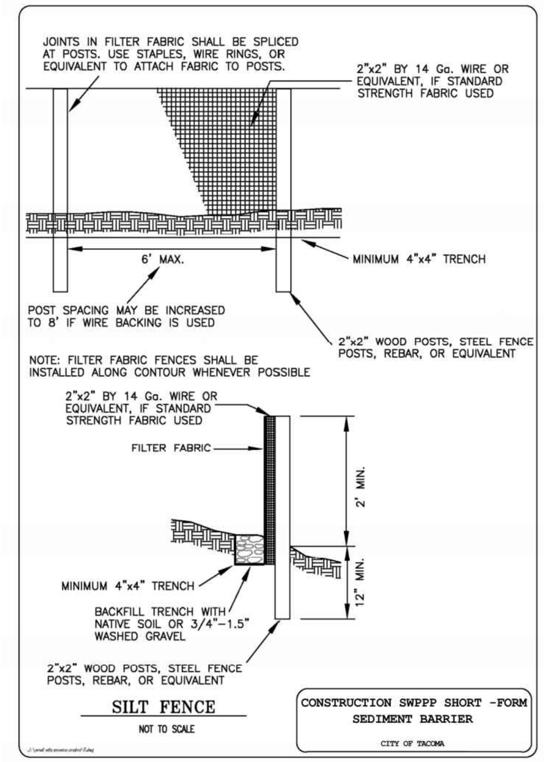
10. AT NO TIME SHALL MORE THAN ONE FOOT OF SEDIMENT BE ALLOWED TO ACCUMULATE WITHIN A CATCH BASIN SEDIMENT TRAP.

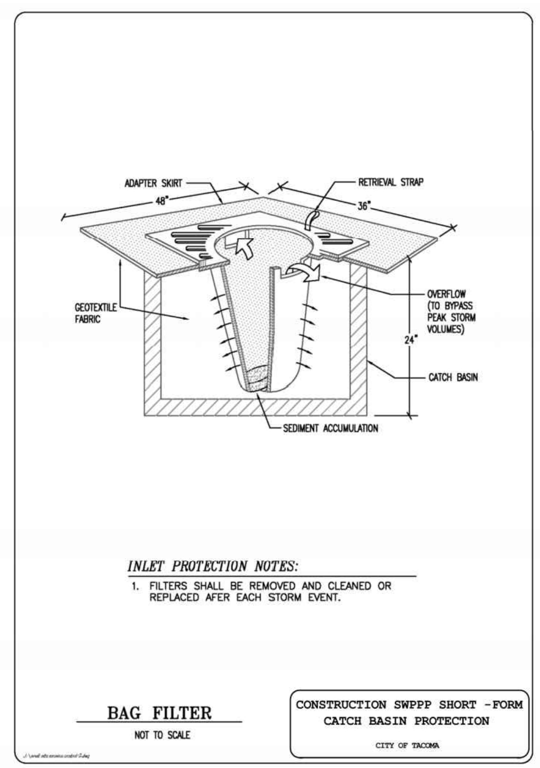
11. ALL CATCH BASINS AND CONVEYANCE LINES SHALL BE CLEANED PRIOR TO PAVING. THE CLEANING OPERATION SHALL NOT FLUSH SEDIMENT-LADEN WATER INTO THE DOWNSTREAM SYSTEM.

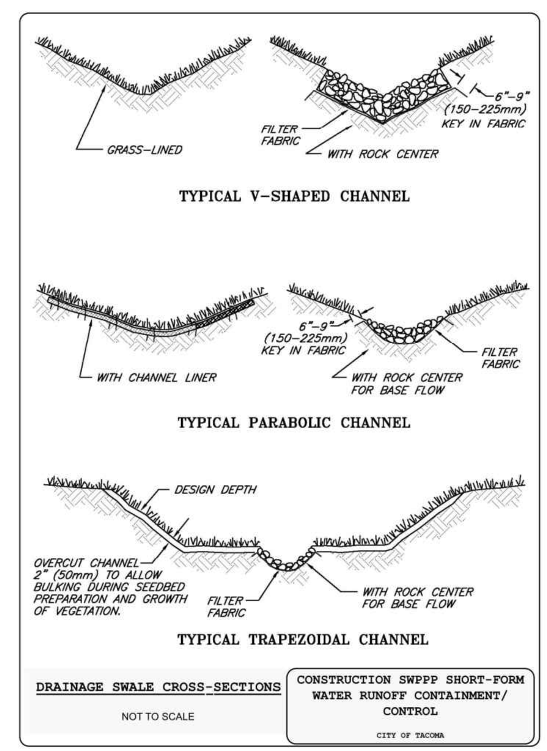
12. STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES MAY BE REQUIRED TO ENSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.







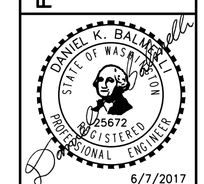




No.	Date	By	Ckd.	Appr.	Revision

Title: EROSION CONTROL NOTES AND DETAILS FOR AVENUE 55/TAYLOR WAY TACOMA PHASE 1

For: AVENUE 55
600 UNIVERSITY STREET, SUITE 2305
SEATTLE, WA 98101



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Designed WED Drawn WED Checked CP Approved DKB Date 1/11/17

18215 72ND AVENUE SOUTH
KENT, WA 98032
(425)251-6222
(425)251-8782 FAX
CIVIL ENGINEERING, LAND PLANNING, SURVEYING, ENVIRONMENTAL SERVICES
BARGHAUSEN CONSULTING ENGINEERS, INC.

Job Number 18293

Sheet E4 of 5

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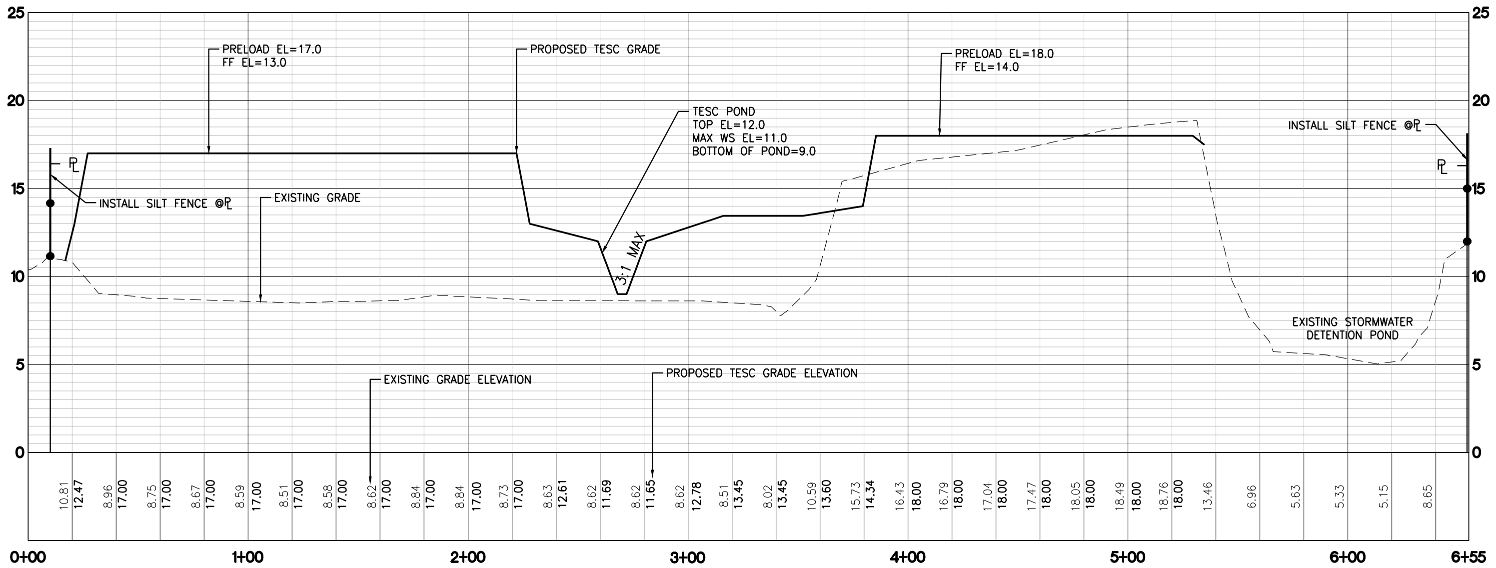
TEMPORARY EROSION AND SEDIMENTATION CONTROL PROFILES

FOR

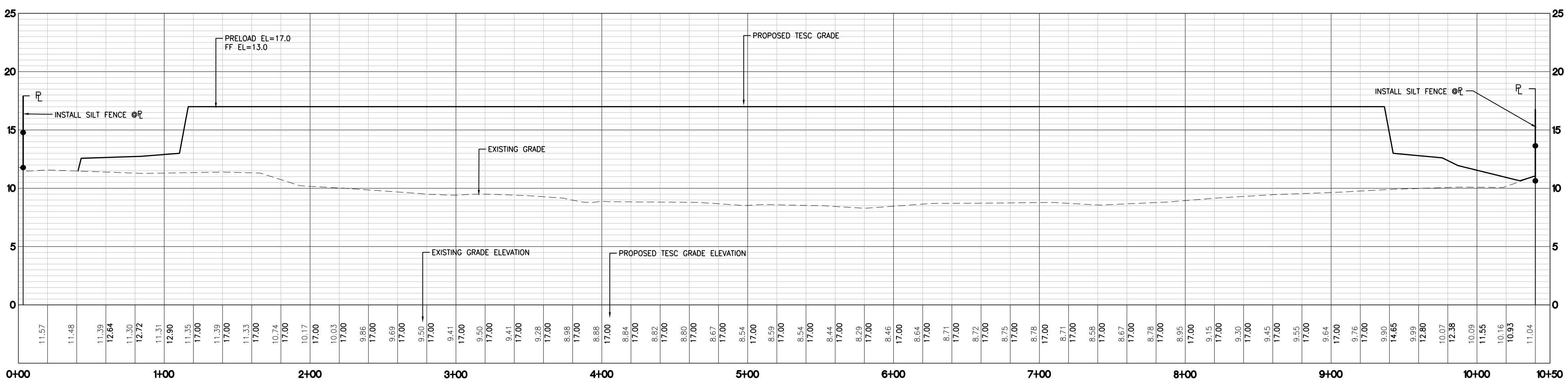
AVENUE 55/TAYLOR WAY PHASE 1

A PORTION OF THE SW 1/4 OF SEC. 26, TOWNSHIP 21N, RANGE 03E
W.M. PIERCE COUNTY, CITY OF TACOMA WASHINGTON



SECTION A

SCALE: H:1"=40' V:1"=5'



SECTION B

SCALE: H:1"=40' V:1"=5'

No.	Date	By	Ckd.	Appr.	Revision

Title: TEMPORARY EROSION AND SEDIMENTATION CONTROL PROFILES FOR AVENUE 55/TAYLOR WAY TACOMA-PHASE 1

For: AVENUE 55
600 UNIVERSITY STREET, SUITE 2305
SEATTLE, WA 98101

DANIEL K. BALMELLI, STATE OF WASHINGTON, 25672, REGISTERED PROFESSIONAL ENGINEER
6/7/2017

Scale: Horizontal 1"=40' Vertical 1"=5'

Designed WED
Drawn WED
Checked CP
Approved DKB
Date 1/11/17

18215 72ND AVENUE SOUTH
KENT, WA 98032
(425)251-6222
(425)251-8782 FAX
CIVIL ENGINEERING, LAND PLANNING, SURVEYING, ENVIRONMENTAL SERVICES
BARGHAUSEN CONSULTING ENGINEERS, INC.

Job Number 18293

Sheet E5 of 5

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B. BMP Detail

Please see following pages for appropriate BMP details.
Below is a list of Alternative BMPs the be used if the BMPs listed in the body of this document are deemed ineffective by the CESCL.

Element #1 - Mark Clearing Limits
BMP C101: Preserving Natural Vegetation
BMP C102: Buffer Zones
BMP C103: High Visibility Fence

Element #2 - Establish Construction Access
BMP C107: Construction Road/Parking Area Stabilization

Element #3 - Control Flow Rates
BMP C203: Water Bars
BMP C209: Outlet Protection
BMP C235: Wattles

Element #4 - Install Sediment Controls
BMP C231: Brush Barrier
BMP C232: Gravel Filter Berm
BMP C234: Vegetated Strip
BMP C235: Wattles
BMP C250: Construction Stormwater Chemical Treatment
BMP C251: Construction Stormwater Filtration
Other Proprietary Sediment Control Technologies

Element #5 - Stabilize Soils
BMP C122: Nets and Blankets
BMP C124: Sodding
BMP C125 Compost
BMP C126: Topsoiling
BMP C127: Polyacrylamide for Soil Erosion Protection
BMP C130: Surface Roughening
BMP C131: Gradient Terraces

Element #6 - Protect Slopes
BMP C121: Mulching
BMP C122: Nets and Blankets
BMP C131: Gradient Terraces
BMP C200: Interceptor Dike and Swale
BMP C201: Grass-Lined Channels
BMP C203: Water Bars
BMP C204: Pipe Slope Drains
BMP C205: Subsurface Drains
BMP C206: Level Spreader
BMP C208: Triangular Silt Dike (Geotextile-Encased Check Dam)

Element #7 - Protect Drain Inlets
BMP C220: Storm Drain Inlet Protection

Element #8 - Stabilize Channels and Outlets
BMP C122: Nets and Blankets
BMP C202: Channel Lining
BMP C209: Outlet Protection

Element #9 - Control Pollutants
BMP C152: Sawcutting and Surface Pollution Prevention
BMP C153: Material Delivery, Storage, Containment
BMP C154: Concrete Washout Area
BMP C250: Construction Stormwater Chemical Treatment
BMP C251: Construction Stormwater Filtration
BMP C252: High pH Neutralization Using Co_2
BMP C253: pH Control for High pH Water
Source Control BMPs As Appropriate

Element #10 - Control Dewatering
BMP C203: Water Bars
BMP C226: Vegetative Filtration

Element #11 - Maintain BMPs
BMP C150: Materials on Hand
BMP C160 Erosion and Sedimentation Control Lead

Element #12 - Manage the Project
BMP C150: Materials on Hand
BMP C160: Erosion and Sediment Control Lead
BMP C162: Scheduling

Element #13: Protect Low Impact Development
BMP C102: Buffer Zone
BMP C103: High Visibility Fence
BMP C200: Interceptor Dike and Swale
BMP C201: Grass-Lined Channels
BMP C207: Check Dams
BMP C208: Triangular Silt Dike (TSD) (Geotextile-Encased Check Dam)
BMP C231: Brush Barrier
BMP C233: Silt Fence
BMP C234: Vegetated Strip

C. Correspondence

Please see following for any pertinent correspondence regarding this project.

Applicable information to be inserted here as needed.

D. Site Inspection Form

Please see following pages for the site inspection form.

Construction Stormwater Site Inspection Form

Project Name ____________________ Permit # _____________ Inspection Date ___________ Time ________

Name of Certified Erosion Sediment Control Lead (CESCL) or qualified inspector if *less than one acre*
Print Name: ____

Approximate rainfall amount since the last inspection (in inches): ______________________________

Approximate rainfall amount in the last 24 hours (in inches): ______________________________

Current Weather Clear ☐ Cloudy ☐ Mist ☐ Rain ☐ Wind ☐ Fog ☐

A. Type of inspection: Weekly ☐ Post Storm Event ☐ Other ☐

B. Phase of Active Construction (*check all that apply*):

Pre Construction/installation of erosion/sediment controls	☐	Clearing/Demo/Grading	☐	Infrastructure/storm/roads	☐
Concrete pours	☐	Vertical Construction/buildings	☐	Utilities	☐
Offsite improvements	☐	Site temporary stabilized	☐	Final stabilization	☐

C. Questions:

1. Were all areas of construction and discharge points inspected? Yes ___ No ___
2. Did you observe the presence of suspended sediment, turbidity, discoloration, or oil sheen Yes ___ No ___
3. Was a water quality sample taken during inspection? (*refer to permit conditions S4 & S5*) Yes ___ No ___
4. Was there a turbid discharge 250 NTU or greater, or Transparency 6 cm or less?* Yes ___ No ___
5. If yes to #4 was it reported to Ecology? Yes ___ No ___
6. Is pH sampling required? pH range required is 6.5 to 8.5. Yes ___ No ___

If answering yes to a discharge, describe the event. Include when, where, and why it happened; what action was taken, and when.

____

____

____

____

*If answering yes to # 4 record NTU/Transparency with continual sampling daily until turbidity is 25 NTU or less/ transparency is 33 cm or greater.

Sampling Results: Date: ______________________

Parameter	Method (circle one)	Result			Other/Note
		NTU	cm	pH	
Turbidity	tube, meter, laboratory				
pH	Paper, kit, meter				

Construction Stormwater Site Inspection Form

D. Check the observed status of all items. Provide "Action Required "details and dates.

Element #	Inspection	BMPs Inspected			BMP needs maintenance	BMP failed	Action required (describe in section F)
		yes	no	n/a			
1 Clearing Limits	Before beginning land disturbing activities are all clearing limits, natural resource areas (streams, wetlands, buffers, trees) protected with barriers or similar BMPs? (high visibility recommended)						
2 Construction Access	Construction access is stabilized with quarry spalls or equivalent BMP to prevent sediment from being tracked onto roads?						
	Sediment tracked onto the road way was cleaned thoroughly at the end of the day or more frequent as necessary.						
3 Control Flow Rates	Are flow control measures installed to control stormwater volumes and velocity during construction and do they protect downstream properties and waterways from erosion?						
	If permanent infiltration ponds are used for flow control during construction, are they protected from siltation?						
4 Sediment Controls	All perimeter sediment controls (e.g. silt fence, wattles, compost socks, berms, etc.) installed, and maintained in accordance with the Stormwater Pollution Prevention Plan (SWPPP).						
	Sediment control BMPs (sediment ponds, traps, filters etc.) have been constructed and functional as the first step of grading.						
	Stormwater runoff from disturbed areas is directed to sediment removal BMP.						
5 Stabilize Soils	Have exposed un-worked soils been stabilized with effective BMP to prevent erosion and sediment deposition?						

Construction Stormwater Site Inspection Form

Element #	Inspection	BMPs Inspected			BMP needs maintenance	BMP failed	Action required (describe in section F)
		yes	no	n/a			
5 Stabilize Soils Cont.	Are stockpiles stabilized from erosion, protected with sediment trapping measures and located away from drain inlet, waterways, and drainage channels?						
	Have soils been stabilized at the end of the shift, before a holiday or weekend if needed based on the weather forecast?						
6 Protect Slopes	Has stormwater and ground water been diverted away from slopes and disturbed areas with interceptor dikes, pipes and or swales?						
	Is off-site storm water managed separately from stormwater generated on the site?						
	Is excavated material placed on uphill side of trenches consistent with safety and space considerations?						
	Have check dams been placed at regular intervals within constructed channels that are cut down a slope?						
7 Drain Inlets	Storm drain inlets made operable during construction are protected.						
	Are existing storm drains within the influence of the project protected?						
8 Stabilize Channel and Outlets	Have all on-site conveyance channels been designed, constructed and stabilized to prevent erosion from expected peak flows?						
	Is stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent stream banks, slopes and downstream conveyance systems?						
9 Control Pollutants	Are waste materials and demolition debris handled and disposed of to prevent contamination of stormwater?						
	Has cover been provided for all chemicals, liquid products, petroleum products, and other material?						
	Has secondary containment been provided capable of containing 110% of the volume?						
	Were contaminated surfaces cleaned immediately after a spill incident?						
	Were BMPs used to prevent contamination of stormwater by a pH modifying sources?						

Construction Stormwater Site Inspection Form

Element #	Inspection	BMPs Inspected			BMP needs maintenance	BMP failed	Action required (describe in section F)
		yes	no	n/a			
9 Cont.	Wheel wash wastewater is handled and disposed of properly.						
10 Control Dewatering	Concrete washout in designated areas. No washout or excess concrete on the ground.						
	Dewatering has been done to an approved source and in compliance with the SWPPP.						
	Were there any clean non turbid dewatering discharges?						
11 Maintain BMP	Are all temporary and permanent erosion and sediment control BMPs maintained to perform as intended?						
12 Manage the Project	Has the project been phased to the maximum degree practicable?						
	Has regular inspection, monitoring and maintenance been performed as required by the permit?						
	Has the SWPPP been updated, implemented and records maintained?						
13 Protect LID	Is all Bioretention and Rain Garden Facilities protected from sedimentation with appropriate BMPs?						
	Is the Bioretention and Rain Garden protected against over compaction of construction equipment and foot traffic to retain its infiltration capabilities?						
	Permeable pavements are clean and free of sediment and sediment laden-water runoff. Muddy construction equipment has not been on the base material or pavement.						
	Have soiled permeable pavements been cleaned of sediments and pass infiltration test as required by stormwater manual methodology?						
	Heavy equipment has been kept off existing soils under LID facilities to retain infiltration rate.						

E. Check all areas that have been inspected. ✔

All in place BMPs ☐ All disturbed soils ☐ All concrete wash out area ☐ All material storage areas ☐
All discharge locations ☐ All equipment storage areas ☐ All construction entrances/exits ☐

F. Elements checked "Action Required" (section D) describe corrective action to be taken. List the element number; be specific on location and work needed. Document, initial, and date when the corrective action has been completed and inspected.

Element #	Description and Location	Action Required	Completion Date	Initials

Attach additional page if needed

Sign the following certification:

"I certify that this report is true, accurate, and complete, to the best of my knowledge and belief"

Inspected by: (print) ____________________ (Signature) __________________________ Date: _______________

Title/Qualification of Inspector: ____

E. Construction Stormwater General Permit (CSWGP)

Please see following attachment for the CS

Issuance Date:	November 18, 2015
Effective Date:	January 1, 2016
Expiration Date:	December 31, 2020

CONSTRUCTION STORMWATER GENERAL PERMIT

National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge General Permit for Stormwater Discharges Associated with Construction Activity

State of Washington
Department of Ecology
Olympia, Washington 98504

In compliance with the provisions of
Chapter 90.48 Revised Code of Washington
(State of Washington Water Pollution Control Act)
and
Title 33 United States Code, Section 1251 et seq.
The Federal Water Pollution Control Act (The Clean Water Act)

Until this permit expires, is modified, or revoked, Permittees that have properly obtained coverage under this general permit are authorized to discharge in accordance with the special and general conditions that follow.

Heather R. Bartlett

Heather R. Bartlett
Water Quality Program Manager
Washington State Department of Ecology

TABLE OF CONTENTS

LIST OF TABLES

SUMMARY OF PERMIT REPORT SUBMITTALS

Refer to the Special and General Conditions within this permit for additional submittal requirements. Appendix A provides a list of definitions. Appendix B provides a list of acronyms.

Table 1: Summary of Required Submittals

Permit Section	Submittal	Frequency	First Submittal Date
S5.A and S8	High Turbidity/Transparency Phone Reporting	As Necessary	Within 24 hours
S5.B	Discharge Monitoring Report	Monthly*	Within 15 days following the end of each month
S5.F and S8	Noncompliance Notification – Telephone Notification	As necessary	Within 24-hours
S5.F	Noncompliance Notification – Written Report	As necessary	Within 5 Days of non-compliance
S9.C	Request for Chemical Treatment Form	As necessary	Written approval from Ecology is required prior to using chemical treatment (with the exception of dry ice or CO_2 to adjust pH)
G2	Notice of Change in Authorization	As necessary	
G6	Permit Application for Substantive Changes to the Discharge	As necessary	
G8	Application for Permit Renewal	1/permit cycle	No later than 180 days before expiration
G9	Notice of Permit Transfer	As necessary	
G20	Notice of Planned Changes	As necessary	
G22	Reporting Anticipated Non-compliance	As necessary	

SPECIAL NOTE: *Permittees must submit electronic Discharge Monitoring Reports (DMRs) to the Washington State Department of Ecology monthly, regardless of site discharge, for the full duration of permit coverage. Refer to Section S5.B of this General Permit for more specific information regarding DMRs.

Table 2: Summary of Required On-site Documentation

Document Title	Permit Conditions
Permit Coverage Letter	See Conditions S2, S5
Construction Stormwater General Permit	See Conditions S2, S5
Site Log Book	See Conditions S4, S5
Stormwater Pollution Prevention Plan (SWPPP)	See Conditions S9, S5

SPECIAL CONDITIONS

S1. PERMIT COVERAGE

A. Permit Area

This Construction Stormwater General Permit (CSWGP) covers all areas of Washington State, except for federal operators and Indian Country as specified in Special Condition S1.E.3.

B. Operators Required to Seek Coverage Under this General Permit:

1. Operators of the following construction activities are required to seek coverage under this CSWGP:

    a. Clearing, grading and/or excavation that results in the disturbance of one or more acres (including off-site disturbance acreage authorized in S1.C.2) and discharges stormwater to surface waters of the State; and clearing, grading and/or excavation on sites smaller than one acre that are part of a larger common plan of development or sale, if the common plan of development or sale will ultimately disturb one acre or more and discharge stormwater to surface waters of the State.

        i. This includes forest practices (including, but not limited to, class IV conversions) that are part of a construction activity that will result in the disturbance of one or more acres, and discharge to surface waters of the State (that is, forest practices that prepare a site for construction activities); and

    b. Any size construction activity discharging stormwater to waters of the State that the Washington State Department of Ecology (Ecology):

        i. Determines to be a significant contributor of pollutants to waters of the State of Washington.

        ii. Reasonably expects to cause a violation of any water quality standard.

2. Operators of the following activities are not required to seek coverage under this CSWGP (unless specifically required under Special Condition S1.B.1.b. above):

    a. Construction activities that discharge all stormwater and non-stormwater to ground water, sanitary sewer, or combined sewer, and have no point source discharge to either surface water or a storm sewer system that drains to surface waters of the State.

    b. Construction activities covered under an Erosivity Waiver (Special Condition S2.C).

    c. Routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility.

C. Authorized Discharges:

1. *Stormwater Associated with Construction Activity*. Subject to compliance with the terms and conditions of this permit, Permittees are authorized to discharge stormwater associated with construction activity to surface waters of the State or to a storm sewer system that drains to surface waters of the State. (Note that "surface waters of the State" may exist on a construction site as well as off site; for example, a creek running through a site.)

2. *Stormwater Associated with Construction Support Activity*. This permit also authorizes stormwater discharge from support activities related to the permitted construction site (for example, an on-site portable rock crusher, off-site equipment staging yards, material storage areas, borrow areas, etc.) provided:

   a. The support activity relates directly to the permitted construction site that is required to have an NPDES permit; and

   b. The support activity is not a commercial operation serving multiple unrelated construction projects, and does not operate beyond the completion of the construction activity; and

   c. Appropriate controls and measures are identified in the Stormwater Pollution Prevention Plan (SWPPP) for the discharges from the support activity areas.

3. *Non-Stormwater Discharges*. The categories and sources of non-stormwater discharges identified below are authorized conditionally, provided the discharge is consistent with the terms and conditions of this permit:

   a. Discharges from fire-fighting activities.

   b. Fire hydrant system flushing.

   c. Potable water, including uncontaminated water line flushing.

   d. Hydrostatic test water.

   e. Uncontaminated air conditioning or compressor condensate.

   f. Uncontaminated ground water or spring water.

   g. Uncontaminated excavation dewatering water (in accordance with S9.D.10).

   h. Uncontaminated discharges from foundation or footing drains.

   i. Uncontaminated water used to control dust. Permittees must minimize the amount of dust control water used.

   j. Routine external building wash down that does not use detergents.

   k. Landscape irrigation water.

The SWPPP must adequately address all authorized non-stormwater discharges, except for discharges from fire-fighting activities, and must comply with Special Condition S3.

At a minimum, discharges from potable water (including water line flushing), fire hydrant system flushing, and pipeline hydrostatic test water must undergo the following: dechlorination to a concentration of 0.1 parts per million (ppm) or less, and pH adjustment to within 6.5 – 8.5 standard units (su), if necessary.

D. Prohibited Discharges:

The following discharges to waters of the State, including ground water, are prohibited.

1. Concrete wastewater.
2. Wastewater from washout and clean-up of stucco, paint, form release oils, curing compounds and other construction materials.
3. Process wastewater as defined by 40 Code of Federal Regulations (CFR) 122.2 (see Appendix A of this permit).
4. Slurry materials and waste from shaft drilling, including process wastewater from shaft drilling for construction of building, road, and bridge foundations unless managed according to Special Condition S9.D.9.j.
5. Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance.
6. Soaps or solvents used in vehicle and equipment washing.
7. Wheel wash wastewater, unless managed according to Special Condition S9.D.9.
8. Discharges from dewatering activities, including discharges from dewatering of trenches and excavations, unless managed according to Special Condition S9.D.10.

E. Limits on Coverage

Ecology may require any discharger to apply for and obtain coverage under an individual permit or another more specific general permit. Such alternative coverage will be required when Ecology determines that this CSWGP does not provide adequate assurance that water quality will be protected, or there is a reasonable potential for the project to cause or contribute to a violation of water quality standards.

The following stormwater discharges are not covered by this permit:

1. Post-construction stormwater discharges that originate from the site after completion of construction activities and the site has undergone final stabilization.
2. Non-point source silvicultural activities such as nursery operations, site preparation, reforestation and subsequent cultural treatment, thinning, prescribed burning, pest and fire control, harvesting operations, surface drainage, or road construction and maintenance, from which there is natural runoff as excluded in 40 CFR Subpart 122.
3. Stormwater from any federal operator.

4. Stormwater from facilities located on "Indian Country" as defined in 18 U.S.C.§1151, except portions of the Puyallup Reservation as noted below.

   Indian Country includes:

   a. All land within any Indian Reservation notwithstanding the issuance of any patent, and, including rights-of-way running through the reservation. This includes all federal, tribal, and Indian and non-Indian privately owned land within the reservation.

   b. All off-reservation Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running through the same.

   c. All off-reservation federal trust lands held for Native American Tribes.

      Puyallup Exception: Following the *Puyallup Tribes of Indians Land Settlement Act of 1989*, 25 U.S.C. §1773; the permit does apply to land within the Puyallup Reservation except for discharges to surface water on land held in trust by the federal government.

5. Stormwater from any site covered under an existing NPDES individual permit in which stormwater management and/or treatment requirements are included for all stormwater discharges associated with construction activity.

6. Stormwater from a site where an applicable Total Maximum Daily Load (TMDL) requirement specifically precludes or prohibits discharges from construction activity.

S2. APPLICATION REQUIREMENTS

A. Permit Application Forms

1. Notice of Intent Form/Timeline

   a. Operators of new or previously unpermitted construction activities must submit a complete and accurate permit application (Notice of Intent, or NOI) to Ecology.

   b. Operators must apply using the electronic application form (NOI) available on Ecology's website http://www.ecy.wa.gov/programs/wq/stormwater/construction/index.html. Permittees unable to submit electronically (for example, those who do not have an internet connection) must contact Ecology to request a waiver and obtain instructions on how to obtain a paper NOI.

      Department of Ecology
      Water Quality Program - Construction Stormwater
      PO Box 47696
      Olympia, Washington 98504-7696

c. The operator must submit the NOI at least 60 days before discharging stormwater from construction activities and must submit it on or before the date of the first public notice (see Special Condition S2.B below for details). The 30-day public comment period begins on the publication date of the second public notice. Unless Ecology responds to the complete application in writing, based on public comments, or any other relevant factors, coverage under the general permit will automatically commence on the thirty-first day following receipt by Ecology of a completed NOI, or the issuance date of this permit, whichever is later; unless Ecology specifies a later date in writing as required by WAC173-226-200(2).

d. If an applicant intends to use a Best Management Practice (BMP) selected on the basis of Special Condition S9.C.4 ("demonstrably equivalent" BMPs), the applicant must notify Ecology of its selection as part of the NOI. In the event the applicant selects BMPs after submission of the NOI, it must provide notice of the selection of an equivalent BMP to Ecology at least 60 days before intended use of the equivalent BMP.

e. Permittees must notify Ecology regarding any changes to the information provided on the NOI by submitting an updated NOI. Examples of such changes include, but are not limited to:

   i. Changes to the Permittee's mailing address,

   ii. Changes to the on-site contact person information, ***and***

   iii. Changes to the area/acreage affected by construction activity.

f. Applicants must notify Ecology if they are aware of contaminated soils and/or groundwater associated with the construction activity. Provide detailed information with the NOI (as known and readily available) on the nature and extent of the contamination (concentrations, locations, and depth), as well as pollution prevention and/or treatment BMPs proposed to control the discharge of soil and/or groundwater contaminants in stormwater. Examples of such detail may include, but are not limited to:

   i. List or table of all known contaminants with laboratory test results showing concentration and depth,

   ii. Map with sample locations,

   iii. Temporary Erosion and Sediment Control (TESC) plans,

   iv. Related portions of the Stormwater Pollution Prevention Plan (SWPPP) that address the management of contaminated and potentially contaminated construction stormwater and dewatering water,

   v. Dewatering plan and/or dewatering contingency plan.

2. Transfer of Coverage Form

   The Permittee can transfer current coverage under this permit to one or more new operators, including operators of sites within a Common Plan of Development, provided the Permittee submits a Transfer of Coverage Form in accordance with General Condition G9. Transfers do not require public notice.

B. Public Notice

For new or previously unpermitted construction activities, the applicant must publish a public notice at least one time each week for two consecutive weeks, at least 7 days apart, in a newspaper with general circulation in the county where the construction is to take place. The notice must contain:

1. A statement that "The applicant is seeking coverage under the Washington State Department of Ecology's Construction Stormwater NPDES and State Waste Discharge General Permit".
2. The name, address and location of the construction site.
3. The name and address of the applicant.
4. The type of construction activity that will result in a discharge (for example, residential construction, commercial construction, etc.), and the number of acres to be disturbed.
5. The name of the receiving water(s) (that is, the surface water(s) to which the site will discharge), or, if the discharge is through a storm sewer system, the name of the operator of the system.
6. The statement: "Any persons desiring to present their views to the Washington State Department of Ecology regarding this application, or interested in Ecology's action on this application, may notify Ecology in writing no later than 30 days of the last date of publication of this notice. Ecology reviews public comments and considers whether discharges from this project would cause a measurable change in receiving water quality, and, if so, whether the project is necessary and in the overriding public interest according to Tier II antidegradation requirements under WAC 173-201A-320. Comments can be submitted to: Department of Ecology, PO Box 47696, Olympia, Washington 98504-7696 Attn: Water Quality Program, Construction Stormwater."

C. Erosivity Waiver

Construction site operators may qualify for an erosivity waiver from the CSWGP if the following conditions are met:

1. The site will result in the disturbance of fewer than 5 acres and the site is not a portion of a common plan of development or sale that will disturb 5 acres or greater.

2. Calculation of Erosivity "R" Factor and Regional Timeframe:

   a. The project's rainfall erosivity factor ("R" Factor) must be less than 5 during the period of construction activity, as calculated (see the CSWGP homepage http://www.ecy.wa.gov/programs/wq/stormwater/construction/index.html for a link to the EPA's calculator and step by step instructions on computing the "R" Factor in the EPA Erosivity Waiver Fact Sheet). The period of construction activity starts when the land is first disturbed and ends with final stabilization. In addition:

   b. The entire period of construction activity must fall within the following timeframes:

      i. For sites west of the Cascades Crest: June 15 – September 15.

      ii. For sites east of the Cascades Crest, excluding the Central Basin: June 15 – October 15.

      iii. For sites east of the Cascades Crest, within the Central Basin: no additional timeframe restrictions apply. The Central Basin is defined as the portions of Eastern Washington with mean annual precipitation of less than 12 inches. For a map of the Central Basin (Average Annual Precipitation Region 2), refer to http://www.ecy.wa.gov/programs/wq/stormwater/construction/resourcesguidance.html.

3. Construction site operators must submit a complete Erosivity Waiver certification form at least one week before disturbing the land. Certification must include statements that the operator will:

   a. Comply with applicable local stormwater requirements; ***and***

   b. Implement appropriate erosion and sediment control BMPs to prevent violations of water quality standards.

4. This waiver is not available for facilities declared significant contributors of pollutants as defined in Special Condition S1.B.1.b. or for any size construction activity that could reasonably expect to cause a violation of any water quality standard as defined in Special Condition S1.B.1.b.ii.

5. This waiver does not apply to construction activities which include non-stormwater discharges listed in Special Condition S1.C.3.

6. If construction activity extends beyond the certified waiver period for any reason, the operator must either:

   a. Recalculate the rainfall erosivity “R” factor using the original start date and a new projected ending date and, if the “R” factor is still under 5 *and* the entire project falls within the applicable regional timeframe in Special Condition S2.C.2.b, complete and submit an amended waiver certification form before the original waiver expires; ***or***

   b. Submit a complete permit application to Ecology in accordance with Special Condition S2.A and B before the end of the certified waiver period.

S3. COMPLIANCE WITH STANDARDS

A. Discharges must not cause or contribute to a violation of surface water quality standards (Chapter 173-201A WAC), ground water quality standards (Chapter 173-200 WAC), sediment management standards (Chapter 173-204 WAC), and human health-based criteria in the National Toxics Rule (40 CFR Part 131.36). Discharges not in compliance with these standards are not authorized.

B. Prior to the discharge of stormwater and non-stormwater to waters of the State, the Permittee must apply all known, available, and reasonable methods of prevention, control, and treatment (AKART). This includes the preparation and implementation of an adequate SWPPP, with all appropriate BMPs installed and maintained in accordance with the SWPPP and the terms and conditions of this permit.

C. Ecology presumes that a Permittee complies with water quality standards unless discharge monitoring data or other site-specific information demonstrates that a discharge causes or contributes to a violation of water quality standards, when the Permittee complies with the following conditions. The Permittee must fully:

   1. Comply with all permit conditions, including planning, sampling, monitoring, reporting, and recordkeeping conditions.

   2. Implement stormwater BMPs contained in stormwater management manuals published or approved by Ecology, or BMPs that are demonstrably equivalent to BMPs contained in stormwater technical manuals published or approved by Ecology, including the proper selection, implementation, and maintenance of all applicable and appropriate BMPs for on-site pollution control. (For purposes of this section, the stormwater manuals listed in Appendix 10 of the Phase I Municipal Stormwater Permit are approved by Ecology.)

D. Where construction sites also discharge to ground water, the ground water discharges must also meet the terms and conditions of this CSWGP. Permittees who discharge to ground water through an injection well must also comply with any applicable requirements of the Underground Injection Control (UIC) regulations, Chapter 173-218 WAC.

S4. MONITORING REQUIREMENTS, BENCHMARKS, AND REPORTING TRIGGERS

A. Site Log Book

The Permittee must maintain a site log book that contains a record of the implementation of the SWPPP and other permit requirements, including the installation and maintenance of BMPs, site inspections, and stormwater monitoring.

B. Site Inspections

The Permittee's site inspections must include all areas disturbed by construction activities, all BMPs, and all stormwater discharge points under the Permittee's operational control. (See Special Conditions S4.B.3 and B.4 below for detailed requirements of the Permittee's Certified Erosion and Sediment Control Lead [CESCL].)

Construction sites one acre or larger that discharge stormwater to surface waters of the State must have site inspections conducted by a certified CESCL. Sites less than one acre may have a person without CESCL certification conduct inspections.

1. The Permittee must examine stormwater visually for the presence of suspended sediment, turbidity, discoloration, and oil sheen. The Permittee must evaluate the effectiveness of BMPs and determine if it is necessary to install, maintain, or repair BMPs to improve the quality of stormwater discharges.

   Based on the results of the inspection, the Permittee must correct the problems identified by:

   a. Reviewing the SWPPP for compliance with Special Condition S9 and making appropriate revisions within 7 days of the inspection.

   b. Immediately beginning the process of fully implementing and maintaining appropriate source control and/or treatment BMPs as soon as possible, addressing the problems no later than within 10 days of the inspection. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when an extension is requested by a Permittee within the initial 10-day response period.

   c. Documenting BMP implementation and maintenance in the site log book.

2. The Permittee must inspect all areas disturbed by construction activities, all BMPs, and all stormwater discharge points at least once every calendar week and within 24 hours of any discharge from the site. (For purposes of this condition, individual discharge events that last more than one day do not require daily inspections. For example, if a stormwater pond discharges continuously over the course of a week, only one inspection is required that week.) The Permittee may reduce the inspection frequency for temporarily stabilized, inactive sites to once every calendar month.

3. The Permittee must have staff knowledgeable in the principles and practices of erosion and sediment control. The CESCL (sites one acre or more) or inspector (sites less than one acre) must have the skills to assess the:

   a. Site conditions and construction activities that could impact the quality of stormwater, ***and***

   b. Effectiveness of erosion and sediment control measures used to control the quality of stormwater discharges.

4. The SWPPP must identify the CESCL or inspector, who must be present on site or on-call at all times. The CESCL must obtain this certification through an approved erosion and sediment control training program that meets the minimum training standards established by Ecology (see BMP C160 in the manual referred to in Special Condition S9.C.1 and 2).

5. The Permittee must summarize the results of each inspection in an inspection report or checklist and enter the report/checklist into, or attach it to, the site log book. At a minimum, each inspection report or checklist must include:

   a. Inspection date and time.

   b. Weather information, the general conditions during inspection and the approximate amount of precipitation since the last inspection, and precipitation within the last 24 hours.

   c. A summary or list of all implemented BMPs, including observations of all erosion/sediment control structures or practices.

   d. A description of the locations:

      i. Of BMPs inspected;

      ii. Of BMPs that need maintenance and why;

      iii. Of BMPs that failed to operate as designed or intended; ***and***

      iv. Where additional or different BMPs are needed, and why.

   e. A description of stormwater discharged from the site. The Permittee must note the presence of suspended sediment, turbidity, discoloration, and oil sheen, as applicable.

   f. Any water quality monitoring performed during inspection.

   g. General comments and notes, including a brief description of any BMP repairs, maintenance or installations made following the inspection.

   h. A summary report and a schedule of implementation of the remedial actions that the Permittee plans to take if the site inspection indicates that the site is out of compliance. The remedial actions taken must meet the requirements of the SWPPP and the permit.

i. The name, title, and signature of the person conducting the site inspection, a phone number or other reliable method to reach this person, and the following statement: "I certify that this report is true, accurate, and complete to the best of my knowledge and belief."

Table 3: Summary of Primary Monitoring Requirements

Size of Soil Disturbance[1]	Weekly Site Inspections	Weekly Sampling w/ Turbidity Meter	Weekly Sampling w/ Transparency Tube	Weekly pH Sampling[2]	CESCL Required for Inspections?
Sites that disturb less than 1 acre, but are part of a larger Common Plan of Development	Required	Not Required	Not Required	Not Required	No
Sites that disturb 1 acre or more, but fewer than 5 acres	Required	Sampling Required – either method[3]		Required	Yes
Sites that disturb 5 acres or more	Required	Required	Not Required[4]	Required	Yes

[1] Soil disturbance is calculated by adding together all areas that will be affected by construction activity. Construction activity means clearing, grading, excavation, and any other activity that disturbs the surface of the land, including ingress/egress from the site.

[2] If construction activity results in the disturbance of 1 acre or more, and involves significant concrete work (1,000 cubic yards of poured over the life of a project) or the use of recycled concrete or engineered soils (soil amendments including but not limited to Portland cement-treated base [CTB], cement kiln dust [CKD], or fly ash), and stormwater from the affected area drains to surface waters of the State or to a storm sewer stormwater collection system that drains to other surface waters of the State, the Permittee must conduct pH sampling in accordance with Special Condition S4.D.

[3] Sites with one or more acres, but fewer than 5 acres of soil disturbance, must conduct turbidity or transparency sampling in accordance with Special Condition S4.C.

[4] Sites equal to or greater than 5 acres of soil disturbance must conduct turbidity sampling using a turbidity meter in accordance with Special Condition S4.C.

C. Turbidity/Transparency Sampling Requirements

1. Sampling Methods

   a. If construction activity involves the disturbance of 5 acres or more, the Permittee must conduct turbidity sampling per Special Condition S4.C.

   b. If construction activity involves 1 acre or more but fewer than 5 acres of soil disturbance, the Permittee must conduct either transparency sampling **or** turbidity sampling per Special Condition S4.C.

2. Sampling Frequency

   a. The Permittee must sample all discharge points at least once every calendar week when stormwater (or authorized non-stormwater) discharges from the site or enters any on-site surface waters of the state (for example, a creek running through a site); sampling is not required on sites that disturb less than an acre.

   b. Samples must be representative of the flow and characteristics of the discharge.

   c. Sampling is not required when there is no discharge during a calendar week.

   d. Sampling is not required outside of normal working hours or during unsafe conditions.

   e. If the Permittee is unable to sample during a monitoring period, the Permittee must include a brief explanation in the monthly Discharge Monitoring Report (DMR).

   f. Sampling is not required before construction activity begins.

   g. The Permittee may reduce the sampling frequency for temporarily stabilized, inactive sites to once every calendar month.

3. Sampling Locations

   a. Sampling is required at all points where stormwater associated with construction activity (or authorized non-stormwater) is discharged off site, including where it enters any on-site surface waters of the state (for example, a creek running through a site).

   b. The Permittee may discontinue sampling at discharge points that drain areas of the project that are fully stabilized to prevent erosion.

   c. The Permittee must identify all sampling point(s) on the SWPPP site map and clearly mark these points in the field with a flag, tape, stake or other visible marker.

   d. Sampling is not required for discharge that is sent directly to sanitary or combined sewer systems.

e. The Permittee may discontinue sampling at discharge points in areas of the project where the Permittee no longer has operational control of the construction activity.

4. Sampling and Analysis Methods

a. The Permittee performs turbidity analysis with a calibrated turbidity meter (turbidimeter) either on site or at an accredited lab. The Permittee must record the results in the site log book in nephelometric turbidity units (NTUs).

b. The Permittee performs transparency analysis on site with a 1¾-inch-diameter, 60-centimeter (cm)-long transparency tube. The Permittee will record the results in the site log book in centimeters (cm).

Table 4: Monitoring and Reporting Requirements

Parameter	Unit	Analytical Method	Sampling Frequency	Benchmark Value	Phone Reporting Trigger Value
Turbidity	NTU	SM2130	Weekly, if discharging	25 NTUs	250 NTUs
Transparency	cm	Manufacturer instructions, or Ecology guidance	Weekly, if discharging	33 cm	6 cm

5. Turbidity/Transparency Benchmark Values and Reporting Triggers

The benchmark value for turbidity is 25 NTUs or less. The benchmark value for transparency is 33 centimeters (cm). Note: Benchmark values do not apply to discharges to segments of water bodies on Washington State's 303(d) list (Category 5) for turbidity, fine sediment, or phosphorus; these discharges are subject to a numeric effluent limit for turbidity. Refer to Special Condition S8 for more information.

a. Turbidity 26 – 249 NTUs, or Transparency 32 – 7 cm:

If the discharge turbidity is 26 to 249 NTUs; or if discharge transparency is less than 33 cm, but equal to or greater than 6 cm, the Permittee must:

i. Review the SWPPP for compliance with Special Condition S9 and make appropriate revisions within 7 days of the date the discharge exceeded the benchmark.

ii. Immediately begin the process to fully implement and maintain appropriate source control and/or treatment BMPs as soon as possible, addressing the problems within 10 days of the date the discharge exceeded the benchmark. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when the Permittee requests an extension within the initial 10-day response period.

iii. Document BMP implementation and maintenance in the site log book.

b. Turbidity 250 NTUs or greater, or Transparency 6 cm or less:

If a discharge point's turbidity is 250 NTUs or greater, or if discharge transparency is less than or equal to 6 cm, the Permittee must complete the reporting and adaptive management process described below.

i. Telephone or submit an electronic report to the applicable Ecology Region's Environmental Report Tracking System (ERTS) number (or through Ecology's Water Quality Permitting Portal [WQWebPortal] – Permit Submittals when the form is available) within 24 hours, in accordance with Special Condition S5.A.

- Central Region (Okanogan, Chelan, Douglas, Kittitas, Yakima, Klickitat, Benton): (509) 575-2490
- Eastern Region (Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman): (509) 329-3400
- Northwest Region (Kitsap, Snohomish, Island, King, San Juan, Skagit, Whatcom): (425) 649-7000
- Southwest Region (Grays Harbor, Lewis, Mason, Thurston, Pierce, Clark, Cowlitz, Skamania, Wahkiakum, Clallam, Jefferson, Pacific): (360) 407-6300

Links to these numbers and the ERTS reporting page are located on the following web site: http://www.ecy.wa.gov/programs/wq/stormwater/construction/index.html.

ii. Review the SWPPP for compliance with Special Condition S9 and make appropriate revisions within 7 days of the date the discharge exceeded the benchmark.

iii. Immediately begin the process to fully implement and maintain appropriate source control and/or treatment BMPs as soon as possible, addressing the problems within 10 days of the date the discharge exceeded the benchmark. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when the Permittee requests an extension within the initial 10-day response period.

iv. Document BMP implementation and maintenance in the site log book.

v. Sample discharges daily until:

a) Turbidity is 25 NTUs (or lower); ***or***

b) Transparency is 33 cm (or greater); ***or***

c) The Permittee has demonstrated compliance with the water quality limit for turbidity:

1) No more than 5 NTUs over background turbidity, if background is less than 50 NTUs, ***or***

2) No more than 10% over background turbidity, if background is 50 NTUs or greater; ***or***

d) The discharge stops or is eliminated.

D. pH Sampling Requirements – Significant Concrete Work or Engineered Soils

If construction activity results in the disturbance of 1 acre or more, ***and*** involves significant concrete work (significant concrete work means greater than 1000 cubic yards poured concrete used over the life of a project) or the use of recycled concrete or engineered soils (soil amendments including but not limited to Portland cement-treated base [CTB], cement kiln dust [CKD], or fly ash), and stormwater from the affected area drains to surface waters of the State or to a storm sewer system that drains to surface waters of the State, the Permittee must conduct pH sampling as set forth below. Note: In addition, discharges to segments of water bodies on Washington State's 303(d) list (Category 5) for high pH are subject to a numeric effluent limit for pH; refer to Special Condition S8.

1. For sites with significant concrete work, the Permittee must begin the pH sampling period when the concrete is first poured and exposed to precipitation, and continue weekly throughout and after the concrete pour and curing period, until stormwater pH is in the range of 6.5 to 8.5 (su).

2. For sites with recycled concrete, the Permittee must begin the weekly pH sampling period when the recycled concrete is first exposed to precipitation and must continue until the recycled concrete is fully stabilized and stormwater pH is in the range of 6.5 to 8.5 (su).

3. For sites with engineered soils, the Permittee must begin the pH sampling period when the soil amendments are first exposed to precipitation and must continue until the area of engineered soils is fully stabilized.

4. During the applicable pH monitoring period defined above, the Permittee must obtain a representative sample of stormwater and conduct pH analysis at least once per week.

5. The Permittee must sample pH in the sediment trap/pond(s) or other locations that receive stormwater runoff from the area of significant concrete work or engineered soils before the stormwater discharges to surface waters.

6. The benchmark value for pH is 8.5 standard units. Anytime sampling indicates that pH is 8.5 or greater, the Permittee must either:

a. Prevent the high pH water (8.5 or above) from entering storm sewer systems or surface waters; ***or***

b. If necessary, adjust or neutralize the high pH water until it is in the range of pH 6.5 to 8.5 (su) using an appropriate treatment BMP such as carbon dioxide (CO_2) sparging or dry ice. The Permittee must obtain written approval from Ecology before using any form of chemical treatment other than CO_2 sparging or dry ice.

7. The Permittee must perform pH analysis on site with a calibrated pH meter, pH test kit, or wide range pH indicator paper. The Permittee must record pH sampling results in the site log book.

S5. REPORTING AND RECORDKEEPING REQUIREMENTS

A. High Turbidity Reporting

Anytime sampling performed in accordance with Special Condition S4.C indicates turbidity has reached the 250 NTUs or more (or transparency less than or equal to 6 cm) high turbidity reporting level, the Permittee must either call the applicable Ecology Region's Environmental Report Tracking System (ERTS) number by phone within 24 hours of analysis or submit an electronic ERTS report (or submit an electronic report through Ecology's Water Quality Permitting Portal (WQWebPortal) – Permit Submittals when the form is available). See the CSWGP web site for links to ERTS and the WQWebPortal: http://www.ecy.wa.gov/programs/wq/stormwater/construction/index.html. Also, see phone numbers in Special Condition S4.C.5.b.i.

B. Discharge Monitoring Reports (DMRs)

Permittees required to conduct water quality sampling in accordance with Special Conditions S4.C (Turbidity/Transparency), S4.D (pH), S8 (303[d]/TMDL sampling), and/or G13 (Additional Sampling) must submit the results to Ecology.

Permittees must submit monitoring data using Ecology's WQWebDMR web application accessed through Ecology's Water Quality Permitting Portal. To find out more information and to sign up for WQWebDMR go to: http://www.ecy.wa.gov/programs/wq/permits/paris/portal.html.

Permittees unable to submit electronically (for example, those who do not have an internet connection) must contact Ecology to request a waiver and obtain instructions on how to obtain a paper copy DMR at:

Department of Ecology
Water Quality Program - Construction Stormwater
PO Box 47696
Olympia, Washington 98504-7696

Permittees who obtain a waiver not to use WQWebDMR must use the forms provided to them by Ecology; submittals must be mailed to the address above. Permittees shall submit DMR forms to be received by Ecology within 15 days following the end of each month.

If there was no discharge during a given monitoring period, all Permittees must submit a DMR as required with “no discharge" entered in place of the monitoring results. DMRs are required for the full duration of permit coverage (from issuance date to termination). For more information, contact Ecology staff using information provided at the following web site: www.ecy.wa.gov/programs/wq/permits/paris/contacts.html.

C. Records Retention

The Permittee must retain records of all monitoring information (site log book, sampling results, inspection reports/checklists, etc.), Stormwater Pollution Prevention Plan, copy of the permit coverage letter (including Transfer of Coverage documentation), and any other documentation of compliance with permit requirements for the entire life of the construction project and for a minimum of three years following the termination of permit coverage. Such information must include all calibration and maintenance records, and records of all data used to complete the application for this permit. This period of retention must be extended during the course of any unresolved litigation regarding the discharge of pollutants by the Permittee or when requested by Ecology.

D. Recording Results

For each measurement or sample taken, the Permittee must record the following information:

1. Date, place, method, and time of sampling or measurement.
2. The first and last name of the individual who performed the sampling or measurement.
3. The date(s) the analyses were performed.
4. The first and last name of the individual who performed the analyses.
5. The analytical techniques or methods used.
6. The results of all analyses.

E. Additional Monitoring by the Permittee

If the Permittee monitors any pollutant more frequently than required by this permit using test procedures specified by Special Condition S4 of this permit, the results of this monitoring must be included in the calculation and reporting of the data submitted in the Permittee’s DMR.

F. Noncompliance Notification

In the event the Permittee is unable to comply with any part of the terms and conditions of this permit, and the resulting noncompliance may cause a threat to human health or the environment (such as but not limited to spills of fuels or other materials, catastrophic pond or slope failure, and discharges that violate water quality standards), or exceed numeric effluent limitations (see S8. Discharges to 303(d) or TMDL Waterbodies), the Permittee must, upon becoming aware of the circumstance:

1. Notify Ecology within 24-hours of the failure to comply by calling the applicable Regional office ERTS phone number (refer to Special Condition S4.C.5.b.i. or www.ecy.wa.gov/programs/wq/stormwater/construction/turbidity.html for Regional ERTS phone numbers).

2. Immediately take action to prevent the discharge/pollution, or otherwise stop or correct the noncompliance, and, if applicable, repeat sampling and analysis of any noncompliance immediately and submit the results to Ecology within five (5) days of becoming aware of the violation.

3. Submit a detailed written report to Ecology within five (5) days, of the time the Permittee becomes aware of the circumstances, unless requested earlier by Ecology. The report must be submitted using Ecology's Water Quality Permitting Portal (WQWebPortal) - Permit Submittals, unless a waiver from electronic reporting has been granted according to S5.B. The report must contain a description of the noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

   The Permittee must report any unanticipated bypass and/or upset that exceeds any effluent limit in the permit in accordance with the 24-hour reporting requirement contained in 40 C.F.R. 122.41(l)(6).

   Compliance with these requirements does not relieve the Permittee from responsibility to maintain continuous compliance with the terms and conditions of this permit or the resulting liability for failure to comply. Upon request of the Permittee, Ecology may waive the requirement for a written report on a case-by-case basis, if the immediate notification is received by Ecology within 24 hours.

G. Access to Plans and Records

1. The Permittee must retain the following permit documentation (plans and records) on site, or within reasonable access to the site, for use by the operator or for on-site review by Ecology or the local jurisdiction:

   a. General Permit

   b. Permit Coverage Letter

   c. Stormwater Pollution Prevention Plan (SWPPP)

   d. Site Log Book

2. The Permittee must address written requests for plans and records listed above (Special Condition S5.G.1) as follows:

a. The Permittee must provide a copy of plans and records to Ecology within 14 days of receipt of a written request from Ecology.

b. The Permittee must provide a copy of plans and records to the public when requested in writing. Upon receiving a written request from the public for the Permittee's plans and records, the Permittee must either:

   i. Provide a copy of the plans and records to the requester within 14 days of a receipt of the written request; ***or***

   ii. Notify the requester within 10 days of receipt of the written request of the location and times within normal business hours when the plans and records may be viewed; and provide access to the plans and records within 14 days of receipt of the written request; ***or***

   iii. Within 14 days of receipt of the written request, the Permittee may submit a copy of the plans and records to Ecology for viewing and/or copying by the requester at an Ecology office, or a mutually agreed location. If plans and records are viewed and/or copied at a location other than at an Ecology office, the Permittee will provide reasonable access to copying services for which a reasonable fee may be charged. The Permittee must notify the requester within 10 days of receipt of the request where the plans and records may be viewed and/or copied.

S6. PERMIT FEES

The Permittee must pay permit fees assessed by Ecology. Fees for stormwater discharges covered under this permit are established by Chapter 173-224 WAC. Ecology continues to assess permit fees until the permit is terminated in accordance with Special Condition S10 or revoked in accordance with General Condition G5.

S7. SOLID AND LIQUID WASTE DISPOSAL

The Permittee must handle and dispose of solid and liquid wastes generated by construction activity, such as demolition debris, construction materials, contaminated materials, and waste materials from maintenance activities, including liquids and solids from cleaning catch basins and other stormwater facilities, in accordance with:

A. Special Condition S3, Compliance with Standards

B. WAC 173-216-110

C. Other applicable regulations

S8. DISCHARGES TO 303(d) OR TMDL WATERBODIES

A. Sampling and Numeric Effluent Limits For Certain Discharges to 303(d)-listed Waterbodies

1. Permittees who discharge to segments of waterbodies listed as impaired by the State of Washington under Section 303(d) of the Clean Water Act for turbidity, fine sediment, high pH, or phosphorus, must conduct water quality sampling according to the requirements of this section, and Special Conditions S4.C.2.b-f and S4.C.3.b-d, and must comply with the applicable numeric effluent limitations in S8.C and S8.D.

2. All references and requirements associated with Section 303(d) of the Clean Water Act mean the most current listing by Ecology of impaired waters (Category 5) that exists on January 1, 2016, or the date when the operator's complete permit application is received by Ecology, whichever is later.

B. Limits on Coverage for New Discharges to TMDL or 303(d)-listed Waters

Operators of construction sites that discharge to a TMDL or 303(d)-listed waterbody are not eligible for coverage under this permit *unless* the operator:

1. Prevents exposing stormwater to pollutants for which the waterbody is impaired, and retains documentation in the SWPPP that details procedures taken to prevent exposure on site; ***or***

2. Documents that the pollutants for which the waterbody is impaired are not present at the site, and retains documentation of this finding within the SWPPP; ***or***

3. Provides Ecology with data indicating the discharge is not expected to cause or contribute to an exceedance of a water quality standard, and retains such data on site with the SWPPP. The operator must provide data and other technical information to Ecology that sufficiently demonstrate:

   a. For discharges to waters without an EPA-approved or -established TMDL, that the discharge of the pollutant for which the water is impaired will meet in-stream water quality criteria at the point of discharge to the waterbody; ***or***

   b. For discharges to waters with an EPA-approved or -established TMDL, that there is sufficient remaining wasteload allocation in the TMDL to allow construction stormwater discharge and that existing dischargers to the waterbody are subject to compliance schedules designed to bring the waterbody into attainment with water quality standards.

   Operators of construction sites are eligible for coverage under this permit if Ecology issues permit coverage based upon an affirmative determination that the *discharge will not cause or contribute to the existing impairment.*

C. Sampling and Numeric Effluent Limits for Discharges to Water Bodies on the 303(d) List for Turbidity, Fine Sediment, or Phosphorus

1. Permittees who discharge to segments of water bodies on the 303(d) list (Category 5) for turbidity, fine sediment, or phosphorus must conduct turbidity sampling in accordance with Special Condition S4.C.2 and comply with either of the numeric effluent limits noted in Table 5 below.

2. As an alternative to the 25 NTUs effluent limit noted in Table 5 below (applied at the point where stormwater [or authorized non-stormwater] is discharged off-site), Permittees may choose to comply with the surface water quality standard for turbidity. The standard is: no more than 5 NTUs over background turbidity when the background turbidity is 50 NTUs or less, or no more than a 10% increase in turbidity when the background turbidity is more than 50 NTUs. In order to use the water quality standard requirement, the sampling must take place at the following locations:

   a. Background turbidity in the 303(d)-listed receiving water immediately upstream (upgradient) or outside the area of influence of the discharge.

   b. Turbidity at the point of discharge into the 303(d)-listed receiving water, inside the area of influence of the discharge.

3. Discharges that exceed the numeric effluent limit for turbidity constitute a violation of this permit.

4. Permittees whose discharges exceed the numeric effluent limit shall sample discharges daily until the violation is corrected and comply with the non-compliance notification requirements in Special Condition S5.F.

Table 5: Turbidity, Fine Sediment & Phosphorus Sampling and Limits for 303(d)-Listed Waters

Parameter identified in 303(d) listing	Parameter Sampled	Unit	Analytical Method	Sampling Frequency	Numeric Effluent Limit[1]
• Turbidity • Fine Sediment • Phosphorus	Turbidity	NTU	SM2130	Weekly, if discharging	25 NTUs, at the point where stormwater is discharged from the site; OR In compliance with the surface water quality standard for turbidity (S8.C.2.a)

[1]Permittees subject to a numeric effluent limit for turbidity may, at their discretion, choose either numeric effluent limitation based on site-specific considerations including, but not limited to, safety, access and convenience.

D. Discharges to Water Bodies on the 303(d) List for High pH

1. Permittees who discharge to segments of water bodies on the 303(d) list (Category 5) for high pH must conduct pH sampling in accordance with the table below, and comply with the numeric effluent limit of pH 6.5 to 8.5 su (Table 6).

Table 6: pH Sampling and Limits for 303(d)-Listed Waters

Parameter identified in 303(d) listing	Parameter Sampled/Units	Analytical Method	Sampling Frequency	Numeric Effluent Limit
High pH	pH /Standard Units	pH meter	Weekly, if discharging	In the range of 6.5 – 8.5

2. At the Permittee's discretion, compliance with the limit shall be assessed at one of the following locations:

   a. Directly in the 303(d)-listed waterbody segment, inside the immediate area of influence of the discharge; or

   b. Alternatively, the Permittee may measure pH at the point where the discharge leaves the construction site, rather than in the receiving water.

3. Discharges that exceed the numeric effluent limit for pH (outside the range of 6.5 – 8.5 su) constitute a violation of this permit.

4. Permittees whose discharges exceed the numeric effluent limit shall sample discharges daily until the violation is corrected and comply with the non-compliance notification requirements in Special Condition S5.F.

E. Sampling and Limits for Sites Discharging to Waters Covered by a TMDL or Another Pollution Control Plan

1. Discharges to a waterbody that is subject to a Total Maximum Daily Load (TMDL) for turbidity, fine sediment, high pH, or phosphorus must be consistent with the TMDL. Refer to http://www.ecy.wa.gov/programs/wq/tmdl/TMDLsbyWria/TMDLbyWria.html for more information on TMDLs.

   a. Where an applicable TMDL sets specific waste load allocations or requirements for discharges covered by this permit, discharges must be consistent with any specific waste load allocations or requirements established by the applicable TMDL.

      i. The Permittee must sample discharges weekly or as otherwise specified by the TMDL to evaluate compliance with the specific waste load allocations or requirements.

      ii. Analytical methods used to meet the monitoring requirements must conform to the latest revision of the Guidelines Establishing Test Procedures for the Analysis of Pollutants contained in 40 CFR Part 136. Turbidity and pH methods need not be accredited or registered unless conducted at a laboratory which must otherwise be accredited or registered.

   b. Where an applicable TMDL has established a general waste load allocation for construction stormwater discharges, but has not identified specific requirements, compliance with Special Conditions S4 (Monitoring) and S9 (SWPPPs) will constitute compliance with the approved TMDL.

c. Where an applicable TMDL has not specified a waste load allocation for construction stormwater discharges, but has not excluded these discharges, compliance with Special Conditions S4 (Monitoring) and S9 (SWPPPs) will constitute compliance with the approved TMDL.

d. Where an applicable TMDL specifically precludes or prohibits discharges from construction activity, the operator is not eligible for coverage under this permit.

2. Applicable TMDL means a TMDL for turbidity, fine sediment, high pH, or phosphorus that is completed and approved by EPA before January 1, 2016, or before the date the operator's complete permit application is received by Ecology, whichever is later. TMDLs completed after the operator's complete permit application is received by Ecology become applicable to the Permittee only if they are imposed through an administrative order by Ecology, or through a modification of permit coverage.

S9. STORMWATER POLLUTION PREVENTION PLAN

The Permittee must prepare and properly implement an adequate Stormwater Pollution Prevention Plan (SWPPP) for construction activity in accordance with the requirements of this permit beginning with initial soil disturbance and until final stabilization.

A. The Permittee's SWPPP must meet the following objectives:

1. To implement best management practices (BMPs) to prevent erosion and sedimentation, and to identify, reduce, eliminate or prevent stormwater contamination and water pollution from construction activity.

2. To prevent violations of surface water quality, ground water quality, or sediment management standards.

3. To control peak volumetric flow rates and velocities of stormwater discharges.

B. General Requirements

1. The SWPPP must include a narrative and drawings. All BMPs must be clearly referenced in the narrative and marked on the drawings. The SWPPP narrative must include documentation to explain and justify the pollution prevention decisions made for the project. Documentation must include:

a. Information about existing site conditions (topography, drainage, soils, vegetation, etc.).

b. Potential erosion problem areas.

c. The 13 elements of a SWPPP in Special Condition S9.D.1-13, including BMPs used to address each element.

d. Construction phasing/sequence and general BMP implementation schedule.

e. The actions to be taken if BMP performance goals are not achieved—for example, a contingency plan for additional treatment and/or storage of stormwater that would violate the water quality standards if discharged.

f. Engineering calculations for ponds, treatment systems, and any other designed structures.

2. The Permittee must modify the SWPPP if, during inspections or investigations conducted by the owner/operator, or the applicable local or state regulatory authority, it is determined that the SWPPP is, or would be, ineffective in eliminating or significantly minimizing pollutants in stormwater discharges from the site. The Permittee must then:

   a. Review the SWPPP for compliance with Special Condition S9 and make appropriate revisions within 7 days of the inspection or investigation.

   b. Immediately begin the process to fully implement and maintain appropriate source control and/or treatment BMPs as soon as possible, addressing the problems no later than 10 days from the inspection or investigation. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when an extension is requested by a Permittee within the initial 10-day response period.

   c. Document BMP implementation and maintenance in the site log book.

   The Permittee must modify the SWPPP whenever there is a change in design, construction, operation, or maintenance at the construction site that has, or could have, a significant effect on the discharge of pollutants to waters of the State.

C. Stormwater Best Management Practices (BMPs)

BMPs must be consistent with:

1. Stormwater Management Manual for Western Washington (most current approved edition at the time this permit was issued), for sites west of the crest of the Cascade Mountains; ***or***

2. Stormwater Management Manual for Eastern Washington (most current approved edition at the time this permit was issued), for sites east of the crest of the Cascade Mountains; ***or***

3. Revisions to the manuals listed in Special Condition S9.C.1. & 2., or other stormwater management guidance documents or manuals which provide an equivalent level of pollution prevention, that are approved by Ecology and incorporated into this permit in accordance with the permit modification requirements of WAC 173-226-230; ***or***

4. Documentation in the SWPPP that the BMPs selected provide an equivalent level of pollution prevention, compared to the applicable Stormwater Management Manuals, including:

   a. The technical basis for the selection of all stormwater BMPs (scientific, technical studies, and/or modeling) that support the performance claims for the BMPs being selected.

   b. An assessment of how the selected BMP will satisfy AKART requirements and the applicable federal technology-based treatment requirements under 40 CFR part 125.3.

D. SWPPP – Narrative Contents and Requirements

The Permittee must include each of the 13 elements below in Special Condition S9.D.1-13 in the narrative of the SWPPP and implement them unless site conditions render the element unnecessary and the exemption from that element is clearly justified in the SWPPP.

1. Preserve Vegetation/Mark Clearing Limits

   a. Before beginning land-disturbing activities, including clearing and grading, clearly mark all clearing limits, sensitive areas and their buffers, and trees that are to be preserved within the construction area.

   b. Retain the duff layer, native topsoil, and natural vegetation in an undisturbed state to the maximum degree practicable.

2. Establish Construction Access

   a. Limit construction vehicle access and exit to one route, if possible.

   b. Stabilize access points with a pad of quarry spalls, crushed rock, or other equivalent BMPs, to minimize tracking sediment onto roads.

   c. Locate wheel wash or tire baths on site, if the stabilized construction entrance is not effective in preventing tracking sediment onto roads.

   d. If sediment is tracked off site, clean the affected roadway thoroughly at the end of each day, or more frequently as necessary (for example, during wet weather). Remove sediment from roads by shoveling, sweeping, or pickup and transport of the sediment to a controlled sediment disposal area.

   e. Conduct street washing only after sediment removal in accordance with Special Condition S9.D.2.d. Control street wash wastewater by pumping back on site or otherwise preventing it from discharging into systems tributary to waters of the State.

3. Control Flow Rates

   a. Protect properties and waterways downstream of development sites from erosion and the associated discharge of turbid waters due to increases in the velocity and peak volumetric flow rate of stormwater runoff from the project site, as required by local plan approval authority.

b. Where necessary to comply with Special Condition S9.D.3.a, construct stormwater retention or detention facilities as one of the first steps in grading. Assure that detention facilities function properly before constructing site improvements (for example, impervious surfaces).

c. If permanent infiltration ponds are used for flow control during construction, protect these facilities from siltation during the construction phase.

4. Install Sediment Controls

The Permittee must design, install and maintain effective erosion controls and sediment controls to minimize the discharge of pollutants. At a minimum, the Permittee must design, install and maintain such controls to:

a. Construct sediment control BMPs (sediment ponds, traps, filters, infiltration facilities, etc.) as one of the first steps in grading. These BMPs must be functional before other land disturbing activities take place.

b. Minimize sediment discharges from the site. The design, installation and maintenance of erosion and sediment controls must address factors such as the amount, frequency, intensity and duration of precipitation, the nature of resulting stormwater runoff, and soil characteristics, including the range of soil particle sizes expected to be present on the site.

c. Direct stormwater runoff from disturbed areas through a sediment pond or other appropriate sediment removal BMP, before the runoff leaves a construction site or before discharge to an infiltration facility. Runoff from fully stabilized areas may be discharged without a sediment removal BMP, but must meet the flow control performance standard of Special Condition S9.D.3.a.

d. Locate BMPs intended to trap sediment on site in a manner to avoid interference with the movement of juvenile salmonids attempting to enter off-channel areas or drainages.

e. Provide and maintain natural buffers around surface waters, direct stormwater to vegetated areas to increase sediment removal and maximize stormwater infiltration, unless infeasible.

f. Where feasible, design outlet structures that withdraw impounded stormwater from the surface to avoid discharging sediment that is still suspended lower in the water column.

5. Stabilize Soils

a. The Permittee must stabilize exposed and unworked soils by application of effective BMPs that prevent erosion. Applicable BMPs include, but are not limited to: temporary and permanent seeding, sodding, mulching, plastic covering, erosion control fabrics and matting, soil application of polyacrylamide

(PAM), the early application of gravel base on areas to be paved, and dust control.

b. The Permittee must control stormwater volume and velocity within the site to minimize soil erosion.

c. The Permittee must control stormwater discharges, including both peak flow rates and total stormwater volume, to minimize erosion at outlets and to minimize downstream channel and stream bank erosion.

d. Depending on the geographic location of the project, the Permittee must not allow soils to remain exposed and unworked for more than the time periods set forth below to prevent erosion:

West of the Cascade Mountains Crest
During the dry season (May 1 - September 30): 7 days
During the wet season (October 1 - April 30): 2 days

East of the Cascade Mountains Crest, except for Central Basin*
During the dry season (July 1 - September 30): 10 days
During the wet season (October 1 - June 30): 5 days

The Central Basin*, East of the Cascade Mountains Crest
During the dry season (July 1 - September 30): 30 days
During the wet season (October 1 - June 30): 15 days

*Note: The Central Basin is defined as the portions of Eastern Washington with mean annual precipitation of less than 12 inches.

e. The Permittee must stabilize soils at the end of the shift before a holiday or weekend if needed based on the weather forecast.

f. The Permittee must stabilize soil stockpiles from erosion, protected with sediment trapping measures, and where possible, be located away from storm drain inlets, waterways, and drainage channels.

g. The Permittee must minimize the amount of soil exposed during construction activity.

h. The Permittee must minimize the disturbance of steep slopes.

i. The Permittee must minimize soil compaction and, unless infeasible, preserve topsoil.

6. Protect Slopes

a. The Permittee must design and construct cut-and-fill slopes in a manner to minimize erosion. Applicable practices include, but are not limited to, reducing continuous length of slope with terracing and diversions, reducing slope steepness, and roughening slope surfaces (for example, track walking).

b. The Permittee must divert off-site stormwater (run-on) or ground water away from slopes and disturbed areas with interceptor dikes, pipes, and/or swales. Off-site stormwater should be managed separately from stormwater generated on the site.

c. At the top of slopes, collect drainage in pipe slope drains or protected channels to prevent erosion.

   i. West of the Cascade Mountains Crest: Temporary pipe slope drains must handle the peak 10-minute flow rate from a Type 1A, 10-year, 24-hour frequency storm for the developed condition. Alternatively, the 10-year, 1-hour flow rate predicted by an approved continuous runoff model, increased by a factor of 1.6, may be used. The hydrologic analysis must use the existing land cover condition for predicting flow rates from tributary areas outside the project limits. For tributary areas on the project site, the analysis must use the temporary or permanent project land cover condition, whichever will produce the highest flow rates. If using the Western Washington Hydrology Model (WWHM) to predict flows, bare soil areas should be modeled as "landscaped area."

   ii. East of the Cascade Mountains Crest: Temporary pipe slope drains must handle the expected peak flow rate from a 6-month, 3-hour storm for the developed condition, referred to as the short duration storm.

d. Place excavated material on the uphill side of trenches, consistent with safety and space considerations.

e. Place check dams at regular intervals within constructed channels that are cut down a slope.

7. Protect Drain Inlets

   a. Protect all storm drain inlets made operable during construction so that stormwater runoff does not enter the conveyance system without first being filtered or treated to remove sediment.

   b. Clean or remove and replace inlet protection devices when sediment has filled one-third of the available storage (unless a different standard is specified by the product manufacturer).

8. Stabilize Channels and Outlets

   a. Design, construct and stabilize all on-site conveyance channels to prevent erosion from the following expected peak flows:

      i. West of the Cascade Mountains Crest: Channels must handle the peak 10-minute flow rate from a Type 1A, 10-year, 24-hour frequency storm for the developed condition. Alternatively, the 10-year, 1-hour flow rate indicated by an approved continuous runoff model, increased by a factor of 1.6, may be used. The hydrologic analysis must use the existing land cover condition for predicting flow rates from tributary areas outside the project limits. For tributary areas on the project site, the analysis must use the temporary or permanent project land cover condition, whichever will produce the highest flow rates. If using the WWHM to predict flows, bare soil areas should be modeled as "landscaped area."

ii. East of the Cascade Mountains Crest: Channels must handle the expected peak flow rate from a 6-month, 3-hour storm for the developed condition, referred to as the short duration storm.

b. Provide stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent stream banks, slopes, and downstream reaches at the outlets of all conveyance systems.

9. Control Pollutants

Design, install, implement and maintain effective pollution prevention measures to minimize the discharge of pollutants. The Permittee must:

a. Handle and dispose of all pollutants, including waste materials and demolition debris that occur on site in a manner that does not cause contamination of stormwater.

b. Provide cover, containment, and protection from vandalism for all chemicals, liquid products, petroleum products, and other materials that have the potential to pose a threat to human health or the environment. On-site fueling tanks must include secondary containment. Secondary containment means placing tanks or containers within an impervious structure capable of containing 110% of the volume contained in the largest tank within the containment structure. Double-walled tanks do not require additional secondary containment.

c. Conduct maintenance, fueling, and repair of heavy equipment and vehicles using spill prevention and control measures. Clean contaminated surfaces immediately following any spill incident.

d. Discharge wheel wash or tire bath wastewater to a separate on-site treatment system that prevents discharge to surface water, such as closed-loop recirculation or upland land application, or to the sanitary sewer with local sewer district approval.

e. Apply fertilizers and pesticides in a manner and at application rates that will not result in loss of chemical to stormwater runoff. Follow manufacturers' label requirements for application rates and procedures.

f. Use BMPs to prevent contamination of stormwater runoff by pH-modifying sources. The sources for this contamination include, but are not limited to: bulk cement, cement kiln dust, fly ash, new concrete washing and curing waters, recycled concrete stockpiles, waste streams generated from concrete grinding and sawing, exposed aggregate processes, dewatering concrete vaults, concrete pumping and mixer washout waters. (Also refer to the definition for "concrete wastewater" in Appendix A--Definitions.)

g. Adjust the pH of stormwater or authorized non-stormwater if necessary to prevent an exceedance of groundwater and/or surface water quality standards.

h. Assure that washout of concrete trucks is performed off-site or in designated concrete washout areas only. Do not wash out concrete trucks or concrete handling equipment onto the ground, or into storm drains, open ditches, streets, or streams. Do not dump excess concrete on site, except in designated concrete washout areas. Concrete spillage or concrete discharge to surface waters of the State is prohibited.

i. Obtain written approval from Ecology before using any chemical treatment, with the exception of CO_2 or dry ice used to adjust pH.

j. Uncontaminated water from water-only based shaft drilling for construction of building, road, and bridge foundations may be infiltrated provided the wastewater is managed in a way that prohibits discharge to surface waters. Prior to infiltration, water from water-only based shaft drilling that comes into contact with curing concrete must be neutralized until pH is in the range of 6.5 to 8.5 (su).

10. Control Dewatering

a. Permittees must discharge foundation, vault, and trench dewatering water, which have characteristics similar to stormwater runoff at the site, into a controlled conveyance system before discharge to a sediment trap or sediment pond.

b. Permittees may discharge clean, non-turbid dewatering water, such as well-point ground water, to systems tributary to, or directly into surface waters of the State, as specified in Special Condition S9.D.8, provided the dewatering flow does not cause erosion or flooding of receiving waters. Do not route clean dewatering water through stormwater sediment ponds. Note that “surface waters of the State” may exist on a construction site as well as off site; for example, a creek running through a site.

c. Other dewatering treatment or disposal options may include:

i. Infiltration.

ii. Transport off site in a vehicle, such as a vacuum flush truck, for legal disposal in a manner that does not pollute state waters.

iii. Ecology-approved on-site chemical treatment or other suitable treatment technologies (see S9.D.9.i. regarding chemical treatment written approval).

iv. Sanitary or combined sewer discharge with local sewer district approval, if there is no other option.

v. Use of a sedimentation bag with discharge to a ditch or swale for small volumes of localized dewatering.

d. Permittees must handle highly turbid or contaminated dewatering water separately from stormwater.

11. Maintain BMPs

a. Permittees must maintain and repair all temporary and permanent erosion and sediment control BMPs as needed to assure continued performance of their intended function in accordance with BMP specifications.

b. Permittees must remove all temporary erosion and sediment control BMPs within 30 days after achieving final site stabilization or after the temporary BMPs are no longer needed.

12. Manage the Project

a. Phase development projects to the maximum degree practicable and take into account seasonal work limitations.

b. Inspection and monitoring – Inspect, maintain and repair all BMPs as needed to assure continued performance of their intended function. Conduct site inspections and monitoring in accordance with Special Condition S4.

c. Maintaining an updated construction SWPPP – Maintain, update, and implement the SWPPP in accordance with Special Conditions S3, S4 and S9.

13. Protect Low Impact Development (LID) BMPs

The primary purpose of LID BMPs/On-site LID Stormwater Management BMPs is to reduce the disruption of the natural site hydrology. LID BMPs are permanent facilities.

a. Permittees must protect all Bioretention and Rain Garden facilities from sedimentation through installation and maintenance of erosion and sediment control BMPs on portions of the site that drain into the Bioretention and/or Rain Garden facilities. Restore the facilities to their fully functioning condition if they accumulate sediment during construction. Restoring the facility must include removal of sediment and any sediment-laden Bioretention/Rain Garden soils, and replacing the removed soils with soils meeting the design specification.

b. Permittees must maintain the infiltration capabilities of Bioretention and Rain Garden facilities by protecting against compaction by construction equipment and foot traffic. Protect completed lawn and landscaped areas from compaction due to construction equipment.

c. Permittees must control erosion and avoid introducing sediment from surrounding land uses onto permeable pavements. Do not allow muddy construction equipment on the base material or pavement. Do not allow sediment-laden runoff onto permeable pavements.

d. Permittees must clean permeable pavements fouled with sediments or no longer passing an initial infiltration test using local stormwater manual methodology or the manufacturer's procedures.

e. Permittees must keep all heavy equipment off existing soils under LID facilities that have been excavated to final grade to retain the infiltration rate of the soils.

E. SWPPP – Map Contents and Requirements

The Permittee's SWPPP must also include a vicinity map or general location map (for example, a USGS quadrangle map, a portion of a county or city map, or other appropriate map) with enough detail to identify the location of the construction site and receiving waters within one mile of the site.

The SWPPP must also include a legible site map (or maps) showing the entire construction site. The following features must be identified, unless not applicable due to site conditions:

1. The direction of north, property lines, and existing structures and roads.
2. Cut and fill slopes indicating the top and bottom of slope catch lines.
3. Approximate slopes, contours, and direction of stormwater flow before and after major grading activities.
4. Areas of soil disturbance and areas that will not be disturbed.
5. Locations of structural and nonstructural controls (BMPs) identified in the SWPPP.
6. Locations of off-site material, stockpiles, waste storage, borrow areas, and vehicle/equipment storage areas.
7. Locations of all surface water bodies, including wetlands.
8. Locations where stormwater or non-stormwater discharges off-site and/or to a surface waterbody, including wetlands.
9. Location of water quality sampling station(s), if sampling is required by state or local permitting authority.
10. Areas where final stabilization has been accomplished and no further construction-phase permit requirements apply.
11. Location or proposed location of LID facilities.

S10. NOTICE OF TERMINATION

A. The site is eligible for termination of coverage when it has met any of the following conditions:

   1. The site has undergone final stabilization, the Permittee has removed all temporary BMPs (except biodegradable BMPs clearly manufactured with the intention for the material to be left in place and not interfere with maintenance or land use), and all stormwater discharges associated with construction activity have been eliminated; ***or***

   2. All portions of the site that have not undergone final stabilization per Special Condition S10.A.1 have been sold and/or transferred (per General Condition G9), and the Permittee no longer has operational control of the construction activity; ***or***

   3. For residential construction only, the Permittee has completed temporary stabilization and the homeowners have taken possession of the residences.

B. When the site is eligible for termination, the Permittee must submit a complete and accurate Notice of Termination (NOT) form, signed in accordance with General Condition G2, to:

   Department of Ecology
   Water Quality Program – Construction Stormwater
   PO Box 47696
   Olympia, Washington 98504-7696

   When an electronic termination form is available, the Permittee may choose to submit a complete and accurate Notice of Termination (NOT) form through the Water Quality Permitting Portal rather than mailing a hardcopy as noted above.

   The termination is effective on the thirty-first calendar day following the date Ecology receives a complete NOT form, unless Ecology notifies the Permittee that the termination request is denied because the Permittee has not met the eligibility requirements in Special Condition S10.A.

   Permittees are required to comply with all conditions and effluent limitations in the permit until the permit has been terminated.

   Permittees transferring the property to a new property owner or operator/Permittee are required to complete and submit the Notice of Transfer form to Ecology, but are not required to submit a Notice of Termination form for this type of transaction.

GENERAL CONDITIONS

G1. DISCHARGE VIOLATIONS

All discharges and activities authorized by this general permit must be consistent with the terms and conditions of this general permit. Any discharge of any pollutant more frequent than or at a level in excess of that identified and authorized by the general permit must constitute a violation of the terms and conditions of this permit.

G2. SIGNATORY REQUIREMENTS

A. All permit applications must bear a certification of correctness to be signed:

1. In the case of corporations, by a responsible corporate officer;
2. In the case of a partnership, by a general partner of a partnership;
3. In the case of sole proprietorship, by the proprietor; ***or***
4. In the case of a municipal, state, or other public facility, by either a principal executive officer or ranking elected official.

B. All reports required by this permit and other information requested by Ecology (including NOIs, NOTs, and Transfer of Coverage forms) must be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

1. The authorization is made in writing by a person described above and submitted to Ecology.
2. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters.

C. Changes to authorization. If an authorization under paragraph G2.B.2 above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph G2.B.2 above must be submitted to Ecology prior to or together with any reports, information, or applications to be signed by an authorized representative.

D. Certification. Any person signing a document under this section must make the following certification:

> "I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my

knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

G3. RIGHT OF INSPECTION AND ENTRY

The Permittee must allow an authorized representative of Ecology, upon the presentation of credentials and such other documents as may be required by law:

A. To enter upon the premises where a discharge is located or where any records are kept under the terms and conditions of this permit.

B. To have access to and copy – at reasonable times and at reasonable cost – any records required to be kept under the terms and conditions of this permit.

C. To inspect – at reasonable times – any facilities, equipment (including monitoring and control equipment), practices, methods, or operations regulated or required under this permit.

D. To sample or monitor – at reasonable times – any substances or parameters at any location for purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act.

G4. GENERAL PERMIT MODIFICATION AND REVOCATION

This permit may be modified, revoked and reissued, or terminated in accordance with the provisions of Chapter 173-226 WAC. Grounds for modification, revocation and reissuance, or termination include, but are not limited to, the following:

A. When a change occurs in the technology or practices for control or abatement of pollutants applicable to the category of dischargers covered under this permit.

B. When effluent limitation guidelines or standards are promulgated pursuant to the CWA or Chapter 90.48 RCW, for the category of dischargers covered under this permit.

C. When a water quality management plan containing requirements applicable to the category of dischargers covered under this permit is approved, ***or***

D. When information is obtained that indicates cumulative effects on the environment from dischargers covered under this permit are unacceptable.

G5. REVOCATION OF COVERAGE UNDER THE PERMIT

Pursuant to Chapter 43.21B RCW and Chapter 173-226 WAC, the Director may terminate coverage for any discharger under this permit for cause. Cases where coverage may be terminated include, but are not limited to, the following:

A. Violation of any term or condition of this permit.

B. Obtaining coverage under this permit by misrepresentation or failure to disclose fully all relevant facts.

C. A change in any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge.

D. Failure or refusal of the Permittee to allow entry as required in RCW 90.48.090.

E. A determination that the permitted activity endangers human health or the environment, or contributes to water quality standards violations.

F. Nonpayment of permit fees or penalties assessed pursuant to RCW 90.48.465 and Chapter 173-224 WAC.

G. Failure of the Permittee to satisfy the public notice requirements of WAC 173-226-130(5), when applicable.

The Director may require any discharger under this permit to apply for and obtain coverage under an individual permit or another more specific general permit. Permittees who have their coverage revoked for cause according to WAC 173-226-240 may request temporary coverage under this permit during the time an individual permit is being developed, provided the request is made within ninety (90) days from the time of revocation and is submitted along with a complete individual permit application form.

G6. REPORTING A CAUSE FOR MODIFICATION

The Permittee must submit a new application, or a supplement to the previous application, whenever a material change to the construction activity or in the quantity or type of discharge is anticipated which is not specifically authorized by this permit. This application must be submitted at least sixty (60) days prior to any proposed changes. Filing a request for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not relieve the Permittee of the duty to comply with the existing permit until it is modified or reissued.

G7. COMPLIANCE WITH OTHER LAWS AND STATUTES

Nothing in this permit will be construed as excusing the Permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

G8. DUTY TO REAPPLY

The Permittee must apply for permit renewal at least 180 days prior to the specified expiration date of this permit. The Permittee must reapply using the electronic application form (NOI) available on Ecology’s website. Permittees unable to submit electronically (for example, those who do not have an internet connection) must contact Ecology to request a waiver and obtain instructions on how to obtain a paper NOI.

Department of Ecology
Water Quality Program - Construction Stormwater
PO Box 47696
Olympia, Washington 98504-7696

G9. TRANSFER OF GENERAL PERMIT COVERAGE

Coverage under this general permit is automatically transferred to a new discharger, including operators of lots/parcels within a common plan of development or sale, if:

A. A written agreement (Transfer of Coverage Form) between the current discharger (Permittee) and new discharger, signed by both parties and containing a specific date for transfer of permit responsibility, coverage, and liability (including any Administrative Orders associated with the Permit) is submitted to the Director; and

B. The Director does not notify the current discharger and new discharger of the Director's intent to revoke coverage under the general permit. If this notice is not given, the transfer is effective on the date specified in the written agreement.

When a current discharger (Permittee) transfers a portion of a permitted site, the current discharger must also submit an updated application form (NOI) to the Director indicating the remaining permitted acreage after the transfer.

G10. REMOVED SUBSTANCES

The Permittee must not re-suspend or reintroduce collected screenings, grit, solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of stormwater to the final effluent stream for discharge to state waters.

G11. DUTY TO PROVIDE INFORMATION

The Permittee must submit to Ecology, within a reasonable time, all information that Ecology may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The Permittee must also submit to Ecology, upon request, copies of records required to be kept by this permit [40 CFR 122.41(h)].

G12. OTHER REQUIREMENTS OF 40 CFR

All other requirements of 40 CFR 122.41 and 122.42 are incorporated in this permit by reference.

G13. ADDITIONAL MONITORING

Ecology may establish specific monitoring requirements in addition to those contained in this permit by administrative order or permit modification.

G14. PENALTIES FOR VIOLATING PERMIT CONDITIONS

Any person who is found guilty of willfully violating the terms and conditions of this permit shall be deemed guilty of a crime, and upon conviction thereof shall be punished by a fine of up to ten thousand dollars ($10,000) and costs of prosecution, or by imprisonment at the discretion of the court. Each day upon which a willful violation occurs may be deemed a separate and additional violation.

Any person who violates the terms and conditions of a waste discharge permit shall incur, in addition to any other penalty as provided by law, a civil penalty in the amount of up to ten thousand dollars ($10,000) for every such violation. Each and every such violation shall be a separate and distinct offense, and in case of a continuing violation, every day's continuance shall be deemed to be a separate and distinct violation.

G15. UPSET

Definition – "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of the following paragraph are met.

A Permittee who wishes to establish the affirmative defense of upset must demonstrate, through properly signed, contemporaneous operating logs or other relevant evidence that: 1) an upset occurred and that the Permittee can identify the cause(s) of the upset; 2) the permitted facility was being properly operated at the time of the upset; 3) the Permittee submitted notice of the upset as required in Special Condition S5.F, and; 4) the Permittee complied with any remedial measures required under this permit.

In any enforcement proceeding, the Permittee seeking to establish the occurrence of an upset has the burden of proof.

G16. PROPERTY RIGHTS

This permit does not convey any property rights of any sort, or any exclusive privilege.

G17. DUTY TO COMPLY

The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

G18. TOXIC POLLUTANTS

The Permittee must comply with effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if this permit has not yet been modified to incorporate the requirement.

G19. PENALTIES FOR TAMPERING

The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than two years per violation, or by both. If a conviction of a person is for a violation committed after a first conviction of such person under this condition, punishment shall be a fine of not more than $20,000 per day of violation, or imprisonment of not more than four (4) years, or both.

G20. REPORTING PLANNED CHANGES

The Permittee must, as soon as possible, give notice to Ecology of planned physical alterations, modifications or additions to the permitted construction activity. The Permittee should be aware that, depending on the nature and size of the changes to the original permit, a new public notice and other permit process requirements may be required. Changes in activities that require reporting to Ecology include those that will result in:

A. The permitted facility being determined to be a new source pursuant to 40 CFR 122.29(b).

B. A significant change in the nature or an increase in quantity of pollutants discharged, including but not limited to: for sites 5 acres or larger, a 20% or greater increase in acreage disturbed by construction activity.

C. A change in or addition of surface water(s) receiving stormwater or non-stormwater from the construction activity.

D. A change in the construction plans and/or activity that affects the Permittee's monitoring requirements in Special Condition S4.

Following such notice, permit coverage may be modified, or revoked and reissued pursuant to 40 CFR 122.62(a) to specify and limit any pollutants not previously limited. Until such modification is effective, any new or increased discharge in excess of permit limits or not specifically authorized by this permit constitutes a violation.

G21. REPORTING OTHER INFORMATION

Where the Permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to Ecology, it must promptly submit such facts or information.

G22. REPORTING ANTICIPATED NON-COMPLIANCE

The Permittee must give advance notice to Ecology by submission of a new application or supplement thereto at least forty-five (45) days prior to commencement of such discharges, of any facility expansions, production increases, or other planned changes, such as process modifications, in the permitted facility or activity which may result in noncompliance with permit limits or conditions. Any maintenance of facilities, which might necessitate unavoidable interruption of operation and degradation of effluent quality, must be scheduled during non-critical water quality periods and carried out in a manner approved by Ecology.

G23. REQUESTS TO BE EXCLUDED FROM COVERAGE UNDER THE PERMIT

Any discharger authorized by this permit may request to be excluded from coverage under the general permit by applying for an individual permit. The discharger must submit to the Director an application as described in WAC 173-220-040 or WAC 173-216-070, whichever is applicable, with reasons supporting the request. These reasons will fully document how an individual permit will apply to the applicant in a way that the general permit cannot. Ecology may make specific requests for information to support the request. The Director will either issue an individual permit or deny the request with a statement explaining the reason for the denial. When an individual permit is issued to a discharger otherwise subject to the construction stormwater general permit, the applicability of the construction stormwater general permit to that Permittee is automatically terminated on the effective date of the individual permit.

G24. APPEALS

A. The terms and conditions of this general permit, as they apply to the appropriate class of dischargers, are subject to appeal by any person within 30 days of issuance of this general permit, in accordance with Chapter 43.21B RCW, and Chapter 173-226 WAC.

B. The terms and conditions of this general permit, as they apply to an individual discharger, are appealable in accordance with Chapter 43.21B RCW within 30 days of the effective date of coverage of that discharger. Consideration of an appeal of general permit coverage of an individual discharger is limited to the general permit's applicability or nonapplicability to that individual discharger.

C. The appeal of general permit coverage of an individual discharger does not affect any other dischargers covered under this general permit. If the terms and conditions of this general permit are found to be inapplicable to any individual discharger(s), the matter shall be remanded to Ecology for consideration of issuance of an individual permit or permits.

G25. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit, or application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

G26. BYPASS PROHIBITED

A. Bypass Procedures

Bypass, which is the intentional diversion of waste streams from any portion of a treatment facility, is prohibited for stormwater events below the design criteria for stormwater management. Ecology may take enforcement action against a Permittee for bypass unless one of the following circumstances (1, 2, 3 or 4) is applicable.

1. Bypass of stormwater is consistent with the design criteria and part of an approved management practice in the applicable stormwater management manual.

2. Bypass for essential maintenance without the potential to cause violation of permit limits or conditions.

   Bypass is authorized if it is for essential maintenance and does not have the potential to cause violations of limitations or other conditions of this permit, or adversely impact public health.

3. Bypass of stormwater is unavoidable, unanticipated, and results in noncompliance of this permit.

   This bypass is permitted only if:

   a. Bypass is unavoidable to prevent loss of life, personal injury, or severe property damage. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass.

   b. There are no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, maintenance during normal periods of equipment downtime (but not if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance), or transport of untreated wastes to another treatment facility.

   c. Ecology is properly notified of the bypass as required in Special Condition S5.F of this permit.

4. A planned action that would cause bypass of stormwater and has the potential to result in noncompliance of this permit during a storm event.

   The Permittee must notify Ecology at least thirty (30) days before the planned date of bypass. The notice must contain:

   a. A description of the bypass and its cause.

   b. An analysis of all known alternatives which would eliminate, reduce, or mitigate the need for bypassing.

   c. A cost-effectiveness analysis of alternatives including comparative resource damage assessment.

   d. The minimum and maximum duration of bypass under each alternative.

   e. A recommendation as to the preferred alternative for conducting the bypass.

f. The projected date of bypass initiation.

g. A statement of compliance with SEPA.

h. A request for modification of water quality standards as provided for in WAC 173-201A-110, if an exceedance of any water quality standard is anticipated.

i. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the bypass.

5. For probable construction bypasses, the need to bypass is to be identified as early in the planning process as possible. The analysis required above must be considered during preparation of the Stormwater Pollution Prevention Plan (SWPPP) and must be included to the extent practical. In cases where the probable need to bypass is determined early, continued analysis is necessary up to and including the construction period in an effort to minimize or eliminate the bypass.

   Ecology will consider the following before issuing an administrative order for this type bypass:

   a. If the bypass is necessary to perform construction or maintenance-related activities essential to meet the requirements of this permit.

   b. If there are feasible alternatives to bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, stopping production, maintenance during normal periods of equipment down time, or transport of untreated wastes to another treatment facility.

   c. If the bypass is planned and scheduled to minimize adverse effects on the public and the environment.

   After consideration of the above and the adverse effects of the proposed bypass and any other relevant factors, Ecology will approve, conditionally approve, or deny the request. The public must be notified and given an opportunity to comment on bypass incidents of significant duration, to the extent feasible. Approval of a request to bypass will be by administrative order issued by Ecology under RCW 90.48.120.

B. Duty to Mitigate

The Permittee is required to take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

APPENDIX A – DEFINITIONS

AKART is an acronym for "all known, available, and reasonable methods of prevention, control, and treatment." AKART represents the most current methodology that can be reasonably required for preventing, controlling, or abating the *pollutants* and controlling pollution associated with a discharge.

Applicable TMDL means a TMDL for turbidity, fine sediment, high pH, or phosphorus, which was completed and approved by EPA before January 1, 2016, or before the date the operator's complete permit application is received by Ecology, whichever is later.

Applicant means an *operator* seeking coverage under this permit.

Benchmark means a *pollutant* concentration used as a permit threshold, below which a *pollutant* is considered unlikely to cause a water quality violation, and above which it may. When *pollutant* concentrations exceed benchmarks, corrective action requirements take effect. Benchmark values are not water quality standards and are not numeric effluent limitations; they are indicator values.

Best Management Practices (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: *stormwater* associated with construction activity, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Buffer means an area designated by a local *jurisdiction* that is contiguous to and intended to protect a sensitive area.

Bypass means the intentional diversion of waste streams from any portion of a treatment facility.

Calendar Day A period of 24 consecutive hours starting at 12:00 midnight and ending the following 12:00 midnight.

Calendar Week (same as **Week**) means a period of seven consecutive days starting at 12:01 a.m. (0:01 hours) on Sunday.

Certified Erosion and Sediment Control Lead (CESCL) means a person who has current certification through an approved erosion and sediment control training program that meets the minimum training standards established by Ecology (see BMP C160 in the SWMM).

Chemical Treatment means the addition of chemicals to *stormwater* and/or authorized non-stormwater prior to filtration and discharge to surface waters.

Clean Water Act (CWA) means the Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, and 97-117; USC 1251 et seq.

Combined Sewer means a sewer which has been designed to serve as a sanitary sewer and a storm sewer, and into which inflow is allowed by local ordinance.

Common Plan of Development or Sale means a site where multiple separate and distinct *construction activities* may be taking place at different times on different schedules and/or by different contractors, but still under a single plan. Examples include: 1) phased projects and projects with multiple filings or lots, even if the separate phases or filings/lots will be constructed under separate contract or by separate owners (e.g., a development where lots are sold to separate builders); 2) a development plan that may be phased over multiple years, but is still under a consistent plan for long-term development; 3) projects in a contiguous area that may be unrelated but still under the same contract, such as construction of a building extension and a new parking lot at the same facility; and 4) linear projects such as roads, pipelines, or utilities. If the project is part of a common plan of development or sale, the disturbed area of the entire plan must be used in determining permit requirements.

Composite Sample means a mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increases while maintaining a constant time interval between the aliquots.

Concrete Wastewater means any water used in the production, pouring and/or clean-up of concrete or concrete products, and any water used to cut, grind, wash, or otherwise modify concrete or concrete products. Examples include water used for or resulting from concrete truck/mixer/pumper/tool/chute rinsing or washing, concrete saw cutting and surfacing (sawing, coring, grinding, roughening, hydro-demolition, bridge and road surfacing). When *stormwater* comingles with concrete wastewater, the resulting water is considered concrete wastewater and must be managed to prevent discharge to *waters of the State*, including *ground water*.

Construction Activity means land disturbing operations including clearing, grading or excavation which disturbs the surface of the land. Such activities may include road construction, construction of residential houses, office buildings, or industrial buildings, site preparation, soil compaction, movement and stockpiling of topsoils, and demolition activity.

Contaminant means any hazardous substance that does not occur naturally or occurs at greater than natural background levels. See definition of "*hazardous substance*" and WAC 173-340-200.

Contaminated Groundwater means groundwater which contains *contaminants*, *pollutants*, or *hazardous substances* that do not occur naturally or occur at levels greater than natural background.

Contaminated Soil means soil which contains *contaminants*, *pollutants*, or *hazardous substances* that do not occur naturally or occur at levels greater than natural background.

Demonstrably Equivalent means that the technical basis for the selection of all stormwater BMPs is documented within a SWPPP, including:

1. The method and reasons for choosing the stormwater BMPs selected.

2. The *pollutant* removal performance expected from the BMPs selected.
3. The technical basis supporting the performance claims for the BMPs selected, including any available data concerning field performance of the BMPs selected.
4. An assessment of how the selected BMPs will comply with state water quality standards.
5. An assessment of how the selected BMPs will satisfy both applicable federal technology-based treatment requirements and state requirements to use all known, available, and reasonable methods of prevention, control, and treatment (AKART).

Department means the Washington State Department of Ecology.

Detention means the temporary storage of *stormwater* to improve quality and/or to reduce the mass flow rate of discharge.

Dewatering means the act of pumping *ground water* or *stormwater* away from an active construction site.

Director means the Director of the Washington State Department of Ecology or his/her authorized representative.

Discharger means an owner or *operator* of any facility or activity subject to regulation under Chapter 90.48 RCW or the Federal Clean Water Act.

Domestic Wastewater means water carrying human wastes, including kitchen, bath, and laundry wastes from residences, buildings, industrial establishments, or other places, together with such ground water infiltration or surface waters as may be present.

Ecology means the Washington State Department of Ecology.

Engineered Soils means the use of soil amendments including, but not limited, to Portland cement treated base (CTB), cement kiln dust (CKD), or fly ash to achieve certain desirable soil characteristics.

Equivalent BMPs means operational, source control, treatment, or innovative BMPs which result in equal or better quality of stormwater discharge to *surface water* or to *ground water* than BMPs selected from the SWMM.

Erosion means the wearing away of the land surface by running water, wind, ice, or other geological agents, including such processes as gravitational creep.

Erosion and Sediment Control BMPs means BMPs intended to prevent erosion and sedimentation, such as preserving natural vegetation, seeding, mulching and matting, plastic covering, filter fences, sediment traps, and ponds. Erosion and sediment control BMPs are synonymous with stabilization and structural BMPs.

Federal Operator is an entity that meets the definition of "*Operator*" in this permit and is either any department, agency or instrumentality of the executive, legislative, and judicial branches of the Federal government of the United States, or another entity, such as a private contractor, performing construction activity for any such department, agency, or instrumentality.

Final Stabilization (same as **fully stabilized** or **full stabilization**) means the establishment of a permanent vegetative cover, or equivalent permanent stabilization measures (examples of permanent non-vegetative stabilization methods include, but are not limited to riprap, gabions or geotextiles) which prevents erosion.

Ground Water means water in a saturated zone or stratum beneath the land surface or a surface waterbody.

Hazardous Substance means any dangerous or extremely hazardous waste as defined in RCW 70.105.010 (5) and (6), or any dangerous or extremely dangerous waste as designated by rule under chapter 70.105 RCW; any hazardous substance as defined in RCW 70.105.010(10) or any hazardous substance as defined by rule under chapter 70.105 RCW; any substance that, on the effective date of this section, is a hazardous substance under section 101(14) of the federal cleanup law, 42 U.S.C., Sec. 9601(14); petroleum or petroleum products; and any substance or category of substances, including solid waste decomposition products, determined by the director by rule to present a threat to human health or the environment if released into the environment. The term hazardous substance does not include any of the following when contained in an underground storage tank from which there is not a release: crude oil or any fraction thereof or petroleum, if the tank is in compliance with all applicable federal, state, and local law.

Injection Well means a well that is used for the subsurface emplacement of fluids. (See Well.)

Jurisdiction means a political unit such as a city, town or county; incorporated for local self-government.

National Pollutant Discharge Elimination System (NPDES) means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring, and enforcing permits, and imposing and enforcing pretreatment requirements, under sections 307, 402, 318, and 405 of the Federal Clean Water Act, for the discharge of *pollutants* to surface waters of the State from point sources. These permits are referred to as NPDES permits and, in Washington State, are administered by the Washington State Department of Ecology.

Notice of Intent (NOI) means the application for, or a request for coverage under this general permit pursuant to WAC 173-226-200.

Notice of Termination (NOT) means a request for termination of coverage under this general permit as specified by Special Condition S10 of this permit.

Operator means any party associated with a construction project that meets either of the following two criteria:

- The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or

- The party has day-to-day operational control of those activities at a project that are necessary to ensure compliance with a SWPPP for the site or other permit conditions (e.g., they are authorized to direct workers at a site to carry out activities required by the SWPPP or comply with other permit conditions).

Permittee means individual or entity that receives notice of coverage under this general permit.

pH means a liquid's measure of acidity or alkalinity. A pH of 7 is defined as neutral. Large variations above or below this value are considered harmful to most aquatic life.

pH Monitoring Period means the time period in which the pH of *stormwater* runoff from a site must be tested a minimum of once every seven days to determine if *stormwater* pH is between 6.5 and 8.5.

Point Source means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, and container from which *pollutants* are or may be discharged to surface waters of the State. This term does not include return flows from irrigated agriculture. (See Fact Sheet for further explanation.)

Pollutant means dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, domestic sewage sludge (biosolids), munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste. This term does not include sewage from vessels within the meaning of section 312 of the CWA, nor does it include dredged or fill material discharged in accordance with a permit issued under section 404 of the CWA.

Pollution means contamination or other alteration of the physical, chemical, or biological properties of waters of the State; including change in temperature, taste, color, turbidity, or odor of the waters; or such discharge of any liquid, gaseous, solid, radioactive or other substance into any *waters of the State* as will or is likely to create a nuisance or render such waters harmful, detrimental or injurious to the public health, safety or welfare; or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses; or to livestock, wild animals, birds, fish or other aquatic life.

Process Wastewater means any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product. If *stormwater* commingles with process wastewater, the commingled water is considered process wastewater.

Receiving Water means the waterbody at the point of discharge. If the discharge is to a *storm sewer system*, either surface or subsurface, the receiving water is the waterbody to which the storm system discharges. Systems designed primarily for other purposes such as for ground water drainage, redirecting stream natural flows, or for conveyance of irrigation water/return flows that coincidentally convey *stormwater* are considered the receiving water.

Representative means a *stormwater* or wastewater sample which represents the flow and characteristics of the discharge. Representative samples may be a grab sample, a time-proportionate *composite sample*, or a flow proportionate sample. Ecology's Construction Stormwater Monitoring Manual provides guidance on representative sampling.

Responsible Corporate Officer for the purpose of signatory authority means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

Sanitary Sewer means a sewer which is designed to convey domestic wastewater.

Sediment means the fragmented material that originates from the weathering and erosion of rocks or unconsolidated deposits, and is transported by, suspended in, or deposited by water.

Sedimentation means the depositing or formation of sediment.

Sensitive Area means a waterbody, wetland, stream, aquifer recharge area, or channel migration zone.

SEPA (State Environmental Policy Act) means the Washington State Law, RCW 43.21C.020, intended to prevent or eliminate damage to the environment.

Significant Amount means an amount of a *pollutant* in a discharge that is amenable to available and reasonable methods of prevention or treatment; or an amount of a *pollutant* that has a reasonable potential to cause a violation of surface or ground water quality or sediment management standards.

Significant Concrete Work means greater than 1000 cubic yards poured concrete used over the life of a project.

Significant Contributor of Pollutants means a facility determined by Ecology to be a contributor of a significant amount(s) of a *pollutant*(s) to waters of the State of Washington.

Site means the land or water area where any "facility or activity" is physically located or conducted.

Source Control BMPs means physical, structural or mechanical devices or facilities that are intended to prevent *pollutants* from entering *stormwater*. A few examples of source control

BMPs are erosion control practices, maintenance of stormwater facilities, constructing roofs over storage and working areas, and directing wash water and similar discharges to the *sanitary sewer* or a dead end sump.

Stabilization means the application of appropriate BMPs to prevent the erosion of soils, such as, temporary and permanent seeding, vegetative covers, mulching and matting, plastic covering and sodding. See also the definition of Erosion and Sediment Control BMPs.

Storm Drain means any drain which drains directly into a *storm sewer system*, usually found along roadways or in parking lots.

Storm Sewer System means a means a conveyance, or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains designed or used for collecting or conveying *stormwater*. This does not include systems which are part of a *combined sewer* or Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

Stormwater means that portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a stormwater drainage system into a defined surface waterbody, or a constructed infiltration facility.

Stormwater Management Manual (SWMM) or **Manual** means the technical Manual published by Ecology for use by local governments that contain descriptions of and design criteria for BMPs to prevent, control, or treat *pollutants* in *stormwater*.

Stormwater Pollution Prevention Plan (SWPPP) means a documented plan to implement measures to identify, prevent, and control the contamination of point source discharges of *stormwater*.

Surface Waters of the State includes lakes, rivers, ponds, streams, inland waters, salt waters, and all other surface waters and water courses within the jurisdiction of the State of Washington.

Temporary Stabilization means the exposed ground surface has been covered with appropriate materials to provide temporary stabilization of the surface from water or wind erosion. Materials include, but are not limited to, mulch, riprap, erosion control mats or blankets and temporary cover crops. Seeding alone is not considered stabilization. Temporary stabilization is not a substitute for the more permanent "*final stabilization*."

Total Maximum Daily Load (TMDL) means a calculation of the maximum amount of a *pollutant* that a waterbody can receive and still meet state water quality standards. Percentages of the total maximum daily load are allocated to the various pollutant sources. A TMDL is the sum of the allowable loads of a single *pollutant* from all contributing point and nonpoint sources. The TMDL calculations must include a "margin of safety" to ensure that the waterbody can be protected in case there are unforeseen events or unknown sources of the *pollutant*. The calculation must also account for seasonable variation in water quality.

Transfer of Coverage (TOC) means a request for transfer of coverage under this general permit as specified by General Condition G9 of this permit.

Treatment BMPs means BMPs that are intended to remove *pollutants* from *stormwater*. A few examples of treatment BMPs are detention ponds, oil/water separators, biofiltration, and constructed wetlands.

Transparency means a measurement of water clarity in centimeters (cm), using a 60 cm transparency tube. The transparency tube is used to estimate the relative clarity or transparency of water by noting the depth at which a black and white Secchi disc becomes visible when water is released from a value in the bottom of the tube. A transparency tube is sometimes referred to as a "turbidity tube."

Turbidity means the clarity of water expressed as nephelometric turbidity units (NTUs) and measured with a calibrated turbidimeter.

Uncontaminated means free from any contaminant. See definition of "*contaminant*" and WAC 173-340-200.

Waste Load Allocation (WLA) means the portion of a receiving water's loading capacity that is allocated to one of its existing or future point sources of pollution. WLAs constitute a type of water quality based effluent limitation (40 CFR 130.2[h]).

Water-only Based Shaft Drilling is a shaft drilling process that uses water only and no additives are involved in the drilling of shafts for construction of building, road, or bridge foundations.

Water quality means the chemical, physical, and biological characteristics of water, usually with respect to its suitability for a particular purpose.

Waters of the State includes those waters as defined as "waters of the United States" in 40 CFR Subpart 122.2 within the geographic boundaries of Washington State and "waters of the State" as defined in Chapter 90.48 RCW, which include lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and water courses within the jurisdiction of the state of Washington.

Well means a bored, drilled or driven shaft, or dug hole whose depth is greater than the largest surface dimension. (See Injection well.)

Wheel Wash Wastewater means any water used in, or resulting from the operation of, a tire bath or wheel wash (BMP C106: Wheel Wash), or other structure or practice that uses water to physically remove mud and debris from vehicles leaving a construction site and prevent track-out onto roads. When *stormwater* comingles with wheel wash wastewater, the resulting water is considered wheel wash wastewater and must be managed according to Special Condition S9.D.9.

APPENDIX B – ACRONYMS

AKART	All Known, Available, and Reasonable Methods of Prevention, Control, and Treatment
BMP	Best Management Practice
CESCL	Certified Erosion and Sediment Control Lead
CFR	Code of Federal Regulations
CKD	Cement Kiln Dust
cm	Centimeters
CTB	Cement-Treated Base
CWA	Clean Water Act
DMR	Discharge Monitoring Report
EPA	Environmental Protection Agency
ERTS	Environmental Report Tracking System
ESC	Erosion and Sediment Control
FR	Federal Register
LID	Low Impact Development
NOI	Notice of Intent
NOT	Notice of Termination
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric Turbidity Unit
RCW	Revised Code of Washington
SEPA	State Environmental Policy Act
SWMM	Stormwater Management Manual
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
UIC	Underground Injection Control
USC	United States Code
USEPA	United States Environmental Protection Agency
WAC	Washington Administrative Code
WQ	Water Quality
WWHM	Western Washington Hydrology Model

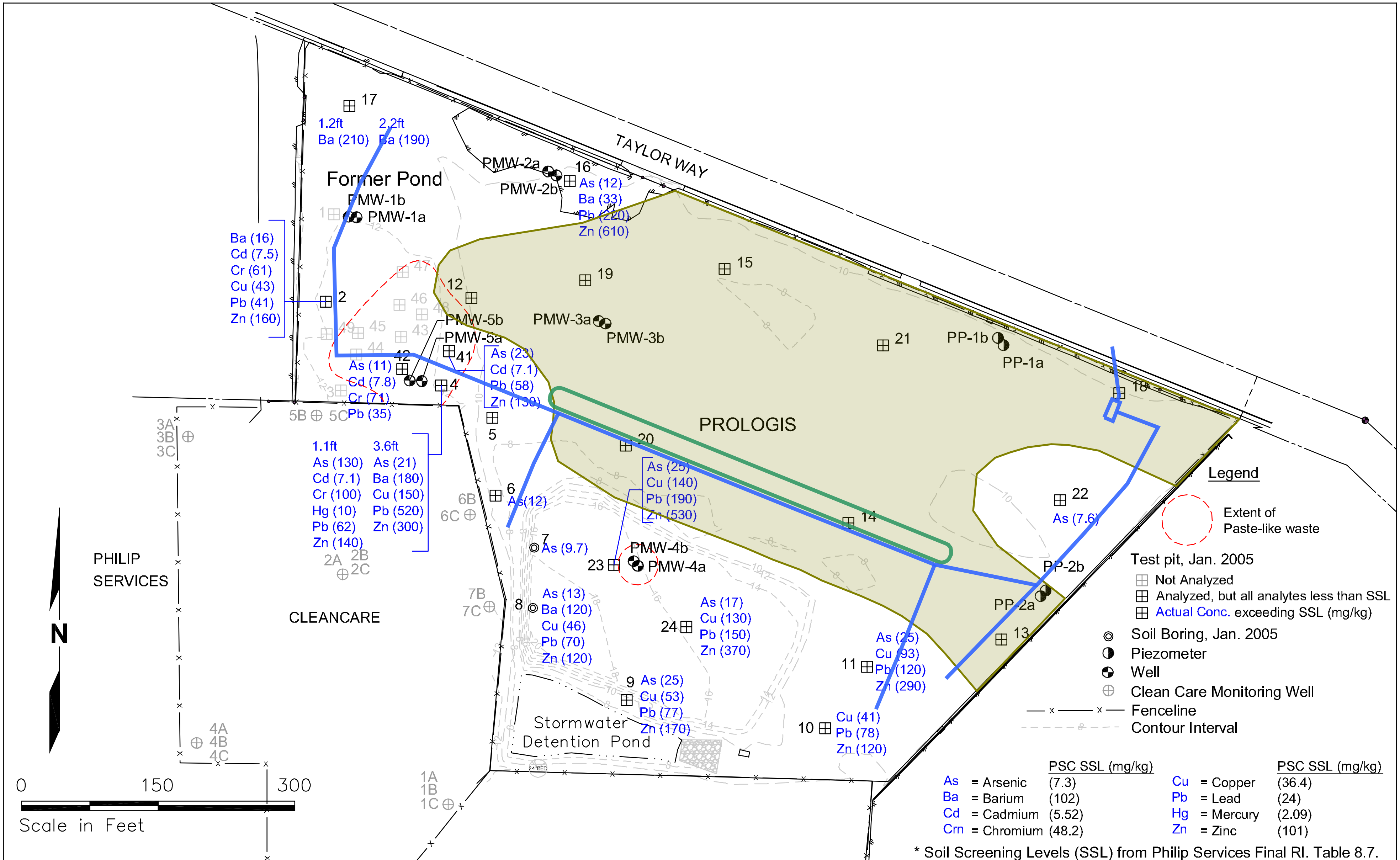
F. 303(d) List Waterbodies / TMDL Waterbodies Information

Please see following pages for any pertinent information regarding 303(d) List Waterbodies or TMDL Waterbodies.

Applicable information to be inserted here as needed.

G. Contaminated Site Information

Please see following pages for information on site contamination.



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Tacoma, Washington

Figure 3.11

Metals Exceeding Soil Screening Levels

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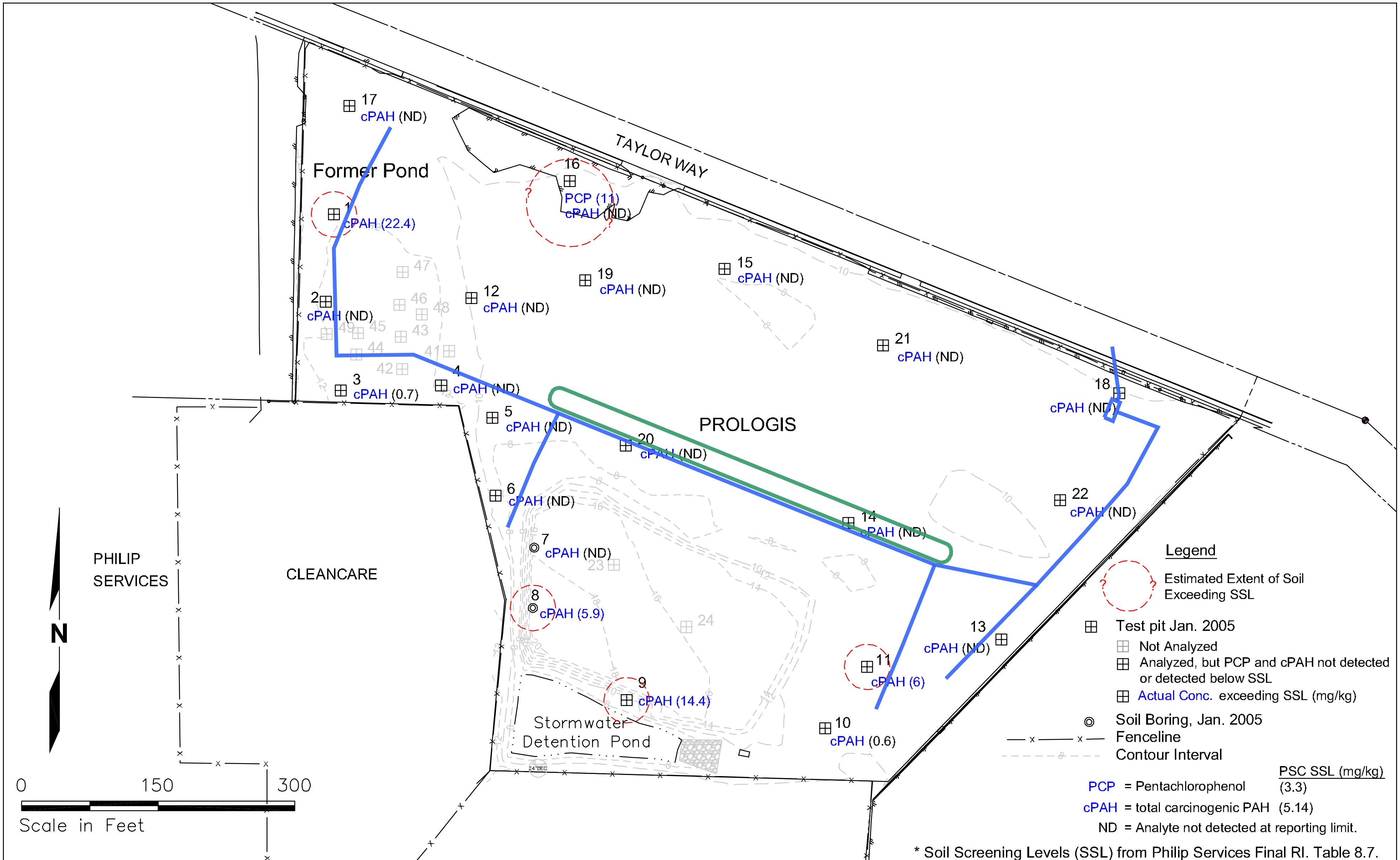

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ProLogis Taylor Way Property
Remedial Investigation
Tacoma, Washington

Figure 3.8
Results of SVOC Analysis for Soil

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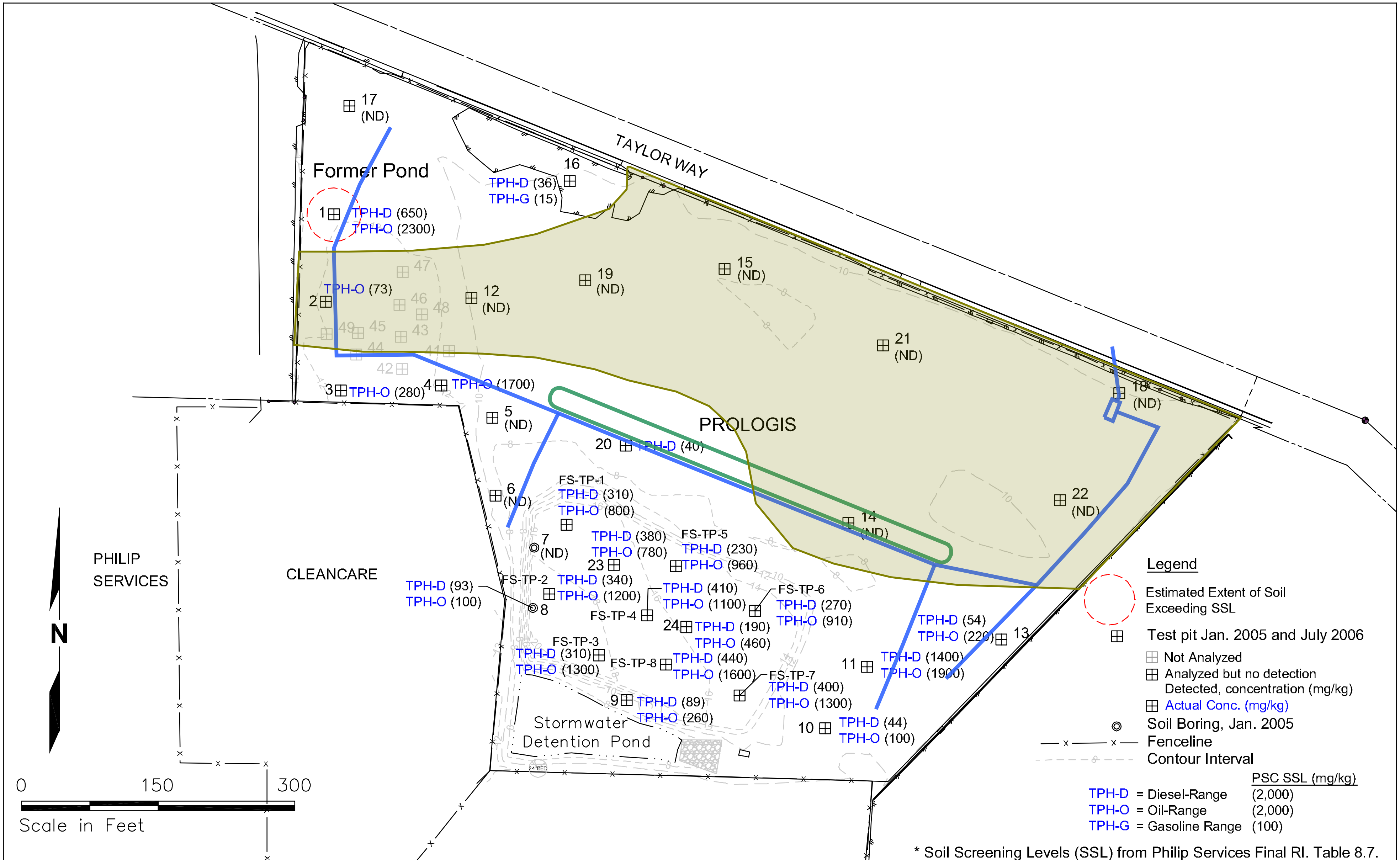

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Figure 3.10
Summary of TPH Analyses in Soil

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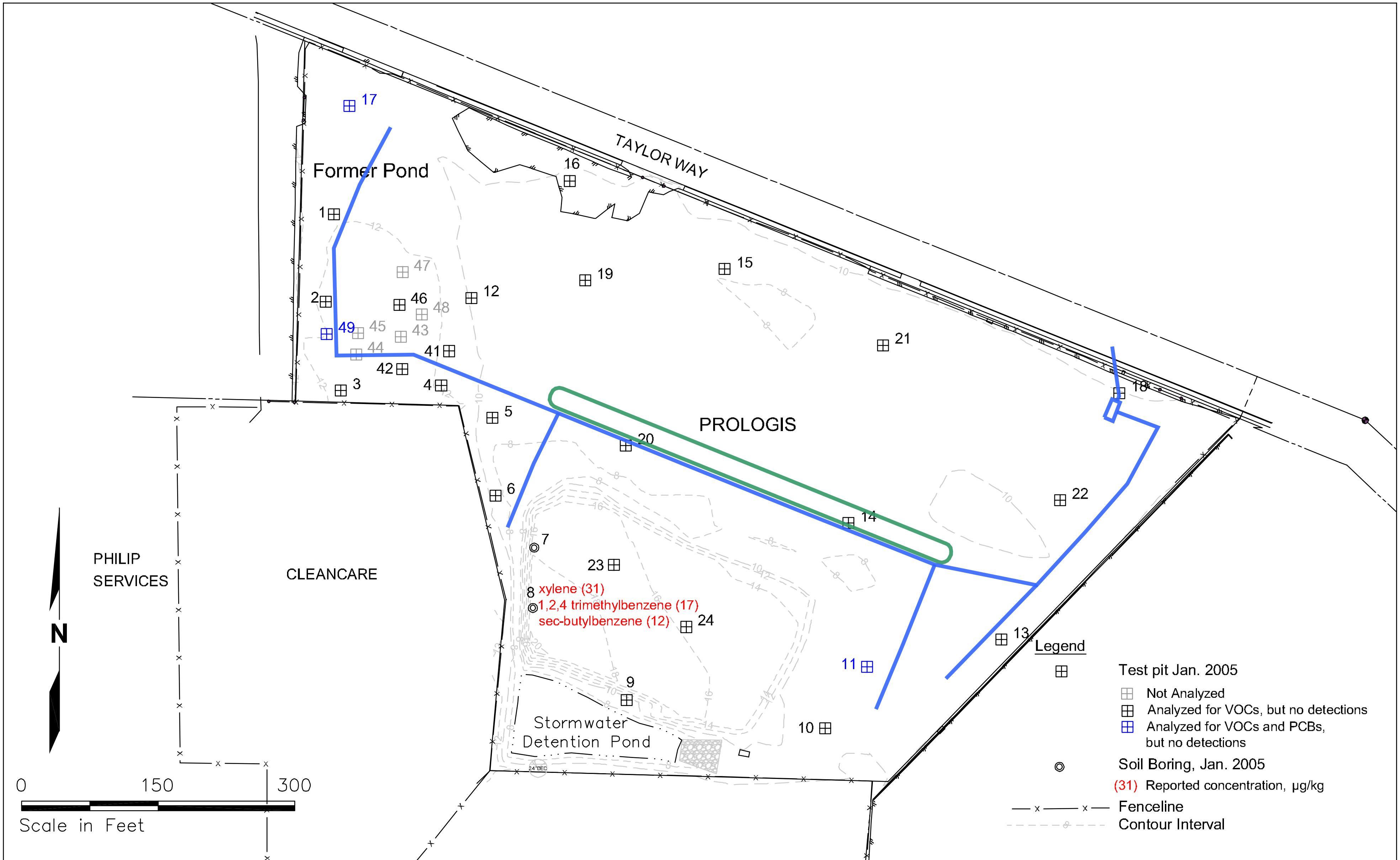

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Figure 3.9
Summary of VOC and PCB Analyses in Soil

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H. Engineering Calculations

Please see following for calculations.

TESC Calculations

Project: AVENUE 55-TAYLOR WAY PHASE 1
BCE #: 18293

Flow	cfs
Q2*	3.501
Q10	5.5706
Q100	8.7371

KEY

INPUT
OUTPUT
CHECK

REQUIRED SURFACE AREA

SA = (2,080)(Q_{10})	=	11,587	SF
SA provided	=	12,000	SF

PRINCIPAL SPILLWAY SIZING

$D = [(Q_{10}) / (3.782)(H)^{0.5}]^{0.5}$	=	1.214	FT
	=	14.56	IN
**H MIN (DEFAULT 1)*	*=*	*1*	*FT*

Use riser diameter of 18"

EMERGENCY OVERFLOW SPILLWAY

$L = [Q_{100} / (3.21)(H)^{1.5}] - 2.4H$	=	6.50	FT
**H MIN (DEFAULT .5)*	*=*	*0.5*	*FT*

Use 6.5' overflow spillway length

DEWATERING ORIFICE

$A_0 = (S.A.)(2H)^{0.5}/(0.6)(3,600)(T)(g)^{0.5}$	=	0.104	SF
DIAM. = $13.54\ (A_0)^{0.5}$	=	4.37	IN
**H MIN (DEFAULT 3.5')*	*=*	*3.5*	*FT*

Use dewatering orifice size of 4-3/8"

*IF CONSTRUCTION TAKES PLACE OUTSIDE THE WET SEASON IN SUMMER MONTHS, Q2 IS ALLOWED TO SIZE POND SA

WWHM2012

PROJECT REPORT

18293-Avenue 55 Taylor Way
Phase 1 TESC Calculations
6/7/2017

General Model Information

Project Name:	18293ESC
Site Name:	Avenue 55 Taylor Way Phase 1
Site Address:	
City:	Tacoma
Report Date:	6/7/2017
Gage:	
Data Start:	10/01/1901
Data End:	09/30/2059
Timestep:	15 Minute
Precip Scale:	0.000 (adjusted)
Version Date:	2017/04/17
Version:	4.2.13

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

Landuse Basin Data
Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Flat	9.99
Pervious Total	9.99
Impervious Land Use	acre
Impervious Total	0
Basin Total	9.99

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

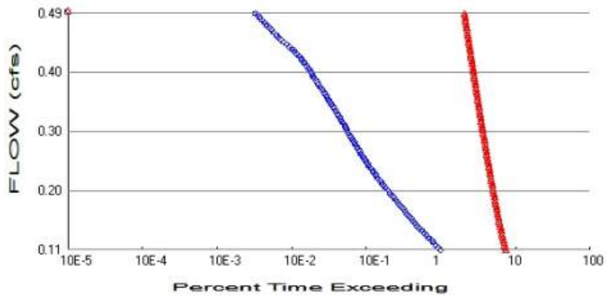
Bypass:	No
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
ROADS FLAT	1.43
ROOF TOPS FLAT	4.67
PARKING FLAT	3.89
Impervious Total	9.99
Basin Total	9.99

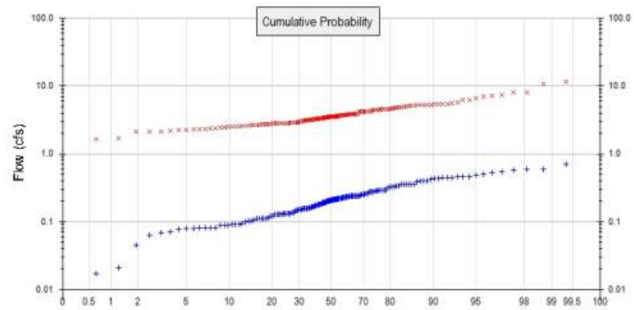
Element Flows To:

Surface	Interflow	Groundwater

Analysis Results

POC 1





+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1

Total Pervious Area:	9.99
Total Impervious Area:	0

Mitigated Landuse Totals for POC #1

Total Pervious Area:	0
Total Impervious Area:	9.99

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.210517
5 year	0.327503
10 year	0.391068
25 year	0.455766
50 year	0.494221
100 year	0.525842

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	3.501004
5 year	4.699489
10 year	5.570555
25 year	6.76273
50 year	7.719529
100 year	8.737097

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1902	0.154	4.140
1903	0.128	4.589
1904	0.210	5.194
1905	0.101	2.329
1906	0.045	2.604
1907	0.323	3.483
1908	0.239	2.864
1909	0.237	3.534
1910	0.326	3.377
1911	0.212	3.790

1912	0.701	6.280
1913	0.336	2.737
1914	0.082	11.488
1915	0.135	2.356
1916	0.210	4.407
1917	0.070	1.665
1918	0.225	3.529
1919	0.166	2.159
1920	0.214	2.873
1921	0.239	2.464
1922	0.240	3.866
1923	0.193	2.693
1924	0.088	5.097
1925	0.109	2.128
1926	0.204	4.152
1927	0.132	3.383
1928	0.163	2.509
1929	0.334	5.007
1930	0.215	5.242
1931	0.199	2.526
1932	0.156	2.727
1933	0.150	2.704
1934	0.441	4.392
1935	0.205	2.328
1936	0.178	3.259
1937	0.284	4.846
1938	0.173	2.369
1939	0.011	2.979
1940	0.192	5.256
1941	0.091	5.193
1942	0.289	3.906
1943	0.149	3.868
1944	0.272	5.561
1945	0.241	4.215
1946	0.130	3.271
1947	0.082	2.550
1948	0.453	3.509
1949	0.388	5.420
1950	0.110	3.066
1951	0.135	4.639
1952	0.591	5.199
1953	0.533	4.812
1954	0.192	2.850
1955	0.157	2.649
1956	0.077	2.613
1957	0.273	2.825
1958	0.570	3.505
1959	0.352	3.511
1960	0.094	2.788
1961	0.354	7.954
1962	0.190	3.420
1963	0.091	2.540
1964	0.100	7.365
1965	0.396	3.304
1966	0.111	2.764
1967	0.170	3.874
1968	0.174	3.265
1969	0.173	2.944

1970	0.272	3.347
1971	0.427	3.243
1972	0.277	10.724
1973	0.353	6.229
1974	0.191	4.508
1975	0.449	4.652
1976	0.238	4.962
1977	0.080	2.130
1978	0.399	3.593
1979	0.110	3.777
1980	0.226	3.724
1981	0.217	3.505
1982	0.089	2.856
1983	0.354	3.873
1984	0.144	3.850
1985	0.235	4.380
1986	0.211	2.224
1987	0.402	3.906
1988	0.255	2.329
1989	0.229	2.131
1990	0.259	2.815
1991	0.203	4.207
1992	0.290	4.000
1993	0.281	4.571
1994	0.422	3.126
1995	0.081	2.430
1996	0.463	3.257
1997	0.177	2.920
1998	0.211	3.470
1999	0.017	3.771
2000	0.161	3.315
2001	0.082	2.659
2002	0.293	4.826
2003	0.256	2.817
2004	0.235	4.225
2005	0.433	8.073
2006	0.131	3.787
2007	0.131	4.237
2008	0.224	3.492
2009	0.153	2.664
2010	0.131	3.420
2011	0.106	3.599
2012	0.153	3.340
2013	0.120	3.151
2014	0.089	3.047
2015	0.171	5.122
2016	0.068	3.200
2017	0.324	5.136
2018	0.590	3.077
2019	0.550	4.554
2020	0.179	3.728
2021	0.292	3.144
2022	0.121	5.345
2023	0.246	6.603
2024	0.462	7.061
2025	0.217	3.437
2026	0.354	3.775
2027	0.127	4.211

2028	0.110	1.648
2029	0.240	2.706
2030	0.445	5.424
2031	0.147	1.704
2032	0.080	2.887
2033	0.129	3.627
2034	0.127	2.839
2035	0.502	3.494
2036	0.261	2.835
2037	0.062	3.814
2038	0.208	3.619
2039	0.021	7.273
2040	0.116	2.846
2041	0.156	3.612
2042	0.489	4.167
2043	0.236	4.609
2044	0.318	3.166
2045	0.217	2.563
2046	0.254	2.842
2047	0.187	3.508
2048	0.242	2.892
2049	0.216	4.291
2050	0.155	3.196
2051	0.225	4.504
2052	0.130	3.441
2053	0.232	2.924
2054	0.295	5.803
2055	0.091	3.553
2056	0.102	4.585
2057	0.159	2.254
2058	0.202	4.316
2059	0.356	5.382

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.7007	11.4880
2	0.5905	10.7238
3	0.5899	8.0730
4	0.5698	7.9543
5	0.5502	7.3649
6	0.5327	7.2725
7	0.5022	7.0606
8	0.4885	6.6034
9	0.4626	6.2803
10	0.4620	6.2288
11	0.4529	5.8034
12	0.4487	5.5612
13	0.4452	5.4238
14	0.4408	5.4195
15	0.4328	5.3816
16	0.4275	5.3446
17	0.4222	5.2562
18	0.4019	5.2416
19	0.3995	5.1991
20	0.3964	5.1941
21	0.3880	5.1935
22	0.3562	5.1363

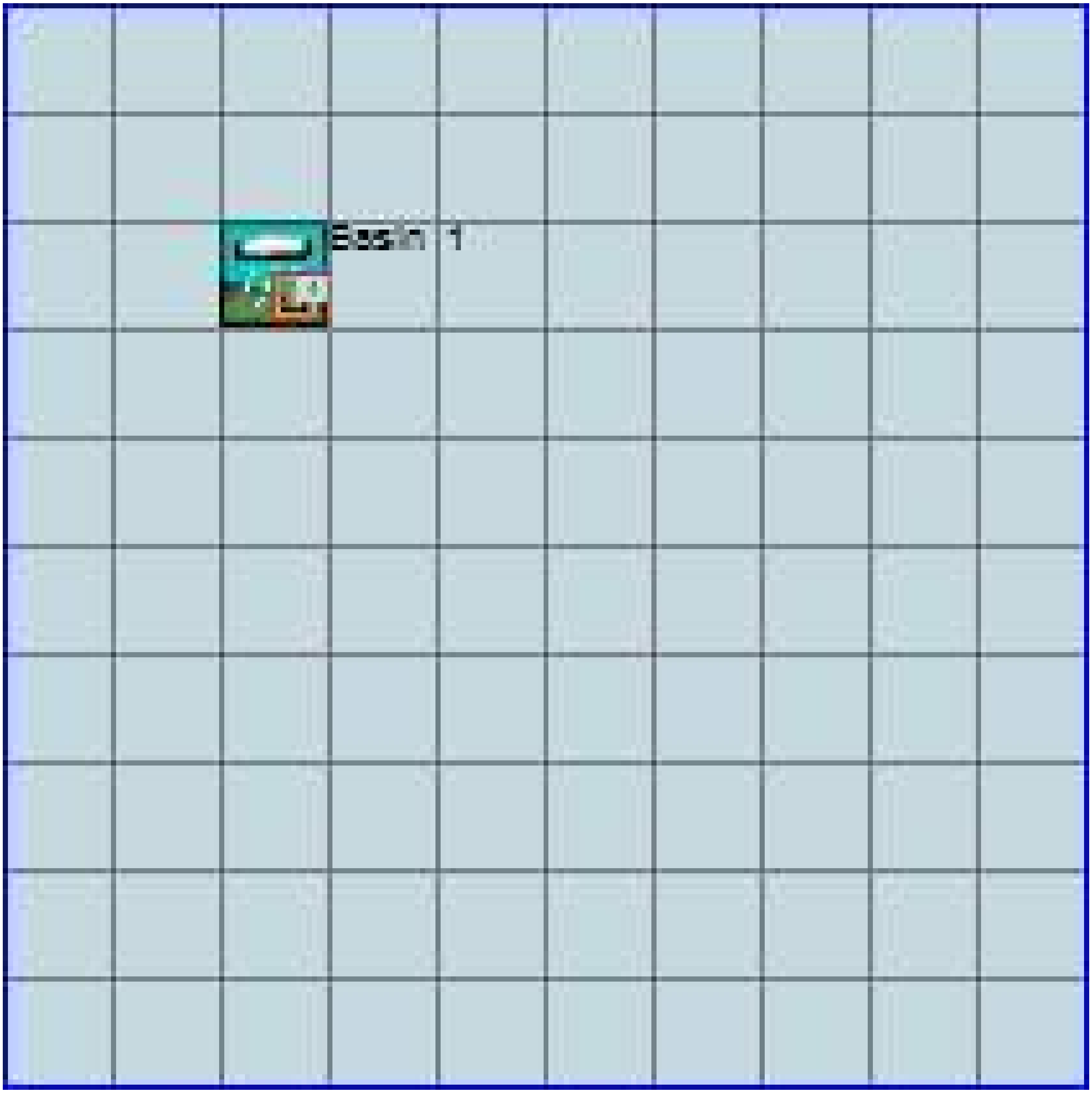
23	0.3543	5.1218
24	0.3542	5.0971
25	0.3541	5.0074
26	0.3533	4.9616
27	0.3523	4.8462
28	0.3358	4.8263
29	0.3344	4.8119
30	0.3263	4.6519
31	0.3244	4.6388
32	0.3231	4.6086
33	0.3183	4.5887
34	0.2948	4.5846
35	0.2935	4.5709
36	0.2921	4.5542
37	0.2903	4.5078
38	0.2889	4.5043
39	0.2840	4.4075
40	0.2815	4.3922
41	0.2772	4.3798
42	0.2728	4.3157
43	0.2722	4.2913
44	0.2715	4.2373
45	0.2608	4.2253
46	0.2593	4.2147
47	0.2555	4.2111
48	0.2548	4.2068
49	0.2539	4.1673
50	0.2457	4.1524
51	0.2419	4.1397
52	0.2407	4.0001
53	0.2402	3.9063
54	0.2400	3.9059
55	0.2395	3.8735
56	0.2393	3.8726
57	0.2376	3.8681
58	0.2367	3.8656
59	0.2359	3.8500
60	0.2350	3.8136
61	0.2349	3.7897
62	0.2320	3.7874
63	0.2291	3.7771
64	0.2262	3.7748
65	0.2254	3.7708
66	0.2249	3.7280
67	0.2236	3.7243
68	0.2169	3.6267
69	0.2168	3.6187
70	0.2166	3.6118
71	0.2163	3.5989
72	0.2149	3.5929
73	0.2141	3.5535
74	0.2125	3.5339
75	0.2111	3.5292
76	0.2107	3.5112
77	0.2101	3.5090
78	0.2100	3.5078
79	0.2080	3.5049
80	0.2046	3.5046

81	0.2039	3.4943
82	0.2030	3.4917
83	0.2017	3.4834
84	0.1988	3.4698
85	0.1930	3.4411
86	0.1922	3.4374
87	0.1918	3.4205
88	0.1912	3.4201
89	0.1902	3.3829
90	0.1869	3.3770
91	0.1795	3.3467
92	0.1779	3.3404
93	0.1775	3.3148
94	0.1737	3.3040
95	0.1734	3.2707
96	0.1731	3.2648
97	0.1706	3.2586
98	0.1703	3.2571
99	0.1663	3.2427
100	0.1632	3.2003
101	0.1606	3.1965
102	0.1593	3.1662
103	0.1571	3.1505
104	0.1559	3.1436
105	0.1556	3.1264
106	0.1552	3.0771
107	0.1544	3.0662
108	0.1534	3.0472
109	0.1531	2.9789
110	0.1501	2.9440
111	0.1486	2.9239
112	0.1471	2.9202
113	0.1443	2.8922
114	0.1353	2.8870
115	0.1353	2.8729
116	0.1322	2.8641
117	0.1313	2.8559
118	0.1309	2.8496
119	0.1306	2.8464
120	0.1301	2.8419
121	0.1297	2.8394
122	0.1288	2.8347
123	0.1284	2.8246
124	0.1273	2.8167
125	0.1267	2.8150
126	0.1209	2.7878
127	0.1195	2.7642
128	0.1156	2.7365
129	0.1111	2.7267
130	0.1103	2.7057
131	0.1100	2.7037
132	0.1096	2.6933
133	0.1095	2.6643
134	0.1055	2.6586
135	0.1025	2.6495
136	0.1011	2.6130
137	0.1003	2.6040
138	0.0937	2.5626

139	0.0914	2.5505
140	0.0913	2.5404
141	0.0911	2.5256
142	0.0890	2.5089
143	0.0885	2.4640
144	0.0882	2.4303
145	0.0822	2.3689
146	0.0822	2.3560
147	0.0820	2.3294
148	0.0810	2.3286
149	0.0801	2.3281
150	0.0800	2.2540
151	0.0770	2.2243
152	0.0701	2.1591
153	0.0679	2.1313
154	0.0623	2.1305
155	0.0452	2.1275
156	0.0209	1.7039
157	0.0170	1.6646
158	0.0108	1.6483

Appendix
Predeveloped Schematic

Mitigated Schematic



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Clear Creek Solutions, Inc.
6200 Capitol Blvd. Ste F
Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

www.clearcreeksolutions.com