PES Environmental, Inc.
Engineering & Environmental Services

A Report Prepared for:
BMR-Dexter LLC
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PUBLIC REVIEW INTERIM ACTION WORK PLAN
AMERICAN LINEN SUPPLY CO-DEXTER AVENUE SITE
700 DEXTER AVENUE NORTH
SEATTLE, WASHINGTON

Facility Site Identification Number: 3573
Cleanup Site Identification Number: 12004

JANUARY 8, 2018

VOLUME I of II

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1.0 INTRODUCTION

This interim action work plan (referred to as the work plan or plan) has been prepared on behalf of BMR-Dexter LLC (BMRD) for the American Linen Supply – Dexter Avenue Site (Site) located at 700 Dexter Avenue North, Seattle, Washington (Figure 1). The work plan was prepared in accordance with the requirements of Agreed Order No. DE 14302 (“AO”) between the State of Washington Department of Ecology (“Ecology”) and BMRD. Specifically, the work plan was prepared to fulfill the requirements of Section VI.G and Section VII.K of the AO. The interim action will be conducted concurrent with an updated remedial investigation (RI) and feasibility study (FS) that are also requirements of the AO (Sections VII.A through VII.D).

1.1 Definition of “Property” and “Site” for Purposes of MTCA Interim Action

For the purpose of this work plan, the word “Site” will refer to an area where contamination released at the property located at 700 Dexter Avenue North (“Property”) has come to be located, consistent with the definition of “site” or “facility” in the Washington Model Toxics Control Act (MTCA, Chapter 173-340 of the Washington Administrative Code (“WAC”)). The word “Property” will refer to the area within the 700 Dexter Avenue North property boundary (Figure 1).

1.2 Overview of Proposed Interim Action

The proposed interim action described in this work plan is being conducted to reduce a threat to human health or the environment by eliminating or substantially reducing the mass of contamination on the Property by: (1) implementing aggressive *in situ* treatment and removal of the contaminant source area located beneath the Property, and (2) controlling migration of contaminants from the Property to downgradient areas of the Site. The proposed interim action will be implemented prior to completing the RI/FS for the overall Site, but does not pre-suppose the final cleanup action for the overall Site that will be recommended in the FS report. Rather, by accomplishing source reduction and migration control now, the proposed interim action will reduce the cleanup timeframe for the overall Site, and components of the interim action can be integrated into the final cleanup action for the Site as determined appropriate by the FS. Furthermore, implementing the interim action now more effectively reduces the threat to human health and the environment compared to delaying the action until after the final cleanup action has been selected by Ecology.

1.3 Work Plan Purpose

This interim action work plan describes development, selection, and implementation of an interim action on and immediately adjacent to the Property. The interim action is being implemented in advance of completing the RI/FS in order to continue to reduce the on-Property sources of contamination. Information generated from the updated RI/FS will be used to prepare an overall cleanup action plan to address contamination that has been attributed to the Property, and, consistent with Chapter 173 340-430 of the WAC, the interim action described in this plan will be designed such that it will both support the overall cleanup objectives for the Site and can be integrated into the final cleanup action.

1.4 Relationship of Interim Action to Property Development and Overall Cleanup Action

The interim action developed and described in this plan is focused on addressing contamination located on the Property. This interim action is designed to take aggressive action to treat the remaining sources of contamination on the Property prior to site development. The current site development plans call for construction to begin in the fourth quarter of 2018 and continue through late 2020. As will be demonstrated throughout the remainder of this document, the proposed redevelopment activities do not preclude future cleanup actions that may be necessary to meet both the on-Property and overall Site cleanup objectives. Furthermore, while the overall cleanup action for the Site will not be defined prior to completing the RI/FS, conducting source reduction and control now as part of the interim action will reduce the potential threats to human health and the environment, and do so more effectively than if these actions were delayed.

1.5 Report Organization

The following is preliminary.

Section 1 – Introduction: Describes the background, purpose, and organization of this report.

Section 2 – Site Background: Provides a summary of the site location and history.

Section 3 – Environmental Setting: Summarizes the environmental background of the site, including climate, hydrology, geology, and area water wells.

Section 4 – Previous Site Investigations and Interim Actions: Describes the environmental investigations and interim actions performed at the Site, including previous subsurface explorations, hydraulic and chemical testing, groundwater monitoring, and surveying conducted at the Site. Also summarizes the previously conducted interim actions.

Section 5 – 2017 Pre-Interim Action Investigations: Describes the soil and groundwater investigations being performed on and immediately adjacent to the Property, including soil sampling and the installation and sampling of new monitoring wells to fill identified data gaps for the Property.

Section 6 – Investigation Results: Describes the site geology, groundwater flow, and nature and extent of contamination.

Section 7 – Preliminary Conceptual Site Model: Provides a summary of the indicator hazardous substances, contaminant sources, chemical fate and transport, exposure pathways and receptors, and cleanup standards for the site.

Section 8 – Interim Action Scoping: Describes the objectives, applicable or relevant and appropriate requirements (ARARs), chemicals of concern and environmental media, and the areas to be addressed by the interim action.

Section 9 – Evaluation of Interim Action Approach and Technologies: Evaluates potential remedial approaches and related technologies to meet the interim action objectives defined in Section 8 and recommends an interim action for implementation.

Section 10 – Interim Action Implementation: Provides a detailed description of the recommended interim action and the procedures to be followed for implementation.

Section 11 – Reporting and Schedule: Provides a description of the reports to be produced during the interim action and a schedule for implementation and reporting.

Section 12 – References: Lists the sources of information referenced in the document.

2.0 SITE BACKGROUND

This section summarizes the Property location and description, the Property history and development, the surrounding facilities, and the regulatory history of the Site.

2.1 Property Location and Description

BMRD owns the Property, which occupies approximately 1.41 acres (61,440 square feet) at 700 Dexter Avenue North in Seattle, Washington (Figure 1). A recent Alta Survey of the Property indicates the Property encompasses 59,818 square feet. The Property is located in the northeast quarter of Section 30, Township 25 North, Range 4 East, Willamette Meridian in King County, Washington. It consists of one tax parcel (King County Assessor Parcel Number 224900-0285) and is currently zoned for mixed use (Seattle Mixed South Lake Union Incentive Height 160/85/240). All but the southwest corner of the Property lies within the U.S. Government Meander Line buffer that designates the historic Lake Union shoreline; properties within this buffer are considered to have the potential for archeological resources. Dexter Avenue North bounds the Property to the west, Valley Street bounds the Property to the north, 8th Avenue North bounds the Property to the east, and Roy Street bounds the Property to the south.

No buildings are currently present at the Property. The Property is almost entirely covered by concrete or asphalt, with small patches of vegetation or exposed soil (Figure 2). Concrete building foundations or slabs cover the surface of the northwest quarter of the Property, the southern half of the Property, and the southeast portion of the northeast quarter of the Property. Most of the northeast quarter of the Property is covered with asphalt. Most of the Property lies below the surrounding streets due to the now-exposed basements of the former buildings. The building formerly in the southwest quarter of the Property did not have a basement under the southern half of it, so that portion of the Property is at grade with the surrounding streets, as is the part of the Property along the northern and eastern Property lines in the northeast quarter. Although full utility services are available in the area (water, sanitary sewer, and storm drainage by Seattle Public Utilities, power by Seattle City Light, natural gas by Puget Sound Energy, and telecommunications by Century Link), utilities are not currently hooked up to the Property.

2.2 Property History and Development

This section provides a brief summary of the Property history and development. The 2013 Draft RI Report (SoundEarth Strategies, Inc. ("SES"), 2013b), which served as a source of this summary, provides more detailed information, including copies of city records and photographs. Appendix A presents selected historical photographs of the Property. Former Property owners include American Linen Supply Company (prior to April 28, 2015) and 700 Dexter LLC (between April 28, 2015, and January 8, 2017).

2.2.1 Buildings and Operations

Residences existed on the Property from at least 1893 until 1925. Building A, consisting of a single-story building with a basement and a mezzanine, was constructed on the southern half of the Property in 1925. A refueling facility was built on the northwest corner of the Property in 1930 (Figure 2). The refueling facility reportedly had several underground storage tanks

("USTs") and two dispenser islands. Between 1947 and 1966, building additions were reportedly constructed. In 1947, Building B (a single-story, masonry garage) was built as an addition to the northeastern corner of Building A. Building B initially operated as a parking garage and automotive repair facility. Four 6,000-gallon USTs containing heating oil for a boiler system were installed beneath Building A in 1947. In 1966, Building C (a single-story concrete building with a basement and a mezzanine) was built in the northwest quadrant of the Property, and the refueling facility at that location was demolished. Building C housed laundry operations, a garage, and offices. Between 1947 and 1966, a fuel dispenser and up to three USTs were constructed along the northern Property boundary in the northeast quadrant of the Property.

According to building plans and available reports, dry cleaning was conducted on the Property as early as 1966, with dry cleaning machines located in the northwestern part of the Building A basement. Reportedly, the dry cleaning machines leaked solvents into the subsurface. By 1990, the dry cleaning machines had been removed. A wastewater treatment facility for the commercial laundry operations was constructed in Building B in 1986, which included several aboveground storage tanks containing acids, caustics, polymers, sludge, and water. Waste material from the wastewater treatment facility was either discharged through the sewer system or conveyed into a disposal container to the north of Building B. In the mid-1990s, commercial laundry operations ceased, and the wastewater treatment system was removed. The buildings were subsequently leased to various tenants, including several automotive repair shops, a bakery, and a car rental office. The on-Property buildings were demolished between January 14 and March 8, 2013.

2.2.2 Subsurface Utilities

Based on the available records, the following utilities existed outside the buildings at the Property (Figure 2):

1. **Sanitary Sewer Lines.** A 1926 Seattle Engineering Department side sewer card shows five sanitary side-sewers running between the east side of the Property and the 8-inch-diameter combined sewer line located beneath the 8th Avenue North Right-of-Way ("ROW"). Four were connected to Building A, and one was connected to the Building B area. An oil/water separator was located in the southeast corner of the yard area and was tied to one of the side sewer lines that connected to the 8-inch-diameter combined sewer line located beneath the 8th Avenue North ROW. Although the status of the side-sewer lines is currently unknown, they are all shown on the most current City of Seattle sewer map.

2. **Storm Drains.** Three catch basins were located on the west side of the yard area in the northeastern quadrant of the Property. SES reported that two of the catch basins were connected to a storm drain that ran northeasterly to connect to the combined sewer in 8th Avenue North. Additionally, a north-south trending trench drain was present in the yard in the northern portion of the Property.

3. **Natural Gas Line.** A gas line was located immediately west of the storm drain line along the west side of the yard area in the northeastern quadrant of the Property. The

line connected to the 4-inch-diameter main line beneath the southern sidewalk of Valley Street.

4. **Electrical Lines.** Power to the Property came from a power pole in the eastern sidewalk of 8th Avenue North ROW. Power lines ran through an underground electrical conduit to an electrical vault in the southwest corner of the yard area in the northeastern quadrant of the Property.

5. **Water Lines.** One water line from the 12-inch-diameter cast iron water line beneath 8th Avenue North entered the Property from the east, and three water lines entered the Property from the west. Of the three western lines, one connected to the south part of Building A, and the other two connected to Building C.

6. **Tank 5.** A tank installed before 1966 (Tank 5) was located in the south part of the yard area in the northeastern quadrant of the Property. The tank reportedly functioned as a cooling tank for laundry wastewater. SES oversaw the removal of this tank in 2013 (SES 2013b).

7. **Ducts.** Four 4-inch-diameter polyvinyl chloride ("PVC") ducts were installed beneath the Property in 1984 near the Roy and Dexter intersection. The purpose of the PVC ducts was not indicated in the documents reviewed by SES (2013b).

SES summarized a review of the subsurface utilities associated with operations in the buildings at the Property (SES, 2013b). Following is a brief summary by building (Figure 2):

1. **Building A.** Subsurface utilities beneath the Building A basement included six sumps (Nos. 1 through 4, 7, and 8) in the north central part of the building, a sump in the southeastern part of the building (in an area formerly used as a garage), the eastern sanitary sewer line, and a drainage system associated with the boilers installed in 1947. Drainage components in the boiler room included Sump No. 4 (which was reportedly connected to the sewer system and covered with a wood grate), two boiler pits, two floor drains between the boiler pits, three floor drains to the west of the boiler pits, and two sets of trenches to the north and south of the boiler pits. The northern trench was for blow-off, and the southern trench reportedly carried oil and steam piping. A trench to the south of the original boiler room was reportedly filled with concrete in 1947. SES indicated that Sump No. 7 in the northeast corner of the building was likely removed or filled in preparation for the construction of Building B in 1947. SES (2013b) indicated that product delivery lines for the 6,000-gallon USTs still exist beneath the sidewalk on the east side of Dexter Avenue North and still run beneath the Property. Additionally, water treatment trenches and Sump No. 6 were located beneath the first floor of the building.

2. **Building B.** A wastewater treatment plant operated in Building B between 1986 and the mid-1990s. The plant included pumps, a sump, drains, and a sanitary sewer line, beneath the wastewater treatment plant that connected the plant to the flow control structure in the northeast quadrant of the Property.

3. **Building C.** Subsurface utilities beneath Building C included a trench drain located along the southern wall of the building, 4-inch-diameter floor drains located under the central and northern part of the building that exited the northeastern part of the building and connected to the combined sewer line beneath 8th Avenue North, a sump (No. 5), and natural gas lines connected to the boiler system in Building A. Additionally, several 5-inch-diameter pipe sleeves were located on the first floor of Building C adjacent to load-bearing columns in the former dry cleaning area; the pipe sleeves ran from the first floor into the basement.

2.3 Surrounding Facilities and Potential Off-Site Sources

This section describes the properties closest to the Property, which are located across Dexter Avenue North, Valley Street, 8th Avenue North, and Roy Street (Figure 3). SES RI Figure 7 (see Appendix B) depicts the surrounding properties and potential historical sources of subsurface contamination.

2.3.1 West of the Property

The block immediately west of Dexter Avenue North from the Property consists of three tax parcels, two of which front Dexter Avenue North: King County Parcel Number 224900-00245 with a street address of 701 Dexter Avenue North on the south, and King County Parcel Number 224900-00255 with a street address of 717 Dexter Avenue North on the north. The 0.62-acre (27,127- square-foot) south parcel contains an office building that was built in 1984. The building has an at-grade parking garage. The 0.33-acre (14,520- square-foot) north parcel was developed as an apartment complex in 2015, with street level retail shops and sub-grade parking. The north parcel previously contained a one-story masonry building built in 1928 that most recently housed an auto shop for the sales and repair of European cars; in 2012, Ecology issued a determination that no further action was required with regard to soil around a heating oil UST that was removed from the north parcel in 2011.

2.3.2 North of the Property

The property immediately north of Valley Street consists of one tax parcel (King County Parcel Number 224900-0330) with a street address of 810 Dexter Avenue North. The 1.43-acre (62,250- square-foot) parcel occupies the entire block and was developed as an apartment complex in 2015, with street level retail shops and sub-grade parking. Prior to 2015, the west half of the property contained a two-story office and warehouse building with a basement, and the east half of the property contained an asphalt-paved parking lot. The property is listed in Ecology's site cleanup database as the Seattle School District 1 Facilities Building (Cleanup Site ID 9747). A release report for a leaking underground storage tank ("LUST") was issued in 1989, with confirmed soil concentrations of gasoline-range organics ("GRO"), benzene, and other hydrocarbons above cleanup levels after removal of six USTs and a listed Site status of "Cleanup Started". Investigation and over-excavation of petroleum-contaminated soil was conducted in 1989, with soil above field screening criteria removed for treatment at another facility (Hart Crowser, 1989 and 1990).

2.3.3 East of the Property

Seattle City Light owns the property immediately east of 8th Avenue North, which consists of one tax parcel (King County Parcel Number 408880-3530) with a street address of 800 Aloha Street (formerly designated 800 Roy Street by SES). The 1.54-acre (67,025-square foot) parcel occupies the entire west half of the block (i.e., west of the alley) and contains a one-story, masonry warehouse with a basement that was built in 1926 on the southern half of the property. An asphalt-paved parking lot with storage structures is located to the north of the building. The building is currently used as a maintenance facility for Seattle City Light vehicles and equipment, and the paved lot north of the building is currently used as a self-pay parking lot. Historically, a garage in the northern part of the building's basement was used to repair, refuel, and wash vehicles. Transformer testing was also performed in the basement. Historically, vehicles, transformers, fuels, and equipment were stored on the northern half of the property. At least two generations of USTs and fuel dispensers were installed on the northern part of the parcel between 1944 and 1955. Two USTs were reportedly removed in 1993 (SES, 2013b). The Seattle City Light property is listed in Ecology's site cleanup database as the Seattle Roy Aloha Shops (Cleanup Site ID 11216). LUST notification was made in 1992, with confirmed soil and groundwater concentrations of GRO and benzene above cleanup levels and a listed Site status of "Cleanup Started".

The area between 9th Avenue North and the alley on the east side of 800 Aloha Street consists of four tax parcels. King County Parcel Number 408880-3435 (701 9th Avenue North), King County Parcel Number 408880-3440 (711 9th Avenue North), King County Parcel Number 408880-3485 (739 9th Avenue North), and King County Parcel Number 408880-3565 (753 9th Avenue North) are all owned by Block 79 LLC. These properties were created by filling in the southern portion of the Lake Union shoreline in the early 1900s (SES, 2013b). In 1922, a Mack International Motor Truck Corporation showroom and service shop were built on the southern half of the property. Three buildings were constructed on the property between 1946 and 1950 that contained an automotive welding factory, automotive repair shops, and general retail. The parcels contained as many as four USTs for storage of waste oil, heating oil, and gasoline, with Ecology and City of Seattle records documenting the removal of four USTs from the parcels. By 1980, automotive dealerships and retail tenants occupied the parcels. Petroleum-contaminated soil was encountered when three of the USTs, located in the northernmost parcel, were removed in 1992. A Maaco Auto Body facility began operating in the central part of the property in 1996 and installed a flammable liquids storage room and a spray paint booth.

The area between 9th Avenue North, Westlake Avenue North, and Broad Street consists of three tax parcels. King County Parcel Number 408880-3495 (900 Roy Street) is owned by the Seattle Department of Transportation ("SDOT"), and King County Parcel Numbers 408880-3500 (707 Westlake Avenue North) and 408880-3510 (731 Westlake Avenue North) are owned by City Investors XXX LLC. These properties were created by filling in the southern portion of the Lake Union shoreline in the early 1900s (SES, 2013b). Per SES (2013b), the parcels were developed in 1914, with multiple renovations to the buildings over time. Property uses included a laundry facility initially, with subsequent uses as a gasoline service station and automotive repair shop, a lithograph manufacturer, a sheet metal fabrication and painting shop, an automotive repair shop, an automotive sales and repair facility, and more recently industrial, food service, retail, and residential uses. Multiple USTs at the properties were used to store heating oil, fuel, and waste oil.

2.3.4 South of the Property

The property immediately south of Roy Street consists of four tax parcels (King County Parcel Numbers 224900-0006, 224900-0040, 224900-0055, and 224900-0080), all owned by the SDOT. The street addresses for Parcel Numbers 224900-0006, 224900-0055, and 224900-0080 are 816 Mercer Street, 714 Mercer Street, and 702 Roy Street, respectively. Parcel Number 224900-0040 does not have an address in the King County tax assessor records, although the tax assessor records also list 801 Roy Street as an address for the property. The four parcels total 1.45 acres (63,105 square feet), and all four parcels are currently vacant and being used for construction staging and parking.

Historically, an auto repair shop, gas station, paint manufacturer, restaurant, and automotive upholstery shop occupied portions of the property. As seen on Figure 3, large-diameter sewer lines constructed as part of the Denny Way Combined Sewer Overflow (“CSO”) project lie beneath the south side of the Roy Street ROW. Besides the large-diameter pipelines, the major component of the project near the Property is the East Tunnel Portal/Drop Structure located just south of the intersection of Roy Street and 8th Avenue North. The approximately 70-foot-deep vertical shaft was used during construction of the Mercer Street Tunnel and the Lake Union and South Lake Union CSO pipelines.

2.3.5 Other Properties

There are two other properties near the Site that have been impacted by volatile organic compounds (“VOCs”) in the soil and/or groundwater: 601 Westlake Avenue North and 630 Westlake Avenue North. The 601 Westlake Ave. North property was developed in the early 1900s, with multiple historical uses. Property uses included a steam laundry facility, a bottling facility, scrap paper and wood storage, and automobile storage, repair, fueling, and sales (Ecology, 2015a; Farallon Consulting L.L.C. (“Farallon”), 2015). This 1.24-acre property is currently occupied by an office building constructed in 2015. During property redevelopment, USTs were decommissioned and removed, cleanup of petroleum hydrocarbons at the property was conducted, and a dewatering system was operated to assist with construction of the building foundation and subsurface structures. The dewatering system operated between November 2013, and December 2014, pumping at rates up to 377 gallons per minute (“gpm”; Farallon, 2015). A treatment system was employed to treat contaminants including chlorinated volatile organic compounds (“CVOCs”) in the pumped water prior to discharge to Lake Union. A brief discussion of the effects of the pumping on the Site is presented in Section 6.2.2.

The 630 Westlake Ave North property occupies 1.6-acres that are currently undeveloped and used for construction staging. Prior uses include multiple automobile service stations, a lumber mill, a creamery, a brewery, a restaurant, boat maintenance, cabinet manufacturing, and automobile service and detailing (Delta, 2007). Extensive investigative and cleanup work has been performed at the property since the 1980s, following an 80,000-gallon gasoline release from one of the service stations. Cleanup actions included product recovery, soil vapor extraction, air sparging, and soil excavation (including excavation in the Westlake Avenue North

ROW). A groundwater extraction system is currently operating at the property. The system was recently installed to capture residual VOCs that might otherwise be pumped by construction dewatering wells at the two properties to the east. The system consists of four 6-inch-diameter, 92-foot-deep PVC extraction wells, screened from 32 to 92 feet below ground surface ("bgs"), submersible pumps each capable of pumping up to 80 gpm, piping, and a water treatment system. Treated water is then discharged to Lake Union. The four extraction wells (IA-1 through IA-4) are located in a north-south line on the property. A brief discussion of the effects of the pumping on the Site are presented in Section 6.2.2.

2.4 Regulatory History

Beginning in November 2012, 700 Dexter LLC (the previous Property owner) participated in the Voluntary Cleanup Program ("VCP") to address subsurface contamination at the Property. Under the VCP, 700 Dexter LLC submitted a draft RI Report (SES, 2013b) and a draft FS Report (SES, 2013c). In 2015, 700 Dexter LLC requested that future cleanup work be administered under a formal agreement with Ecology, so Ecology terminated their participation in the VCP. Subsequently, Ecology issued determination of potential liable party ("PLP") status letters to 700 Dexter LLC and American Linen in December 2015, based on American Linen being the owner and operator of the Property at the time of disposal or release of hazardous substances and 700 Dexter LLC having owned and possessed a hazardous substance and having arranged for treatment of the hazardous substance at the Property. Ecology issued a letter to 700 Dexter LLC (Ecology, 2015) detailing additional work Ecology felt necessary to complete investigation of the Site and presentation of the data. On January 12, 2017, Ecology also issued a determination of PLP status letter to BMRD as the current owner of the Property.

BMRD and Ecology entered into an AO with an effective date of October 24, 2017. The AO requires that BMRD perform an RI/FS and prepare a preliminary draft Cleanup Action Plan ("DCAP"). The AO also describes the requirements for performing an additional interim action, which is the subject of this work plan.

2.5 Future Property Use

The Property is currently scheduled to be redeveloped. The redevelopment design consists of three (3) levels of underground parking (below the elevation of 8th Avenue), a partial subgrade level for parking and support facilities located between the elevation of Dexter Avenue North and 8th Avenue North, on-street retail and two adjacent 14-story office towers. The parking garage and foundations will require excavations to extend to approximately 30 to 35 feet below the elevation of 8th Avenue North.

3.0 ENVIRONMENTAL SETTING

This section summarizes the physical setting, climate, regional geology and hydrogeology, and groundwater use in the vicinity of the Property.

3.1 Physical Setting

The Property is located within the Puget Lowland physiographic province, a broad, low-lying region situated between the Cascade Range to the east and the Olympic Mountains to the west. Alluvial valleys and plains, and glacially formed or modified hills and ridges dominate the lowland. The Property lies on the southeast flank of Queen Anne Hill in the South Lake Union district north of downtown Seattle, with Lake Union to the northeast, Capitol Hill to the east, and Elliott Bay to the southwest. The Property is relatively flat, with an elevation of approximately 40 feet above the North American Vertical Datum of 1988 ("NAVD88"). The area immediately around the Property slopes gently to the east.

3.2 Climate

Air masses originating over the Pacific Ocean strongly affect the climate of the Puget Sound Lowland, with generally overcast, cool, damp, and mild weather during the autumn, winter, and spring, and warm and dry weather during the summer. The annual precipitation ranges from about 30 to over 60 inches in the lowland. The average annual precipitation in the Seattle area is about 39 inches, with approximately three-quarters of it falling between October and March.

Annual snowfall averages approximately 12 inches, falling between November and March. The prevailing wind direction year-round is from the south. The average monthly maximum temperature ranges from a low of 45 degrees Fahrenheit in January to a high of 75 degrees in July and August. Monthly minimum temperature averages vary from a low of 35 degrees in January to a high of 55 degrees in July and August.

3.3 Regional Geology

The Puget Sound Region is underlain by a thick accumulation of Quaternary sediment of alluvial and glacial origin. The shallowest sediments consist primarily of inter-layered and/or sequential river, lake, fan, and terrace deposits of sand, silt, and clay deposited on top of Pleistocene glacial deposits. The Property is located in the southern part of the Puget Sound Lowland, a broad, relatively level glacial drift plain dissected by a network of deep marine embayments. The Property is located at the edge of Queen Anne Hill and the Lake Union Depression. The portion of Seattle where the Property is located has undergone extensive excavation and filling in the early 1900s, with removal of Denny Hill to the southwest and the filling in of the southernmost portion of Lake Union. The fill is reported to be greater than 25 feet thick in some locations.

The geologic units mapped in the vicinity of the Property from youngest to oldest include Quaternary lacustrine deposits in the immediate vicinity of the Property and to the east, Quaternary Vashon recessional lacustrine deposits and ice contact deposits to the south and southwest, Quaternary Vashon till and advance outwash to the west, and Quaternary Vashon lacustrine and pre-Vashon deposits to the north (Booth et al, 2009). The thickness of unconsolidated deposits in the area is over 2,700 feet (Jones, 1999). The Property lies approximately 2 miles north of the Seattle Fault Zone, a seismically active area with multiple strands of the Seattle fault present.

3.4 Regional Hydrogeology

The principal aquifers in the Puget Sound Region are in glacial drift that, along with finer grained interglacial sediments, underlies the basin lowland to depths of more than 1,000 feet and in alluvial deposits that underlie the major lowland and mountain river valleys. In the Puget Sound region, shallow groundwater flow direction often mimics the surface topography, with deeper groundwater more influenced by aquifer geometry and discharge location (Vacarro et al, 1998). Groundwater typically flows from areas of high elevation to areas of low elevation. In addition, shallow groundwater flow typically migrates toward nearby surface water bodies. In the South Lake Union area, groundwater recharge occurs in unpaved locations, most importantly at higher elevations, and groundwater discharge occurs to Lake Union. Leaking pipes could influence groundwater flow locally.

3.5 Water Supply Wells

In April 2017, the Ecology well logs, Ecology water right, and King County groundwater well databases were queried for records of beneficial water use within 1 mile of the Property. The database search indicated potential groundwater use at two properties:

- **100 Fourth Avenue North:** Two potential water supply wells are listed in the Ecology water well logs database at this location, approximately 0.5-mile southwest of the Property. The wells were drilled to depths of 148 and 155 feet bgs in 1999 and 2001. Both wells were completed with 10 feet of well screen at the bottom of the well. The static groundwater levels in the wells were reported to be between 77 and 80 feet bgs. Based on the reported location of the wells and groundwater flow in the area, the well locations are upgradient of the Site. No record of the wells exists in the Ecology water right or King County groundwater well databases. The use of the wells is unknown, but given the availability of city water, it is unlikely that they are used as a potable water source.
- **300 Boren Avenue North:** Ecology's water right database has water right records for a well located at 300 Boren Avenue North, approximately 0.5-mile southeast of the Property. The database has a water right claim filed in 1971 and a certificate of groundwater right issued in 1973, both for an industrial well with a maximum pumping rate of 250 gpm. Based on the property location and groundwater flow in the area, the property is upgradient of the eastern part of the Site. The property has been redeveloped for non-industrial use, and it is unknown if the well still exists.

3.6 Surface Water

3.6.1 Area Surface Water

The Property lies in the Cedar-Sammamish Watershed, a roughly rectangular-shaped watershed approximately bounded by the Cascade Mountain range to the southeast, south Everett to the north, and downtown Seattle to the south. Major surface water bodies in the watershed include

Lake Washington, Lake Sammamish, Lake Union, the Sammamish River, and the Cedar River, with numerous other small lakes and creeks on the upland plain. The closest surface water bodies to the Property are Lake Union, located approximately 570 feet northeast of the northeast corner of the Property, and Puget Sound, located approximately 1 mile southwest of the southwest corner of the Property (Figure 1).

The Water Quality Standards for Surface Waters of the State of Washington (WAC 173-201A-600) lists the beneficial uses of Lake Union as salmonid spawning, rearing, and migration; primary contact recreation; domestic, industrial, and agricultural water supply; stock watering, wildlife habitat; harvesting; commerce and navigation; boating; and aesthetic values. WAC 173-201A-600 lists the beneficial uses of Elliott Bay as excellent salmonid spawning, rearing, and migration; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning; shellfish harvesting; primary contact recreation; wildlife habitat; harvesting; commerce and navigation; boating; and aesthetic values.

3.6.2 Surface Water Use Near the Property

PES reviewed agency databases documenting surface water use near the Property. The databases reviewed in May 2017 included the state of Washington Department of Health ("DOH") water systems database and the Ecology water resources explorer database. The databases were reviewed for documentation of potential water uses within a 1-mile radius of the Property. No surface water rights were identified for Lake Union or Puget Sound.

4.0 PREVIOUS SITE INVESTIGATIONS AND INTERIM ACTIONS

This section summarizes the previous investigations and interim actions performed at the Site. Site investigations were conducted between 1992 and March 2016. Investigations included drilling and sampling soil and groundwater from temporary borings, installing and sampling monitoring wells, conducting aquifer tests, measuring groundwater levels, and collecting groundwater samples. Over 450 soil samples and over 320 groundwater samples were submitted for laboratory analysis of CVOCs and/or petroleum hydrocarbon related constituents. Subsurface explorations have been located from Aloha Street on the north to Mercer Street on the south, and from Dexter Avenue North on the west to Westlake Avenue North on the east. The maximum depth explored was 140 feet bgs.

Following is a brief summary of the investigations conducted at the Site. A more complete summary of the investigations conducted at the Site is provided in Appendix D. The Draft RI Report (SES, 2013b), Draft Cleanup Action Plan (SES, 2015), and Draft Interim Action Work Plan (SES, 2016) provide more detailed information. Figures 4 and 5 show the boring and well locations, Table 1 presents the well completion details (where known), Appendix E provides the available boring logs, and Appendix F provides the testing and analytical data. The results of the investigations are presented in Section 6.3.

4.1 1992 Roux Phase I Environmental Site Assessment

Roux Associates ("Roux"), of Concord, California, conducted a Phase I Environmental Site Assessment ("ESA") of the Property in 1992 (Roux, 1992). Roux identified four recognized environmental conditions ("RECs") associated with the Property: (1) the storage of fuel in the yard area, both historically and at the time of the Phase I ESA, (2) the storage of heating oil in USTs beneath the Property, both historically and at the time of the Phase I ESA, (3) the storage and use of solvents on the Property, both historically and at the time of the Phase I ESA, and (4) the presence of potential polychlorinated biphenyl ("PCB")-containing transformers on the Property.

4.2 1992 Roux Phase II Environmental Site Assessment

Roux conducted a Phase II ESA at the Property in October 1992 to evaluate whether the RECs identified during the Phase I ESA had impacted soil or groundwater (Roux, 1993). Roux reportedly advanced six borings to depths between 15 and 36.5 feet bgs and completed them as monitoring wells MW1 through MW6. To avoid confusion with other wells labeled MW1 through MW6 (or MW-1 through MW-6), SES added the prefix "R-" in front of the well names. Soil samples collected from the borings were submitted for laboratory analysis of CVOCs. Roux and another consultant (Dalton, Olmsted & Fuglevand, Inc. ("DOF")) both collected groundwater samples from R-MW1 through R-MW6 and submitted them for analysis of CVOCs and petroleum hydrocarbons.

4.3 1997 Black and Veatch Phase II Environmental Site Assessment

Black & Veatch ("B&V") conducted a Phase II ESA as part of the Denny Way/Lake Union combined sewer overflow project (B&V, 1998). The purpose of the investigation was to provide King County with geotechnical data for engineering design and to evaluate if properties along the project corridor had impacted soil and/or groundwater. The investigation included drilling 56 borings (53 completed as monitoring wells), excavation of 15 test pits, and installation of 5 pumping wells and 3 observation wells. Nine of the borings (BB-5, BB-7, BB-8, BB-10, BB-12, BB-13, BB-14, TB-12, and TB-18) and two pumping wells (PW-1 and PW-4) were located near the Property. B&V collected soil and groundwater samples from all borings drilled during the investigation, analyzing all samples for petroleum hydrocarbons and selected soil and groundwater samples for CVOCs and polycyclic aromatic hydrocarbons ("PAHs").

4.4 2000 ThermoRetec Soil and Groundwater Testing Under the Building

ThermoRetec conducted a subsurface investigation in June 2000 at the Property to evaluate the lateral extent of solvent-impacted soil and groundwater at the Property (ThermoRetec, 2000). Nine borings (B-1 through B-3, B-4A, B-4B, B-4C, and B-5 through B-10) were drilled on the Property. Selected soil and reconnaissance groundwater samples were submitted for laboratory analysis of CVOCs.

4.5 2001 GeoEngineers Supplemental Remedial Investigation

GeoEngineers, Inc. ("GeoEngineers") conducted a supplemental RI at the Property in July 2001 to evaluate a potential source of subsurface CVOCs, one of the three dry cleaning machines in operation on the Property in the 1980s that may have leaked dry cleaning solvents into the subsurface (GeoEngineers, 2002). GeoEngineers drilled one soil boring (SB4) and three monitoring wells (MW1 through MW3). To avoid confusion with other soil borings and wells, SES added the prefix "G-" in front of the boring and well names. Soil samples collected from borings G-MW1 and G-SB4 and groundwater samples collected from G-MW1, G-MW1, and G-MW3 were submitted for laboratory analysis of CVOCs and hydrocarbon-related VOCs. Soil samples with the highest detected concentrations of PCE were also submitted for analysis of leachable constituents.

4.6 1992 through 2002 East Adjoining Properties Subsurface Investigations

4.6.1 800 Aloha Street

Fueling operations with a 1955-era UST system at 800 Aloha Street were suspended in October 1992 after discovery of a leaking fuel pump dispenser. A vapor survey indicated that VOCs were present in the vicinity of a 550-gallon UST, a 2,700-gallon UST, and the pump island (SCS, 1992). Vapor survey points near the eastern parcel boundary did not indicate elevated VOCs. The following year, E.P. Johnson ("EPJ") removed the two USTs and product piping and excavated approximately 3,200 tons of petroleum-contaminated soil (PCS) from the parcel (Retec, 1993 and 1995). Soil samples were collected from the sidewalls and bottom of the excavation and were submitted for laboratory analysis of metals, petroleum hydrocarbons, waste-characterization constituents, total PCBs, and/or CVOCs. The excavated PCS was disposed of off the site.

In March 1993, EPJ oversaw drilling of seven soil borings (SCLB-1 through SCLB-7), with borings SCLB-3 through SCLB-7 completed as monitoring wells MW-1 through MW-5, respectively. These wells were subsequently decommissioned after they were deemed to be screened across the upper and lower portions of an aquifer (Retec, 1995). In October 1993, RETEC oversaw the drilling of eight borings, five of which were completed as replacement monitoring wells (RB-1, RB-2, RB-3, and MW-6 through MW-10). In June 2002, Urban Redevelopment LLC (Urban, 2002) oversaw drilling of seven borings and the collection of 21 discrete soil samples (borings SCL-B100, SCL-B101, SCL-B102, SCL-MW101, SCL-MW102, SCL-MW103, and SCL-MW105 and soil samples SP-1 through SP-21). The locations and maximum depths of these sample locations, with exception of SCL-MW101 and SCL-MW105 (which were completed as monitoring wells), reportedly could not be confirmed. Soil samples were collected from each boring, and groundwater samples were collected from the monitoring wells. Samples were submitted for laboratory analysis of ORO and BTEX, with selected samples also submitted for analysis of DRO, PAHs (including carcinogenic PAHs ("cPAHs")), pentachlorophenol, CVOCs, and/or metals.

4.6.2 1992 753 9th Avenue North Parcel Investigations

Environmental Associates Inc. (EA) conducted a subsurface investigation at the north parcel on 753 9th Avenue in June 1992 (SES, 2013b). EA oversaw drilling borings to the east of the parcel within the Westlake Avenue North ROW near 1948-era USTs with 1000-, 300-, and 675-gallon capacities used to store gasoline, used oil, and fuel oil, respectively. The USTs were located west of the building within the asphalt-paved parking lot. The locations and depths of the borings are not known. Soil and groundwater samples were collected from the borings and analyzed for petroleum hydrocarbon identification ("HCID").

In July and September 1992, GeoTech Consultants, Inc. ("GeoTech") removed the three USTs and observed pinholes in the gasoline and fuel USTs (GeoTech, 1992). Soil was excavated around each tank to depths between 12 and 14 feet bgs. GeoTech collected soil samples from the bottom of each excavation, from the stockpiled soil (which did not appear to be contaminated), and from test pits excavated along the western parcel boundary and in the northwest corner of the parcel. The samples were submitted for laboratory analysis of petroleum hydrocarbons. The excavations were backfilled with the stockpiled soil. It is not known if CVOCs were analyzed in any of the samples.

4.7 2004 and 2009 DOF Groundwater Sampling

DOF collected groundwater samples at the Property in December 2004 and January 2009 (DOF, 2004 and 2009. In December 2004, DOF sampled monitoring well G-MW3, and in January 2009, DOF sampled on-Property wells G-MW1, G-MW2, R-MW1, R-MW2, and R-MW3, and off-Property wells R-MW5, R-MW6, BB-8, and BB-8A. Monitoring well R-MW4 had been decommissioned before the January 2009 groundwater sampling event. Groundwater samples were submitted for laboratory analysis of petroleum hydrocarbons and CVOCs.

4.8 2008 CH2M Hill 9th Avenue Sewer Upgrade Environmental Investigation

In April 2008, CH2M Hill conducted an environmental investigation along the 9th Avenue North corridor between Republican and Aloha Streets to evaluate if any soil and/or groundwater contamination was present along the proposed sewer alignment footprint (CH2M Hill, 2008). Four soil borings were drilled in the 9th Avenue North ROW using a hollow-stem auger rig to maximum depths of 7 to 26 feet bgs. Boring CHB-07 was advanced northeast of the Property between Ward and Aloha Streets, boring CHB-08 was drilled to the east of the Property at the eastern projection of Roy Street, boring CHB-09 was advanced to the southeast of the Property between Roy and Mercer Streets; and CHB-10 was drilled to the south-southeast of the Property between Mercer and Republican Streets. Reconnaissance groundwater samples were collected from borings CHB-07, CHB-08, and CHB-09 using temporary well screens. Soil and groundwater samples were not collected from boring CHB-10 because the potential for contamination in that boring location was considered low. Soil and reconnaissance groundwater samples were submitted for laboratory analysis of petroleum hydrocarbons and CVOCs.

4.9 2010 and 2011 Groundwater Sampling Events

SES collected groundwater samples from monitoring wells located at the Site in May 2010 and June 2011 (SES, 2013b). In May 2010, SES collected groundwater samples from off-Property wells BB-8, BB-8A, BB-12, BB-12A, and BB-13 and submitted them for laboratory analysis of CVOCs. In June 2011, SES collected groundwater samples from on-Property wells G-MW1, G-MW2, G-MW3, R-MW1, R-MW2, and R-MW3, and off-Property wells R-MW5, R-MW6, BB-8, BB-8A, and MW-9 (located across the 8th Avenue North ROW near the 800 Aloha Street parcel); the samples were submitted for analysis of petroleum hydrocarbons and CVOCs.

4.10 2011 and 2012 Preferred Pathway Investigation

Between April 2011 and March 2012, SES conducted an investigation to evaluate the configuration and integrity of the on-Property sanitary sewer system, including the sewer line cleanouts, drains, and sumps (SES, 2013b). In April 2011, a plumbing company video recorded the condition of accessible portions of the on-Property sanitary sewer lines. The contractor video recorded the southern line from Sump No. 4 to near Sump No. 2, the eastern line from Sump No. 2 to near the 8th Avenue North ROW, and the northern line from just north of Sump No. 5 to the eastern side of the northwest wing of Building A (Figure 2).

Between April and June 2011, SES collected sludge samples from Sump No. 2 through Sump No. 5, located on the basement level, and from one of the 1925-era water treatment drainage trenches located on the first floor of the building. Sludge samples were also collected from sewer line cleanouts No. 1 and No. 2, located in Building C (Figure 2). Sump No. 1 was dry and contained no residual fluid. Each sample was analyzed for VOCs. Additional stratified samples of water, sludge mixed with water, and sludge were collected from Sump No. 4 and submitted for laboratory analysis.

In July 2011, SES cleaned and saw cut a hole in the base of Sump No. 4 to assess its structural integrity and to evaluate whether or not the sump had leaked. SES collected a soil sample from approximately 1 foot below the base of the sump. In February 2012, SES excavated two test pits (EX01 and EX02) along the southern sewer line alignment near Sump No. 2 (Figure 2) to observe the conditions and structural integrity of the sewer line in the area of boring B-9 (Figure 4), which exhibited elevated concentrations of PCE in shallow soil. Test pit EX01 exposed the 6-inch-diameter, cast iron sewer line, and although the line appeared to sag slightly at the belled joint connections, no obvious perforations or breaks in the line were observed. SES collected soil samples from excavation EX01 and submitted for analytical testing for CVOCs.

Based on the low photoionization detector ("PID") measurements in screened soil samples, SES did not submit soil samples from EX02 for laboratory analysis.

4.11 2012 Subsurface Soil and Groundwater Investigations

Windward Environmental LLC ("Windward") conducted a subsurface soil and groundwater investigation at the Site in January and February 2012 to further evaluate the lateral and vertical extent of contamination beneath the Property and to confirm if contaminated soil and groundwater extended off-Property to the east (Windward, 2012). Four soil borings (P-03, P-06, P-07, and P-08) were drilled during the investigation. P-03 and P-06 and were drilled in the sidewalk of 8th Avenue North to evaluate impacts to the east of the Property, P-07 was drilled near monitoring well R-MW1 to better evaluate the vertical extent of solvent contamination previously encountered in soil collected from R-MW1. P-08 was drilled in the yard area to evaluate the vertical extent of solvent contamination previously identified in soil collected from boring B-6 and was drilled at an approximate 25-degree angle from vertical extending beneath Building C.

Borings P-03, P-06, P-07, and P-08 were completed as monitoring wells MW-01 through MW-04, respectively, each with approximately 10 feet of well screen. To avoid confusion with other soil borings and wells, SES added the prefix "W-" in front of the well names. Windward collected groundwater samples from W-MW-01 through W-MW-04, from on-Property monitoring wells G-MW1, G-MW2, G-MW3, R-MW1, R-MW2, and R-MW3, and from off-Property monitoring wells R-MW5, R-MW6, MW-9, BB-8, and BB-13. Selected soil, reconnaissance groundwater, and monitoring well groundwater samples were submitted for laboratory analysis of petroleum-related VOCs and CVOCs.

4.12 2012 through 2016 SES Remedial Investigation

SES conducted an RI at the Site between July 2012 and March 2016 (SES, 2013b and 2016). The purpose of the work was to fill data gaps, evaluate the lateral and vertical extent of soil and groundwater contamination, collect soil vapor data, and collect sufficient data to conduct an FS. The RI included drilling and sampling soil borings and monitoring well borings, installing and developing monitoring wells, collecting reconnaissance groundwater samples, measuring groundwater levels, collecting groundwater samples, installing and sampling soil vapor probes, and conducting aquifer (slug) tests.

Forty-four soil borings were drilled during the RI (borings B101 through B128, B130, B131, and DB01 through DB14). Selected soil samples were submitted for laboratory analysis of CVOCs and selected petroleum-related VOCs. Reconnaissance groundwater samples collected from B101 through B106, B115, B116, B122, B124, B126, DB01 through DB05, DB05A, DB10, DB13, and DB14 were submitted for laboratory analysis of selected CVOCs and petroleum-related VOCs.

Monitoring wells were installed in borings B101 through B131 (designated with a "MW" prefix and the boring number). SES identified three water-bearing zones during drilling activities: a shallow water-bearing zone comprised of fill and encountered to depths of 10 to 20 feet bgs, a relatively thick intermediate water-bearing zone composed of dense to very dense, heterogeneous glacial soil (found between 25 and 80 feet bgs, divided into an upper "A" zone and a lower "B" zone), and a deep water-bearing zone composed of glacial outwash deposits.

SES conducted slug testing of thirteen monitoring wells in March 2013. SES measured groundwater levels eight times between September 4, 2012, and February 1, 2016. SES collected groundwater samples from the existing monitoring wells and the newly installed monitoring wells between July 2012 and March 2013. During purging, temperature, pH, specific conductivity, dissolved oxygen ("DO"), turbidity, and oxidation-reduction potential ("ORP") were measured. Groundwater samples were submitted for laboratory analysis of selected CVOCs and petroleum-related constituents. Table 2 provides the slug test results, Table 3 provides the groundwater elevation data, and Appendix F provides the analytical data.

In March 2013, SES conducted a soil vapor investigation event in the sidewalk west of the 800 Aloha Street parcel. The investigation involved the installation of permanent soil vapor monitoring points SV01, SV02, and SV03 and collection of soil vapor samples. Soil vapor samples were collected in the vadose zone just above the groundwater capillary fringe at depths ranging from 11.75 to 12.75 feet bgs. The sample depths were selected to simulate sub-slab soil vapor samples. The samples were submitted for laboratory analysis of selected CVOCs.

4.13 Previous Interim Actions

4.13.1 UST Closure

Four 6,000-gallon USTs (Tanks 1 through 4) associated with the former laundry boiler system and a fifth 500- to 600-gallon UST (Tank 5) were removed from the Property by SoundEarth Strategies Construction, LLC on March 22, 2013 (SES, 2013a; Figure 2). Droplets of liquid mercury were found when the concrete foundation near Tank 2 was removed; the mercury was contained and disposed of as hazardous waste at a regulated facility. A limited amount of petroleum-contaminated soil was observed in the vicinity of Tanks 1 and 4. It was thought that this soil was a result of tank overfill. Tanks 1 through 5 contained no measurable product and were cleaned by Marine Vacuum Services, Inc., prior to disposal at Seattle Iron and Metal in Seattle. Tanks 1 through 4 each measured approximately 28 feet long by 6 feet in diameter, were constructed of single-walled steel, and appeared to be in good condition, with no visible perforations or rust. Tank 5 measured approximately 10 feet long by 3 feet in diameter, was constructed of single-walled steel (though a lighter gauge than Tanks 1 through 4), and appeared to be in poor condition, with numerous perforations. Based on visual, olfactory, and analytical methods, the contents of Tanks 1 through 4 were thought to be Bunker C fuel oil and the content of Tank 5 water.

Soil samples were collected from the sidewalls and bottom of each UST excavation and were submitted for laboratory analysis of diesel-range organics ("DRO") and oil-range organics ("ORO"); the soil samples collected from the bottom of the Tank 2 excavation was also submitted for analysis of Resource Conservation Recovery Act ("RCRA") 8 metals. Based on the low concentrations of the analyzed constituents and limited amount of soil with visible petroleum impacts, it was reported that the soil near the tanks was protective of human health and the environment (SES, 2013a); however, no correspondence from Ecology concurring with this conclusion is available.

4.13.2 Independent Cleanup Action - Electrical Resistance Heating and Soil Vapor Extraction

Between April and December 2013, an electrical resistance heating/soil vapor extraction ("ERH/SVE") system was designed, installed, and operated by SES to clean up high concentrations of CVOCs in soil and groundwater beneath the Property (SES, 2015 and 2016). The objective of using the ERH/SVE system was to reduce tetrachloroethene ("PCE") concentrations to below 14 mg/kg in vadose zone soil (at an approximate elevation of 30 to 40 feet) and to below 5,000 µg/L in groundwater. The soil cleanup goal was selected to allow for disposal of excavated soil at a non-hazardous, Subtitle D landfill. The groundwater target concentration was set as it was believed that reducing PCE concentrations to below 5,000 µg/L would facilitate subsequent treatment of this saturated zone using in-situ enhanced reductive dechlorination ("ERD"). The ERH/SVE system was also implemented to improve groundwater quality beneath the Site by reducing soil and groundwater CVOC concentrations beneath the Property.

4.13.2.1 System Installation and Operation

The ERH/SVE system included 165 heating electrodes and 16 temperature monitoring points covering approximately 37,943 square feet of the Property (Figure 6). The Schedule 40 steel electrodes were installed in borings drilled to an elevation of 0 feet (approximately 40 feet below the current grade level and approximately 30 feet into saturated soil). The Schedule 80 temperature monitoring points were installed to monitor subsurface temperatures in the treatment area. Pipes conveyed soil vapor recovered by vacuum from the electrodes to a treatment system consisting of a power control unit, condenser, two SVE blowers, and granular-activated carbon units that treated condensate and vapor generated by the ERH/SVE system (SES, 2015 and 2016).

Between May 10 and June 4, 2013, nine shallow monitoring wells (F5, F9, F13, G12, J5, J15, K8, M15, and N7) were installed in the ERH/SVE treatment area prior to starting the system. The wells were drilled to 40 feet bgs and were completed with 1-inch-diameter stainless steel screens (from 10 to 40 feet bgs) with 0.010-inch wide slots, stainless steel blank risers, 10-20 silica sand annular backfill around the screens, and 8 feet of neat cement grout above the silica sand. SES developed the wells by surging and pumping them a minimum of five well volumes and/or until the groundwater no longer appeared turbid.

4.13.2.2 System Performance

SES operated the ERH/SVE system from August to December 2013, removing an estimated 12,000 pounds of CVOCs from the treatment area (SES, 2015 and 2016). Based on the system monitoring data, SES determined that the removal rate had reached an asymptotic state by November 2013, and that approximately 98 percent of the original CVOC mass had been removed. SES determined that other treatment technologies would be more effective at that point and after running the system for an additional 40 days shut the ERH/SVE system down in December 2013.

After letting the soil cool down, SES drilled five direct-push borings (P02 to P06) in February 2014 near borings GMW-1 and B-9. Vadose zone soil samples (collected from an elevation between 30 and 40 feet or from 0 to 10 feet bgs) from the borings were analyzed for PCE-related CVOCs by EPA Method 8260C. All sample results were below the treatment goal of 14 mg/kg.

Groundwater samples were collected using low-flow sampling techniques from monitoring wells (F5, F9, F13, G12, J5, J15, K8, M15, and N7) in July, October, November, and December 2013 and in March 2014, June and October 2015, and in February 2016. Lack of water in some wells limited sampling during operation of the ERH/SVE system. Samples were analyzed for PCE, trichloroethene ("TCE"), cis-1,2-dichloroethene ("cDCE"), trans-1,2-dichloroethene ("tDCE"), and vinyl chloride ("VC") by EPA Method 8260C. Concentrations of PCE-related CVOCs decreased approximately 2 to 3 orders of magnitude due to operation of the ERH/SVE system.

4.13.3 Enhanced Reductive Dechlorination Pilot Tests

Pilot testing was conducted in the shallow and intermediate water-bearing zones to evaluate the use of ERD as a cleanup technology to degrade the PCE-related CVOCs remaining at the Property post operation of the ERH/SVE system (SES, 2016). The objectives of the pilot test were to determine whether bioamendments would be effective in furthering ERD at the Property, to determine whether adequate injection and distribution of the amendments could be achieved, and to develop the basis for full-scale design. Locations on the south and east boundaries of the Property were selected to test the potential of the technology for use as a biobarrier and due to the proximity of monitoring wells. Two phases of pilot testing were conducted: injection in one temporary well (IW-01) installed in the Intermediate A water-bearing zone in November 2015 and injection in five temporary Intermediate A water-bearing zone wells (IW-02 through IW-06) and 24 shallow (40-foot-deep) water-bearing zone ERH probes (C14, D13, D14, E14, F15, G15, H16, J16, K17, L17, M18, N17, N18, P7, P16, P17, R8, R16, S9 through S13, and S15) in January 2016 (Figure 6).

The intermediate injection points were installed using a sonic drill rig. Each injection point consisted of a temporary 2-inch-diameter well completed as follows: a stainless-steel wire wrap screen was set in the open borehole from 50 to 65 feet bgs, followed by a 3-foot blank casing section to 47 feet bgs, a 5-foot-long inflatable packer from approximately 42 to 47 feet bgs, and blank casing to just above the ground surface. Since the ground surface elevation at IW-05 and IW-06 was 10 feet higher than the other injection locations, those temporary injection wells were drilled and installed approximately 10 feet deeper than the depths described for IW-01 through IW-04. Before amendment injection, each packer was inflated to a pressure of 300 pounds per square inch ("psi"), sealing off the target injection zone from the upper water-bearing zone. Appendix E provides boring logs for IW-01 and IW-06.

A carbohydrate substrate (food-grade dextrose) was injected in the shallow pilot test points; it was selected for use in the shallow points due to shallow groundwater zone characteristics, faster metabolic reaction times, and the project timeline. Low pressure (less than 15 psi) injections were used in the shallow points to prevent short circuiting. A total of 43,590 gallons of dextrose solution was injected in the shallow points, at an average dextrose dose rate of 4.2 percent.

A biodegradable soybean oil, EDS-ER by Tersus Environmental, was injected in the temporary intermediate pilot test wells. A total of 65,744 gallons of the solution was injected, with average EDS-ER doses ranging from 2.9 to of 4.1 percent, average wellhead pressures varying from 34.4 to 60.5 psi, and average flow rates ranging from 7 to 20 gpm.

Data collected during pilot testing indicated a radial distribution of the injected solutions, relatively little movement of the injected solutions out of the unit in which they were injected, an adequate radius of influence, significant increases in TOC concentrations in nearby monitoring wells, and significant decreases in PCE and TCE concentrations over the relatively short timeframe of the pilot test. Based on the monitoring results in nearby wells during and shortly after the injection events, SES concluded that the injected substrates were effectively distributed and were impacting the injection zones to promote ERD, including increasing TOC, decreasing DO and ORP, and generally decreasing concentrations of PCE-related CVOCs (SES, 2016).

5.0 2017 PRE-INTERIM ACTION INVESTIGATIONS

PES conducted investigations in 2017 to provide current groundwater data and to fill gaps in the data set needed prior to proposing an interim action at the Property. The following sections provide a summary of the Site data gaps and the investigations conducted to date in 2017. Additionally, a geotechnical investigation conducted to generate data as part of the Property redevelopment also collected limited environmental data. Appendix G details the procedures used to collect the data.

5.1 Data Gaps

Based on the review of prior investigations, pilot tests, and interim cleanup actions, PES has identified additional data needed to complete the characterization of environmental conditions at the Site that would allow a preferred cleanup action to be identified. These data gaps include those previously identified by Ecology (2015b). Following is a brief summary of the data gaps that were identified for the Site:

- **Delineation of the Lateral and Vertical Extent of PCE in Shallow Soil and Exceeding the State Dangerous Waste Criteria.** Ecology noted that the lateral and vertical extent of soil PCE concentrations above the state dangerous waste criteria (14 mg/kg) was not delineated after the ERH/SVE interim action was performed. This information is important when evaluating potential cleanup action alternatives given that approximately the upper 30 to 35 feet of soil at the Property is expected to be excavated and disposed of off-Property. The previous investigations of the lateral and vertical extent of PCE in soil above 14 mg/kg was limited to the upper 10 feet. The lateral and vertical extent of PCE in soil on the Property needs to be confirmed after implementation of the ERH/SVE system.

- **Delineation of the Vertical Extent of Soil Contamination at the Property.** The deepest soil samples collected in a number of borings drilled at the Property to depths greater than those treated by the ERH/SVE system had CVOC concentrations above the screening levels, including DB03, DB05, DB07, DB08, DB10 through DB14, G-MW1, B-MW3, MW130, and MW131, but the vertical extent of soil contamination at the Property has not been delineated.

- **Delineation of the Vertical Extent of CVOCs in Groundwater Beneath the Property Sumps.** The vertical extent of CVOCs in groundwater beneath the sumps has not been fully delineated, especially Sump No. 4, where CVOCs have been detected at depth in MW130.

- **Definition of the Lateral and Vertical Extent of the CVOC Groundwater Plume.** The lateral and vertical extent of groundwater exceeding the screening levels has not been fully defined, including the vertical extent of the plume beneath the Property. The lateral extent of shallow, intermediate, and deep groundwater exceeding the screening levels has not been defined south and east of the Property.

- **Documentation of the Current Conditions in the Area Treated by ERH/SVE.** Soil samples have not been collected in most locations at the Property confirming the current conditions post-ERH/SVE system operation.

- **Collection of Seasonal Groundwater Elevation Data.** Groundwater levels have not been monitored systematically over a seasonal cycle. Consistent data over one cycle are required to evaluate the variability of vadose zone thickness, groundwater flow direction, and groundwater flow rate.

- **Collection of Seasonal Groundwater Quality Data.** Groundwater quality data have not been monitored systematically over a seasonal cycle, with some wells sampled only twice. Consistent data over one cycle are required to evaluate the variability of CVOC concentrations over a season and to provide sufficient data for determining indicator hazardous substances.

- **Collection of Additional Hydraulic Conductivity Data.** Additional data are required to evaluate the hydraulic conductivities of the range of lithologies present across the Site. The data are needed to allow evaluation of contaminant fate and transport and to support the development of interim and final cleanup actions.

- **Collection of Additional Lithology Data.** Additional lithology data are required to improve the understanding of geologic materials present under the Site and provide updated geologic cross sections and an updated conceptual site model.

- **Collection of Transport and Remediation Parameter Data.** Transport and remediation parameters (e.g., fraction organic carbon (“f_{oc}”)) are needed to facilitate contaminant fate and transport evaluation and the evaluation of interim and final cleanup actions.

Table 4 summarizes which of the above data gaps or portions of the above data gaps specific to the Property, and Table 5 summarizes the 2017 monitoring and investigation locations that were assessed in 2017 to address the Property-specific data gaps. Figure 7 shows the locations of the 2017 soil borings and monitoring wells completed during the Pre-Interim Action Property investigation.

5.2 <u>2017 Groundwater Monitoring</u>

PES monitored groundwater levels and quality in early 2017 to: (1) update the Site data set, (2) begin collecting seasonal elevation and groundwater quality data, and (3) monitor the effects of current groundwater extraction in nearby redevelopments.

5.2.1 Groundwater Level Monitoring

PES conducted three complete rounds of groundwater level monitoring that included wells from the shallow, Intermediate A, Intermediate B, and deep water-bearing zones at the Site. The events were conducted on March 20, March 24, and June 12, 2017, and included 22 shallow wells, 11 Intermediate A wells, 6 Intermediate B wells, and 12 deep wells (Table 5). In each well, depth to water below the top of the PVC or steel well casing was measured with an electronic water level probe.

Based on information obtained from the Seattle Department of Construction & Inspections web site (http://www.seattle.gov/dpd/toolsresources/Map/), PES identified several development projects located to the southeast of the Property that were undergoing redevelopment and would be dewatering to facilitate construction. The properties include the two square blocks bounded by Valley Street to the north, Fairview Avenue to the east, Mercer Street to the south and Terry Avenue North to the west (Figure 3). According to the Groundwater Control Plan (Middour Consulting LLC, July 2016), the construction dewatering would extract groundwater at rates ranging from 580 to 750 gallons per minute ("gpm"). PES instrumented nine monitoring wells (Table 5) with pressure transducers to monitor the effects of the groundwater extraction activities associated with the development of these two properties. PES installed the transducers between April 6 and April 10, 2017. Groundwater extraction associated with the redevelopment properties was initiated April 17, 2017, with additional dewatering wells activated after that date. To provide water levels to monitor drawdown in the early stages of groundwater extraction and to check the conditions of the flush-with-grade monitoring well completions containing the pressure transducers, PES measured depth to water in 13 wells on the Property and 18 wells off the Property weekly between April 14 and May 19 (Table 5).

Table 3 provides the groundwater elevation data measured with an electronic water level probe in previous investigations and in 2017. Appendix H presents hydrographs for groundwater elevations in selected wells, hydrographs of the data collected by the pressure transducers, and tabulated pressure transducer data.

5.2.2 Groundwater Sampling

PES collected groundwater samples from 53 monitoring wells between March 20 and April 21, 2017, and between June 12 and 30, 2017. The sampled wells included 22 shallow water-bearing zone wells, 17 intermediate water-bearing zone wells, and 14 deep water-bearing zone wells (Table 5). PES monitored pH, specific conductance, temperature, DO, and ORP, with selected wells also monitored for turbidity.

PES shipped all groundwater samples via overnight carrier service to ESC Lab Sciences ("ESC") in Mount Juliet, Tennessee, for analysis of VOCs by EPA Method 8260C. Groundwater samples from 10 wells near the northern part of the Property (where fuel was stored and distributed) were also analyzed for GRO by Ecology Method NWTPH-Gx, and groundwater samples from 31 wells located beneath and downgradient of the Property were also monitored and tested for monitored natural attenuation ("MNA") parameters (Table 5).

Table 6 summarizes the groundwater chemical detection statistics, Table 7 provides the results for the volatile constituents (GRO and VOCs) detected in the 2017 groundwater samples, Table 8 presents the historical and 2017 MNA data, and Table 9 provides the field parameter data measured during 2017 sampling. The 2017 GRO and VOC data are also presented with the historical data in Appendix F.

5.3 Geotechnical Investigation

Four temporary borings (B-201 through B-204) were drilled as part of a geotechnical investigation conducted at the Property in June 2017. Holocene Drilling of Puyallup, Washington, drilled the borings, and Terra Associates, Inc., oversaw the drilling and logged the borings. Terra tested six samples for grain size distribution. PES collected soil samples from each geotechnical boring and submitted them to ESC for analysis of VOCs; PES also submitted selected samples for analysis of GRO. Figure 7 shows the locations of the borings, Table 10 provides a summary of the grain size results, Appendix G describes the field and laboratory procedures used, and Appendix E provides the boring logs.

5.4 Pre-Interim Action Investigation

Investigations at and adjacent to the Property were conducted in August and September 2017 to fill data gaps at the Property (Table 4) and provide the data needed to design and implement an interim action. The investigation included drilling and sampling soil and groundwater from temporary borings, installing and developing monitoring wells, and collecting groundwater samples from the new wells. Figure 7 shows the locations of the borings and monitoring wells, Table 4 summarizes the purpose of each boring and well, and Appendix G details the field and laboratory procedures used. Appendix E provides the boring and well logs. Following is a summary of the investigation.

5.4.1 Temporary Boring Drilling

Cascade Drilling ("Cascade") of Woodinville, Washington, drilled 19 borings (B-205 through B-223) to depths ranging from approximately 50 to 125 bgs (elevation -11 to -80 feet relative to NAVD88; see Table 1) in August and September 2017. Borings B-205 through B-211 and B-216 through B-223 were drilled on the Property, and borings B-212 through B-215 were drilled in the street ROWs to the west and south of the Property. All borings were drilled using a sonic drilling rig to allow continuous soil retrieval and logging. Periodic grab (reconnaissance) groundwater samples were also collected. Table 5 summarizes the soil and reconnaissance groundwater samples collected for laboratory analysis. These samples were submitted to ESC for analysis of VOCs by EPA Method 8260C, with selected samples also submitted for analysis of GRO by Ecology Method NWTPH-Gx (Table 5). Soil samples were collected from most borings for laboratory analysis of grain size, vertical hydraulic conductivity, dry bulk density, or f_{oc}. The samples were submitted to PTS Laboratories ("PTS") in Houston, Texas, for analysis. Physical analysis soil samples were selected to represent a variety of lithologies, various sample depths, and different locations on the Property. PES submitted 16 samples for analysis of grain size, 1 sample for analysis of vertical hydraulic conductivity, 1 sample for analysis of dry bulk density, and 4 samples for analysis of f_{oc} (Table 5). Table 10 provides a summary of the soil physical properties testing results.

To provide the data needed to fill the data gaps, PES projected that temporary borings B-205 through B-217 and B-219 would need to be advanced to the bottom of the intermediate water-bearing zone, to a depth of 80 to 95 feet bgs (an approximate elevation of -40 feet). Nine of the borings (B-205, B-206, B-208, B-209, B-210, B-212, B-215, B-216, and B-219) were drilled as planned to an approximate elevation of -40 feet. Based on field indications of potential contamination in or near the boring being drilled, five of the borings (B-207, B-211, B-213, B-214, and B-217) were drilled deeper than planned, to depths anticipated to be below potential contamination. Bottom depths in these borings ranged from 90 to 125 feet bgs (approximate elevations from -51 to -80 feet). Five borings were added to help delineate the lateral and vertical extent of CVOCs detected in soil at MW-135. B-221 was drilled to an approximate depth of 70 feet bgs (an approximate elevation of -31 feet), and B-218 (moved from its original location and replaced there by MW-139), B-220, B-222, and B-223 were each drilled to an approximate depth of 50 feet bgs (approximate elevations of -11 to -12 feet). Due to the density and silt content of the soil in the intermediate and deep water-bearing zones, fewer reconnaissance groundwater samples were collected during drilling of the temporary borings than were planned.

5.4.2 Monitoring Well Installation and Development

Ten monitoring wells (MW-132 through MW-141) were drilled to depths ranging from 80 to 120 bgs (elevation -39 to -80 feet relative to NAVD88; see Table 1) in August and September 2017 (Figure 7). Wells MW-132 through MW-137, MW-139, and MW-141 were drilled on the Property, and wells MW-138 and MW-140 were drilled in the street ROWs to the west and south of the Property. The monitoring well borings were drilled using a sonic drilling rig to allow continuous soil retrieval and logging. Periodic grab (reconnaissance) groundwater samples were also collected. Table 5 summarizes the soil and reconnaissance groundwater samples collected for laboratory analysis. These samples were submitted to ESC for analysis of VOCs, with selected samples also submitted for analysis of GRO (Table 5). Soil samples were collected from most monitoring well borings for laboratory analysis of grain size, hydraulic conductivity, or f_{oc}. The samples were submitted to PTS for analysis. As with the samples from the temporary borings, physical analysis soil samples were selected to represent a variety of lithologies, various sample depths, and different locations on the Property. PES submitted 8 samples for analysis of grain size, 2 samples for analysis of vertical hydraulic conductivity, 2 samples for analysis of dry bulk density, and 2 samples for analysis of f_{oc} (Table 5). Table 10 provides a summary of the soil physical properties testing results.

To provide the data needed to fill the data gaps, PES projected that six monitoring wells (MW-132, MW-134 through MW-138) would need to be advanced to the bottom of the intermediate water-bearing zone (to a depth of 80 to 95 feet bgs or an approximate elevation of -40 feet), with a well screened in each near the base of the Intermediate B zone, and that two monitoring wells (MW-133 and MW-140) would need to be advanced to and completed at the base of the deep water-bearing zone (to a depth of 120 to 130 feet bgs or an approximate elevation of -75 to -80 feet). Four of the wells (MW-132, MW-134, MW-135, and MW-136) were drilled as planned to an approximate elevation of -40 feet with a 10-foot-long well screen installed in each. Two of the planned intermediate water-bearing zone-wells (MW-137 and MW-138) were advanced into the deep water-bearing zone to depths anticipated to be below potential contamination in borings near the well locations (each to 115 feet bgs). Monitoring wells with 10-foot-long screens were installed at the bottom of each of these monitoring well borings. Two monitoring wells were added to help delineate the eastern extent of CVOCs detected in soil and groundwater at B-211 and MW-133: MW-139 (drilled at the original B-218 location) was drilled to an approximate depth of 80 feet bgs (an approximate elevation of -40 feet), and MW-141 was drilled to an approximate depth of 105 feet bgs (an approximate elevation of -65 feet), with 10-foot-long screens were installed at the bottom of each of these monitoring well borings. Due to the density and silt content of the soil in the intermediate and deep water-bearing zones, fewer reconnaissance groundwater samples were collected during drilling of the monitoring well borings than were planned.

Cascade developed each new monitoring well before the wells were monitored. Development involved repeated surging (with a surge block or bailer) and pumping until the color of the discharge water did not change with additional development.

5.4.3 Monitoring Well Sampling

PES sampled each new monitoring well approximately 1 day after it was developed. PES conducted the sampling between September 21 and 25, 2017. PES used a bladder pump to purge and sample the wells, submitting the samples to ESC for analysis of VOCs and GRO.

5.5 Bench Treatability Testing

A bench treatability study was conducted by In-Situ Oxidative Technologies, Inc. ("ISOTEC") to provide data for design of the interim action. A copy of the treatability study report is included in Appendix I. The objectives of the study were to evaluate whether soil characteristics at the Property would prevent modified Fenton's reagent ("MFR") from effectively treating PCE contaminated soil and to evaluate the relative effectiveness of two different MFR dose rates for treating CVOCs. The bench study used a bulk soil sample collected during installation of monitoring well MS-135 (a 1-gallon sample collected from the soil remaining in the sampler after the discrete sample at 46 feet bgs was collected) that contained a pre-testing concentration of PCE of 13.0 mg/kg after the bulk sample was homogenized in the laboratory.

ISOTEC set up one control reactor and two treatment reactors. One treatment reactor was dosed with a low-concentration of MFR (6 grams oxidant per kilogram of soil) and one was dosed with a relatively high concentration of MFR (24 g/kg). The MFR was injected into each treatment reactor without opening the container and mixed thoroughly with the sample contents after each injection. The injections occurred in two stages, 24 hours apart, to increase treatment efficiency, minimize gas formation and the resulting pressure buildup. The two treatment reactors were quenched after 24 hours following the second injection and the treated soil (and the control soil) was sampled and submitted for analysis of VOCs and GRO. The study concluded that:

- There does not appear to any soil characteristics that would prevent MFR from oxidizing PCE and MFR should be an effective oxidizing agent for this project; and
- The low and high doses of the MFR provided generally the same level of treatment and that based on this outcome, the recommended application approach of MFR would be multiple low doses rather than fewer high dose injections.

5.6 Water Injection Testing

ISOTEC conducted brief injection tests in 10 monitoring wells on October 18, 2017, to assess the ability to inject treatment fluids into the water-bearing zones proposed for the interim action. ISOTEC used monitoring wells MW130, MW131, MW-132, MW-134, MW-135, MW-136, MW-139, MW-141, W-MW-01, and W-MW-02 for the tests. At each well, an adapter was connected to the top of the PVC casing, and a small volume of potable water, similar to the volume of water in slug testing, well development, or well rehabilitation, was pumped into the well under pressure. Water pressure and volume were measured and recorded. Total flow into each well varied from 4 to 50 gallons, with injection pressures ranging from 12 to 100 psi.

5.7 Data Validation

PES reviewed the analytical reports to evaluate the laboratory's performance in meeting the quality control criteria outlined in the 2017 USEPA Contract Laboratory Program National Functional Guidelines for Organic Superfund Methods Data Review and 2017 USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Methods Data Review (USEPA, 2017a and 2017b). PES reviewed completeness, sample collection and preservation, holding times, initial and continuing calibration, method blank results, field and laboratory duplicate results, surrogate recoveries, laboratory control samples, matrix spike/matrix spike duplicates ("MS/MSD"), and quantitation limits. PES assigned the following data qualifiers, as needed:

- **J qualifier**: the result is an estimate based on laboratory quality control results or data quality review;
- **U qualifier**: the result is considered not detected at the concentration shown based on a review of the laboratory quality control results; and
- **R qualifier**: the result is rejected based on a review of laboratory data quality results.

Following is a summary of the reasons that some of the data were qualified:

- All laboratory qualifiers indicating detections between the laboratory method detection limits and the associated laboratory reported detection limits ("RDL," the laboratory's practical quantitation limits), which the laboratory indicated with a J qualifier, were accepted;
- Based on the lack of 2-chloroethyl vinyl ether recoveries for the MS/MSD, the non-detected 2-chloroethyl vinyl ether results in FMW-3D and MW111 were rejected (R);
- Some low-level detections of VOCs were qualified as non-detected (U) due to detections of those VOCs in the associated method blanks;
- A few detected VOCs were qualified as estimated (J) due to continuing calibration verification ("CCV") issues;
- Some non-detected VOCs were qualified as estimated (UJ) due to CCV issues; and
- Isolated non-detected VOC results were qualified as estimated due to slightly low or elevated laboratory control sample recoveries.

The usefulness of the data was determined based on the EPA guidelines. Based on the data quality review, PES judged all of the data, except for the data qualified with an R, acceptable for use in the interim action and RI. PES does not think that the rejected data will materially affect the evaluation of environmental conditions. Appendix J provides the analytical data reports and data validation review memoranda.

5.8 Well Surveying

Bush, Roed & Hitchings, Inc. ("BRH") surveyed the horizontal and vertical locations of monitoring wells not previously surveyed, selected additional Site wells, and selected Property features to ensure accuracy of the Site figures and aid in evaluation of the data. The horizontal datum was North American Datum of 1983/1991 ("NAD 83/91"), and the vertical datum was the NAVD 88.

6.0 INVESTIGATION RESULTS

This section presents a summary of the investigation results, including the geology, hydrogeology, and nature and extent of contamination. The Draft RI Report (SES, 2013b), Draft Cleanup Action Plan (SES, 2015), and Draft Interim Action Work Plan (SES, 2016) presented the bulk of the information summarized in this section.

6.1 Site Geology

Based on the previous investigations at the Site, the subsurface lithology consists predominantly of silty sand, with lesser units of silt, sandy silt, sand, silty gravel. Minor amounts of gravel are found in many of the silty sand and sand units. Densities of the deposits range from loose near the surface to very dense at depth. Dense to very dense soil was typically encountered in the borings at depths greater than 30 to 40 feet bgs, although at some locations (e.g., MW112, MW114, and MW117) dense to very dense soil was encountered as shallow as 10 feet bgs. SES interpreted these lithologies to comprise the following stratigraphic units (from youngest to oldest): fill, recent (post-glacial) lacustrine deposits, glacial till or ice-contact deposits of the most recent glacial advance (Vashon Stade of the Frasier Glaciation), and Vashon or pre-Vashon glacial (outwash or drift) or inter-glacial deposits. The thickness of the fill is greatest to the east, near the southern extent of Lake Union.

Figures 8 through 11 present cross sections along roughly east-west and north-south transects across the Site. Figure 5 shows the cross section locations. The cross sections were located to allow the presentation of subsurface conditions roughly along a groundwater flow path and along transects roughly perpendicular to groundwater flow. To create the cross sections, the thickness and Unified Soil Classification Symbols for each lithology shown on the available boring logs, as well as the horizontal and vertical coordinates of the boring locations, were entered into a subsurface visualization software package (Earth Volumetric Studio by C Tech). Earth Volumetric Studio created a 3-dimensional model of the subsurface lithology using a kriging algorithm. Once the model was created, PES cut cross sectional slices (A-A’, B-B’, C-C’, and D-D’) through the block model incorporating as many deeper borings as possible. For presentation purposes, PES grouped lithologies that may be expected to behave similarly with respect to groundwater flow and contaminant transport. Thus, cleaner sand and gravel units were combined, silty sand and silty gravel units were combined, and predominantly fine-grained units (sandy silt, silt, and clay) were combined. Cross sections A-A’ (Figure 8) and B-B’ (Figure 9) were further modified by hand to include the nearest borings and monitoring wells drilled during the pre-interim action investigation (B-209 through B-212, MW-132, and MW-133 on Figure 8 and MW-135, MW-137, and MW-140 on Figure 9).

As seen on the cross sections, most of the Site is underlain by fill, with the areas shown without fill due to a lack of subsurface data (e.g., the south end of cross section B-B’) or a lack of soil sampling (e.g., the top of MW106). Under most of the Site, 70 to 80 feet of interbedded silty sand, sandy silt, and silt underlie the fill, with occasional interbedded sand. Silty sand predominates in this zone, especially in the upper portion of this unit beneath the Property and to the southeast of the Property, but in the area around MW128, the interbedded unit is thin. Beneath the interbedded zone lies a coarser unit consisting primarily of sand with silty sand interbeds, with the thickest accumulations south of the Property and in the area around MW128.

Although the Studio model shows finer material (silty sand to predominantly silty soil) beneath the sand, only a few locations (e.g., MW105 and MW-133) were drilled deep enough to encounter this unit.

6.2 Site Hydrogeology

6.2.1 Hydrostratigraphy

SES described the Site hydrostratigraphy as comprised of discontinuous water-bearing zones in the glacial or ice-contact deposits, extending from the water table to the top of the outwash deposits, with a deeper water-bearing zone in the outwash deposits. SES designated a shallow, unconfined water-bearing zone in the fill, lacustrine deposits, and upper portion of the glacial till/ice-contact deposits (corresponding to the fill and less dense upper portion of the interbedded unit shown on the cross sections); an intermediate, dense to very dense, semi-confined to confined water-bearing zone in the glacial till/ice-contact deposits, which serves as a leaky aquitard (corresponding to the interbedded unit shown on the cross sections); a deeper, very dense, confined water-bearing zone in the outwash deposits (corresponding to the coarser unit shown on the cross sections); and a lower aquitard consisting of very hard, fine-grained glacial drift (corresponding to the few locations shown below the coarse deposits). The approximate locations of the shallow, intermediate, and deep water-bearing zones are shown on the cross sections. The intermediate water-bearing zone is further divided into an upper coarser zone (termed the Intermediate A water-bearing zone) and lower finer zone (termed the Intermediate B water-bearing zone).

6.2.2 Groundwater Elevations

Table 3 summarizes the groundwater levels measured in monitoring wells at the Site to date, including top of casing elevation (if known), depth to water, and groundwater elevation. Although the earliest reported water levels were measured in the early 1990's in off-Property wells, more comprehensive Site-wide water level monitoring rounds have been conducted between 2012 and 2017. Factors affecting groundwater elevations include seasonal variability, operation of the ERH/SVE system at the Property between August and December 2013, operation of a dewatering system at Block 43 between November 2013 and December 2014, and operation of a dewatering system at Block 37 between April 2017 and the present. In presumed non-pumping periods between 2012 and 2017, depth to groundwater varied from 2.2 feet bgs in J5 (March 20, 2017) to 42.5 feet bgs in MW112 (December 21, 2012), and groundwater elevations (relative to NAVD 88) ranged from 10.97 feet in MW102 and MW106 (February 1, 2016) to 39.1 feet in R-MW5 (March 20, 2017). Operation of the ERH/SVE system locally volatilized groundwater in the depth range treated, resulting in some of the Property monitoring wells in the depth range treated (0 to 40 feet bgs) going dry during the period that the system was operational (SES, 2015). Operation of the Block 43 dewatering wells lowered the intermediate and deep groundwater elevations from 5 to 8 feet during and shortly after the period of pumping (SES, 2015).

During the groundwater level events conducted by PES in March and early April 2017 (when no cleanup or dewatering activities were known to be occurring), depth to groundwater varied from 2.2 feet bgs in J5 to 41.5 feet bgs in MW124, and groundwater elevations (relative to NAVD 88) ranged from 14.7 feet in MW124 to 39.1 feet in R-MW5. Based on the historical data, groundwater elevations (in general) were highest in the shallower monitoring wells and lowest in deeper monitoring wells. Sufficient data have not been collected to verify the seasonal variability of groundwater elevations.

Since groundwater extraction began on the two redevelopment properties located to the southeast of the Property in April 2017 (see Section 2.3.5), groundwater elevations in the monitored wells at the Site have decreased significantly. Through October 11, decreases in groundwater elevations ranged from 8.02 (R-MW5) to 13.90 feet (F13) in the shallow water-bearing zone, from 10.44 (MW131) to 22.03 feet (MW119) in the Intermediate A water-bearing zone, from 3.04 (MW130) to 16.92 feet (MW111) in the Intermediate B water-bearing zone, and from 2.41 (MW124) to 20.38 feet (MW128) in the deep water bearing zone. The larger groundwater elevation decreases in the deeper monitoring wells increases the downward hydraulic gradients at the Site. A portion of the groundwater elevation decreases may be due to seasonal water level changes (e.g., at MW102, MW112, MW124, and MW130, which are located on the western edge of the Site), but as seen in the hydrographs in Appendix H, it appears that the majority of the groundwater elevation decreases observed are due to groundwater extraction activities on the redevelopment properties to the southeast.

6.2.3 Groundwater Flow Direction

Figure 12 presents groundwater contour maps for the shallow, Intermediate A, and deep water-bearing zones using groundwater levels measured on March 24, 2017. Consistent with groundwater contour maps generated using groundwater levels from the limited number of historical groundwater monitoring events, the groundwater flow direction in the shallow and Intermediate A water-bearing zones was to the east on March 24, 2017. However, the groundwater flow direction in the deep water-bearing zone on March 24, 2017, was westward to the west of 9th Avenue North (opposite the historical groundwater flow direction) and eastward to the east of 9th Avenue North. Groundwater levels measured on March 20 and April 14, 2017, also indicated a westerly groundwater flow direction in the deep water-bearing zone. PES confirmed water level stability in each well as they were measured, and the consistency of the flow direction in the deep water-bearing zone over three measurement events indicates that the measurements are trustworthy. PES is not aware of any activities near the Site that would cause a groundwater flow direction reversal in the western part of the Site. Based on the groundwater contour maps generated using the March 24, 2017, data, the horizontal hydraulic gradient varied from was approximately 0.031 to 0.050 feet/foot in the shallow water-bearing zone, from 0.029 to 0.063 feet/foot in the Intermediate A water-bearing zone, and from 0.006 to 0.008 feet/foot in the deep water-bearing zone.

Figure 12 also provides a groundwater contour map in the deep water-bearing zone on May 5, 2017. By May 5, the groundwater extraction system southeast of Property had been pumping for 17 days, and the groundwater flow direction in the deep water-bearing zone was to the east across the Site. Based on the hydrographs for the deep water-bearing zone wells monitored with pressure transducers (Appendix H), the groundwater flow direction switched from westward to eastward on April 20. The significant alteration of the deep water-bearing zone groundwater flow direction is similar to the effects shown in 2013 and 2014, when there was a shift of the intermediate and deep groundwater flow directions from eastward to southeastward (see the SES groundwater contour maps for January 6, 2014, and June 16, 2015, provided in Appendix B).

Figure 13 presents groundwater contour maps for the shallow, Intermediate A, Intermediate B, and deep water-bearing zones using groundwater levels measured on October 11, 2017. By October 11, the complete groundwater extraction system southeast of the Property had been pumping for 176 days. Based on the groundwater contour maps generated using the October 11, 2017, data, groundwater flow was generally to the east (ranging from east northeast to east southeast), and the horizontal hydraulic gradient varied from approximately 0.009 to 0.023 feet/foot in the shallow water-bearing zone, from 0.051 to 0.137 feet/foot in the Intermediate A water-bearing zone, from 0.020 to 0.025 feet/foot in the Intermediate B water-bearing zone, and from 0.015 to 0.017 feet/foot in the deep water-bearing zone. The horizontal hydraulic gradients in the Intermediate A and deep water-bearing zones were higher in October 2017 than in March 2017, likely due to groundwater extraction associated with the groundwater extraction system southeast of the Property.

6.2.4 Aquifer Test Results

Table 2 provides the horizontal hydraulic conductivities estimated from the slug tests conducted by SES in 2013 (SES, 2013b). Hydraulic conductivities were estimated from both the falling head and rising head tests, with average hydraulic conductivities determined using all of the data at each well. Generally, the hydraulic conductivities determined from the rising head tests were somewhat higher than those determined from the falling head tests. The estimated average horizontal hydraulic conductivities varied from 7.5×10^{-6} (W-MW-01) to 2.2×10^{-2} cm/sec (MW115), with the lower values (10^{-6} to 10^{-4} cm/sec) in wells screened in silt and silty sand, and the higher values (10^{-3} to 10^{-2} cm/sec) in wells screened at least partially in relatively clean sand. The average horizontal hydraulic conductivity of tests conducted in the Intermediate A, Intermediate B, and deep water-bearing zones were 4.3×10^{-3} cm/sec, 1.3×10^{-4} cm/sec, and 1.2×10^{-2} cm/sec, respectively. The slug test results are consistent with published laboratory test results for various mixtures of sand, silt, and clay (Wolfe, 1982).

Table 10 presents the soil physical properties determined by laboratory testing of samples collected during the 2017 pre-interim action investigations. PES used the Kozeny-Carmen equation (Payne et al., 2008) to estimate the hydraulic conductivity of the samples analyzed for grain size. The median calculated hydraulic conductivities of the samples collected in the Intermediate A, Intermediate B, and deep water-bearing zones were 1.6×10^{-3} cm/sec, 1.0×10^{-3} cm/sec, and 1.9×10^{-2} cm/sec, respectively. The median calculated hydraulic conductivities of the sandy silt and silt, silty sand, and sand samples were 1.6×10^{-6} cm/sec, 1.6×10^{-3} cm/sec, and 1.9×10^{-2} cm/sec, respectively. The maximum calculated hydraulic conductivity was 9.4×10^{-2} cm/sec (MW-140 at 100 feet bgs), and the minimum calculated hydraulic conductivity was 2.3×10^{-7} cm/sec (MW-136 at 77 feet bgs). Outside of the median hydraulic conductivity for the Intermediate B water-bearing zone, these results were similar to the slug test results obtained by SES. The vertical hydraulic conductivities measured in the laboratory varied from 8.5×10^{-7} (MW-140, 80 to 80.5 feet bgs) to 1.5×10^{-3} cm/sec (B-206, 50 to 51 feet bgs).

The f_{oc} results were relatively low, ranging from 3.90 x 10^{-4} g/g (B-213 at 125 feet bgs) to 2.45 x 10^{-3} g/g (MW-137 at 90 feet bgs). The laboratory dry bulk densities varied from 112.4 pounds per cubic foot ("pcf"; MW-140, 80 to 80.5 feet bgs) to 127.4 pcf (MW-136 at 77 feet bgs).

6.2.5 Groundwater Flow Velocity

The groundwater flow velocity (also known as the seepage velocity or average linear velocity) can be determined using the following equation (Fetter, 2001):

$$v = \frac{ki}{n},$$

where v = groundwater flow velocity (cm/sec),
k = hydraulic conductivity (cm/sec),
i = hydraulic gradient (feet/foot), and
n = effective porosity.

PES estimated the horizontal groundwater flow velocity using an effective porosity value of 30 percent (Wolff, 1982); the average horizontal hydraulic gradients for each zone on March 24, 2017, and October 11, 2017; and the range in horizontal hydraulic conductivity for each water-bearing zone determined from the slug tests (1.9 x 10^{-5} cm/sec to 2.2 x 10^{-2} cm/sec in the Intermediate A zone, 7.5 x 10^{-6} cm/sec to 2.1 x 10^{-4} cm/sec in the Intermediate B zone, and 1.5 x 10^{-3} cm/sec to 1.9 x 10^{-2} cm/sec in the deep zone). Since horizontal hydraulic conductivity could not be determined for the Intermediate B zone using the limited March 24 data, PES did not estimate the Intermediate B groundwater flow velocity for that date. Although no slug tests were conducted in the shallow water-bearing zone, the lithologies of the shallow fill and recent deposits are variable enough that the rather wide range of horizontal hydraulic conductivity determined in the Intermediate A water–bearing zone may be representative of the shallow zone also and were used to calculate the shallow zone groundwater flow velocity. For the March 24, 2017, data, PES estimated the horizontal groundwater flow velocity to vary from approximately 0.007 to 8.4 feet per day in the shallow water-bearing zone, from approximately 0.008 to 9.6 feet per day in the Intermediate A water-bearing zone, and from approximately 0.10 to 1.3 feet per day in the deep water-bearing zone. Using the October 11, 2017 data, PES estimated the horizontal groundwater flow velocity to vary from approximately 0.003 to 3.3 feet per day in the shallow water-bearing zone, from approximately 0.017 to 20 feet per day in the Intermediate A water-bearing zone, from approximately 0.002 to 0.043 feet per day in the Intermediate B water-bearing zone, and from approximately 0.23 to 2.9 feet per day in the deep water-bearing zone.

6.3 Nature and Extent of Contamination

6.3.1 Screening Levels

In the discussion below, screening levels are used to provide a basis for describing the nature and extent of contamination. These screening levels are not cleanup levels or cleanup standards for the Site. Cleanup standards for the Site will be established in the upcoming RI/FS and the Cleanup Action Plan (CAP) for the Site, once the additional RI work has been conducted. Cleanup standards will be developed using MTCA Method B for soil, groundwater, surface water, indoor air in accordance with WAC 173-340-740, WAC 173-340-720, WAC 173-340-730 and WAC 173-340-750, respectively. Cleanup standards include COC concentrations that are protective of human health and the environment (cleanup levels) and where those concentrations must be met (point of compliance).

For purposes of this work plan, screening levels will be set consistent with the approach outlined in Ecology's 2015 letter (Ecology, 2015), which used MTCA Method B as the basis for establishing cleanup levels at the Site. Following the MTCA process for developing cleanup levels, Ecology (2016a and 2017) developed and updated preliminary Method B soil and groundwater cleanup levels for PCE, TCE, cDCE, tDCE, and VC for this Site. Ecology also summarized the sub-slab soil and groundwater vapor intrusion screening levels based on Ecology's draft 2009 guidance document (Ecology, 2009)

Table 11 presents the preliminary screening levels, including those developed by Ecology for PCE, TCE, cDCE, tDCE, and VC, and for those developed by PES (following Ecology's methodology) for other CVOCs and petroleum hydrocarbons detected in soil and groundwater samples collected historically at the Site. Table 11 also presents the most recent Ecology vapor intrusion screening levels (Ecology, 2016b). These screening levels are protective of the of the exposure pathways identified in the CSM described Section 7.

For the purposes of the Interim Action described in Sections 8 through 10 of this plan, the soil and groundwater screening levels presented in Table 11 will be used when evaluating the results of future soil and groundwater monitoring results generated during and after implementing the IAWP.

6.3.2 Soil Chemistry

Appendix F provides the analytical results for soil samples collected during investigations on and off the Property. The analytical results for the primary constituents representing substances handled at the Property (CVOCs and petroleum hydrocarbons) are presented in the Appendix F tables and summarized in Table 6. Figures 14 through 17 show the estimated areas where soil containing PCE, TCE, cDCE, and/or VC are above one or more of the screening levels. To create the figures depicting the extents of CVOCs above the screening levels, the soil CVOC results (collected in 2012 and 2013) and the horizontal and vertical coordinates of the sampling locations were entered into Earth Volumetric Studio. PES used the program's kriging algorithm to create a 3-dimensional model of the subsurface CVOC concentrations in soil. Once the model was created, PES cut horizontal slices in the elevation ranges of the shallow (above elevation 20 feet relative to NAVD88), Intermediate A (elevation -15 to 20 feet), Intermediate B (-45 to -15 feet), and deep (-100 to -45 feet) water-bearing zones near the Property. The vadose zone is not presented due to a limited number of samples in the relatively thin unit and the plan to excavate all of it during Property redevelopment. Following is a brief summary of those results.

6.3.2.1 <u>Property</u>

Before ERH/SVE Treatment. PCE and TCE were detected above the screening levels in most soil samples collected from the on-Property borings drilled before operation of the ERH/SVE system. VC, cDCE, and tDCE were detected less frequently than PCE and TCE and always in the same samples with PCE and/or TCE detections. The maximum detections of PCE, TCE, cDCE, tDCE, and VC were 237 mg/kg (G-MW1 at 20 feet bgs), 2.3 mg/kg (W-MW-04 at 9 feet bgs), 7.3 mg/kg (W-MW-04 at 9 feet bgs), 0.22 J mg/kg (W-MW-04 at 9 feet bgs), and 0.71 mg/kg (W-MW-04 at 9 feet bgs).

PCE and TCE screening level exceedances were found in soil sampled on-Property between 5 feet bgs (DB07) and 81 feet bgs (MW101). Soil at depths shallower than 40 bgs was treated by the ERH/SVE system in 2013 over most of the Property, and CVOC concentrations in that depth range in the treated area (Figure 6) are generally significantly less than the pretreatment levels (see below). PCE, TCE, and in limited cases cDCE, were detected above the screening levels in soil samples collected on-Property before soil treatment at depths below the treatment zone (greater than 40 feet bgs (below approximately 0 feet elevation)). These detections occurred in samples collected from MW101, DB03 through DB13, W-MW-03, and W-MW-04, which were located across the southern three-quarters of the Property. PCE concentrations over two orders of magnitude above the screening level were detected in soil samples collected below the treatment zone in MW101 (up to 4.2 mg/kg), DB03 (up to 3.6 mg/kg), DB06 (up to 1.3 mg/kg), DB07 (up to 13 mg/kg), DB08 (up to 4.2 mg/kg), DB10 (up to 57 mg/kg), DB11 (up to 15 mg/kg), W-MW-03 (up to 46 mg/kg), and W-MW-04 (up to 10 mg/kg).

Limited petroleum hydrocarbon analysis was performed on soil samples collected at the Property pre-ERH/SVE treatment. The results of the samples collected before operation of the ERH/SVE system were generally below the screening levels, except for GRO (300 mg/kg) at a depth of 10.5 feet bgs in B-1a and GRO (260 and 73 mg/kg at 10 and 20 feet bgs, respectively), benzene (0.059 mg/kg), toluene (0.41 mg/kg), ethylbenzene (1.2 mg/kg), and total xylenes (3.6 and 1.0 mg/kg at 10 and 20 feet bgs, respectively) in DB14.

After ERH/SVE Treatment. As discussed in Section 4.13.2.2, limited soil sampling was conducted soon after completion of the ERH/SVE treatment. Soil was sampled in five shallow (to 10 feet bgs) direct-push borings (P02 to P06) drilled in the treatment area in February 2014. Shallow soil samples (5 to 10 feet bgs) collected from P02 through P06 contained PCE detections above the screening level, though at greatly reduced concentrations from pretreatment samples (generally below 1 mg/kg). Post treatment sampling at 5 and 10 feet bgs in P01, drilled outside of the ERH/SVE treatment area near the DB14 location and only analyzed for petroleum-related constituents, only detected DRO below the screening level at 10 feet bgs.

Soil samples were also collected within and below the soil volume treated by the ERH/SVE system in 2016 (IW06, MW130, and MW131) and in the 2017 geotechnical and pre-interim action investigations (B-201 through B-211, B-216 through B-223, MW-132 through MW-137, MW-139, and MW-141). The maximum detections of PCE, TCE, cDCE, tDCE, and VC in these samples were 8,270 mg/kg (B-221 at 45 feet bgs), 113 mg/kg (MW-135 at 14 feet bgs), 329 mg/kg (MW-135 at 14 feet bgs), 0.700 mg/kg (MW-135 at 14 feet bgs), and 17.0 mg/kg (MW-135 at 14 feet bgs). At least one sample was above a screening level for PCE, TCE, cDCE, tDCE, and/or VC in all borings and wells, except B-209, B-216, MW-137, and MW-141. GRO and BTEX results were generally not detected above the MDLs in the samples collected after operation of the ERH/SVE system. Detections were generally below the screening levels, except for GRO (168 mg/kg) at a depth of 5 feet bgs in B-203; GRO (274 mg/kg), benzene (0.304 mg/kg), toluene (0.372J mg/kg), ethylbenzene (4.74 mg/kg), and total xylenes

(6.02 mg/kg) at 10 feet bgs in B-205; and toluene (0.580 mg/kg) at 85 feet bgs in MW-133. The toluene detection above the screening level in MW-133 is coincident with a PCE detection above 1 mg/kg, and although the shallow petroleum hydrocarbon detections in B-203 and B-205 are not coincident with elevated CVOC detections, they appear to be limited in extent and are in the depth range to be excavated during Property redevelopment.

CVOC concentrations in the depth range treated by the ERH/SVE system (elevations greater than approximately 0 feet) were generally over an order of magnitude lower in concentration in soil sample collected post treatment. Examples include MW-137 (four orders of magnitude decrease compared to DB06) and MW-139 (two orders of magnitude decrease compared to DB08 and DB13). Two locations at the Property continue to exhibit CVOC concentrations over two orders of magnitude above the screening level in the depth range treated by the ERH/SVE system: at MW-133 and the area near MW-135. PCE was detected at 3.62 mg/kg in the sample collected at 20 feet bgs (elevation of 20 feet) in MW-133, and the PCE concentrations ranged from 1.01 to 25.8 mg/kg in soil samples collected between 0 and 40 feet bgs (above elevation 0 feet) in B-220 through B-222 and MW-135.

CVOCs (primarily PCE, TCE, and cDCE) were above the screening levels in multiple samples collected below the volume treated by the ERH/SVE system in many of the borings, including B-203, B-205, B-206, B-207, B-211, B-217, B-218, B-220 through B-223, DB03, DB05 through DB10, MW101, MW130, MW131, MW-132, MW-133, MW-134, MW-135, W-MW-03, and W-MW-04.

Figures 14 through 17 present the distribution of PCE, TCE, cDCE, and VC in the elevation ranges of the shallow (above 20 feet relative to NAVD88), Intermediate A (-15 to 20 feet), Intermediate B (-45 to -15 feet), and deep (-100 to -45 feet) water-bearing zones across the Site. The figures were prepared using all soil data collected outside of the ERH/SVE treatment volume and all soil data within the treatment volume that were collected post treatment. PCE and TCE were the primary CVOCs detected in soil above the screening levels in all four water-bearing zones. In the shallow water-bearing zone, soil CVOC screening level exceedances were located in the west central portion of the Property and at and immediately southeast of the southeast corner of the Property. CVOC screening level exceedances in the Intermediate A and B water-bearing zones were located in a southwest-northeast trending swath across the Property, in the southeast corner of the Property, immediately east of the Property, and immediately south of the southeast quadrant of the Property. In the deep water-bearing zone, CVOC detections above the screening levels were limited to a narrow southwest-northeast trending swath located primarily in the southwest quadrant of the Property.

6.3.2.2 Off Property

CVOC concentrations in off-Property soil samples were generally low, with most of the screening level exceedances from borings drilled adjacent to the Property (B-215, MW104, MW107, MW-140, W-MW-01, and W-MW-02) or downgradient along the alley between 8th Avenue North and 9th Avenue North (MW103, MW108, MW109, MW110, and MW111). PCE, TCE, and cDCE were the primary CVOCs detected, with infrequent detections of tDCE and VC. The maximum detections of PCE, TCE, cDCE, tDCE, and VC were 19 mg/kg (MW107 at 35 feet bgs), 1.02 mg/kg (B-215 at 65 feet bgs), 1.55 mg/kg (B-215 at 65 feet bgs), 0.0083 mg/kg (CHB-07 at 12.5 feet bgs), and 0.0990 mg/kg (MW-140 at 55 feet bgs). The predominance of CVOC detections in the intermediate water-bearing zone indicates that their presence in soil samples may be due to their presence in groundwater.

Off-Property petroleum hydrocarbon results were generally low, with isolated screening level exceedances near historical sources on other properties. Pretreatment results from the off-Property borings closest to the Property indicate that any historical petroleum hydrocarbon contamination at the Property did not extend significantly off the Property, as GRO and benzene, toluene, ethylbenzene, and total xylenes ("BTEX") results from MW107, MW121, MW124, W-MW-01, and W-MW-02 were all below the screening levels. Although the B-212 GRO result at 21 feet bgs (63 mg/kg) exceeded the GRO screening level based on the presence of benzene (30 mg/kg), it did not exceed the screening level when benzene is not present (100 mg/kg); the estimated benzene detection in the sample was below the reporting level and two orders of magnitude below the benzene screening level, suggesting that the higher screening level could be used and that the GRO detection is not significant.

6.3.3 Groundwater Quality

The Appendix F tables provide the complete analytical results for groundwater samples collected during investigations on and off the Property, Table 6 presents a statistical summary of the primary constituents representing substances handled at the Property (CVOCs and petroleum hydrocarbons), and Table 7 provides the GRO and VOC results for the 2017 sampling event. Summary map views of the areas of the Site with primary CVOC concentrations above the screening levels before and after operation of the ERH/SVE system are presented in Figures 18 and 19, respectively. Figures 20 through 23 present map views of the current areas of the Site with the primary CVOCs above the screening levels in the shallow, Intermediate A, Intermediate B, and deep water-bearing zones, respectively. Figures 24 through 27 present cross sectional views of the current areas of the Site with the primary CVOCs above the screening levels along section lines A-A', B-B', C-C', and D-D'. Finally, Figure 28 depicts the results of the MNA screening.

To create the figures depicting the extents of CVOCs above the screening levels, the groundwater CVOC results (collected in 2017) and the horizontal and vertical coordinates of the sampling locations were entered into Earth Volumetric Studio. PES used the program's kriging algorithm to create a 3-dimensional model of the subsurface CVOC concentrations in groundwater. Once the model was created, PES used the model to plan views (Figures 20 through 23) and cross sectional views (Figures 24 through 27) depicting the extents of CVOCs above the screening levels. For the plan views, PES cut horizontal slices at depths representative of the shallow (above 20 feet relative to NAVD88), Intermediate A (-15 to 20 feet), Intermediate B (-45 to -15 feet), and deep (-100 to -45 feet) water-bearing zones near the Property. Since the model uses average concentrations for areas beyond the lateral and vertical extents of available data, PES used judgment to locate the extent lines as needed in these areas and indicated the uncertain nature of the lines with question marks. Following is a brief discussion of the nature and extent of GRO and CVOCs at the Site.

6.3.3.1 Effects of the ERH/SVE System

Following is a brief summary of the nature and extent of VOC contamination before and after operation of the ERH/SVE system at the Property in late 2013, including data collected prior to 2017.

Shallow Water-Bearing Zone. Prior to implementation of the ERH/SVE interim action, petroleum hydrocarbon-related constituents were detected above the screening levels in wells located near the former fueling dispenser in the northeast corner of the Property (R-MW1 through R-MW3) but not in the off-Property wells located closest to the Property (R-MW4 through R-MW6). Post-treatment samples were not collected prior to 2017 to confirm the effects of the ERH/SVE system on petroleum hydrocarbons in the shallow water-bearing zone on and immediately adjacent to the Property. SES (2013b) documented petroleum hydrocarbon-related constituents above the screening levels in off-Property shallow wells located in the parking lot north of the 800 Aloha Street parcel; post-treatment samples were not collected in these wells.

Concentrations of PCE-related CVOCs were detected in groundwater prior to treatment at numerous shallow sampling locations at the Property, with the highest concentrations found in wells and borings located in the west central and southeast parts of the Property (B-10, F5, G-MW2, and J5) and near subsurface drains and sumps (B-2, B-6, B-7, B-9, DB12, F9, G12, and J15). The highest detected concentrations of PCE, TCE, cDCE, and VC at the Property prior to the interim actions were 176,000 µg/L (G-MW2), 4,800 µg/L (DB12), 9,200 µg/L (G12), and 170 µg/L (R-MW1), respectively. Concentrations of PCE-related CVOCs typically decreased approximately 2 to 3 orders of magnitude due to operation of the ERH/SVE system, slightly larger decreases in some wells (F9) and slightly less in others (J5 and K8).

Relatively few shallow wells were sampled before and after operation of the ERH/SVE system. CVOC concentrations were at or below the laboratory reporting limits in R-MW5 before and after treatment, and the initial elevated CVOC concentrations in R-MW6 decreased to levels at or below the laboratory reporting limits prior to treatment, except for VC, which remained above the screening level. PCE, TCE, and VC were detected above their respective screening levels in reconnaissance samples collected at W-MW-02 prior to operation of the ERH/SVE system.

Intermediate A Water-Bearing Zone. No Intermediate A water-bearing zone wells were sampled for petroleum hydrocarbon-related constituents both before and after operation of the ERH/SVE system. Prior to operation of the ERH/SVE system, petroleum hydrocarbon-related constituents were detected either at relatively low concentrations or at elevated concentrations with chromatograms indicating that the results were not hydrocarbon related but due to CVOCs in the samples.

Concentrations of PCE-related CVOCs were detected in groundwater at numerous Intermediate A sampling locations at the Property prior to operation of the ERH/SVE system. Pretreatment CVOC concentrations above the screening levels were found in wells and borings located in the west and southeast parts of the Property (DB01, DB05A, DB09, DB-10, DB13, and G-MW1) and near subsurface drains and sumps (DB02, DB12, and DB14). The highest detected concentrations of PCE, TCE, cDCE, and VC in Intermediate A groundwater samples at the Property prior to the interim actions were 230,000 µg/L (DB05A), 1,700 µg/L (DB10), 4,050 µg/L (G-MW3), and 290 µg/L (G-MW3), respectively. Locations at the Property with PCE in groundwater above the 5,000 µg/L treatment goal prior to treatment included G-MW1, G-MW3, DB05A, DB10, DB12, and DB13. No Intermediate A water-bearing zone wells or borings at the Property were sampled for CVOCs in groundwater after operation of the ERH/SVE system.

In locations off Property, concentrations of PCE-related CVOCs were detected in groundwater at numerous Intermediate A sampling locations east and south of the Property prior to operation of the ERH/SVE system. Pretreatment CVOC concentrations above the screening levels were found in wells and borings located in the 8th Avenue North ROW (MW107, MW120, MW127, and W-MW-02), in the alley between 8th and 9th Avenues North (MW103, MW108 through MW110), in the 9th Avenue North ROW (MW115, MW116, and MW119), and in and near the Roy Street ROW (BB-8 and MW106). The highest detected concentrations of PCE, TCE, cDCE, and VC in Intermediate A groundwater samples off the Property prior to the interim actions were 47,000 µg/L (MW107), 2,800 µg/L (MW107), 5,100 µg/L (MW107), and 380 µg/L (BB-12), respectively. The post treatment CVOC concentrations in MW107 (located immediately east of the Property) varied, with PCE and VC decreasing approximately one order of magnitude, and TCE and cDCE increasing slightly. CVOC concentrations in other wells either remained approximately the same (e.g., BB-8, MW108, and MW110) or increased somewhat (e.g., MW109 and MW114). Non-detected CVOC concentrations in MW117 and MW118 to the southwest and south of the Property before and after operation of the ERH/SVE system provide data bounding the lateral extent of the CVOC plume in those directions.

Intermediate B Water-Bearing Zone. No Intermediate B water-bearing zone wells on the Property were sampled for petroleum hydrocarbon-related constituents both before and after operation of the ERH/SVE system, which prevents an assessment of the effectiveness of the ERH/SVE system on reducing hydrocarbon-related constituents. Prior to operation of the ERH/SVE system, BTEX was not detected in W-MW-03 and W-MW-04. Similarly, in off-Property wells BB-10, BB-13, BB-14, PW-1, and W-MW-01, petroleum hydrocarbon constituents were not detected before implementation of on-Property interim actions. In off-Property well W-MW-02, BTEX was not detected above the screening levels before or after operation of the ERH/SVE system, and BTEX was not detected in off-Property wells MW111, MW112, or MW126 post operation of the ERHSVE system at the Property.

PCE, TCE, cDCE, and VC were detected in groundwater above the screening levels in three borings or wells (MW101, W-MW-03, and W-MW-04) and eight borings (DB03, DB04, DB05, DB06, DB07, DB08, DB09, and DB10) on the Property prior to operation of the ERH/SVE system, with maximum concentrations of 15,000 µg/L PCE in DB07, 1,100 µg/L TCE in DB08, 1,900 µg/L cDCE in W-MW-04, and 630 µg/L VC in W-MW-04. No Intermediate B water-bearing zone wells or borings at the Property were sampled for CVOCs in groundwater after operation of the ERH/SVE system.

In locations off Property, PCE, TCE, cDCE, and VC were detected in groundwater above the screening levels in eight borings or wells (BB-13 (VC only), MW103, MW104, MW106, MW111, MW122 (VC only), W-MW-01, and W-MW-02) prior to operation of the ERH/SVE system at the Property. The maximum PCE, TCE, cDCE, and VC concentrations prior to operation of the ERH/SVE system were 6,900 µg/L, 1,700 µg/L, 2,800 µg/L, and 120 µg/L, respectively, all in W-MW-02. CVOC concentrations remained approximately the same in MW111, MW112, and W-MW-01 after operation of the ERH/SVE system at the Property, but

PCE and TCE concentrations in W-MW-02 decreased over two orders of magnitude after implementation of the ERH/SVE treatment. Concentrations of cDCE and VC increased significantly in W-MW-02 during the same time period. Non-detected CVOC concentrations in MW112 to the west and MW126 to the northeast of the Property before and after operation of the ERH/SVE system provide data bounding the lateral extent of the CVOC plume in those directions.

Deep Water-Bearing Zone. Only one location was sampled for petroleum hydrocarbon-related constituents or VOCs on the Property, MW101. BTEX, TCE, cDCE, and VC were not detected above the screening levels prior to operation of the ERH/SVE system. PCE was detected just above the screening level in one sample collected prior to operation of the ERH/SVE system, at a depth of 95 feet bgs in MW101. No deep samples were collected beneath the Property after operation of the system.

BTEX was not detected above the screening levels in the off-Property wells sampled before and after operation of the ERH/SVE system (MW102, MW103, MW104, MW105, and MW106). Additionally, BTEX was not detected above the laboratory reporting limits in groundwater samples collected from MW113, MW122, MW123, MW124, and MW128 after operation of the ERH/SVE system.

In locations off Property, PCE, TCE, cDCE, and VC were detected in groundwater above the screening levels in four borings or wells (MW103, MW104 (reconnaissance sample only), MW105 (VC only), and MW113) prior to operation of the ERH/SVE system at the Property; no CVOCs were detected in four borings or wells (MW102, MW104, MW105 (reconnaissance sample only), and MW106). The maximum PCE, TCE, cDCE, and VC concentrations prior to operation of the ERH/SVE system were 15 µg/L (MW104), 440 µg/L (MW113), 5,500 µg/L (MW113), and 150 µg/L (MW113), respectively. Concentrations of cDCE and VC in MW103 and TCE, cDCE, and VC in MW113 decreased from one to two orders of magnitude after operation of the ERH/SVE system at the Property. CVOCs were not detected immediately post treatment in seven wells (MW102, MW104, MW105, MW106, MW122, MW123, and MW124), but PCE and TCE concentrations just above the screening level were found in MW104 and MW105 in 2015, and cDCE and VC were detected at concentrations above the screening levels in MW128 in January 2014.

6.3.3.2 2017 Groundwater Sampling Results

The laboratory (ESC) reported the analytical results for the 114 groundwater samples collected in 2017 to the method detection limit ("MDL") to provide VC detection limits below the screening level. ESC qualified all results between the MDL and the laboratory PQL (termed the RDL by ESC) with a J qualifier, indicating that the results were estimated.

GRO was detected in 11 of the 27 samples analyzed. Three of the detections were deemed by the laboratory to be due to the presence of CVOCs in the samples. Of the remaining eight detections, only two were above the screening level. Thirty-five VOCs were detected at least once above the MDL, with 11 (acetone, benzene, chloroethane, 1,1-dichloroethene ("DCE"), cDCE, tDCE, naphthalene, PCE, toluene, TCE, and VC) detected in at least 10 percent of the samples. Eight VOCs were detected at least once above their respective screening levels, including benzene (13 samples), DCE (4 samples), cDCE (43 samples), 1,2-dichloropropane (2 samples), ethylbenzene (3 samples), PCE (31 samples), TCE (33 samples), and VC (68 samples). Following are brief discussions of the 2017 results by water-bearing zone.

Shallow Water-Bearing Zone. The only petroleum-related constituents detected above their respective screening levels in the shallow water-bearing zone were GRO, benzene, and ethylbenzene. GRO was detected in 6 of the 16 shallow samples analyzed, with 2 samples collected north of the 800 Aloha Street Parcel above the screening level. None of the GRO detections at or adjacent to the Property were above the screening level. Benzene was detected in 24 of the 42 shallow samples analyzed, with 10 detections above the screening level. The four benzene detections above the screening level in Property wells (F5, F9, J5, and R-MW2) were just above the screening level. Ethylbenzene was detected in 7 of the 42 analyzed samples, with only 3 detections (off Property) above the screening level. Based on these results, residual petroleum hydrocarbons in groundwater left after operation of the ERH/SVE appear to be minimal.

Four CVOCs were detected at least once above their respective screening levels in the 42 samples collected in the shallow water-bearing zone, including cDCE (15 samples), PCE (7 samples), TCE (8 samples), and VC (25 samples). As shown in Figure 20, the highest detections of these CVOCs in shallow groundwater were in the southern half of the Property (wells F5, G12, J5, K8, and N7). Monitoring wells R-MW5 on the east side of Dexter Avenue North, and MW-9 and MW-121 in the 8th Avenue North ROW provide lateral control of the shallow CVOC plume extent. The CVOC cross sections confirm the shallow CVOC plume at and potentially near the Property, but data are not available to determine the lateral extent of groundwater with CVOCs above the screening levels to the south and east of the southern part of the Property (Figures 24 through 26).

Intermediate A Water-Bearing Zone. The only petroleum-related constituent detected above its respective screening level in the Intermediate A water-bearing zone was benzene. Benzene was detected in 7 of the 22 Intermediate A samples analyzed, with 2 detections above the screening level (in off Property well MW108). The MW108 results, while consistent with the one historical result (in 2015), appear to be isolated relative to the results in other nearby Intermediate A wells (MW107, MW109, MW116, and MW120) and may indicate a source other than the former USTs at the Property.

Five CVOCs were detected at least once above their respective screening levels in the 22 samples collected in the Intermediate A water-bearing zone, including cDCE (9 samples), 1,2-dichloropropane (2 samples), PCE (11 samples), TCE (11 samples), and VC (15 samples). As shown in Figure 21, the highest detections of these CVOCs in Intermediate A groundwater were in wells at the southern part of the Property (MW131) and east of the Property (MW108, MW109, and MW110). The elevated CVOC concentrations in the reconnaissance groundwater sample collected from B-205 (northeast corner of the Property) indicate that there may be groundwater with CVOCs above the screening levels in that location also. Monitoring wells MW116 at 9th Avenue North and GEI-1 in the northwest corner of Block 37 provide lateral control of the Intermediate A CVOC plume extent (Figures 21, 24, and 27), but additional data are necessary to confirm the CVOC concentrations in the Intermediate A water-bearing zone south of the Property, northeast of MW108, and to the south and east of the area around BB-8, MW110, and MW119 (Figures 21, 25, 26, and 27).

Intermediate B Water-Bearing Zone. None of the petroleum-related constituents were detected above their respective screening level in the 18 Intermediate B water-bearing zone samples, including the 5 samples collected in September from the recently installed pre-interim action investigation wells (MW-132, MW-134, MW-135, MW-136, and MW-139). ESC indicated that the chromatograms for the elevated GRO detection in the MW130 and MW135 samples did not resemble the fuel standard and that the result was likely due to the presence of CVOCs in the sample.

Five CVOCs were detected at least once above their respective screening levels in the 18 samples collected in the Intermediate B water-bearing zone, including DCE (3 samples) cDCE (8 samples), PCE (4 samples), TCE (5 samples), and VC (12 samples). As shown in Figure 22, the highest detections of these CVOCs in Intermediate B groundwater were in MW130 (west central part of the Property) and MW-135 (north central part of the Property), with decreasing concentrations in wells located to the east (W-MW-02 and MW111). Monitoring wells MW112 (west side of Dexter Avenue North), MW126 (alley east of the 800 Aloha Street parcel parking lot), MW-139 (southeast quadrant of the Property, except for VC), and W-MW-01 (just east of the southeast corner of the Property, except for VC) provide lateral control of the Intermediate B CVOC plume extent. The low CVOC concentrations in the reconnaissance groundwater samples collected from B-213 (Dexter Avenue North) and MW-137 (south central part of the Property) during drilling also provide lateral control of the Intermediate B CVOC plume extent). Additional data are necessary to confirm the CVOC concentrations in the Intermediate B water-bearing zone south and east of the Property (Figures 22, 25, 26, and 27).

Deep Water-Bearing Zone. The only petroleum-related constituent detected above its respective screening level in the deep water-bearing zone was benzene. Benzene was detected in only 3 of the 33 deep samples analyzed, with only 2 of the detections above the screening level (in off Property wells MW113 and MW128). The MW113 result was elevated compared to the results in December 2013 and June 2017, and the June MW128 result was elevated compared to the January 2014 and March 2017 results. The results also appear to be isolated relative to the results in other deep wells and may indicate a source other than the former USTs at the Property.

Five CVOCs were detected at least once above their respective screening levels in the 33 samples collected in the deep water-bearing zone, including DCE (1 sample), cDCE (11 samples), PCE (5 samples), TCE (9 samples), and VC (16 samples). As shown in Figure 23, the highest detections of these CVOCs in deep groundwater were in MW-133 and MW-137 (southwest quadrant of the Property) and in MW103, MW113, and FMW-129 (all three east and southeast of the Property). MW105, MW122, MW123, MW-138, MW-140, MW-141 (except VC), FMW-3D, and FMW-131 provide lateral control of the deep CVOC plume extent. As seen on the CVOC cross sections (Figures 24 through 27), additional deep wells are needed in the center of the deep CVOC plume (near MW103 or MW113 and south of FMW-129) and in the eastern portion of the CVOC plume to confirm the vertical extent of CVOCs above the screening levels.

6.3.3.3 MNA Screening Results

To determine the potential for natural biodegradation in the CVOC plume, PES screened the 2017 CVOC and MNA data (Tables 7, 8, and 9) using the first step of the screening procedure outlined in EPA's technical protocol for evaluating natural attenuation of CVOCs (EPA, 1998). The process involved assigning values to the applicable natural attenuation data (alkalinity, chloride, ethane/ethene, ferrous iron, methane, nitrate, sulfate, TOC, pH, DO, ORP, and PCE breakdown products (TCE, cDCE, and VC)) that reflect the likely occurrence of natural biodegradation (Table 2.3, EPA, 1998). Table 12 provides the individual screening values for each well with MNA data, including a summary score for each well. PES highlighted the summary score indicating whether there is inadequate, limited, adequate, or strong evidence of anaerobic biodegradation of CVOCs (Table 2.4, EPA, 1998). Figure 28 summarizes the results.

The MNA screening indicates adequate or strong evidence of anaerobic biodegradation in shallow water-bearing zone wells F13, J5, and J15; Intermediate A water-bearing zone wells MW107, MW108, MW109, MW119, and MW131; Intermediate B water-bearing zone wells MW130 and W-MW-02; and deep water-bearing zone wells MW113 and MW128. The screening results for all other wells indicate limited evidence of anaerobic biodegradation, except for two wells located at the edge of or beyond the limits of the CVOC plume (Intermediate A well BB-8 and Intermediate B well MW112). As indicated by the MNA screening, the strongest evidence for anaerobic biodegradation is currently in wells located beneath or downgradient of the Property and potentially within reach of the pilot test injections conducted between November 2015 and January 2016.

6.3.4 Soil Vapor Results

Table E-13 provides the analytical results for the VOCs detected in soil vapor samples collected from the three vapor monitoring wells (SV01, SV02, and SV03) installed in the sidewalk on the east side of 8th Avenue North (Figure 4; SES, 2013b). The soil vapor samples were collected 5 months prior to start-up of the ERH/SVE system at the Property. PCE was detected in all three soil vapor samples at concentrations varying from 1.5 to 4.6 micrograms per cubic meter ("µg/m^3"), well below Ecology's soil vapor screening level of 320 µg/ m^3 for PCE. TCE was only detected in the SV03 soil vapor sample at a concentration of 0.39 µg/ m^3, which was well below Ecology's soil vapor screening level of 12 µg/ m^3 for TCE. VC and cDCE were only detected in the SV01soil vapor sample at concentrations of 0.71 and 0.31 µg/ m^3, respectively. The VC concentration in the SV01 soil vapor sample was well below the Ecology VC soil vapor screening level of 9.3 µg/ m^3. There is no Ecology soil vapor screening for cDCE. No other VOCs were detected above the laboratory reporting limits in the soil vapor samples.

7.0 PRELIMINARY CONCEPTUAL SITE MODEL

This section provides a summary of the preliminary conceptual site model ("CSM") for the Site. The preliminary CSM has been developed from the historical investigation results and the nature of the interim cleanup actions conducted to date. The CSM will be revisited once the additional RI data has been collected and evaluated. Figure 29 provides a visual depiction of the CSM.

7.1 Contaminant Sources

The primary sources of contamination at the Site were: (1) spills and releases of PCE-containing liquids from the former laundry and dry cleaning operations at the Property, and (2) spills and releases of petroleum hydrocarbons from former USTs at the Property. The primary contaminants of concern ("COCs") in both soil and groundwater as a result of these releases include PCE, TCE, cDCE, and VC. Other CVOCs are detected less frequently and/or at much lower concentrations in soil and groundwater than the primary COCs. Petroleum-related contaminants (i.e., GRO, DRO, ORO, and BTEX) are generally not present above screening levels on the Property.

Based on the data collected at the Property, primary sources of CVOCs in the subsurface were located in the central to west-central part of the Property, near former Sump Nos. 4 and 8 (in the general vicinity of wells MW-130 and MW-133), and the sewer lines located just east of Building C (in the vicinity of well MW-135). Dry cleaning effluent containing spent PCE may have flowed into Sump No. 4, which likely connected through the southern sewer line to the sewer. Results of sludge samples collected from cleanouts and soil and groundwater samples collected during the pre-interim action investigation indicate that effluent containing spent PCE also was likely conveyed through the northern sewer line. Additional smaller releases may have contributed to shallow PCE contamination elsewhere on the Property, including in the vicinity of the former water/sludge treatment facility that operated in Building C. Dry cleaning operations ceased in the 1990s, so any releases to the subsurface would have ended then. Operation of the ERH/SVE system likely removed the majority of the residual sources of PCE in the depth range treated (to approximately 40 feet bgs).

The primary source of petroleum hydrocarbon contamination at the Property were two generations of UST systems located in the northeast corner of the Property, with impacts to soil and groundwater. The USTs were removed between 1966 and 1985. Four USTs containing heating oil (also referred to as Bunker C fuel oil) were located in the southwestern portion of the Property; those USTs were removed in 2013. Operation of the ERH/SVE system likely removed the residual sources of petroleum hydrocarbons in the depth range treated. However, shallow soil containing petroleum hydrocarbons located in the 8th Avenue North ROW immediately east of the Property (which may have been at least partially sourced at the Property), may still exist; the contaminated soil is vertically limited to the shallow and intermediate water-bearing zones. Additional sources of petroleum hydrocarbons to the subsurface were documented to have existed in many of the other properties that are included within the Site and are not likely attributable to the former American Linen Supply property (Section 2.3).

7.2 Chemical Fate and Transport

7.2.1 Contaminant Fate Processes

Several physical, chemical, and biological processes affect the mobility and behavior of liquid- (or pure-) phase and vapor-phase contaminants in the unsaturated zone and dissolved- or pure-phase contaminants in the saturated zone. These processes can generally be classified into two categories: nondestructive and destructive.

Nondestructive Processes. Nondestructive processes primarily affect contaminant mobility and behavior, but do not alter the chemical composition of the contaminant. Nondestructive processes include sorption, dispersion, volatilization, dissolution, and dilution.

- Sorption is the chemical bonding of contaminants to soil particles, which slows the rate of soil vapor and pure-phase contaminant migration in the unsaturated zone and the rate of dissolved- and pure-phase contaminant migration in the saturated zone. Sorption effects are directly related to soil organic carbon content. Based on the amount of silt and organic matter in an aquifer, sorption may slow the rate of contaminant transport;

- Dispersion is the longitudinal and transverse spreading of contaminants as they move through a porous media. Dispersion spreads out the contaminant plume, which slows the migration rate and decreases the contaminant concentration of the plume boundary. Dispersion occurs when variations in soil pore size, pore "roughness," and particle flow path length result in different advective transport rates for different solute molecules. Dispersion is most significant in stratified soil zones. Its effects increase with flow path length. A narrow, high concentration plume near the source area will become a broad, low concentration plume several hundred feet from the source area. Dispersion may be more significant in siltier portions of an aquifer;

- Volatilization occurs when pure-phase contaminants in the unsaturated soil or dissolved-phase contaminants in groundwater transfer into the vapor-phase in unsaturated soil. Volatilization from groundwater occurs only at the water table. Volatilization rates depend on the relative volatility of the contaminant (PCE is moderately volatile, while vinyl chloride is highly volatile);

- Dissolution occurs when pure-phase contaminants transfer into the dissolved-phase in soil pore water above the water table or into groundwater below the water table, and when vapor-phase contaminants transfer into groundwater at the water table. This process depends on the relative solubility of the contaminant (PCE is moderately soluble, while vinyl chloride is highly soluble); and

- Dilution occurs when relatively cleaner water from natural or artificial sources infiltrates through the unsaturated soil and mixes with contaminated groundwater resulting in lower contaminant concentrations. Significant natural dilution is likely limited to the few unpaved areas of the Site (e.g., the Seattle Department of Transportation property).

Except as noted for dilution, the nondestructive processes described above are likely active at the Site. Historical desorption of VOCs from soil in the source area, continued desorption of VOCs from secondary sources (fine-grained soil), and dissolution of DNAPL (if any, see below) in the saturated zone likely generate most of the dissolved VOCs in groundwater at the Site.

Destructive Processes. Destructive processes either destroy the contaminant or change the chemical behavior. Both processes result in effective decreases in contaminant concentration. Destructive processes are either biotic (process due to a living organism, such as biodegradation) or abiotic (process not related to a living organism). Biodegradation includes all microbial activity occurring in the subsurface that permanently destroys contaminants. Abiotic processes include various chemical reactions, primarily hydrolysis, that destroys contaminants. Biodegradation processes are generally much more significant than abiotic processes; thus, only the biodegradation processes are discussed.

Microbial metabolic degradation of petroleum hydrocarbons occurs under both aerobic and anaerobic conditions, with aerobic biodegradation occurring preferentially. Dissolved oxygen, nitrate, sulfate, manganese, and iron-oxides serve as oxidants (electron acceptors) to facilitate biodegradation. For BTEX components, ethylbenzene and xylenes will be metabolized before toluene, with benzene being biodegraded last. Anaerobic biodegradation can end up responsible for the bulk of biodegradation of petroleum hydrocarbons due to the typically higher amounts of sulfate, manganese, and iron-oxide electron acceptors in most aquifers.

Microbial metabolic degradation of PCE occurs under both aerobic and anaerobic conditions. Aerobic metabolism includes direct oxidation of CVOCs as an energy source, and fortuitous degradation of CVOCs (co-metabolism) during metabolism of other organic compounds. Under anaerobic conditions, CVOCs are degraded by reductive dechlorination (the sequential removal of chlorine atoms from a CVOC molecule).

Anaerobic reductive dechlorination is defined as the degradation of a compound in the absence of oxygen. Bacterial metabolism under anaerobic conditions requires both electron acceptor and electron donor compounds. Electron donors (primary energy sources or substrates) include organic compounds such as readily degradable sugars, volatile fatty acids (e.g., acetate, lactate), naturally occurring organic matter, and alcohols, or longer chain aliphatic and aromatic hydrocarbons (petroleum fuels). Under anaerobic conditions, electron acceptors include (in order of decreasing metabolic energy yield) nitrate, manganese (V), iron (III), sulfate, and carbon dioxide. During anaerobic reductive dechlorination, CVOCs (i.e., PCE, TCE, cDCE, tDCE, and vinyl chloride) may increasingly serve as an electron acceptor, particularly as the naturally occurring electron acceptors are consumed by microbial metabolism. Degradation of both petroleum hydrocarbons and CVOCs may occur simultaneously during reductive dechlorination. Anaerobic reductive dechlorination is most favorable under methanogenic conditions. Anaerobic reductive dechlorination efficiency decreases as chlorine atoms are removed, PCE is most readily degraded, and vinyl chloride is the most recalcitrant. Vinyl chloride, however, may be degraded aerobically with oxygen as an electron acceptor, or co-metabolically under aerobic conditions in the presence of methane and the Fe^{3+} ion.

Although a detailed evaluation of biodegradation has not been performed at the Site, the natural attenuation screening (Section 6.3.3.3) indicates that anaerobic biodegradation is occurring at the

Site. Biodegradation has evidently contributed to substantial destruction of contaminants in the subsurface, but because of the high source area concentrations, downward hydraulic gradient, relatively high groundwater flow rate, and changing groundwater flow regimes caused by groundwater extraction in the vicinity, has not been sufficient to attenuate contaminants before they migrate off of the Property.

7.2.2 Migration Mechanisms and Pathways

Residual contaminants residing in saturated and unsaturated soil may be further mobilized by flow of water or air in the subsurface.

Unsaturated Soil. PCE-containing liquids and petroleum hydrocarbons were originally released into the subsurface at the Property from the former laundry and dry cleaning operations and from former USTs. The contamination in the unsaturated soil and shallow saturated soil (to approximately 40 feet bgs) was treated by the ERH/SVE interim action performed at the Property (Figure 6) in 2013. The processes that affected migration of VOCs in the unsaturated zone before it the interim action was performed are discussed below. As noted, these processes are of much less significance since the interim action was conducted in 2013.

- **Pure Phase Flow.** When a release of a VOC product occurs in the subsurface, the product moves downward through the unsaturated soil as a non-aqueous phase liquid ("NAPL") under the force of gravity. Geologic heterogeneities control the amount of lateral spreading that occurs during the downward movement of NAPL. Small NAPL releases may not have sufficient volume to reach the water table, as NAPL is trapped in the vadose zone soil pores. If the release is large enough, the NAPL eventually reaches the water table and the saturated zone. If the NAPL is lighter than water (light, non-aqueous phase liquid or "LNAPL"), it can accumulate and spread along the water table. The resulting distribution of LNAPL is dependent on the soil properties, the LNAPL properties, and the volume of LNAPL released. This pathway was probably the primary contaminant migration route in the former dry cleaning and fuel storage and distribution areas. Because product and waste handling activities ceased at the Property 1990's and the last fuel UST was removed in 1985, it is likely that all pure-phase VOCs originally released into the unsaturated zone migrated into the saturated zone, adsorbed onto unsaturated soil, or volatilized prior to the 2013 interim action. Therefore, pure-phase migration in the unsaturated soil is not considered an active migration pathway.

- **Leaching from Unsaturated Soil to Groundwater.** This process includes infiltration of natural precipitation through unsaturated soil, dissolution of pure-phase contaminants or flushing of soil pore water contaminants into the water, and transport of the contaminants to the saturated zone (groundwater). While likely an active contaminant migration pathway when the former dry cleaning and fueling activities were occurring, this process is not considered a significant migration pathway at the Property since the unsaturated soil near most of the potential VOC sources have been treated by the 2013 interim action.

- **Diffusion.** Diffusion is driven by chemical concentration gradients, and is the primary mechanism for vapor transport in unsaturated soil where soil vapor is usually stagnant. While likely an active contaminant migration pathway when the former dry cleaning and fueling activities were occurring, this process is not considered a significant migration pathway at the Property since the unsaturated soil near most of the potential VOC sources have been treated by the 2013 interim action.

- **Volatilization.** Volatilization occurs when pure-phase contaminants in the unsaturated soil or dissolved-phase contaminants in groundwater transfer into the vapor-phase in unsaturated soil. Volatilization from groundwater occurs only at the water table, and volatilization rates depend on the relative volatility of the contaminant (PCE is moderately volatile, while VC is highly volatile). To the degree that pure-phase contaminants remain in the vadose zone and VOCs are present at the water table, volatilization could be an active process at the property.

Saturated Soil. As discussed above, LNAPL can accumulate and spread along the water table. If the NAPL has a density greater than water, referred to as DNAPL, it will continue to move downward, in a typically tortuous fashion along multiple flow paths, with downward movement controlled by the pore size distribution and bedding of the geologic unit. As DNAPL moves through the subsurface, disconnected blobs and ganglia are left behind the trailing edge of the DNAPL, effectively diminishing the migrating mass. The blobs and ganglia are small (less than 10 grain diameters in length) and occupy between approximately 5 to 20 percent of the invaded pore space behind the DNAPL body (Kueper et al., 2003). Downward DNAPL movement will continue until the mass of DNAPL is exhausted or a soil layer fine enough to stop the DNAPL is encountered. In the latter case, the DNAPL will pool and spread laterally. DNAPL in a pool is connected between adjacent pores; pore space in DNAPL pools can be up to 70 percent saturated with DNAPL (Kueper et al., 2003). Portions of a site containing DNAPL pools and/or residual DNAPL (blobs and ganglia) are termed the DNAPL source zone.

As groundwater moves through the NAPL source zone, a plume of dissolved contaminants is generated; soluble constituents partition into groundwater dictated by the effective solubility of the solvent mixture or petroleum hydrocarbon components. Dissolved contaminants then migrate by advection with groundwater. Volatile constituents from groundwater partition into the unsaturated zone vapor phase and migrate in soil vapor. Over time, the DNAPL remaining in the subsurface weathers as volatile and soluble components are depleted from NAPL interfaces, with residual NAPL continuing to be a source of contaminants to both groundwater and soil vapor. According to Kueper et al. (2003), the lifespan of residual DNAPL in the unsaturated zone is considerably shorter than residual DNAPL in the saturated zone due to high unsaturated zone volatilization rates.

Elevated soil and groundwater CVOC concentrations and the persistence of CVOC contamination in the Intermediate A and upper portions of the Intermediate B water-bearing zones beneath the Property indicate that DNAPL may be present beneath the former PCE source area at the Property. If so, the DNAPL would likely be present as disseminated residuals, blobs, and ganglia (rather than extensive pooled accumulations) in the finer-grained units beneath the depth of the subsurface treated by the 2013 interim action at the Property. Any DNAPL present in the subsurface would be subject to the migration mechanisms described above.

7.3 Current and Future Land and Water Use

The Property is currently zoned for mixed use (Seattle Mixed South Lake Union 175/85-280). Based on the current redevelopment of the area, the future land use at the Site is reasonably expected to remain mixed use. Therefore, potential receptors at the Site currently and in the future are light industrial workers, workers and patrons of commercial and retail facilities, and area residents.

Groundwater at the Site or potentially affected by groundwater contamination at the Site is not currently used for drinking water but remains a future potential exposure pathway. As discussed in Section 3.4.1, Ecology has designated surface water in Lake Union to be protected for a wide range of uses, including domestic, industrial, and agricultural water supply. For the purpose of preparing this preliminary conceptual site model, use of surface water in Lake Union for drinking water is considered a potential exposure pathway.

7.4 Exposure Pathways and Receptors

Based on the previous investigation results and current and future land and water uses discussed above, the following potentially complete exposure pathways and receptors are included in the Conceptual Site Model and are shown on Figure 29.

7.4.1 Soil Pathway

Potential exposure pathways for soil contamination include the following:

- Direct contact pathway, which comprises direct contact with and/or ingestion of the contaminated soil beneath the Site;
- Leaching pathway, which includes the leaching of contaminants in soil (unsaturated and saturated) to groundwater such that groundwater becomes contaminated; and
- Volatilization of contaminants to soil vapor and subsequent migration to indoor air (see Section 7.4.3).

Most of the Site is currently covered with pavement or buildings, which limits direct contact and minimizes soil leaching from the unsaturated zone. Except for the Property, contaminated soil at the Site is present at depths (greater than 15 feet bgs) that make direct contact by building occupants and site workers unlikely. However, there is the potential that human receptors (site workers) could be exposed to contaminants present in soil at the Site and immediately adjacent to the Property via direct contact (and potential incidental ingestion) during future redevelopment and/or subsurface maintenance and construction activities. Leaching from contaminated soil within the saturated zone to groundwater is a complete pathway at the Site. Exposure of ecological receptors to Site-related contaminants does not appear to be a complete exposure pathway. Given the highly developed nature of the South Lake Union area, including the buildings and pavement covering most of the Site, the commercial/industrial use of the property and surrounding area, and the depth of contaminated soil (greater than 15 feet bgs) in the off-Property area, terrestrial ecological exposure to the soil is unlikely. However, the evaluation of potential terrestrial ecological receptors will be deferred until the RI is completed as the extent of contamination will have been defined.

7.4.2 Groundwater Pathway

There are no active water supply wells located on or downgradient of the Property. Therefore, there is no potential for ingestion of contaminated groundwater from current potable uses of groundwater. However, future use of deeper aquifers downgradient of the Site cannot be ruled out, therefore ingestion of contaminated groundwater is a potential future exposure pathway.

7.4.3 Vapor Intrusion Pathway

The vapor intrusion pathway includes the volatilization of Site contaminants in unsaturated zone soil and shallow groundwater to soil vapor and subsequent migration into indoor air. This is a potentially complete pathway for the Site. Based on the limited soil vapor sampling conducted on the east side of 8^{th} Avenue North, it appears that there is not an unacceptable vapor intrusion risk for the off-Property portions of the Site. However, due to the limited extent of the data collected to date, the vapor intrusion pathway will be considered a potential current and future exposure pathway. Additional data collection and evaluation during the RI will be required.

7.4.4 Surface Water Pathway

The nearest potential aquatic receptor of contaminated groundwater is the southern end of Lake Union. The limited data collected to date in the wells closest to the lake (SMW-3, MW-214, and MW123) indicate that discharge of contaminated groundwater to the lake is unlikely. However, given the limited extent of the data collected to date, the groundwater to surface water pathway will be considered a potential current and future exposure pathway. Additional data collection and evaluation during the RI will be required.

8.0 INTERIM ACTION SCOPING

The process of developing the interim action includes the following major steps:

- Defining the interim action objectives;
- Identifying applicable regulations and standards;
- Establishing Remediation Levels and Treatment Areas;
- Identifying and screening cleanup action technologies; and
- Recommending the preferred interim action.

This section describes the first three steps, including defining the interim action objectives that provide the framework for developing and evaluating interim action alternatives. Section 9 identifies and screens potentially applicable interim action technologies and recommends the preferred interim action which is described in detail in Section 10.

8.1 Interim Action Objectives

The interim action objectives are based on WAC 173-340-430. In particular, at this site the interim action is intended to be a:

- A remedial action that is technically necessary to reduce a threat to human health or the environment by eliminating or substantially reducing one or more pathways for exposure to a hazardous substance at a facility; and

- A remedial action that corrects a problem that may become substantially worse or cost substantially more to address if the remedial action is delayed.

By attaining these two main objectives listed in MTCA, some of the remedial action objectives identified by Ecology (Ecology, 2015) for the Site cleanup are partially addressed, including:

- Prevent further migration of the contaminant plume; and

- Protect potential current and future receptors against vapor intrusion;
- Ensure off-Property impacted areas meet applicable cleanup standards within a reasonable restoration timeframe.

The objectives will be met by implementing the following actions:

- Reducing the mass of contamination (CVOCs and petroleum hydrocarbons) remaining in saturated soil and groundwater in the on-Property area, to the extent practicable;

- Providing for continued treatment of residual on-Property contamination, as necessary, after the Property development activities are completed and consistent with the final overall Site FS; and

- Controlling migration of contaminants from the Property, to the extent practicable, to provide long-term protection of downgradient off-Property human and environmental receptors.

The previous independent action described in Section 4.13 (ERH/SVE) was estimated to have removed approximately 12,000 pounds of CVOCs from soil and groundwater in the treatment area from the ground surface to an elevation of approximately 0 feet (approximately 40 feet deep) [1]. The interim action described in this work plan focuses on reducing the previously untreated mass of contamination that remains on the Property through a combination of: (1) removal (through excavation) of residual or previously untreated contamination and (2) reducing the mass of contaminants in the saturated soil beneath the excavation using *in situ* treatment.

The interim action excavation will be completed as part of the planned building construction and will remove unsaturated and saturated soil to an elevation 6.5 to 11.5 feet (approximately 28.5 to 33.5 feet deep). The soil excavation will effectively remove the majority of the contaminated soil remaining in the ERH/SVE treated depth interval and will also remove the shallow water bearing zone saturated soil and associated groundwater and the upper portion of the Intermediate A water bearing zone saturated soil and associated groundwater contamination. Additional contaminant mass will be removed from groundwater that is extracted during the dewatering that will be conducted to facilitate soil excavation.

The use of *in situ* treatment beneath the excavation will address contamination in the both lower portion of the Intermediate A water bearing zone and the Intermediate B water bearing zone. The specific technology or technologies used to reduce contaminant mass on the Property are discussed in Section 9 of this plan.

The mass reduction achieved by the previous independent action (ERH/SVE) has also led to reductions in CVOC concentrations immediately downgradient of the Property (i.e., reduced migration of contaminants from the Property). Because the ultimate effectiveness of the source area removal and *in situ* treatment component of the interim action is not known at this time, the interim action will also include a component specifically designed to control further contaminant migration from the Property. The specific technology or technologies used to provide this additional migration control are evaluated in Section 9 of this plan.

8.2 Applicable or Relevant and Appropriate Requirements

WAC 173-340-710 requires that all MTCA cleanup actions, including interim actions, comply with applicable state and federal laws. Applicable requirements include those cleanup standards or requirements for a hazardous substance adopted under state or federal law. As stated in WAC 173-340-710(4), "relevant and appropriate requirements include those cleanup standards, standards of control, and other environmental requirements, criteria, or limitations established under state or federal law that, while not legally applicable to the hazardous substance, cleanup

[1] In the discussions that follow, the primary references to the vertical position of interim action elements (e.g., treatment zones, injection well screened intervals) will be to their elevation in feet NAVD88. Where appropriate, depths below ground surface are added in parentheses and are based on nominal ground surface elevation of 40 feet NAVD88 for the main portions of the Property.

action, location, or other circumstance at a site, address problems or situations sufficiently similar to those encountered at the site that their use is well suited to the particular site."

The FS will determine the ARARs specific to the overall cleanup action alternatives considered for the Site. With respect to the proposed interim action, potential ARARs, besides MTCA, may include the following:

- Washington Ground Water Quality Standards (WAC 173-201) establish standards to protect groundwater quality (e.g., maximum contaminant levels) and beneficial uses;
- Washington Water Pollution Control Act (RCW 90.48) and its regulations address the requirement under Sections 301, 302, and 303 of the Federal Clean Water Act (CWA, 33 USC § 1251 et seq.) and the following implementing regulations:
  - Washington Surface Water Quality Standards (WAC 173-201A) are applicable to surface waters of the state, are protective of aquatic life and other beneficial uses, and can be applicable if an alternative includes discharge of treated water;
  - Washington Sediment Management Standards (WAC 173-204) establish standards for the quality of surface sediments and a management and decision process for the cleanup of contaminated sediments in an effort to eliminate adverse effects on biological resources and protect humans from surface sediment contamination; and
  - Washington Underground Injection Control Program (WAC 173-218) provides the requirements for injecting liquids into underground injection control wells.
  - Washington State NPDES Program Regulations (WAC 173-220) would be applicable for discharge to surface waters under an NPDES permit.
- Washington Dangerous Waste Regulations (WAC 173-303) establish procedures and standards related to the definition, management, and disposal of dangerous wastes;
- Washington Clean Air Act Regulations (WAC 173-400) provide standards and procedures for managing the discharge of contaminants to the atmosphere;
- The Endangered Species Act (ESA; 16 USC § 1531 et seq.) ensures that the actions that federal agencies authorize, fund, or carry out do not jeopardize the continued existence of an endangered or threatened species or result in the destruction or adverse impact of designated critical habitat;
- Washington State Environmental Policy Act (SEPA; RCW 43.21c) requires state agencies to analyze the impacts of proposals for legislation and other actions that might significantly affect the quality of the environment;
- Washington State Department of Archeological and Historic Preservation (DAHP) requirements for identification, protection, and treatment of archaeological sites on or near Washington's shorelines including the requirements of Archaeological Sites and

Resources (RCW 27.53) and Archaeological Excavation and Removal Permit (WAC 25-48), if required; and

- Washington Water Well Construction Regulations (WAC 173-160) establish state standards for installing, maintaining, and decommissioning groundwater monitoring and recovery wells;

- Washington Industrial Safety and Health Act Regulations (WAC 296-62) contain health and safety training requirements for on-site workers.

- City of Seattle Development and Planning Department Director's Rule 2-98. The Rule elaborates on SEPA Historic Preservation Policy and provides guidance for identification, protection, and treatment of archaeological sites on the City of Seattle's shorelines;

- City of Seattle regulations, codes and standards applicable to work performed within the city right of way and discharge of water to storm and/or sanitary sewer; and

- King County regulations, codes and standards applicable to discharge of water to storm sewer and/or sanitary sewer.

8.3 Chemicals of Concern and Environmental Media

Based on the findings of the investigations completed to date and summarized in Section 6, and for purposes of developing the interim action, the primary COCs at the Site are PCE, TCE, cis-1,2-DCE, and VC in soil, soil vapor, and groundwater. Other COCs identified for the Site include metals, polycyclic aromatic hydrocarbons (PAHs), and petroleum-related organics (i.e., GRO, DRO, ORO, and BTEX) in the same environmental media. These other COCs are detected much less frequently compared to the primary COCs. In addition, their distribution footprint matches that of the primary COCs on the Property. Regarding the petroleum-related organics, PAHs, and metals, the pre-interim action investigation documented these are infrequently detected on the Property and they will be removed by the excavation component of the interim action.

8.4 Interim Action Treatment Area

A key component of the interim action for the Property includes treating the contaminants that remain on the Property below the depth of the proposed building foundation, approximately elevation 6.5 feet. The interim action treatment area was identified using a remediation level of 0.5 mg/kg of PCE in soil at elevations below 6.5 feet. This remediation level was selected for the following reasons:

- Review of the soil data indicated that the distribution of PCE in soil at concentrations greater 0.5 mg/kg at elevations of less than 6.5 feet (deeper than 33.5 feet) includes areas containing the less frequently detected and generally lower detected concentrations of TCE, DCE, vinyl chloride, and GRO.

- The interim action treatment area identified using a 0.5 mg/kg PCE remediation level coincides with the areas of elevated CVOCs in groundwater on the Property based on the recent groundwater sampling (see Figures 20-23), ensuring high concentrations of CVOCs in groundwater on the Property will also be treated. These are also the areas where the primary releases of PCE occurred (around the DCU, on-Property sewers).

- An estimate of the total mass of CVOCs (PCE, TCE, cDCE, and VC) present within the area represented by the 0.5 mg/kg PCE concentration on the Property below elevation 5 feet represents approximately 88 percent of the total mass of the same constituents above the soil screening levels (Table 10) for the entire Property in the same interval.

- A concentration of 0.5 mg/kg of PCE was used because it is approximately 0.5 percent of the PCE soil saturation limit of 106 mg/kg[2]. The soil saturation limit is the contaminant concentration at which soil pore air and pore water are saturated with the chemical and the absorptive limits of the soil particles have been reached. Using 0.5 percent of the soil saturation limit ensures soil with the potential to contain residual NAPL, based on the available data, will be treated.

The interim action treatment area was determined using the Earth Volumetric Studio model (see Section 6.3.2) to prepare PCE isoconcentration maps using the following soil data:

- Results from the 2012 to 2013 investigations that are from areas below the maximum depth treated by the ERH/SVE interim action (i.e., below elevation 0 feet), or outside the ERH/SVE treatment area;

- Results of soil sampling conducted in 2014 and 2016 after the prior ERH/SVE interim action; and

- Results from soil sampling collected during the 2107 pre-interim action investigation.

Using this combined data set, isoconcentration maps showing PCE concentrations above the remediation level of 0.5 mg/kg were prepared at 5 foot intervals beginning at elevation 5 feet (approximately 35 feet bgs) and extending to the maximum depth where PCE exceeded the remediation level (approximately elevation -55 feet or 90 feet bgs). It is important to note that the isoconcentration maps likely overestimate the areal extent of the area exceeding the PCE remediation level because they are based on the modeled results and not just where PCE has been detected in soil. Copies of the isoconcentration maps used to evaluate the treatment zones for the interim action are included in Appendix K.

Within the 60-foot-thick soil zone where concentrations exceed the remediation level (i.e., elevations 5 to -55 feet), the following four 15-foot treatment zones were defined based on the observed site lithology and hydrogeology described in Section 6.1 and 6.2:

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[2] Calculated using Ecology's Workbook for Calculating Cleanup Levels for Individual Hazardous Substances (MTCASGL11) and the default input parameters.

- **Treatment Zone A (TZ-A).** This zone extends from elevation 5 to approximately elevation -10 feet (approximately 35 to 50 feet bgs) and is entirely within the Intermediate A water bearing zone that is characterized by silty sands.

- **Treatment Zone B (TZ-B).** This zone, extending from approximately elevations -10 to -25 feet (approximately 50 to 65 feet bgs), consists of the transition from the lower portion of the Intermediate A zone and the transition into the upper portion of the Intermediate B zone. Since the transition from the Intermediate A into the Intermediate B zone is not well defined, the geology is variable across the Property and ranges from the silty sands to sandy silts, with interbeds present throughout.

- **Treatment Zone C (TZ-C).** This zone is entirely within the lower portion of the Intermediate B zone and extends from elevation -25 to -40 feet (approximately 65 to 80 feet bgs). The lower portion of the Intermediate B zone is characterized by very dense sandy silts with interbedded layers of silty sands.

- **Treatment Zone D (TZ-D).** Extending from elevations -40 to -55 feet (approximately 80 to 95 feet bgs), this zone covers the very bottom of the lower Intermediate B unit down into the upper portion of the Deep water bearing zone. The Deep water bearing zone consists of dense fine to medium sand and silty sands.

The Deep water-bearing zone extends downwards another approximately 45 feet beneath the Property to an elevation of approximately -100 feet, but the deepest soil sample exceeding the remediation level was at an elevation of -54 feet at boring B-217 in the southwest portion of the Property. Of the 46 soil samples collected at elevations below -55 feet (95 feet bgs), only six had detectable PCE with a maximum concentration of 0.0119 mg/kg, which is below the screening levels of 0.025 mg/kg.

For each of these four treatment zones, the maximum lateral extent of PCE in soil exceeding the 0.5 mg/kg remediation level are shown in Figures 30 through 33. The maximum lateral extent was then extended vertically to the full 15-foot thickness for each treatment zone, which defines the volume of soil that will be targeted for cleanup as part of this interim action. It is important to note that within these defined 15-foot thick zones, only a portion of the total volume exceeds the remediation level. The characteristics of each treatment zone is discussed below and summarized in Table 13.

- **TZ-A.** The zone covers approximately 18,530 square feet, and contains a total of 10,290 cubic yards of soil, including 5,960 cubic yards exceeding the remediation level.

- **TZ-B.** The zone covers approximately 20,220 square feet, and contains a total of 11,230 cubic yards of soil, including 6,440 cubic yards exceeding the remediation level.

- **TZ-C.** The zone covers approximately 7,780 square feet, and contains a total of 4,320 cubic yards of soil, including 2,310 cubic yards exceeding the remediation level.

- **TZ-D.** The zone covers approximately 3,270 square feet, and contains a total of 1,820 cubic yards of soil, including 920 cubic yards exceeding the remediation level.

As can be seen in Figures 30 through 33, the majority of the contamination is oriented in a band stretching from the southwest portion of the Property in the vicinity of MW-133, northeast towards MW-135, and then east-northeast towards MW-134 near the eastern Property boundary. This contaminant distribution corresponds with the known or suspected primary release areas (e.g., DCU, PCE storage areas, and side sewer connections) and also the areas of the highest on-Property groundwater contamination (See Figures 20 through 23).

Figures 30 through 33 also show the location of a cross-section running southwest-northeast through this main area of contamination. This cross section is shown on Figure 34, which shows the projected area to be excavated during building construction activities and each of the four treatment zones superimposed on the hydrostratigraphic units. Within each treatment zone, the cross section also shows the portion of each treatment zone where PCE concentrations exceeded the 0.5 mg/kg criteria. As shown in Table 13, the portion of each treatment zone exceeding the remediation level represents from 51 to 58 percent of the total volume. By treating the entire volume of each treatment zone, including those portions containing less than 0.5 mg/kg PCE, the total percentage of the mass of CVOCs targeted for treatment on the Property increases from 88 percent (amount contained with 0.5 mg/kg area) to approximately 92 percent.

9.0 EVALUATION OF INTERIM ACTION TECHNOLOGIES

This section describes the approach to the interim action, including the integration of the interim action with the proposed future property use and the evaluation of technologies considered to meet the interim action objectives. The implementation of the selected interim action approach is described in Section 10. The reporting requirements and implementation schedule for the interim action is presented in Section 11.

9.1 Integration of Interim Action and Future Property Use

As described in Section 2.5, the development plans include three levels of underground parking that extends across the entire Property. The current schedule anticipates construction beginning in the fourth quarter of 2018 with an expected completion in late 2020. The following subsurface construction activities, will help meet the Property interim action objectives.

9.1.1 Excavation

Constructing the underground parking garage will require excavation from the existing ground surface down to elevations of approximately 11.5 feet, which is approximately 28.5 feet below ground surface and well below the top shallow water-bearing zone based on the March 2017 data (Figure 12). Portions of the excavation will extend from up to 5 feet deeper to accommodate foundations and footings beneath the building cores, structural columns, and the exterior garage perimeter walls, and up to 10 feet deeper beneath the elevators. Shoring for the excavation is assumed to be soldier piles and lagging. Given the approximately 59,000-square-foot size of the excavation, approximately 65,000 cubic yards of soil will be excavated during the Property development.

Construction dewatering will be required for the duration of the excavation activities and will continue until the foundation and parking garage structure are completed to above the adjacent ground surface. The total estimated time for this work is approximately 14 months (ending in early 2020). The dewatering extraction and treatment system will be designed by the building design team in coordination with the construction contractor, and will generally consist of dewatering wells located around the edge of the shoring walls. An expected flow rate has not yet been estimated by the designers but, based on similar dewatering conducted on nearby properties, flow rates could be in the range of 100 to 300 gpm. Extracted groundwater will be treated using a combination of particulate removal technologies (e.g., sedimentation, filtration) and granular activated carbon to remove the CVOCs prior to discharge to a City of Seattle storm drain pursuant to the requirements of an Ecology Construction Stormwater General Permit ("CSWGP") to be obtained for the project and the conditions set forth in an Administrative Order to be issued by Ecology to facilitate the treatment and establish discharge limits.

9.1.2 Foundation and Garage Construction

The current design for the building foundation is for a continuous spread footing and mat slab. The minimum thickness of the bottom mat slab is 2.5 feet and, as noted above, significant portions of the foundation (e.g., beneath columns, exterior walls, and the building towers) will be thickened up to 5 feet thicker as required for structural purposes, and up to 10 feet thicker beneath the elevators. The exterior basement walls will range from 14 to 18 inches thick. The garage floor slab, the foundations, and the portions of the exterior garage walls below the water table will be constructed using concrete that is amended with an additive (e.g., Hycrete) that makes the concrete hydrophobic and waterproof. Hycrete is a water-soluble admixture that, when dosed into concrete, chemically transforms and becomes a water-insoluble polymer that plugs the pores in the concrete, preventing water from permeating the concrete. The Hycrete-amended concrete will form a waterproof barrier on all below-grade concrete structures in contract with soil and/or groundwater. This concrete design, in addition to excavating all unsaturated soil on the Property and excavating saturated soil and the associated water contained in the saturated soil down to elevations ranging from 6.5 to 11.5 feet NAVD88 (approximately 28.50 to 33.5 feet bgs), will prevent future vapor intrusion.

9.2 Development of Interim Action

As described in Section 8.1 above, the main components of the interim action will focus on:

- Providing source area removal and treatment to reduce on-Property contaminant mass;
- Providing for continued longer term treatment of residual on-Property contamination, as necessary, during and after the Property development activities are completed; and
- Controlling migration of dissolved-phase CVOCs from the Property to downgradient areas.

Different approaches to completing these actions are identified and screened in Table 14 prior to recommending the preferred interim action approach. Factors considered in evaluating these approaches are discussed below.

9.2.1 Source Removal and Treatment

Although there are a number of general approaches that can be used to achieve the source removal and treatment associated with contaminated saturated soil and groundwater beneath the Property, there are only a few that are compatible with the contaminant distribution, vertical extent, and soil conditions. The two general approaches that could be used to reduce the contaminant mass in this source area include soil excavation and *in situ* treatment.

9.2.1.1 Excavation

With respect to excavation, there are two general approaches that can be considered: (1) excavation associated with the planned building construction and (2) excavation below the proposed building excavation. The former is an integral part of the interim action as it will occur during development while implementing the latter is significantly more challenging due to the depth and extent of the source area defined in Section 8.5. Specifically, excavating the areas exceeding the PCE remediation level of 0.5 mg/kg would essentially require excavating the entire Property to an elevation of approximately -55 feet because it would be nearly impossible to only remove the soil exceeding 0.5 mg/kg of PCE. These two approaches are evaluated in Table 14. Specific soil handling and disposal procedures will be defined in a contaminated media management plan (CMMP) that will be developed with input for the contractor (see Section 10.1 for more information on the CMMP).

For either of these approaches, the excavation would also include excavations related to the utility improvements in the ROWs surrounding the property and other incidental excavation associated with the building construction. Soils from these incidental excavations will be managed consistent with the CMMP.

As noted above, the excavation will include a dewatering system that will operate for approximately 14 months starting in late 2018 when excavation begins and continuing until early 2020 when the concrete garage is completed. While operational, the dewatering system will depress the groundwater table to below the project depth of excavation and groundwater flow will be towards the Property on all sides.

9.2.1.2 *In Situ* Treatment

Regarding *in situ* treatment, there are a number of factors to consider in evaluating which technology(ies) are appropriate for inclusion in the interim action. The four interim action treatment zones defined in Section 8.5 have several physical characteristics that can be used to focus the potential *in situ* technologies available to meet the source mass reduction objective, including:

- **Depth.** The target treatment zone ranges from an elevation of 5 feet down to -55 feet (approximately 35 to 95 feet below existing grade);
- **Saturated Soil.** The treatment zones are located entirely in the saturated zone and also have at least 30 feet of previously treated unsaturated and saturated soil above them; and
- **Soil Type.** Soils in the treatment zone are dense to very dense silty fine sand to sandy silt, and based on limited data have generally low hydraulic conductivities ranging from approximately 1×10^{-7} to 1×10^{-2} cm/sec.

These characteristics (deep, low and variable hydraulic conductivity soils, and no unsaturated zone) eliminate from consideration the *in situ* technologies that rely on desorbing and volatilizing the CVOCs from the subsurface (e.g., thermal technologies and air sparging) and subsequently removing the contaminants using soil vapor extraction ("SVE"). *In situ* stabilization or immobilization technologies would also be very difficult to implement at these depths and soil conditions, and these technologies are not well suited to addressing the CVOCs present at the Property. The remaining general types of *in situ* treatment involve injecting or emplacing chemicals or other agents to facilitate the destruction or degradation of the CVOCs and include *in-Situ* chemical oxidation ("ISCO"), enhanced *in-situ* bioremediation or enhanced reductive dechlorination ("ERD"), and *in situ* chemical reduction ("ISCR"). The factors used to evaluate these approaches are discussed below and summarized in Table 14.

For all three of these *in situ* technologies, the selection of the appropriate chemical agent to inject into the subsurface is based on site-specific conditions and cleanup objectives. For this interim action, there are two main objectives: short-term treatment and mass reduction to correct a problem that may become substantially worse, and provide for longer-term treatment of the residuals remaining after the short-term treatment is completed to continue to reduce the threat to human health and the environment. The primary site-specific conditions that will influence the selection of the appropriate *in situ* technology are the distribution of contaminant mass between the dissolved and sorbed phase in the target treatment area and soil conditions. These factors are discussed below.

Contaminant Distribution. The target treatment zones defined in Section 8.5 are based on the lateral extent of saturated soil concentrations exceeding 0.5 mg/kg (see Figures 30 and 33). Within these treatment zones, the primary CVOCs are present in both the dissolved phase (groundwater PCE concentrations of up to 11,100 µg/L) and the sorbed phase (PCE soil concentrations ranging from less than 0.025 mg/kg up to 8,270 mg/kg, with the typical PCE concentration range of 0.5 mg/kg to less than 60 mg/kg). The available data suggest that the total mass of the primary CVOCs in the four treatment zones is at least 140 pounds, nearly all found in the sorbed phase. The actual mass of the primary CVOCs is likely higher because the estimate does not include the mass of NAPL that may be present in areas with high soil and or groundwater concentrations. All of the *in situ* technologies being considered would be effective in treating the dissolved phase contaminants. Where significant sorbed contamination is present, like in the target treatment zones, these sorbed contaminants are generally poorly treated until they desorb into the dissolved phase. This situation leads to a common concern for many *in situ* remediation projects, commonly referred to as contaminant "rebound", whereby matrix diffusion effects as these sorbed contaminants dissolve into groundwater lead to re-contamination of the treatment area. This rebound effect can be mitigated to varying degrees by using either (1) long-lasting agents and/or multiple applications, (2) aggressive agents that increase desorption of contaminants from soil into the dissolved phase or (3) a combination of both.

Soil Conditions. For the *in situ* technologies being considered for this interim action, the effectiveness of the technology is closely related to the ability to distribute the active agent (e.g., oxidant, ZVI, EVO) throughout the target treatment zone. The combination of the depth of the target treatment area (35 to 95 feet bgs) with the very dense, fine-grained, and relatively low-permeability soils presents challenges to all of the *in situ* technologies being considered. Technologies that use active agents that are more readily distributed in the subsurface (e.g., most oxidizers, organic substrates for ERD) will tend to be more effective than those that are more difficult to distribute (e.g., granular or micro-scale ZVI).

As described in Section 5.6, ISOTEC conducted brief water injection tests in 10 monitoring wells on October 18, 2017, to assess the ability to inject treatment fluids into the water-bearing zones proposed for the interim action. The injection pressure and volume were measured and recorded. The total flow into each well varied from as little as 4 gallons over a 20-minute period to 50 gallons, with injection pressures ranging from 12 to 100 psi. Wells completed in the lower portion of the Intermediate A water bearing zone, the upper portion of the Intermediate B water bearing zone, and in the Deep water bearing zone all tended to accept higher volumes of water at lower to moderate pressures and injecting *in situ* chemicals or amendments appears feasible in these zones. The lower portion of the Intermediate B water bearing zone, however, was much more difficult to inject water into. Injection pressures needed to get any water into this zone often reached 100 psi and, even then, the amount of water that was injected was very small. This lower Intermediate B zone will be more difficult to inject into.

Preferred Source Area Treatment Technologies. For ISCR technologies, ZVI is the primary reductant to treat CVOC sites and, while it can effectively treat dissolved phase CVOCs, it is not very efficient at treating sorbed contamination. Therefore, ISCR does not appear well suited to the subsurface conditions present on the Property and is eliminated from further consideration.

The remaining two *in situ* technologies are ERD and ISCO. Both have been shown to effectively treat CVOCs, and both utilize injection of aqueous reagents or amendments that can be injected into the dense, lower permeability soils present on the Property. ERD has been pilot tested at the Property (SES, 2016), and this testing has shown that injecting significant amounts of aqueous amendments into the subsurface is technically feasible, and also demonstrated that ERD is effective at reducing dissolved phase CVOC concentrations. However, ERD is not the best technology for the short-term mass reduction in the target treatment areas that may contain residual NAPL. On the other hand, ERD using EVO, or other long-lasting amendments, provides ongoing treatment for periods of 2 to 5 years, and would be effective at treating residual contamination after more aggressive short-term treatment is accomplished.

ISCO, and especially the types that utilize the stronger oxidant types, is more effective than ERD at reducing contaminant mass in higher concentration source areas, including areas with residual NAPL. In addition, the oxidation reactions occur quickly, which would allow for multiple applications in a relatively short period of time.

Based on the discussion above, the *in situ* source treatment approaches proposed for use on the Property will include both ISCO (short-term treatment) and ERD (long-term, post development treatment). The specific type of ISCO and ERD to be implemented is evaluated further below. The sequential use of ISCO and ERD has been shown in to be an effective combination of cleanup technologies for treatment of CVOCs. Although ISCO will initially create oxidative conditions (positive ORP, elevated DO), reducing conditions will begin to return once the oxidizer dissipates (days or weeks in the case of MFR) and this transition can be expedited through introduction of fast-acting carbon substrates (e.g., sodium lactate).

9.2.2 Groundwater Treatment to Prevent Contaminant Migration

The source removal and treatment approaches described above will significantly reduce contaminant mass on the Property immediately upon implementation, and also can provide ongoing treatment of residual contamination. Nonetheless, given the complexities of the geology, nature and distribution of the contaminants, it is reasonable to expect that, for at least for some period following the source area treatment, controlling future migration of dissolved-phase CVOCs from the Property to downgradient areas will be required (further referred to as “migration control”). Initially, this migration control will be in the form of the hydraulic control provided by the excavation dewatering system described above. Once the dewatering system is shut down in early 2020, migration control measures will be implemented in the areas immediately downgradient and adjacent to the Property, such as in the sidewalks within the ROWs of 8th Avenue North and Roy Street.

A number of potential applicable approaches to the post-dewatering migration control were considered, including using a physical barrier wall (e.g., slurry wall), hydraulic containment, or a perimeter *in situ* treatment system. As discussed in Table 14, there are significant drawbacks to both the containment approaches (physical barrier wall and hydraulic containment) including severe implementation issues. The use of a perimeter *in situ* treatment system utilizing ERD with EVO as the carbon source has been demonstrated as an effective treatment option for the Property, therefore, this is the proposed approach for migration control adjacent to the downgradient edge of the Property. In addition to controlling migration from the Property, the effects of the EVO injections will migrate and begin to reduce contaminant concentrations in the groundwater downgradient from the Property. The perimeter *in situ* treatment system will be installed in the form of a series of injection wells along the perimeter of the Property on the 8th Avenue North and Roy Street sides and will be referred to as the perimeter injection wells.

9.2.3 Selecting *In Situ* Treatment Chemicals

In the sections above and in Table 14, ISCO and ERD were selected as the two *in situ* treatment approaches for the interim action. This section provides the basis for the selecting the specific chemicals and/or amendments to be used for these approaches during the interim action.

9.2.3.1 ISCO Treatment Chemicals

ISCO is proposed for implementation as the on-Property aggressive treatment technology for purposes of reducing the source area contaminant mass in the short term. The major types of oxidants that can be utilized, in order of decreasing oxidant strength, include:

- Fenton's Reagent;
- MFR;
- Ozone;
- Permanganate;
- Persulfate; and
- Catalyzed persulfate.

In general terms, these oxidants all work in a similar fashion, with the oxidant contacting the target contaminant, which oxidizes the molecule, giving up an electron and forming new compounds from the original elements. For example, CVOCs oxidize into carbon dioxide and chlorine ions. There can be short-lived intermediaries, but they do not persist long enough to measure. Some of the oxidants, such as permanganate and persulfate, react more slowly, are longer lasting (weeks or months) in the subsurface, and can, to some degree, flow with groundwater. Other oxidants, including catalyzed persulfate, ozone, and MFR, react very quickly and do not persist more than several days or a few weeks.

As noted above, nearly all of the oxidation occurs for contaminants present in the dissolved or aqueous phase. Contaminants sorbed onto soil particles or present as residual NAPL must be transferred into solution so that the oxidation reactions can occur quickly and effectively. Increasing the rate at which this mass transfer process occurs will result in faster treatment of the target treatment area and more effectively reduce contaminant mass. The rate at which mass transfer from the sorbed to dissolved phase varies significantly between the different oxidants. For example, the injection of the more persistent oxidants (permanganate and persulfate) and some of the shorter-lived oxidants (catalyzed persulfate and ozone) can cause some mass transfer into the dissolved phase. This is, however, due to the limited physical agitation caused by the injection process and, to a lesser degree, the changes in equilibrium conditions between the soil and groundwater concentrations. Even injecting a gas, as is done to deliver ozone, does not cause a significant mass transfer, due to the preferential pathways created during injection. These pathways limit the extent to which the gas bubbles move through individual pore spaces, since the gas travels along the path of least resistance and is not generated in individual pore spaces.

MFR, on the other hand, is a much more aggressive oxidant and, due to reaction kinetics, can actively transfer mass into the dissolved phase. This approach is based on the standard Fenton's oxidation chemistry, where ferrous iron is used to catalyze the decomposition of hydrogen peroxide at low pH conditions to produce a hydroxyl radical, a very powerful oxidizer. The "modified" aspect of this approach is the use of a complexed ferrous iron solution that allows the process to occur at near-neutral pH conditions, and a stabilized hydrogen peroxide solution that allows the two components to be distributed in the treatment zone before the reaction can consume all the peroxide.

The modified Fenton's process disturbs the mass equilibrium between the phases. The hydroxyl radical quickly and completely oxidizes CVOCs in the dissolved phase, while the superoxide radical desorbs mass from the adsorbed phase by interfering with the electrical (molecular) forces that cause contaminant molecules to adhere to grains of soil and organic carbon. In addition to these chemical processes, the Fenton's reaction produces oxygen gas through decomposition of peroxide. This gas is produced within the individual pore spaces where the two reagents are mixed, and as the gas bubbles are generated and migrate vertically up through soil pores, a physical action occurs that mixes groundwater, disturbs soil "fines" (increasing turbidity) and dislodges residual NAPL. Mass is transferred from the adsorbed and NAPL phases into the dissolved phase through this physical agitation. Mass is also transferred from the NAPL phase to the adsorbed phase as the NAPL is mixed within the pore space and contacts more soil surface area.

These aggressive chemical and physical processes that upset the phase equilibrium and facilitate the mass transfer from the sorbed to the dissolved phase can lead to temporary increases in dissolved concentrations, especially early in the treatment program when the total mass is still at levels near the original mass. As the total mass decreases with multiple injections, the post-injection increases in dissolved concentrations also decrease. Post-injection dissolved concentrations will remain elevated and out of equilibrium with the total mass, even as the total mass approaches minimal levels. Only time will allow the dissolved mass and total mass to re-equilibrate through dilution, dispersion, re-adsorption and degradation. This time period varies depending on specific site conditions, but has been observed to take from months up to quarters.

Based on the discussion above, ISCO using the MFR is proposed for implementation as the short-term source treatment/mass reduction technology at the Property. This technology will improve mass transfer from the sorbed to dissolved phase better than other oxidants, and given the fast reaction times, multiple injections can be accomplished in a relatively short-period of time. Section 10 provides a detailed description of how this technology would be implemented.

9.2.3.2 Selecting ERD Amendments

The effective use of ERD at the Property has been previously demonstrated as documented in draft *Interim Action Work Plan* (SES, 2016), and in particular in the *Intermediate and Shallow*

Groundwater Zone Remediation Pilot Test report (ESM, 2016) contained in Appendix A of SES's 2016 interim action work plan. The objectives of the pilot test were to confirm that the EVO product could be injected into the subsurface in sufficient quantities to provide effective treatment and then monitor the results of the injections to document the effects. In this pilot test, food-grade EVO was injected into six injection wells (IW-01 through IW-06). EVO was selected based on its physical properties (i.e., easily mixed and injected) and because a single application can provide a controlled release of electron donors for periods of up to 2 to 5 years.

The injection wells were completed in the intermediate groundwater zone at elevations ranging from approximately -2 feet to -33 feet (generally similar to treatment zones TZ-A and TZ-B defined in Section 8.5 of this report). The total amount of EVO injected in the six wells ranged from approximately 8,000 to over 13,000 gallons at pressures ranging from 15 to over 100 psi. Groundwater monitoring conducted before and a year after the EVO injections showed significant decreases in primary CVOC concentrations (from one to three orders of magnitude decrease in PCE, TCE, and VC in MW107 and W-MW-02), demonstrated that the EVO solution was effectively distributed with at least a 25-foot radius of influence, and that the ERD process is occurring with reductions and breakdown of CVOC.

Based on the successful results of this on-Property pilot test, EVO is proposed for use as the general category of ERD amendment that will be used as part of this interim action. Although reductive dechlorination has been documented to be occurring on the Property, indicating that the required microorganisms are present, a bioaugmentation culture would be added to the ERD injection process to introduce an active colony of these organisms following the ISCO treatment. Bioaugmentation is a low cost and effective way to increase the effectiveness of ERD treatment and reduce cleanup times.

9.3 Summary of Proposed Interim Action Approach

Based on the discussion above, the interim action for the Property will consist of the following actions:

- Implementing a series of ISCO injections in the treatment zones defined in Section 8.5 to provide aggressive short-term mass reduction beneath the Property;
- Conducting one round of EVO injections (with bioaugmentation) after completing the ISCO injections and allowing the MFR reagents to fully react;
- Excavating contaminated soil throughout the Property down to elevations 11.5 to 6.5 feet, including operation of a dewatering system throughout the excavation and garage construction process; and
- Conducting an initial round of EVO injections after dewatering is completed using the perimeter injection wells.

These four actions will address the interim action objectives defined in Section 8.2.2. The interim actions described above were developed assuming that the site development activities summarized in Section 2.4 are completed as planned. The subsurface components of the planned building construction are not only compatible with the implementation of the interim action, but they will not preclude future on-Property treatment if determined necessary during the RI/FS.

9.4 Proposed Interim Action Consistency with MTCA Requirements

The proposed interim action summarized above meets the MTCA regulatory requirements for selecting and implementing an interim action contained in WAC 173-340-430. This interim action addresses contamination on the Property which is part of the Site, thereby providing a partial cleanup (WAC 173-340-430(2)(b)). This interim action "corrects a problem that may become substantially worse or cost substantially more to address if the remedial action is delayed." (WAC 173-340-430(1)(b)).

WAC 173-340-430(3)(b) requires that when the overall site cleanup action is not known (which is the case here), "the interim action shall not foreclose reasonable alternatives for the cleanup action. This is not meant to preclude the destruction or removal of hazardous substances." The proposed interim action is designed to remove contamination by completing partial excavation, destroying hazardous substances on the Property using ISCO, and providing for ongoing treatment within the Property after redevelopment by injecting EVO into the on-Property wells prior to construction. Lastly, the interim action provides for migration control using the downgradient perimeter injection wells. Consistent with WAC 173-340-430(3)(b), the proposed interim action does not preclude the implementation of future destruction of hazardous substances beneath the Property should this be determined to be necessary in the Final Cleanup Action Plan for the Site.

The proposed interim action is intended to expedite the cleanup of the remaining contamination present on the Property. The proposed timing of the interim action is consistent with the requirements of WAC 173-340-430(4) in that it does not delay the cleanup process for the Property or the Site but rather it reduces the potential threat to human health and the environment through source control/mass reduction and allows for future cleanup actions to be implemented. The interim action will be implemented under the AO (WAC 173-340-430(5)), and this work plan will go through the public participation process (WAC 173-340-430(6)). Finally, WAC 173-340-430(7) requires that a report shall be prepared before conducting an interim action. Sections 2 through 7 of this Work Plan provide a detailed description of the Site conditions related to the interim action based on the latest data available, and Sections 9.1 through 9.3 provide an evaluation of the reasonably implementable alternatives for the interim action and the rationale for the proposed action.

10.0 INTERIM ACTION IMPLEMENTATION

This Section describes the proposed interim action for the Property.

10.1 Interim Action Documents

This work plan is the primary document used to guide the implementation of the proposed interim action. The following three supporting plans are included as appendices to this work plan:

- ***Sampling and Analysis Plan* ("SAP") – Appendix L.** The SAP describes the sample collection, handling, and analysis activities to be conducted as part of the interim action, such that the data collected will meet the project's data quality objectives ("DQOs"). The SAP provides detailed information regarding sampling frequency and location, analytical methods, field and laboratory documentation, quality assurance/quality control and data validation procedures for interim-action related sampling and monitoring.

- ***Quality Assurance Project Plan* ("QAPP") – Appendix M.** The QAPP documents the planning, implementation, and assessment procedures for quality assurance and quality control ("QA/QC") activities to be used during interim action sampling and monitoring. The purpose of the QAPP is to ensure that data of sufficiently high quality are generated to support the project DQOs. The QAPP describes both quantitative and qualitative measures of data quality to ensure that the DQOs are achieved.

- ***Health and Safety Plan* ("HASP") – Appendix N.** The HASP provides the Site-specific health and safety requirements for the interim action, including procedures designed to reduce the potential for exposure or injury during implementation of the interim action, emergency response procedures, project emergency contact information, incident preparedness, and spill response procedures, and a description of the types of contaminants expected to be encountered during the proposed work.

The excavation activities, described in Section 9, will also require preparation of a contaminated media management plan (CMMP). The objective of this CMMP is to provide information regarding the location, source, depth, and disposal classification type of contaminated soil and other media present at the Property to assist the selected excavation contractor with its proper management and disposal. The plan also provides the procedures for differentiating soils with different levels of contamination from each other to facilitate their efficient excavation and transport and minimizing stockpiling and double handling of the contaminated soil. The CMMP will include the following specific components:

- A description of the various interim action and construction activities that will generate contaminated media, including the mass soil excavation and excavation related to utility realignment and undergrounding and other incidental excavations that may occur during construction;

- Definition of the various categories of contaminated media that will require management, and the specific criteria that define each category;

- A delineation of where contaminants have been detected in soil and where concentrations may exceed applicable waste management criteria (e.g., hazardous waste suitable for direct landfilling, hazardous waste requiring treatment prior to disposal);
- Specific procedures for managing the contaminated media including procedures used to segregate different categories of waste, soil handling and loading procedures, and manifesting requirements;
- Procedures used to pre-treat soil with contaminant concentrations exceeding the applicable Universal Treatment Standards prior to transporting the soil offsite. These soils would otherwise require treatment (incineration) by the waste management company prior to disposal;
- Procedures for dust and odor control;
- Procedures for managing both stormwater and groundwater extracted by the dewatering systems. These water management procedures will include those defined in the Stormwater Pollution Prevention Plan and discharge permit related plans;
- Sampling and monitoring requirements;
- Contingencies for unanticipated contamination that may be encountered; and
- Decontamination procedures.

The CMMP will be prepared in coordination with the excavation contractor and will be submitted to Ecology for review not less than 60 days prior to initiating excavation activities.

10.2 Source Area *In Situ* Treatment

As described in Section 9.2, the *in situ* technologies proposed for the interim action include both ISCO, using MFR as the oxidant, and ERD using EVO. As described below, the ISCO using MFR will include multiple applications of this aggressive oxidant to significantly reduce the mass of contamination. Following the last ISCO injection, and after a short period of time to let the MFR chemical fully react, EVO will be injected into the subsurface (along with bioaugmentation cultures) prior to decommissioning the injection wells.

10.2.1 ISCO Program Design

The design of the source area ISCO program is based upon the available data summarized in Section 6 of this workplan, which includes the results of the pre-interim action investigation described in Section 5 and the results of a bench scale treatability study conducted to evaluate the effectiveness of MFR for treating soils on the Property (see Appendix I for treatability study report). As described in Section 5.5, the bench study concluded that MFR should be an effective oxidizing agent for this project and that an application approach consisting of multiple low doses rather than fewer high dose injections would be preferred.

The ISCO program addresses the four treatment zones TZ-A through TZ-D defined in Section 8.5, and shown in Figures 30 through 33. These four 15-foot thick zones include areas on the Property with total CVOC concentrations in soil exceeding 0.5 mg/kg between elevations 5 feet and -55 feet NAVD88.

MFR reagents will be delivered to the treatment zones through a total of 132 injection wells as shown on Figures 35 through 38. These figures also show the location of a cross-section running southwest to northeast through the middle of the main areas of contamination on the Property. This cross section, which intersects the four treatment zones, is shown on Figure 39. As shown on Figure 39, depending on the thickness and depth of the soils requiring treatment at a specific location, anywhere from one to four injection wells will be installed (see Section 10.3.2 below for details on injection well design). The number and spacing of the locations is based upon an anticipated 12.5- to 15-foot radius of influence ("ROI") for the reagent distribution. If an individual ISCO injection well is located at the site of an existing ERH/SVE well, the ERH/SVE well will be over-drilled and the injection well installed. This procedure will effectively decommission the ERH/SVE well by the installation of the ISCO injection well.

As described in detail below in Section 10.3.1, the general injection approach is to inject up to approximately 380 to 680 gallons of MFR at each injection well during each round, with three rounds of injections planned. As noted above, the actual amount of MFR reagents injected may limited by conditions encountered in the field. Monitoring will be conducted between injection rounds to document the effects of each round (see Section 10.4).

Based on the available information, each injection round will take approximately 3 weeks to complete. Once a round of injections is complete, the next round will not begin for approximately 4 weeks to allow for the all reagents to be consumed and the sorbed contaminants to enter the dissolved phase, and to allow for inter-round groundwater monitoring activities. The ISCO injection program is estimated to take approximately 4 to 5 months to implement.

10.2.2 EVO Injection Design

As described above, when the last (third) round of ISCO injections is completed and the same 4 week waiting period has elapsed to ensure that the MFR reagents have dissipated, carbon substrate electron donor amendment will be injected into the same wells to provide for ongoing treatment by enhanced bioremediation beneath the Property during and after building construction. Given the effectiveness demonstrated during the 2016 ERD pilot test, emulsified vegetable oil ("EVO") will be used as the electron donor. EVO is a slow-release carbon source that has been demonstrated to have persistence for enhancing bioremediation for 2 to 5 years. While the general approach for the EVO injection is outlined below, information gathered during the performance of the ISCO injections (e.g., ability to inject reagents in the different treatment zones, post-injection monitoring results, etc.) may be used to refine the details of the injection approach.

The application of the enhanced bioremediation program will be accomplished by injecting a blended mixture of EVO, sodium lactate, pH buffer, bioaugmentation cultures, and water at a target dose rate that will provide for effective distribution of the carbon substrate mixture into the subsurface and provide adequate carbon substrate to support the degradation of the residual CVOCs. Details of the EVO injection procedures are provided below in Section 10.3.2

10.2.3 Permitting

Prior to injecting the MFR reagents and EVO into the subsurface, the project will be registered with the Ecology Underground Injection Control ("UIC") Program. To obtain rule authorization, the UIC Program requires that UIC wells be registered prior to use, and that the discharge from the wells meet the non-endangerment standard of WAC 173-218-080. Registration of the injection wells and program is accomplished by submitting Ecology form ECY 040-47e and the required supporting information to the UIC Coordinator in the Ecology Water Quality Program.

10.2.4 Injection Well Installation

The 132 on-Property injection wells will be installed at the locations shown on Figure 40, and the injection well designs are shown on Figure 41 (Figure 40 also shows the perimeter injection wells; see Section 10.5 for discussion of the installation of these wells). Each well will be completed in an 8-inch diameter borehole housing 2-inch diameter casing. The injection wells will be constructed of 2-inch diameter Schedule 40 PVC flush-thread casing, with 15-foot long 0.020-inch slotted PVC screen. The annulus of each injection well will be filled with 10 x 20 Colorado silica sand (or equivalent), which will extend from the bottom of the borehole to approximately one foot above the top of the screen, followed by hydrated bentonite (3/8-inch diameter pellets) to a depth of 6 feet bgs. The remainder of the borehole should be filled with concrete. The top of each well casing will consist of blank 2-inch PVC pipe, such that the injection wellhead assembly described below can be connected. The surface completion for each injection well will be constructed in a minimum of a 12-inch diameter steel traffic box set in concrete.

10.3 Injection Procedures

10.3.1 MFR Injection Procedures

This section describes the general procedures used to inject the reagents into the subsurface.

10.3.1.1 Mobilization

Mobilization activities include transportation and staging of the required equipment, materials, instruments, personnel and services required for implementing the program, including hoses, tanks, drums, a gas-powered air compressor and generator, electric mixers, and pneumatic pumps. The reagents that will be transported to the Property will include hydrogen peroxide at a concentration of 30 percent, and a dry catalyst required for reagent preparation. The 30 percent hydrogen peroxide will be stored in a secure location on the Property in U.S. Department of Transportation ("USDOT")-approved 55-gallon drums.

10.3.1.2 Reagent Preparation

The oxidizer component of the MFR consists of a pre-determined proprietary concentration of hydrogen peroxide, water and stabilizer. During the initial injection round, a standard oxidizer concentration of 3 to 12 percent will be used. The concentrations of hydrogen peroxide in the first few injection wells will be low, in the 3-6% range, until injection pressures are evaluated. Concentrations will be increased as the injections proceed up to the target concentration of 12 percent, as injection pressures allow. Lower permeability zones (e.g., Treatment Zone 3) may require lower peroxide concentrations to avoid excessive buildup of gas in the soil matrix which would require excessively high injection pressures to overcome. The 30 percent hydrogen peroxide will be diluted down to the target concentration (e.g., 3 to 12 percent) in 300-gallon bulk tanks, with water obtained from a fire hydrant located adjacent to the Property. The catalyst component of the MFR consists of a neutral pH-buffered ferrous iron complex. At post-reaction concentrations, the iron complex is similar and comparable to naturally occurring metals within the soil matrix (i.e., ppm range). The catalyst will be shipped to the site in dry form and mixed with water on-Property in 300-gallon bulk tanks. A reagent mixing schematic is included as Figure 42.

All reagents will be either injected during the mobilization or removed from the Property at the completion of injections.

10.3.1.3 Reagent Handling and Storage

Only injection contactor employees with appropriate training will handle and store hydrogen peroxide and catalyst to complete this interim action. These employees will also have received specific training in the personal protective equipment (PPE) required to handle these chemicals safely. A fire extinguisher and eye-wash station will be on-Property at all times during injection events.

Chemicals will be stored according to the requirements of the USDOT. In brief, the hydrogen peroxide and the catalyst will be stored at separate locations on the Property in such a way that, if a spill were to occur, the two would not come into contact with each other. The potential for combustion issues associated with the presence of hydrogen peroxide, a strong oxidizer, are minimized since a maximum solution of 30 percent will be delivered to the Property. Flammable materials, i.e., gasoline, will not be stored near the peroxide or in locations where a peroxide spill could occur.

Diluting the peroxide will be performed in a dilution tank. Water will be added to the dilution tank along with dry stabilizer in a predetermined volume to create an approximately 3 to 12 percent concentration after the addition of a predetermined volume of hydrogen peroxide. An electric drum pump or an air-operated double diaphragm pump will be used to transfer the peroxide into the dilution tank. Two technicians are required to complete this process: one operates the pump and one holds the transfer wand in the dilution tank. Both technicians will wear splash-resistant aprons, face-shields and chemical resistant gloves while completing the transfer.

To mix the catalyst, iron will be added to the mixing tank, followed by a predetermined quantity of water. An electric mixer is used to mix the solution. The chelating agents will then be added to the solution and mixing will continue. Although the chemicals are non-hazardous and the mixing process is generally dust-free, the technician completing the mixing will wear nitrile gloves and a particulate respirator as a precautionary measure, consistent with the HASP.

As described below, the MFR components are not combined at the surface. The peroxide and catalyst only contact each other in the subsurface. Additional precautions are taken to prevent reactions in the injection equipment by flushing all equipment with water between separate injections of each reagent.

10.3.1.4 Spill Prevention

Site personnel should be aware of potential conditions that could cause a spill and take preventative measures before a spill occurs. Safe storage and handling procedures are discussed above.

The tanks used to dilute the peroxide and to mix and store the catalyst are oversized to prevent spillage from the tanks. If a small spill (less than five gallons) of peroxide occurs to the ground surface, water will be used to dilute it further and actions taken to prevent the fluid from entering any storm drains or drainage ditches while the fluid is soaked up with clay sorbent. If a larger spill of peroxide occurs, the same procedure will be followed and any excess liquid will be pumped into a clean empty storage tank. If a small spill (less than 5 gallons) of catalyst occurs, it will be contained and soaked up with sorbent pads then placed in a steel or poly drum. If a large spill of catalyst occurs, it will be contained and pumped into the storage tank with an air diaphragm pump. If a spill of dry catalyst occurs, it will be swept up and placed in a poly bag. Work will stop immediately if a spill occurs and will not restart until after the spill is cleaned up and the cause of the spill is determined and corrected. All spilled materials will be disposed of properly.

10.3.1.5 Reagent Injection Procedures

The MFR reagents consist of a patented neutral pH chelated iron catalyst (catalyst) and dilute stabilized hydrogen peroxide (oxidizer). The procedures for reagent preparation and injection, and the basis for establishing the appropriate dose rate and injection well sequencing are described below.

Injection Dosing. The objective of each round of injections is to inject enough MFR to fill 3 to 5 percent of the pore volume within the assumed ROI. Each injection round will address the contaminants in the dissolved phase at that time, and also the contaminants that get desorbed at the time of injection. Based on the assumed ROI of 12.5 feet, a porosity of 0.25, and a 15-foot long screen, the total pore volume to be treated around each well screen is approximately 13,800 gallons, which gives a target injection volume of up to approximately 380 to 680 gallons (roughly 3 to 5 percent). If more than 3 to 5 percent pore volume is filled up, or too strong of a peroxide mixture is used, the aggressive nature of the reaction can lead to well over-pressurization, surfacing, and increased injection pressures. Note that this is a target volume, and conditions encountered in the field may limit the volume of chemicals that can be injected in certain wells (e.g., wells completed in Treatment Zone C completed in the lower portion of the Intermediate B water bearing zone).

Injection Sequencing. The injections will be sequenced such that adjacent injection wells will not be used on consecutive days.

Injection Equipment. Chemical injection equipment consists of storage containers, pneumatic double-diaphragm pumps, regulators, flow meters, 0.75-inch-diameter reinforced PVC tubing, valves, and cam-lock connectors. Transfer of the reagents from the storage and/or mixing containers to the point of injection will be performed via a double diaphragm pump. Reagents are conveyed through 0.75-inch reinforced PVC tubing and connected to the injection well with a wellhead containing ball valves, fittings, and a pressure gauge.

Injection Method. Reagents will be injected into the subsurface using injection wells in a five-step process. The first step is injecting approximately 10 to 25 gallons of water into the subsurface, followed by approximately 190 to 340 gallons of catalyst. An additional 10 to 25 gallons of water will then be injected to flush the catalyst away from the screen. Following the water flush, approximately 190 to 340 gallons of oxidizer will be injected into the subsurface. The last step is a final water injection to flush the oxidizer from the injection equipment. It is important to note that the actual volume injected will depend upon the lithology, surfacing, injection flow rate, pressure and radial effects noted during injection.

This process is repeated for each injection well. An MFR injection method schematic detailing the injection method is included in Figure 42. Reagent quantities will be recorded on daily log sheets.

It is important to note that, if surfacing occurs during injections into a particular injection screen, the injection pump will be immediately shut off to limit the amount of liquid escaping to the surface. The surface materials will be immediately cleaned up and containerized for proper disposal.

Injection Rates and Pressures. Injection rates and volumes are interrelated to the reaction rates of hydroxyl radicals with the contaminants, the distribution of contaminants in the subsurface, and the rate of hydrogen peroxide decomposition. The rate at which reagents are injected into the subsurface is initially determined by the soil/aquifer characteristics. Based upon review of the provided data, and the results of the recent water injection test, expected injection flow rates are between 1 and 3 gpm and injection pressures are between 15 and 70 psi. In order to prevent compromising the injection well and avoid surfacing of MFR reagents, injection pressures will be maintained at less than 100 psi. Injection rates and pressures will be recorded on daily log sheets.

10.3.2 Source Area EVO Injection Procedures

Based on observed dissolved oxygen concentrations and other geochemical conditions in groundwater following the third ISCO injection, the ERD injections may be initiated with injection of only a sodium lactate solution to accelerate the transition from the aerobic and high ORP conditions that are likely to be present after ISCO injections to the anaerobic and reducing conditions needed to support ERD. Approximately 50 to 150 gallons of a 1 to 5 percent sodium lactate solution may be injected into select injection wells to precondition the aquifer. Sodium lactate, a fast-release carbon source, is a commonly used carbon substrate for ERD.

Following this initial pre-conditioning step, the EVO solution will be injected. The anticipated EVO dose rate, based on the Property-specific soil and groundwater characteristics, CVOC concentrations, and standard industry practices for EVO application, is initially set at 5 percent; however, actual solutions to be injected may range from 2 to 10 percent EVO. Commercially available EVO products used for remediation contain a nominal amount of sodium lactate (generally less than 5 percent). Additional sodium lactate will be added to the EVO solution to further assist the transition to anaerobic and reducing conditions. Based on an expected 15-foot radius of influence, a 15-foot injection well screen length, and the goal of injecting enough EVO solution to displace 7 to 10 percent of the pore volume, the total target injection volume for each well will be approximately 2,500 gallons. Site conditions (e.g., required injection pressures, hydraulic conductivity) may limit the actual volume of EVO injected in the wells.

A pH buffer may be included in the carbon substrate solution in efforts to maintain pH in a range favorable for dechlorinating bacteria. Due to the fermentation by soil microbes following carbon addition, groundwater pH can drop if the aquifer is not sufficiently buffered. Bicarbonate buffers are commonly used for ERD to keep groundwater pH in the injection zone to a range of 6.0 to 7.5 to maintain remedial performance. An additional benefit of injecting a pH buffer is that reductive dechlorination rates have been observed to be approximately four times higher in the laboratory at pH 7 compared to pH 6 (Young and Gossett, 1997). Site-specific bicarbonate demand is difficult to estimate prior to remediation, as different geochemical conditions and microbial activity will be generated following application of ISCO and injection of carbon substrate. A dosage approximately equivalent to 0.5 to 2 pounds of sodium bicarbonate per gallon of 60 percent EVO shipped is anticipated.

As noted above, bioaugmentation (addition of dechlorinating bacteria) will also conducted concurrent with the EVO injections. The bioaugmentation cultures (e.g., KB-1 or SDC-9) are anaerobic bacterium, and exposure to oxygen has been demonstrated to reduce activity and viability. Therefore, the culture solution will be kept in the shipping vessels, under anoxic conditions, until they are injected. To minimize exposure to oxygen, a small volume of anaerobic water will be injected immediately before and immediately after injection of the bacterial culture (approximately 10 to 15 gallons before and after). Specific bioaugmentation dosage is anticipated to be between 0.5 and 1.5 liters per well; however, higher concentrations of bioaugmentation may be applied to targeted areas based on groundwater conditions following ISCO injections. To optimize delivery of the dechlorinating bacteria, the bioaugmentation solution will also be injected in the middle of EVO injection as follows:

- Inject approximately 1/2 to 2/3 of the EVO solution;
- Inject the bioaugmentation culture (i.e., 10 gallons anoxic water, bioaugmentation culture, 10 gallons anoxic water); and
- Inject remaining carbon substrate solution per injection point. This final injection of EVO solution will help distribute the dechlorinating bacteria into the water bearing zones.

It is important to note that the above approach may be changed based on field conditions, observations, and monitoring conducted during the three rounds of ISCO injections. For example, if injection wells in a portion of a treatment zone will not readily take 2,500 gallons of EVO, the concentration of EVO in the solution may be increased and the volume of solution injected reduced so that a similar quantity of carbon substrate can be injected in a smaller volume.

10.4 On-Property Well Decommissioning

To facilitate the beginning of shoring installation and excavation work, all of the existing monitoring wells, ISCO injection wells, and former ERH/SVE wells within the Property boundary will be decommissioned following the monitoring activities conducted immediately after the EVO injection. The wells will be decommissioned by a licensed well driller consistent with the Ecology well regulations (WAC-173-160-460).

10.5 Perimeter Injection Well Installation

A total of 44 perimeter injection wells will be installed just downgradient of the property along 8th Avenue and Roy Street (Figure 40). The injection wells will be screened at a range of depths such that EVO can be applied at elevations consistent with treatment zones TZ-A through TZ-D (ranging from 5 feet to -55 feet). Given the limited space available to install these wells, the design of the perimeter injection wells will consist of dual-completion wells, with the screen intervals as follows:

- **"Type 1" Completion.** A dual-completion well will be installed at these locations, with a well screened between elevations 5 feet and -10 feet and a well screened between elevations -25 feet and -40 feet installed in the same boring. A bentonite seal will be placed in the boring annulus between the two well screen intervals; and

- **"Type 2" Completion.** A dual-completion well will be installed at these locations, with a well screened between elevations -10 feet and -25 feet and a well screened between elevations -40 feet and -55 feet installed in the same boring. A bentonite seal will be placed in the boring annulus between the two well screen intervals.

The "Type 1" and "Type 2" wells will be located 10 feet apart, meaning that successive "Type 1" well locations (and successive "Type 2" well locations) will be 20 feet apart (assuming a radius of influence greater than 10 feet). The wells will be constructed of 2-inch-diameter Schedule 40 PVC flush-thread casing, with 0.020-inch slotted PVC screen. The annulus of each injection well will be filled with 10x20 Colorado Silica Sand (or equivalent) from the bottom of each well screen to approximately one foot above the top of the screen. The well annulus between the two filter packs and above the top filter pack will be filled with hydrated bentonite chips to a depth of 6 feet bgs, with the remainder of the borehole filled with concrete. The top of each well casing will be completed with a flush-with-grade steel monument such that the well can be used for monitoring purposes as necessary or as an injection well. Because two wells will be installed in each dual completion well boring, a variance from the prohibition on nested resource protection wells contained in the Minimum Standards for Construction and Maintenance of Wells (WAC 173-160-420) must be obtained from Ecology prior to installing the wells.

The installation of the perimeter injection wells will be conducted in conjunction with the Property development construction that includes installation of below-ground utilities beneath the sidewalks and portions of the ROWs along Roy Street, Valley Street, Dexter Avenue North, and 8th Avenue North. The design of the new utilities and associated improvements are underway. A key feature of the new utilities is that they will result in the removal and undergrounding of the overhead power and cable lines that parallel Roy Street and Dexter Avenue North. Removing these overhead obstructions will allow access to this area for installations of a portion of the interim action that otherwise would not be available due to the presence of the overhead utilities.

The development utilities work will be performed pursuant to a Utilities Major Permit (UMP) from the City of Seattle. The location and design of the perimeter injection wells is being included in the utilities design and UMP application. The UMP is expected to be issued in the second quarter of 2018. Based on the latest schedule for the utilities work and the soil excavation and related shoring and dewatering activities, the perimeter injection wells would not be installed until at least the second quarter of 2019. At the latest, the perimeter injection wells will be installed prior to the dewatering system shutting down in early 2020, since the injections cannot occur until then.

10.6 EVO Injection Procedures for Perimeter Wells

The initial injection of EVO in the perimeter injection wells will be conducted in the second quarter of 2020 following the one-time monitoring event discussed below, and will generally follow the procedures used for the on-Property EVO injections described in Section 10.3 above. If modifications to these procedures are warranted based on information gathered during the on-Property injection activities, they will be proposed to Ecology not less than 60 days prior to the proposed start of the perimeter injections.

10.7 Interim Action Performance Monitoring

This section describes the performance monitoring that will be performed prior to, during and after the completion of the ISCO and EVO treatment of the target treatment zones identified on Figures 35 through 38. As described below, the monitoring well network includes existing wells on and adjacent to the Property, new monitoring wells, and select monitoring from several of the proposed perimeter injection wells prior to injecting EVO in these wells.

10.7.1 Monitoring Well Installation

Eighteen new performance monitoring wells will be installed at the locations shown on Figure 43. Four of these wells are located on the Property and will be used, along with existing on-Property wells, to monitor the effects of the ISCO and EVO injections described above after each injection event. These wells will be decommissioned following the monitoring event conducted after the final injection round.

Fourteen of these new wells are located across 8th Avenue North and Roy Street, and will be used in conjunction with existing monitoring well network (see below for specific wells) to monitor the long-term performance of the interim action downgradient of the Property, including monitoring the area downgradient of the perimeter injection wells described in Section 10.5. A separate ROW permit from the City of Seattle will be required to install the new wells. These 14 new wells, in addition to the existing monitoring wells located along 8th Avenue North and Roy

Street, will provide six well clusters downgradient of the Property to monitor the effectiveness of the interim action.

The new monitoring wells include three wells installed in the shallow water-bearing zone, six wells to monitor the Intermediate A water-bearing zone, seven wells to monitor the Intermediate B water-bearing zone, and two wells to monitoring the deep water-bearing zone. Table 15 summarizes the well location rationale and soil samples to be collected during drilling of the monitoring well borings that will document conditions prior to amendment injection. These wells will be designed and installed consistent with the procedures provided in the SAP (Appendix L).

PES evaluated the feasibility of installing monitoring wells through the development below grade parking garage floor to monitor post-development groundwater quality on the Property. However, because the bottom of the garage is over 20 feet below the water table, this makes installing wells technically infeasible.

10.7.2 Interim Action Performance Groundwater Monitoring

There will be four phases of performance monitoring associated with the interim action: (1) baseline monitoring before on-Property injections, (2) monitoring after each on-Property injection, (3) quarterly monitoring during dewatering, and (4) quarterly monitoring after perimeter well injection. The performance monitoring well network (Figure 43) will be sampled and monitored for groundwater levels per the schedule shown in Table 16. Groundwater samples will be analyzed for VOCs, GRO, and/or geochemical parameters as detailed in Table 16. The SAP (Appendix L) provides the sampling procedures and analytical methods, and the QAPP (Appendix M) provides the QA/QC procedures used to evaluate the laboratory data.

Each of the four performance monitoring phases is described in more detail below.

10.7.2.1 Baseline Monitoring Before On-Property Injections

The baseline monitoring will be conducted prior to initiating any of the interim action injection activities and will provide a Site-wide baseline data set of conditions prior to implementing the interim action. Baseline monitoring will include all existing shallow, intermediate, and deep wells, including those recently installed during the Pre-Interim Action investigation activities, and the 18 new performance monitoring wells (Figure 43). Samples will be analyzed for VOCs, GRO, and geochemical parameters as detailed in Table 16.

10.7.2.2 Monitoring After Each On-Property Injection

Once the on-Property interim action injections begin, a limited round of sampling will be conducted from select on-Property wells (see Table 16 for specific wells) after each of the three planned ISCO injection events and after the EVO injection (fourth and final injection event). The purpose of these inter-injection round monitoring events will be to track changes in dissolved-phase contaminant concentrations after each application of the MFR reagents and EVO amendments. Sampling will be conducted at least one week after completing the previous injection round. As noted above, it is expected that dissolved-phase concentrations will increase in some areas where the MFR reagents result in desorption of contaminants from soil into the dissolved phase.

10.7.2.3 Quarterly Monitoring During Dewatering

After the last of the inter-injection sampling is completed (following the EVO injection round), all of the on-Property monitoring wells and any other remaining on-Property wells (e.g., ERH wells) will be decommissioned in preparation for the beginning of construction, and specifically the installation of shoring and mass excavation of soil.

Longer-term monitoring of the effects of the on-Property phase of the interim action will be conducted using the wells located immediately downgradient of the Property (Figure 43 and Table 16). These wells will be monitored quarterly for a minimum of one year after the last round of the on-Property injections with the first quarterly event conducted in the fourth quarter of 2018. Each of these quarterly post-injection monitoring events will include the following:

- Conducting a complete round of water level measurements; and
- Sampling all wells listed in Table 16.

As discussed above, the excavation dewatering system will be operational throughout this post-injection monitoring phase. Although the design of the dewatering system is not known, it will induce groundwater flow toward the Property in and above the depth range pumped (likely extending at least through treatment zones TZ-A and TZ-B). Because of the inward groundwater flow direction in this zone, the effects of the on-Property ISCO and EVO injections are not likely to be observed in the shallow and Intermediate A monitoring wells immediately adjacent to and downgradient of the Property while the dewatering system is operational. Groundwater flow in deeper water-bearing zones may also be altered due to the on-Property dewatering. Therefore, the results of these four quarters of monitoring will be primarily used to assess the seasonal variability of VOC concentrations adjacent to and downgradient of the Property.

Once the excavation dewatering system has been shut down, groundwater levels will be monitored in the performance monitoring well network. During this period, at least one well in each water-bearing zone will be instrumented with a pressure transducer and datalogger, and water levels in the performance monitoring wells will be measured using an electronic water level probe approximately twice a month. It is anticipated that static groundwater conditions, including a resumption of the pre-pumping groundwater flow directions, will be achieved within two months of pump shutdown. Within one month of groundwater levels and flow directions returning to pre-pumping conditions, a fifth sampling event will be conducted to provide a post-dewatering baseline prior to injecting EVO into the perimeter injection wells. In addition to the monitoring wells identified in Table 16, this post-dewatering sampling event will include 24 perimeter injection wells (12 clusters) that will be sampled prior to conducting the initial round of EVO injections in these wells (see Sections 10.5 and 10.6 above). These wells are identified on Figure 43 and include another six well clusters, with each cluster including four wells screened at depths consistent with the treatment zones identified for the on-Property treatment. This monitoring event will also include conducting a complete round of water level measurements and sampling the wells listed in Table 16 for this phase of monitoring.

10.7.2.4 Quarterly Monitoring After Perimeter Well Injection

The results of the sampling of the select perimeter injection wells will be used to determine whether additional monitoring wells are required along 8th Avenue North and Roy Street to supplement the interim monitoring wells identified in Table 16. After these additional wells (if any) have been identified and installed, the initial EVO injection into the 88 perimeter injection wells will be conducted (in early 2020). Approximately one month after completing the perimeter injections, the first of four quarterly monitoring events will be conducted to evaluate the effects of the interim action. These quarterly events will be conducted consistent with the procedures describe above in 10.7.2.3 using the wells listed in Table 16 located immediately downgradient of the Property. After four quarters of monitoring (early 2021), the scope and need for additional monitoring will be reassessed.

It is anticipated that the RI/FS process will either be completed, and the Final CAP completed or nearing completion, during the timeframe of this post-perimeter injection monitoring. If this is the case, the last stages of the interim action monitoring described above may be integrated into the overall cleanup action monitoring if appropriate and approved by Ecology.

10.8 Interim Action Expectations

Over its approximately two-year implementation time frame, the interim action described above will result in significant reductions in contaminant mass beneath the Property and also control migration from the Property to downgradient portions of the Site. The specific expectations for the different phases of the interim action, and how meeting these expectations will assessed using information gathered during the monitoring described in Section 10.7 are summarized below.

10.8.1 On-Property *In Situ* Treatment

In the short-term, the effectiveness of the on-Property *in situ* treatment will be established by documenting the completion of the four injection events and through the inter-injection monitoring described in Section 10.7.2.2. This monitoring is expected to show decreases in CVOC concentrations after the combined effects of the three rounds of ISCO injections, although it is expected that dissolved-phase concentrations will increase in some areas where the MFR reagents result in desorption of contaminants from soil into the dissolved phase. Following the EVO injection, the monitoring is expected to document the distribution of the EVO.

10.8.2 Monitoring During Excavation Dewatering

After the on-Property wells have all been decommissioned, source area excavation will begin in late 2018 which will include initiation of a dewatering system that will operate until early 2020. While operational, significant quantities of contaminated water will be removed and treated, and groundwater flow will be inward toward the Property, especially in the Intermediate A water-bearing zone and at least the upper portion of the Intermediate B water-bearing zone. Until the dewatering system design is completed by the excavation contractor, the effects of the dewatering on the lower portion of the Intermediate B and the deep water bearing zones are difficult to predict.

Performance monitoring associated with the dewatering treatment system is expected to show reductions in CVOC concentrations over time as cleaner water from downgradient of the Property is drawn back towards the Property. Groundwater monitoring wells on Roy Street and 8th Avenue North will also track the effects of the dewatering, which may also include reductions in CVOC concentrations as less contaminated water is drawn toward the dewatering system. Monitoring will also include geochemical parameters that will establish baseline conditions in the area immediately downgradient of the Property prior to injection of EVO in the next phase of the interim action.

10.8.3 Perimeter Well *In Situ* Treatment

After the dewatering system is shut down in early 2020, an initial baseline monitoring event will be conducted (see Section 10.7.2.4) with injections into the perimeter injection wells following that monitoring event. After the perimeter well injections, quarterly monitoring will be conducted to document the effects of the injections. Typically, the following conditions are observed in plumes undergoing anaerobic biodegradation (EPA, 1998):

- Alkalinity and chloride above background concentrations;
- DO less than 0.5 mg/L;
- Ethene/ethane greater than 0.01 mg/L;
- Ferrous iron greater than 1 mg/L;
- Nitrate less than 0.1 mg/L;
- ORP less than 50 millivolts;
- Sulfate less than 20 mg/L;
- TOC concentrations greater than 20 mg/L; and
- Ultimately, reductions in CVOC concentrations compared to pre-interim action concentrations.

As discussed in Section 10.7.2.4, groundwater samples from the performance monitoring wells will be analyzed for these parameters. Based on travel time estimates using the procedure described in Section 6.2.5 and the distance to the performance monitoring wells on the east side of 8th Avenue North (60 feet from the perimeter injection wells) and the south side of Roy Street (65 feet from the perimeter injection wells), it is anticipated that it will take at least 1 to over 3 years to see the effects of the on-Property source removal and treatment and perimeter well injections in the Intermediate A monitoring wells along Roy Street and 8th Avenue North. Similarly, it is anticipated that it will take at least 3 to 4 years to see the effects of the on-Property and perimeter well injections in the Intermediate B monitoring wells along Roy Street and 8th Avenue North. Given the wide variability in hydraulic conductivities generated from the existing testing, it is possible that it may take longer to see the effects in wells installed in lower-conductivity materials (e.g., the lower part of the Intermediate B water-bearing zone) and the effects may be seen sooner in some areas than others. Based on these estimated travel times, the earliest that the effectiveness of the perimeter well injections could be expected to be evaluated is in mid-2021 for the Intermediate A water bearing zone.

10.9 Interim Action Contingencies

As described above, the assessment of the effectiveness of the interim action as a whole would begin based on monitoring data collected through the end of the first year of post-PIWN injection monitoring (mid-2021) when the initial effects of the PIWN injections are anticipated to be observed in the monitoring wells on 8th Avenue North and Roy Street. The full effects of overall interim action (on-Property injections, excavation, and the PIWN injections) are expected to take an additional two to three years to manifest in the performance monitoring wells (i.e., 2023 or 2024). While the ultimate goal of interim action is to control migration of CVOCs above the screening levels to areas downgradient of the Property, these long-term objectives may not be achieved in this timeframe.

Assuming that the RI/FS and Final CAP will be completed by this time, the overall effectiveness of the interim action would be assessed, and possible modifications or contingencies that may be needed will be evaluated in the context of the final cleanup action. The effectiveness of the interim action will be evaluated within 5 years using the following information:

- Long-term trends in CVOC concentrations in the performance monitoring wells, with the expectation that concentrations will be steadily declining; and
- Long-term trends in the performance monitoring wells of the geochemical parameters listed in 10.8.3 above, with the expectation that conditions remain suitable for supporting ERD.

If this evaluation concludes that the interim action is not meeting the objectives (i.e., controlling migration of CVOCs above the lowest applicable screening level in Table 11 to areas downgradient of the Property), modifications or contingent actions will be pursued, in consultation with Ecology. If it appears that the effects of the initial perimeter well injection are beginning to dissipate, the likely contingent action would be to conduct another round of EVO injection in the perimeter injection wells. If on the other hand, the evaluation concludes that concentrations of CVOCs migrating from the Property are causing concentrations in the performance monitoring wells to exceed screening levels, a different contingent action that provides additional treatment beneath the Property would be implemented. This contingent action would be to install a series of injection wells in the right of way on the east side of Dexter Avenue North and inject EVO into these wells. The installation of these upgradient injection wells, if needed, will occur within the new utility alignment on Dexter Avenue that will be specifically designed to accommodate these contingency wells (see Figure 40).

11.0 REPORTING AND SCHEDULE

The AO provides the requirements for reporting in Exhibit B and schedule of deliverables in Exhibit E. Following is a summary of the AO requirements.

11.1 Reporting

The AO requires monthly progress reports and data uploads to Ecology's Environmental Information Management ("EIM") database. In addition, an agency review draft and final version of an interim action implementation report will be prepared at the completion of the interim action.

11.1.1 Progress Reports

Project progress reports will be submitted to Ecology by the 15th of each month. The progress reports will include the following:

1. A description of the actions which have been taken to comply with the AO.
2. Summaries of sampling and testing reports and other data reports received by BMRD.
3. Summaries of deviations from the approved work plans, including this interim action work plan.
4. Summaries of contacts with representatives of the local community, public interest groups, press, and federal, state, or tribal governments.
5. Summaries of problems or anticipated problems in meeting the schedule or objectives set forth in the scope of work and work plan.
6. Summaries of solutions developed and implemented or planned to address any actual or anticipated problems or delays.
7. Changes in key personnel.
8. A description of work planned for the next reporting period.

11.1.2 Data Uploading to the Environmental Information Management Database

Validated analytical data collected as part of the interim action implementation will be entered in Ecology's EIM database within 60 days of sample collection unless otherwise approved by Ecology. All data used to support a draft document will be entered in Ecology's EIM database 30 days prior to submittal of the draft document for Ecology review. All locations will include latitude, longitude, and elevation data and specify the horizontal datum and vertical datum being used.

11.1.3 Interim Action Implementation Report

At the completion of the interim action (i.e., after the post-perimeter well injection monitoring has been completed), an Agency review draft interim action implementation report will be prepared summarizing the ISCO injection activities, perimeter injection well installation, performance monitoring, well decommissioning, data analyses and evaluation, and conclusions.

The Agency Review Draft interim action report will be submitted for Ecology review and comment. After receipt of Ecology's comments, a final interim action implementation report that addresses Ecology's comments will be prepared.

Consistent with the requirements of the AO, draft reports will be submitted electronically, with a paper copy also submitted if requested by Ecology. Public review draft and final reports will be submitted as paper copies in the number requested by Ecology.

11.2 Schedule

The preliminary schedule for implementing the interim action is as follows:

Interim Action Task	Date
Permitting (UIC Registration)	Completed
Injection Well Installation and Development	February/March 2018
Monitoring Well Installation and Development	February/March 2018
Baseline Monitoring Before On-Property Injections	March 2018
ISCO/EVO Injection Rounds 1 through 4:	March through September 2018
Monitoring After Each On-Property Injection	March through September 2018
Contaminated Media Management Plan	June 2018
On-Property Well Decommissioning	August/September 2018
On-Property Excavation and Dewatering	Fourth Quarter 2018 through First Quarter 2020
Quarterly Monitoring During Dewatering	Fourth Quarter 2018 through First Quarter 2020
Perimeter Injection Well Installation	2019
EVO Injection in Perimeter Injection Wells	Second Quarter 2020
Quarterly Monitoring after Perimeter Well Injection	Third Quarter 2020 through Second Quarter 2021
Interim Action Implementation Report	TBD in coordination with Ecology
Note: The dates associated with all tasks listed above will be revised once this work plan has been approved by Ecology.	

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LIMITATIONS

The services described in this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report.

TABLES

Table 1

Monitoring Well and Boring Completion Details
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Sample Location	Description of Location	Log?	Surveyed?	Well Tag	Dates Drilled	Easting	Northing	Depth		Elevation		Well Screen				Well Dia	Drill Rig	Casing Depth
								Total	Well	Ground	TOC	Depth		Elevation				
								(ft bgs)	(ft bgs)	(ft)	(ft)	Top	Bottom	Top	Bottom	(in)	Type	(ft bgs)
Shallow Water-Bearing Zone Wells																		
F13	Property	N	Yes		Jun-13	1,268,570.14	231,929.52	40	40	38.38	39.69	10	40	28.38	-1.62	1	–	–
F5	Property	N	Yes		Jun-13	1,268,450.74	231,943.61	40	40	39.05	39.00	10	40	29.05	-0.95	1	–	–
F9	Property	N	Yes		Jun-13	1,268,508.08	231,942.51	40	40	38.48	38.76	10	40	28.48	-1.52	1	–	–
G12	Property	N	Yes		Jun-13	1,268,541.87	231,927.48	40	40	39.39	39.40	10	40	29.39	-0.61	1	–	–
J15	Property	N	Yes		Jun-13	1,268,578.97	231,895.55	40	40	38.74	38.85	10	40	28.74	-1.26	1	–	–
J5	Property	N	No		Jun-13	1,268,418.17	231,903.60	40	40	39.84	39.95	10	40	29.84	-0.16	1	–	–
K8	Property	N	Yes		Jun-13	1,268,456.68	231,888.93	40	40	39.90	40.39	10	40	29.90	-0.10	1	–	–
M15	Property	N	Yes		Jun-13	1,268,549.38	231,859.22	40	40	39.48	39.82	10	40	29.48	-0.52	1	–	–
MW121 (B121)	In the east sidewalk of the 8th Avenue ROW east of the Property	Y	Yes		12/16/13	1,268,598.04	232,091.86	26.5	25	–	41.72	15	25	26.72	16.72	2	HSA	–
MW125 (B125)	In the Valley Street ROW north of the Property	Y	Yes		12/20/13	1,268,598.04	232,091.86	31.5	30	–	43.55	15	30	28.55	13.55	2	HSA	–
MW-214	Valley Street ROW, north of Block 37	N	Yes		–	1,269,388.42	231,861.09	–	17	27.81	27.32	7	17	20.81	10.81	2	–	–
MW-8	Northern portion of SCL property	N	TOC Elev		–	–	–	19	19	–	33.19	4.5	19	28.69	14.19	2	–	–
MW-9	8th Avenue North ROW, east of Property	N	TOC Elev		–	–	–	22	22	–	40.81	7	22	33.81	18.81	2	–	–
N7	Property	N	Yes		Jun-13	1,268,413.11	231,847.65	40	40	51.76	52.44	10	40	41.76	11.76	1	–	–
R-MW2	Property	Y	TOC Elev		10/22/92	–	–	15	15	–	41.74	5	15	36.74	26.74	2	HSA	–
R-MW3	Property	Y	TOC Elev		10/22/92	–	–	17	17	–	41.74	7	17	34.74	24.74	2	HSA	–
R-MW5	Bike Lane in Dexter Avenue, east of Property	Y	Yes		10/27/92	1,268,352.09	231,915.17	30	30	–	57.03	15	30	42.03	27.03	2	HSA	–
R-MW6	Sidewalk, Southeast of Property	Y	Yes		10/27/92	1,268,622.13	231,825.18	22	22	–	45.28	12	22	33.28	23.28	2	HSA	–
SCL-MW101	Alley east of 800 Aloha Street parcel	N	TOC Elev		Jun-02	–	–	–	15	–	30.46	5	15	25.46	15.46	2	–	–
SCL-MW105	Alley east of 800 Aloha Street parcel	N	TOC Elev		Jun-02	–	–	–	30	–	31.26	20	30	11.26	1.26	2	–	–
SCS-2	SCL property	N	TOC Elev		–	–	–	–	21	–	39.16	11	21	28.16	18.16	4	–	–
SMW-3	Valley Street ROW, north of Block 37	N	Yes		–	1,269,463.18	231,959.15	–	20	27.09	26.57	10	20	17.09	7.09	2	–	–
Intermediate A Water-Bearing Zone Wells																		
BB-8	Roy Street ROW, southeast of the Property	Y	Yes		6/6/97	1,268,705.38	231,762.42	78.5	40	–	43.69	30	40	13.69	3.69	2	HSA	–
GEI-1	Block 37	Y	Yes		4/16/14	1,269,362.77	231,828.18	81.5	26.8	–	27.95	26.8	36.8	1.15	-8.85	2	HSA	–
GEI-MW-1	739 9th Avenue North	Y	TOC Elev	BIJ490	8/22/14	–	–	61.5	59.9	–	30.10	39.8	59.8	-9.70	-29.70	2	HSA	–
GEI-MW-2	739 9th Avenue North	Y	TOC Elev	BIJ492	8/23/14	–	–	60	37.1	–	31.00	27.0	37.0	4.00	-6.00	2	HSA	–
GEI-MW-3	739 9th Avenue North	Y	TOC Elev	BIJ491	8/23/14	–	–	65.5	59.5	–	30.75	49.4	59.4	-18.65	-28.65	2	HSA	–
MW107 (B107)	8th Avenue North ROW, east of Property	Y	Yes		12/3/12	1,268,625.93	231,885.46	45.5	45	–	43.82	35	45	8.82	-1.18	2	HSA	–
MW108 (B108)	Alley east of 800 Aloha Street parcel	Y	Yes		12/14/12	1,268,805.44	232,044.39	50.5	50	–	32.78	40	50	-7.22	-17.22	2	HSA	–
MW109 (B109)	Alley east of 800 Aloha Street parcel	Y	Yes		12/4/12	1,268,808.76	231,943.07	45.5	45	–	34.97	35	45	-0.03	-10.03	2	HSA	–
MW110 (B110)	Alley east of 800 Aloha Street parcel	Y	Yes		12/4/12	1,268,806.34	231,814.34	45.5	45	–	39.67	35	45	4.67	-5.33	2	HSA	–
MW114 (B114)	SDOT property south of Roy Street	Y	Yes		12/10/12	1,268,537.67	231,656.12	45.5	45	–	45.84	35	45	10.84	0.84	2	HSA	–
MW115 (B115)	9th Avenue North ROW, east of the Property	Y	Yes		12/13/12	1,268,948.67	231,824.86	46	45	34.44	34.10	35	45	-0.56	-10.56	2	HSA	–
MW116 (B116)	9th Avenue North ROW, east of the Property	Y	Yes		12/7/12	1,268,952.65	232,006.18	46.5	45	31.92	31.34	35	45	-3.08	-13.08	2	HSA	–
MW117 (B117)	Eastern sidewalk of the Dexter Avenue ROW, south of the Property	Y	Yes		2/4/13	1,268,343.66	231,643.72	55.5	55	–	56.90	40	55	16.90	1.90	2	HSA	–
MW118 (B118)	Mercer Street ROW, south of the Property	Y	Yes		3/21/13	1,268,503.40	231,491.37	55.5	50	–	52.91	40	50	12.91	2.91	2	HSA	–
MW119 (B119)	9th Avenue North ROW, southeast of the Property	Y	Yes		3/21/13	1,268,924.29	231,652.18	46	45	37.74	37.42	35	45	2.74	-7.26	2	HSA	–
MW120 (B120)	8th Avenue ROW, northeast of the Property	Y	Yes		12/16/13	1,268,675.29	232,145.67	50.5	50	–	40.00	40	50	0.00	-10.00	2	HSA	–
MW127 (B127)	8th Avenue ROE northeast of the Property	Y	Yes		12/31/13	1,268,689.96	232,261.39	50.5	50	–	39.04	40	50	-0.96	-10.96	2	HSA	–
MW131	Property	Y	Yes	BIX-341	3/03/16 – 3/04/16	1,268,544.45	231,831.38	54.0	54	39.84	39.39	44	54	-4.16	-14.16	2	HSA	40
Intermediate B Water-Bearing Zone Wells																		
MW111 (B111)	Alley east of 800 Aloha Street parcel	Y	Yes		12/05/12 – 12/06/12	1,268,807.78	231,896.74	80.5	80	–	36.48	70	80	-33.52	-43.52	2	HSA	50
MW112 (B112)	In ROW West of the Property	Y	Yes		12/11/12 – 12/12/12	1,268,310.57	231,915.11	85.5	85	57.71	57.45	75	85	-17.29	-27.29	2	HSA	–

Table 1

Monitoring Well and Boring Completion Details
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Sample Location	Description of Location	Log?	Surveyed?	Well Tag	Dates Drilled	Easting	Northing	Depth		Elevation		Well Screen				Well Dia (in)	Drill Rig Type	Casing Depth (ft bgs)
								Total (ft bgs)	Well (ft bgs)	Ground (ft)	TOC (ft)	Depth		Elevation				
												Top	Bottom	Top	Bottom			
MW126 (B126)	Alley east of 800 Aloha Street parcel	Y	Yes		12/30/13	1,268,813.91	232,263.78	95	95	–	30.94	85	95	-54.06	-64.06	2	HSA	–
MW130	Property	Y	Yes	BIX-340	3/01/16 – 3/02/16	1,268,422.37	231,932.27	80	80	39.12	38.72	70	80	-30.88	-40.88	2	HSA	40
W-MW-01	In ROW East of the Property	N	Yes		1/27/2012	1,268,631.93	231,818.02	80	80	–	44.88	70	80	-25.12	-35.12	2	HSA	–
W-MW-02	In ROW East of the Property	N	Yes		1/29/2012	1,268,627.92	231,911.22	80	80	–	43.46	70	80	-26.54	-36.54	2	HSA	–
MW-132	North central part of the Property	Y	Yes	BKA-298	8/22/17 – 8/23/17	1,268,494.61	231,916.83	83	80	40.10	40.07	70	80	-29.90	-39.90	2	Sonic	55
MW-134	Northeast quadrant of the Property	Y	Yes	BKA-294	8/27/17 – 8/29/17	1,268,601.58	231,993.63	90	90	41.45	41.05	80	90	-38.55	-48.55	2	Sonic	–
MW-135	North central part of the Property	Y	Yes	BKA-299	8/24/17 – 8/25/17	1,268,495.24	231,963.50	80	80	39.11	38.96	70	80	-30.89	-40.89	2	Sonic	60
MW-136	Southwest corner of the Property	Y	Yes	BKA-300	8/28/17 – 8/29/17	1,268,420.05	231,820.95	95.5	95.5	51.87	51.45	84.6	94.6	-32.73	-42.73	2	Sonic	–
MW-139	Southeast quadrant of the Property	Y	Yes	BKA-295	9/13/17 – 9/14/17	1,268,533.63	231,841.28	80	80	39.81	39.44	70	80	-30.19	-40.19	2	Sonic	–
Deep Water-Bearing Zone Wells																		
FMW-129	SDOT Parcel south of Property	Y	Yes		5/13/14 – 5/16/14	1,268,873.71	231,707.21	119	89.2	38.64	38.31	84.2	89.2	-45.56	-50.56	2	HSA	–
FMW-131	Block 37	Y	Yes		8/25/16 – 8/30/16	1,269,436.35	231,629.37	75.0	74.85	–	27.85	62.5	72.5	-34.65	-44.65	2	HSA	–
FMW-3D	Block 37	Y	Yes		3/7/16 – 3/8/16	1,269,941.28	231,737.65	71.5	69	–	27.88	59	69	-31.12	-41.12	2	HSA	–
GEI-2	Block 37	Y	Yes		4/16/14 – 4/17/14	1,269,358.70	231,666.08	81.5	60.5	–	29.38	50.5	60.5	-21.12	-31.12	2	HSA	–
MW101 (B101)	Central portion of the Property	Y	Yes		7/10/12 – 7/12/12	1,268,533.39	231,934.66	140	115	–	39.49	105	115	-65.51	-75.51	2	Sonic	40, 80
MW102 (B102)	In the southern Valley Street sidewalk, north of the Property	Y	Yes		7/17/12 – 7/23/12	1,268,504.81	232,058.51	125	125	–	49.19	115	125	-65.81	-75.81	2	Sonic	–
MW103 (B103)	Between 8th And 9th Avenues North, east of Property	Y	Yes		7/25/12 – 7/27 12	1,268,808.01	231,912.50	115	114	–	35.92	103.5	113.5	-67.58	-77.58	2	Sonic	–
MW104 (B104)	8th Avenue North ROW, east of the Property	Y	Yes		7/30/12 – 8/01/12	1,268,635.95	231,912.28	130	129	–	42.68	119	129	-76.32	-86.32	2	Sonic	–
MW105 (B105)	Roy Street ROW, southeast of the Property	Y	Yes		8/06/12 – 8/10/12	1,268,695.16	231,763.25	140	140	–	44.69	130	140	-85.31	-95.31	2	Sonic	–
MW106 (B106)	North portion of the SDOT property south of Aloha Street	Y	Yes		8/14/12 – 8/15/12	1,268,501.66	231,720.28	140	140	–	51.99	130	140	-78.01	-88.01	2	Sonic	–
MW113 (B113)	9th Avenue North ROW, East of the Property	Y	Yes		12/18/12	1,268,950.83	231,911.79	80	80	33.20	32.90	70	80	-36.80	-46.80	2	HSA	–
MW122 (B122)	Alley east of 800 Aloha Street parcel	Y	Yes		12/17/13	1,268,810.95	232,139.15	115	115	–	30.03	105	115	-74.97	-84.97	2	HSA	–
MW123 (B123)	At the intersection of 9th Avenue and Westlake Avenue	Y	Yes		12/18/13	1,269,085.13	232,171.44	80	80	–	27.51	70	80	-42.49	-52.49	2	HSA	–
MW124 (B124)	In the southern Valley Street sidewalk, north of the Property	Y	Yes		12/19/13	1,268,387.41	232,058.20	120	120	–	56.24	110	120	-53.76	-63.76	2	HSA	–
MW128 (B128)	Southeast corner of the intersection of Westlake Avenue and Valley Street	Y	Yes		1/9/14	1,269,319.15	231,810.63	70.5	70	29.20	28.59	60	70	-30.80	-40.80	2	HSA	–
MW-133	Southwest quadrant of the Property	Y	Yes	BKA-297	8/15/17 – 8/17/17	1,268,397.31	231,878.49	145	139	40.08	39.77	129	139	-88.92	-98.92	2	Sonic	62.5
MW-137	Southwest quadrant of the Property	Y	Yes		8/31/17 – 9/1/17	1,268,471.72	231,851.07	115	115	51.73	51.46	105	115	-53.27	-63.27	2	Sonic	–
MW-138	In the Dexter Ave N ROW, west of the southwest Property quadrant	Y	Yes	BKA-296	9/12/17 – 9/15/17	1,268,345.42	231,841.79	117	115	57.48	57.06	105	115	-47.52	-57.52	2	Sonic	–
MW-140	In the Roy Street ROW south of the central part of the Property	Y	Yes	BKA-301	8/30/17 – 8/31/17	1,268,511.94	231,782.78	140	140	50.57	50.20	129.5	139.5	-78.93	-88.93	2	Sonic	–
MW-141	Southeast quadrant of the Property	Y	Yes		9/18/17 – 9/19/17	1,268,598.81	231,860.58	107	105	39.59	39.32	95.0	105.0	-55.41	-65.41	2	Sonic	–
Off-Property Shallow Water-Bearing Zone Borings																		
SV01	East sidewalk of 8th Ave N ROW, next to 800 Aloha St parcel	Y	No		3/11/13	–	–	12.25	–	–	–	–	–	–	–	–	DP	–
SV02	East sidewalk of 8th Ave N ROW, next to 800 Aloha St parcel	Y	No		3/11/13	–	–	11.75	–	–	–	–	–	–	–	–	DP	–
SV03	East sidewalk of 8th Ave N ROW, next to 800 Aloha St parcel	Y	No		3/11/13	–	–	12.75	–	–	–	–	–	–	–	–	DP	–
Intermediate A Water-Bearing Zone Borings																		
DB01	Northwest portion of the Property	Y	No		3/18/13	–	–	41	–	–	–	–	–	–	–	–	HSA	–
DB02	Northern portion of the Property	Y	No		3/18/13	–	–	45.5	–	–	–	–	–	–	–	–	HSA	–
DB03	Northeast portion of the Property	Y	No		3/27/13	–	–	60.5	–	–	–	–	–	–	–	–	HSA	–
DB04	Northwest portion of the Property	Y	No		3/21/13, 3/24/13	–	–	60	–	–	–	–	–	–	–	–	HSA	–
DB05	Southwest portion of the Property	Y	No		3/26/13	–	–	70.5	–	–	–	–	–	–	–	–	HSA	–
DB11	Southwest corner of the Property	Y	No		4/2/13	–	–	55	–	–	–	–	–	–	–	–	HSA	–
DB12	North-central portion of the Property	Y	No		4/3/13	–	–	45.5	–	–	–	–	–	–	–	–	HSA	–
DB13	Southwest portion of the Property	Y	No		4/3/13	–	–	45.5	–	–	–	–	–	–	–	–	HSA	–
DB14	Northeast portion of the Property	Y	No		4/4/13	–	–	45.5	–	–	–	–	–	–	–	–	HSA	–
B-201	Southwest portion of the Property	Y	No	–	6/19/17	–	–	50.5	–	–	–	–	–	–	–	–	Sonic	–

Table 1

Monitoring Well and Boring Completion Details
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

								Depth		Elevation		Well Screen				Well	Drill	Casing
Sample				Well	Dates			Total	Well	Ground	TOC	Depth		Elevation		Dia	Rig	Depth
Location	Description of Location	Log?	Surveyed?	Tag	Drilled	Easting	Northing	(ft bgs)	(ft bgs)	(ft)	(ft)	Top	Bottom	Top	Bottom	(in)	Type	(ft bgs)
B-202	Northwest portion of the Property	Y	Yes	–	6/19/17	1,268,405.50	231,991.69	50.5	–	39.17	–	–	–	–	–	–	Sonic	–
B-204	Southeast portion of the Property	Y	Yes	–	6/20/17	1,268,599.02	231,834.38	50.5	–	39.80	–	–	–	–	–	–	Sonic	–
B-218	North central part of the Property	Y	Yes	–	09/19/17	1,268,498.98	231,949.50	50	–	38.11	–	–	–	–	–	–	Sonic	–
B-220	North central part of the Property	Y	Yes	–	9/20/17	1,268,507.48	231,959.67	50	–	38.91	–	–	–	–	–	–	Sonic	–
B-222	North central part of the Property	Y	Yes	–	9/21/17	1,268,485.13	231,956.09	50	–	39.16	–	–	–	–	–	–	Sonic	–
B-223	North central part of the Property	Y	Yes	–	9/21/17	1,268,481.78	231,979.18	50	–	39.10	–	–	–	–	–	–	Sonic	–
Intermediate B Water-Bearing Zone Borings																		
DB06	Southern portion of the Property	Y	No		3/25/13	–	–	80.5	–	–	–	–	–	–	–	–	HSA	–
DB07	South-central portion of the Property	Y	No		3/27/13, 3/28/13	–	–	90.5	–	–	–	–	–	–	–	–	HSA	–
DB08	Southeast portion of the Property	Y	No		3/20/13, 3/21/13	–	–	70.5	–	–	–	–	–	–	–	–	HSA	–
DB09	Southeast portion of the Property	Y	No		3/19/13	–	–	70.5	–	–	–	–	–	–	–	–	HSA	–
DB10	Western portion of the Property	Y	No		3/29/13, 4/01/13	–	–	71.5	–	–	–	–	–	–	–	–	HSA	–
B-203	Northeast portion of the Property	Y	Yes	–	6/20/17	1,268,561.63	232,025.18	80.5	–	39.18	–	–	–	–	–	–	Sonic	–
B-205	Northeast portion of the Property	Y	Yes	–	8/30/17	1,268,576.55	232,029.05	80	–	40.28	–	–	–	–	–	–	Sonic	
B-206	North central part of the Property	Y	Yes	–	8/14/17	1,268,449.73	231,966.00	80	–	39.10	–	–	–	–	–	–	Sonic	–
B-207	North central part of the Property	Y	Yes	–	8/25/17	1,268,512.28	231,939.23	90	–	38.51	–	–	–	–	–	–	Sonic	55
B-208	Southeast quadrant of the Property	Y	Yes	–	8/24/17	1,268,562.08	231,910.53	80	–	38.80	–	–	–	–	–	–	Sonic	–
B-209	Southeast quadrant of the Property	Y	Yes	–	8/25/17	1,268,592.62	231,906.12	82	–	38.97	–	–	–	–	–	–	Sonic	–
B-210	Southeast quadrant of the Property	Y	Yes	–	8/21/17-8/22/17	1,268,521.39	231,878.26	80	–	39.38	–	–	–	–	–	–	Sonic	50
B-216	Southern central portion of the property	Y	Yes	–	9/1/17	1,268,471.33	231,824.29	95	–	51.86	–	–	–	–	–	–	Sonic	–
B-219	Southeast portion of the Property	Y	Yes	–	8/28/17	1,268,593.22	231,834.94	80	–	39.79	–	–	–	–	–	–	Sonic	–
B-221	North central part of the Property	Y	Yes	–	9/20/17-9/21/17	1,268,500.74	231,971.67	70	–	39.02	–	–	–	–	–	–	Sonic	–
Deep Water-Bearing Zone Borings																		
B-211	Southwest quadrant of the Property	Y	Yes	–	8/17/17-8/18/17	1,268,426.80	231,900.70	122	–	39.75	–	–	–	–	–	–	Sonic	55
B-212	Dexter Ave ROW, west of central portion of the Property	Y	Yes	–	9/8/17-9/11/17	1,268,349.91	231,945.06	100	–	57.61	–	–	–	–	–	–	Sonic	
B-213	Dexter Ave ROW, west of the Property	Y	Yes	–	9/5/17-9/6/17	1,268,347.25	231,893.53	125	–	57.42	–	–	–	–	–	–	Sonic	–
B-214	Dexter Ave ROW, west of lower southwest quadrant of the Property	Y	Yes	–	9/7/17-9/8/17	1,268,344.84	231,831.15	120	–	57.42	–	–	–	–	–	–	Sonic	–
B-215	Roy St ROW, south of the southwest quadrantt of the property	Y	Yes	–	9/12/17-9/13/17	1,268,432.65	231,782.45	95	–	53.95	–	–	–	–	–	–	Sonic	–
B-217	Southwest corner of the property	Y	Yes	–	9/5/17	1,268,385.94	231,843.51	115	–	51.80	–	–	–	–	–	–	Sonic	–

Notes:

1. TOC = top of PVC casing.
2. TOCs were surveyed relative to an arbitrary benchmarks prior to 2012. TOCs were resurveyed by Bush, Roed & Hitchings, Inc. (BR&H) of Seattle, Washington, in February, October, and December 2012 and March 2013,relative to the North American Vertical Datum of 1988 (NAVD 88). Selected wells were surveyed by BR&H to NAD83/91, Washington State Plane Coordinate System, North Zone (horizontal) and NAVD 88 (vertical) in January 2014.
3. bgs = below ground surface
4. – = no data
5. ROW = right-of-way
6. HSA = hollow-stem auger
7. DP = direct-push probe
8. Casing depth = depth where casing or auger size was reduced, with the larger casing left in place during drilling

Table 2

Hydraulic Conductivity Estimates from Slug Tests
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Well ID	Well Location	Well Screen Elevation (feet NAVD88)	Well Screen Depth (feet bgs)	Lithologic Unit in Screen Zone	Slug Test ID	Transmissivity (ft^2/day)	Hydraulic Conductivity (ft/day)	Average Hydraulic Conductivity (ft/day)	Average Hydraulic Conductivity (cm/sec)
Intermediate A Water-Bearing Zone									
MW107	8th Avenue North ROW	9.2 to 0.2	35 to 45	SM	MW107_Fall1	4.752	0.4752	0.4667	1.88E-05
					MW107_Rise1	4.582	0.4581		
MW108	Alley Between 8th and 9th Avenues North	-6.9 to -16.9	40 to 50	SP above SM	MW108_Fall1	108.5	10.85	12.77	4.51E-03
					MW108_Fall2	103.2	10.32		
					MW108_Rise1	153.9	15.39		
					MW108_Rise2	145.2	14.52		
MW109	Alley Between 8th and 9th Avenues North	0.7 to -9.3	35 to 45	SP	MW109_Fall2	74.04	7.404	7.621	2.69E-03
					MW109_Fall3	79.48	7.948		
					MW109_Rise2	71.12	7.112		
					MW109_Rise3	80.21	8.021		
MW110	Alley Between 8th and 9th Ave N	5.0 to -5.0	35 to 45	SM and ML	MW110_Fall1	11.53	1.153	1.213	4.28E-04
					MW110_Rise1	12.73	1.273		
MW114	SDOT Property South of Roy Street	11.4 to 1.4	35 to 45	SP with an interbed of SP	MW114_Fall1	5.729	0.5729	1.023	3.61E-04
					MW114_Rise1	9.655	0.9655		
					MW114_Rise2	15.29	1.529		
MW115	9th Avenue North ROW	-0.5 to -10.5	35 to 45	MH above SM, SP at base	MW115_Fall1	647.0	64.70	62.63	2.21E-02
					MW115_Fall2	591.4	59.14		
					MW115_Rise1	733.9	73.39		
					MW115_Rise2	533.0	53.30		
MW116	9th Avenue North ROW	-3.0 to -13.0	35 to 45	ML	MW116_Fall1	9.825	0.9825	0.8186	2.89E-04
					MW116_Fall2	8.447	0.8447		
					MW116_Rise1	7.176	0.7176		
					MW116_Rise2	7.295	0.7295		
Intermediate B Water-Bearing Zone									
MW111	Alley Between 8th and 9th Ave N	-33.2 to -43.2	70 to 80	GM	MW111_Fall1	5.0597	0.5060	0.5060	1.78E-04
W-MW-01	8th Avenue North ROW	-24.6 to -34.6	70 to 80	Unknown	WMW01_Fall1	0.1568	0.0157	0.0212	7.48E-06
					WMW01_Rise1	0.2670	0.0267		
W-MW-02	8th Avenue North ROW	-26.3 to -36.3	70 to 80	Unknown	WMW02_Fall2	6.25	0.6251	0.5812	2.05E-04
					WMW02_Rise2	5.37	0.5373		

Table 2

Hydraulic Conductivity Estimates from Slug Tests
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Well ID	Well Location	Well Screen Elevation (feet NAVD88)	Well Screen Depth (feet bgs)	Lithologic Unit in Screen Zone	Slug Test ID	Transmissivity (ft^2/day)	Hydraulic Conductivity (ft/day)	Average Hydraulic Conductivity	
								(ft/day)	(cm/sec)
Deep Water-Bearing Zone									
MW104	8th Avenue North ROW	-76 to -86	119 to 129	SP	MW104_Fall1	459.5	45.95	45.58	1.61E-02
					MW104_Fall2	421.2	42.12		
					MW104_Rise1	479.1	47.91		
					MW104_Rise2	463.6	46.36		
MW105	Roy Street ROW	-85.0 to -95.0	130 to 140	SP	MW105_Fall3	41.2	4.120	4.344	1.53E-03
					MW105_Rise3	45.7	4.567		
MW113	9th Avenue North ROW	-36.8 to -46.8	70 to 80	Unknown	MW113_Fall1	505.2	50.52	54.14	1.91E-02
					MW113_Fall2	220.6	22.06		
					MW113_Rise1	748.5	74.85		
					MW113_Rise2	691.4	69.14		

Notes:

1. Elevations in feet relative to the North American Vertical Datum of 1988 (NAVD 88)
2. Hydraulic conductivity calculated by using the well screen length (10 feet) for aquifer thickness
3. Analysis used Cooper, H.H., J.D. Bredehoeft, and I.S. Papadopulos, 1967, "Response of a finite-diameter well to an instantaneous charge of water, "Water Resources Research", volume 3, number 1, pages 263–269
4. bgs = below ground surface
6. ft^2/day = square feet per day
7. hydraulic conductivity = transmissivity/aquifer thickness
8. cm/sec = centimeters per second
9. GM = silty gravel, MH = plastic silt, ML = silt or sandy silt, SP = sand, and SM = silty sand; unknown where lack of recovery or no boring log available

Table 3

Summary of Groundwater Elevations
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Sample Location	Property	Screen Interval (ft below TOC)	Top of Casing Elevation (feet)	Sample Date	Measured By	Depth to Groundwater[a]	Groundwater Elevation [b]
Shallow Water Bearing Zone							
F5	Property	10 to 40	39.00	03/20/17	PES	4.02	34.98
				03/24/17	PES	NA	–
				04/14/17	PES	NA	–
				04/28/17	PES	NA	–
				05/05/17	PES	NA	–
				05/12/17	PES	NA	–
				05/19/17	PES	6.91	32.09
				06/12/17	PES	9.72	29.28
				10/11/17	PES	16.27	22.73
F9	Property	10 to 40	38.76	03/20/17	PES	4.40	34.36
				03/24/17	PES	5.01	33.75
				04/14/17	PES	4.98	33.78
				04/28/17	PES	6.01	32.75
				05/05/17	PES	6.14	32.62
				05/12/17	PES	6.80	31.96
				05/19/17	PES	7.16	31.60
				06/12/17	PES	10.46	28.30
				10/11/17	PES	17.73	21.03
F13	Property	10 to 40	38.69	03/20/17	PES	4.34	34.35
				03/24/17	PES	4.80	33.89
				04/14/17	PES	4.68	34.01
				04/28/17	PES	5.62	33.07
				05/05/17	PES	5.90	32.79
				05/12/17	PES	6.43	32.26
				05/19/17	PES	6.99	31.70
				06/12/17	PES	9.87	28.82
				10/11/17	PES	18.58	20.11
G12	Property	10 to 40	39.40	03/20/17	PES	5.29	34.11
				03/24/17	PES	5.74	33.66
				04/14/17	PES	5.89	33.51
				04/28/17	PES	7.10	32.30
				05/05/17	PES	7.18	32.22
				05/12/17	PES	7.89	31.51
				05/19/17	PES	8.32	31.08
				06/30/17	PES	13.58	25.82
				10/11/17	PES	18.68	20.72
J5	Property	10 to 40	39.95	03/20/17	PES	2.16	37.79
				03/24/17	PES	2.64	37.31
				04/14/17	PES	2.71	37.24
				04/28/17	PES	3.87	36.08
				05/05/17	PES	3.71	36.24
				05/12/17	PES	4.41	35.54
				05/19/17	PES	4.88	35.07
				06/12/17	PES	8.13	31.82
				10/11/17	PES	15.15	24.80
J15	Property	10 to 40	38.85	03/20/17	PES	4.90	33.95

Table 3

Summary of Groundwater Elevations
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Sample Location	Property	Screen Interval (ft below TOC)	Top of Casing Elevation (feet)	Sample Date	Measured By	Depth to Groundwater[a]	Groundwater Elevation [b]
				03/24/17	PES	5.35	33.50
				04/14/17	PES	5.55	33.30
				04/28/17	PES	6.82	32.03
				05/05/17	PES	6.82	32.03
				05/12/17	PES	6.74	32.11
				05/19/17	PES	6.24	32.61
				06/12/17	PES	11.30	27.55
				10/11/17	PES	18.29	20.56
K8	Property	10 to 40	40.39	03/20/17	PES	2.97	37.42
				03/24/17	PES	3.77	36.62
				04/14/17	PES	3.70	36.69
				04/28/17	PES	5.10	35.29
				05/05/17	PES	5.15	35.24
				05/12/17	PES	5.99	34.40
				05/19/17	PES	6.47	33.92
				06/12/17	PES	10.11	30.28
				10/11/17	PES	17.17	23.22
M15	Property	10 to 40	39.82	03/20/17	PES	5.22	34.60
				03/24/17	PES	5.75	34.07
				04/14/17	PES	5.97	33.85
				04/28/17	PES	7.24	32.58
				05/05/17	PES	7.40	32.42
				05/12/17	PES	7.93	31.89
				05/19/17	PES	8.47	31.35
				06/12/17	PES	11.53	28.29
				10/11/17	PES	18.44	21.38
MW-6	800 Aloha Street Parcel	7 to 22	58.76	10/26/93	Retec	16.79	41.97
				01/25/94	Retec	17.43	41.33
				04/25/94	Retec	15.75	43.01
				09/15/94	Retec	16.61	42.15
			38.20	02/07/12	Windward	14.91	23.29
MW-7	800 Aloha Street Street Parcel	9 to 18.5	55.82	10/26/93	Retec	14.10	41.72
				01/25/94	Retec	15.30	40.52
				04/25/94	Retec	13.40	42.42
				09/15/94	Retec	14.29	41.53
			35.09	02/07/12	Windward	12.56	22.53
MW-8	800 Aloha Street Street Parcel	4.5 to 19	53.72	10/26/93	Retec	12.35	41.37
				01/25/94	Retec	13.51	40.21
				04/25/94	Retec	11.80	41.92
				09/15/94	Retec	12.49	41.23
			33.19	02/07/12	Windward	11.64	21.55
				03/20/17	PES	10.42	22.77
				03/24/17	PES	10.54	22.65
				06/12/17	PES	18.95	14.24
MW-9	8th Avenue North ROW	7 to 22	61.35	01/25/94	Retec	15.51	45.84
				04/25/94	Retec	17.09	44.26
				09/15/94	Retec	15.50	45.85
			40.81	06/20/02	Urban	18.30	22.51
				06/02/11	SES	14.89	25.92
				02/07/12	Windward	16.39	24.42
				09/04/12	SES	16.84	23.97

Table 3

Summary of Groundwater Elevations
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Sample Location	Property	Screen Interval (ft below TOC)	Top of Casing Elevation (feet)	Sample Date	Measured By	Depth to Groundwater[a]	Groundwater Elevation [b]
				12/21/12	SES	15.94	24.87
				01/06/14	SES	13.99	26.82
				03/20/17	PES	13.33	27.48
				03/24/17	PES	13.32	27.49
				04/14/17	PES	13.59	27.22
				04/28/17	PES	15.60	25.21
				05/05/17	PES	15.68	25.13
				05/12/17	PES	16.54	24.27
				05/19/17	PES	16.78	24.03
				06/12/17	PES	19.91	20.90
				10/11/17	PES	21.80	19.01
MW-10	800 Aloha Street Parcel	7 to 22	58.53	01/25/94	Retec	15.09	43.44
				04/25/94	Retec	16.64	41.89
				09/15/94	Retec	16.64	41.89
				06/20/02	Urban	16.55	41.98
			37.95	02/07/12	Windward	15.85	22.10
MW121	8th Avenue North ROW	15 to 25	41.72	01/06/14	SES	18.69	23.03
				03/20/17	PES	12.25	29.47
				03/24/17	PES	11.09	30.63
				04/14/17	PES	11.24	30.48
				04/28/17	PES	11.65	30.07
				05/05/17	PES	12.36	29.36
				05/12/17	PES	11.75	29.97
				05/19/17	PES	11.61	30.11
				06/12/17	PES	14.35	27.37
				10/11/17	PES	21.67	20.05
MW125	Valley Street ROW	15 to 30	43.55	01/06/14	SES	24.18	19.37
				03/20/17	PES	14.40	29.15
				03/24/17	PES	14.55	29.00
				06/28/17	PES	22.20	21.35
				10/11/17	PES	26.39	17.16
MW214	Valley Street ROW	TD = 15	27.32	03/20/17	PES	6.84	20.48
				03/24/17	PES	7.67	19.65
				06/12/17	PES	16.45	10.87
				10/11/17	PES	dry	--
N7	Property	10 to 40	52.44	03/20/17	PES	NA	–
				03/24/17	PES	NA	–
				04/14/17	PES	18.70	33.74
				04/28/17	PES	16.98	35.46
				05/05/17	PES	17.10	35.34
				05/12/17	PES	17.51	34.93
				05/19/17	PES	18.02	34.42
				06/12/17	PES	20.93	31.51
				10/11/17	PES	27.13	25.31
R-MW2	Property	5 to 15	30.86	10/24/92	Roux	10.04	20.82
				01/29/09	DOF	12.97	17.89
			40.53	02/19/10	SES	12.93	27.60
				06/02/11	SES	10.52	30.01
			41.74	02/07/12	Windward	11.61	30.13
				09/04/12	SES	12.64	29.10
				12/21/12	SES	10.84	30.90

Table 3

Summary of Groundwater Elevations
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Sample Location	Property	Screen Interval (ft below TOC)	Top of Casing Elevation (feet)	Sample Date	Measured By	Depth to Groundwater[a]	Groundwater Elevation [b]
				03/29/13	SES	9.85	31.89
				01/06/14	SES	Dry	
				03/20/17	PES	6.20	35.54
				03/24/17	PES	6.55	35.19
				04/14/17	PES	6.56	35.18
				04/28/17	PES	7.35	34.39
				05/05/17	PES	7.87	33.87
				05/12/17	PES	8.12	33.62
				05/19/17	PES	8.55	33.19
				06/12/17	PES	11.26	30.48
				10/11/17	PES	dry	--
R-MW3	Property	7 to 17	32.04	10/24/92	Roux	11.29	20.75
				01/29/09	DOF	14.22	17.82
			41.74	02/19/10	SES	14.21	27.53
				06/02/11	SES	11.77	29.97
				02/07/12	Windward	12.90	28.84
				09/04/12	SES	14.00	27.74
				12/21/12	SES	12.09	29.65
				03/29/13	SES	11.17	30.57
				01/06/14	SES	16.35	25.39
				03/20/17	PES	7.34	34.40
				03/24/17	PES	7.66	34.08
				04/14/17	PES	7.68	34.06
				04/28/17	PES	8.46	33.28
				05/05/17	PES	8.78	32.96
				05/12/17	PES	9.20	32.54
				05/19/17	PES	9.48	32.26
				06/12/17	PES	12.48	29.26
				10/11/17	PES	16.45	25.29
R-MW5	Dexter Avenue North ROW	15 to 30	47.20	10/28/92	Roux	22.89	24.31
				01/29/09	DOF	22.80	24.40
			57.01	02/19/10	SES	21.93	35.08
				06/02/11	SES	20.48	36.53
				02/07/12	Windward	21.61	35.40
			57.03	09/05/12	SES	23.72	33.31
				12/21/12	SES	22.55	34.48
				03/29/13	SES	21.72	35.31
				12/18/13	SES	28.59	28.44
				03/20/17	PES	17.92	39.11
				03/24/17	PES	18.29	38.74
				06/12/17	PES	21.58	35.45
				10/11/17	PES	26.31	30.72
R-MW6	Property	12 to 22	35.39	10/28/92	Roux	17.85	17.54
				01/29/09	DOF	19.15	16.24
			45.18	02/19/10	SES	18.25	26.93
				05/03/10	SES	18.25	26.93
				06/02/11	SES	16.22	28.96
				02/07/12	Windward	14.11	31.07
			45.28	09/05/12	SES	19.38	25.90
				12/21/12	SES	15.27	30.01
				03/29/13	SES	17.18	28.10

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Summary of Groundwater Elevations
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Sample Location	Property	Screen Interval (ft below TOC)	Top of Casing Elevation (feet)	Sample Date	Measured By	Depth to Groundwater[a]	Groundwater Elevation [b]
				01/06/14	SES	22.58	22.70
				03/20/17	PES	11.49	33.79
				03/24/17	PES	11.82	33.46
				04/14/17	PES	12.37	32.91
				04/28/17	PES	13.41	31.87
				05/05/17	PES	13.60	31.68
				05/12/17	PES	13.99	31.29
				05/19/17	PES	14.21	31.07
				06/12/17	PES	17.08	28.20
				10/11/17	PES	dry	--
SCL-MW101	Alley East of 800 Aloha Street	--	30.46	02/07/12	Windward	7.48	22.98
				01/06/14	SES	13.09	17.37
				03/20/17	PES	7.00	23.46
				03/24/17	PES	7.08	23.38
				06/14/17	PES	11.50	18.96
				10/11/17	PES	dry	--
SCL-MW105	Alley East of 800 Aloha Street	--	31.26	02/07/12	Windward	10.46	20.80
				01/06/14	SES	13.88	17.38
				03/20/17	PES	11.40	19.86
				03/24/17	PES	10.04	21.22
				06/12/17	PES	20.45	10.81
				10/11/17	PES	23.47	7.79
SCS-2	800 Aloha Street Parcel	Unknown	39.16	02/07/12	Windward	16.56	22.60
				03/20/17	PES	15.65	23.51
				03/24/17	PES	–	–
				06/12/17	PES	20.18	18.98
				06/12/17	PES	20.18	18.98
SMW-3	Valley Street ROW	Unknown	26.57	03/20/17	PES	–	–
				03/24/17	PES	17.75	8.82
				06/12/17	PES	10.95	15.62
				10/11/17	PES	12.71	13.86
Intermediate "A" Water Bearing Zone							
BB-8	Roy Street ROW	30 to 40	--	06/20/97	B&V	17.49	–
				06/24/97	B&V	19.00	–
				10/06/97	B&V	20.40	–
				01/25/98	B&V	20.68	–
				02/28/98	B&V	20.20	–
				03/30/98	B&V	20.14	–
				04/22/98	B&V	19.99	–
				06/04/98	B&V	20.51	–
				07/27/98	B&V	24.02	–
				01/29/09	DOF	20.08	–
			44.25	02/19/10	SES	18.66	25.59
				05/03/10	SES	19.90	24.35
				06/02/11	SES	17.64	26.61
				02/07/12	Windward	15.39	28.86
			44.26	09/05/12	SES	20.01	24.25
				12/21/12	SES	16.23	28.03
				03/29/13	SES	18.70	25.56
			43.69	01/06/14	SES	24.42	19.27
				06/16/15	SES	18.90	24.79

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Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Sample Location	Property	Screen Interval (ft below TOC)	Top of Casing Elevation (feet)	Sample Date	Measured By	Depth to Groundwater[a]	Groundwater Elevation [b]
				03/20/17	PES	13.21	30.48
				03/24/17	PES	13.26	30.43
				06/12/17	PES	18.80	24.89
				10/11/17	PES	23.87	19.82
GEI-1	Block 37	26.8 to 36.8	27.95	03/24/17	PES	8.63	19.32
				06/12/17	PES	21.91	6.04
MW107	8th Avenue North ROW	35 to 45	43.82	12/21/12	SES	17.28	26.54
				03/29/13	SES	18.28	25.54
				01/06/14	SES	26.74	17.08
				06/16/15	SES	17.78	26.04
				10/19/15	SES	19.88	23.94
				02/01/16	SES	12.85	30.97
				03/20/17	PES	11.80	32.02
				03/24/17	PES	12.20	31.62
				04/14/17	PES	12.31	31.51
				04/28/17	PES	14.12	29.70
				05/05/17	PES	14.34	29.48
				05/12/17	PES	14.85	28.97
				05/19/17	PES	15.03	28.79
				06/12/17	PES	18.62	25.20
				10/11/17	PES	25.10	18.72
MW108	Alley Between 8th and 9th Avenue	40 to 50	32.78	12/21/12	SES	13.43	19.35
				03/29/13	SES	15.76	17.02
				01/06/14	SES	21.44	11.34
				06/16/15	SES	15.53	17.25
				10/19/15	SES	17.16	15.62
				02/01/16	SES	16.31	16.47
				03/20/17	PES	12.53	20.25
				03/24/17	PES	12.61	20.17
				06/12/17	PES	28.13	4.65
				10/11/17	PES	29.02	3.76
MW109	Alley Between 8th and 9th Avenue	35 to 45	34.97	12/21/12	SES	15.80	19.17
				03/29/13	SES	18.39	16.58
				01/06/14	SES	24.74	10.23
				06/16/15	SES	18.06	16.91
				10/19/15	SES	19.80	15.17
				02/01/16	SES	19.04	15.93
				03/20/17	PES	15.00	19.97
				03/24/17	PES	15.00	19.97
				06/12/17	PES	31.53	3.44
				10/11/17	PES	32.17	2.80
MW110	Alley Between 8th and 9th Avenue	35 to 45	39.67	12/21/12	SES	20.01	19.66
				03/29/13	SES	22.95	16.72
				01/06/14	SES	30.48	9.19
				04/22/15	SES	22.59	17.08
				06/16/15	SES	22.72	16.95
				10/19/15	SES	24.57	15.10
				02/01/16	SES	23.30	16.37
				03/20/17	PES	19.10	20.57
				03/24/17	PES	18.95	20.72
				06/12/17	PES	34.70	4.97

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Summary of Groundwater Elevations
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Sample Location	Property	Screen Interval (ft below TOC)	Top of Casing Elevation (feet)	Sample Date	Measured By	Depth to Groundwater[a]	Groundwater Elevation [b]
				10/11/17	PES	36.46	3.21
MW115	9th Avenue North ROW	35 to 45	34.14	12/21/12	SES	15.26	18.88
				03/29/13	SES	18.34	15.80
				01/06/14	SES	26.08	8.06
				04/22/15	SES	16.49	17.65
				06/16/15	SES	17.72	16.42
				10/19/15	SES	19.61	14.53
				02/01/16	SES	19.14	15.00
			34.10	03/20/17	PES	14.72	19.38
				03/24/17	PES	14.70	19.40
				06/12/17	PES	32.50	1.60
				10/11/17	PES	32.58	1.52
MW116	9th Avenue North ROW	35 to 45	31.36	12/21/12	SES	12.24	19.12
				03/29/13	SES	14.65	16.71
				01/06/14	SES	20.30	11.06
				06/16/15	SES	14.54	16.82
				10/19/15	SES	16.07	15.29
				02/01/16	SES	15.49	15.87
			31.34	03/20/17	PES	11.95	19.39
				03/24/17	PES	11.99	19.35
				04/14/17	PES	11.99	19.35
				04/28/17	PES	20.60	10.74
				05/05/17	PES	21.35	9.99
				05/12/17	PES	22.16	9.18
				05/19/17	PES	22.46	8.88
				06/12/17	PES	27.33	4.01
				10/11/17	PES	28.26	3.08
MW119	9th Avenue North ROW	35 to 45	37.35	03/25/13	SES	22.21	15.14
				03/29/13	SES	22.52	14.83
				01/06/14	SES	32.12	5.23
				04/22/15	SES	21.12	16.23
				06/16/15	SES	21.12	16.23
				10/19/15	SES	23.50	13.85
				02/01/16	SES	22.99	14.36
			37.42	03/20/17	PES	17.40	19.95
				03/24/17	PES	17.45	19.90
				04/14/17	PES	17.91	19.44
				04/28/17	PES	27.14	10.21
				05/05/17	PES	28.25	9.10
				05/12/17	PES	29.25	8.10
				05/19/17	PES	29.68	7.67
				06/12/17	PES	35.73	1.62
				10/11/17	PES	39.94	2.59
MW120	8th Avenue North ROW	40 to 50	40.00	01/06/14	SES	22.80	17.20
				06/16/15	SES	18.10	21.90
				10/19/15	SES	19.91	20.09
				02/01/16	SES	16.98	23.02
				03/20/17	PES	16.50	23.50
				03/24/17	PES	15.24	24.76
				06/12/17	PES	23.65	16.35
				10/11/17	PES	26.99	13.01

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Summary of Groundwater Elevations
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Sample Location	Property	Screen Interval (ft below TOC)	Top of Casing Elevation (feet)	Sample Date	Measured By	Depth to Groundwater[a]	Groundwater Elevation [b]
MW131	Property	45 to 55	39.39	03/20/17	PES	9.73	29.66
				03/24/17	PES	10.11	29.28
				04/14/17	PES	10.31	29.08
				04/28/17	PES	12.10	27.29
				05/05/17	PES	13.10	26.29
				05/12/17	PES	12.69	26.7
				05/19/17	PES	12.84	26.55
				06/12/17	PES	15.77	23.62
				10/11/17	PES	20.75	18.64
Intermediate "B" Water Bearing Zone							
MW111	Alley Between 8th and 9th Avenue	70 to 80	36.48	12/21/12	SES	17.45	19.03
				03/29/13	SES	20.17	16.31
				01/06/14	SES	26.54	9.94
				04/22/15	SES	20.05	16.43
				06/16/15	SES	19.90	16.58
				10/19/15	SES	21.67	14.81
				02/01/16	SES	21.25	15.23
				03/20/17	PES	18.24	18.24
				03/24/17	PES	16.82	19.66
				06/12/17	PES	25.23	11.25
				10/11/17	PES	33.74	2.74
MW112	Dexter Avenue North ROW	75 to 85	57.49	12/21/12	SES	42.45	15.04
				03/29/13	SES	38.76	18.73
				01/06/14	SES	40.79	16.70
				06/16/15	SES	39.40	18.09
			57.45	03/20/17	PES	36.65	20.80
				03/24/17	PES	36.46	20.99
				06/12/17	PES	38.72	18.73
				10/11/17	PES	40.46	16.99
MW126	Alley Between 8th and 9th Avenue	85 to 95	30.94	01/06/14	SES	18.08	12.86
				03/20/17	PES	12.75	18.19
				03/24/17	PES	13.35	17.59
				06/12/17	PES	24.98	5.96
				10/11/17	PES	24.24	6.70
MW130	Property	70 to 80	39.55	03/20/17	PES	21.21	18.34
				03/24/17	PES	22.54	17.01
				04/14/17	PES	23.35	16.20
				04/28/17	PES	23.89	15.66
				05/05/17	PES	23.30	16.25
				05/12/17	PES	23.65	15.90
				05/19/17	PES	23.81	15.74
				06/12/17	PES	24.28	15.27
				10/11/17	PES	26.39	13.16
MW-132	Property	70 to 80	40.07	10/11/17	PES	28.11	11.96
MW-134	Property	80 to 90	41.05	10/11/17	PES	29.93	11.12
MW-135	Property	70 to 80	38.96	10/11/17	PES	23.48	15.48
MW-136	Property	84.6 to 94.6	51.45	10/11/17	PES	39.13	12.32
MW-139	Property	70 to 80	39.44	10/11/17	PES	25.73	13.71

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Summary of Groundwater Elevations
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

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W-MW-01	8th Avenue North ROW	70 to 80	44.88	02/07/12	Windward	21.22	23.66
				09/06/12	SES	23.26	21.62
				12/21/12	SES	21.82	23.06
				03/29/13	SES	23.63	21.25
				01/06/14	SES	28.96	15.92
				06/16/15	SES	24.60	20.28
				10/19/15	SES	26.86	18.02
				02/01/16	SES	25.26	19.62
				03/20/17	PES	21.02	23.86
				03/24/17	PES	21.85	23.03
				04/14/17	PES	22.11	22.77
				04/28/17	PES	25.09	19.79
				05/05/17	PES	25.33	19.55
				05/12/17	PES	25.88	19.00
				05/19/17	PES	26.09	18.79
				06/12/17	PES	29.15	15.73
				10/11/17	PES	31.50	13.38
W-MW-02	8th Avenue North ROW	70 to 80	43.46	02/07/12	Windward	17.51	25.95
				09/05/12	SES	19.95	23.51
				12/21/12	SES	17.82	25.64
				03/29/13	SES	19.14	24.32
				01/06/14	SES	24.40	19.06
				06/16/15	SES	18.79	24.67
				10/19/15	SES	20.94	22.52
				02/01/16	SES	15.85	27.61
				03/20/17	PES	15.24	28.22
				03/24/17	PES	14.97	28.49
				04/14/17	PES	15.34	28.12
				04/28/17	PES	18.18	25.28
				05/05/17	PES	18.53	24.93
				05/12/17	PES	19.10	24.36
				05/19/17	PES	19.28	24.18
				06/12/17	PES	22.83	20.63
				10/11/17	PES	27.86	15.60
Deep Water Bearing Zone							
FMW-131	Block 37	63 to 73	27.85	03/24/17	PES	9.56	18.29
				06/12/17	PES	32.94	5.09
FMW-3D	Block 31	59 to 69	27.88	03/24/17	PES	9.58	18.30
				06/12/17	PES	30.87	2.99
GEI-2	Block 37	50.5 to 60.5	29.38	03/24/17	PES	10.96	18.42
				06/12/17	PES	37.60	8.22
MW102	Property	115 to 125	49.19	09/05/12	SES	31.11	18.08
				12/21/12	SES	30.78	18.41
				03/29/13	SES	31.65	17.54
				01/06/14	SES	33.80	15.39
				10/19/15	SES	37.06	12.13
				02/01/16	SES	38.22	10.97
				03/20/17	PES	32.25	16.94
				03/24/17	PES	33.50	15.69
				04/14/17	PES	34.38	14.81
				04/28/17	PES	35.18	14.01

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Sample Location	Property	Screen Interval (ft below TOC)	Top of Casing Elevation (feet)	Sample Date	Measured By	Depth to Groundwater[a]	Groundwater Elevation [b]
				05/05/17	PES	34.77	14.42
				05/12/17	PES	35.00	14.19
				05/19/17	PES	35.21	13.98
				06/12/17	PES	36.87	12.32
				10/11/17	PES	37.59	11.60
MW103	Alley Between 8th and 9th Avenue	103.5 to 113.5	35.92	09/05/12	SES	18.03	17.89
				12/21/12	SES	17.38	18.54
				03/29/13	SES	19.70	16.22
				01/06/14	SES	26.45	9.47
				06/16/15	SES	20.03	15.89
				10/19/15	SES	22.31	13.61
				02/01/16	SES	22.40	13.52
				03/20/17	PES	17.10	18.82
				03/24/17	PES	17.36	18.56
				04/14/17	PES	17.68	18.24
				04/28/17	PES	25.82	10.10
				05/05/17	PES	26.17	9.75
				05/12/17	PES	26.71	9.21
				05/19/17	PES	27.99	7.93
				06/12/17	PES	30.85	5.07
				10/11/17	PES	30.31	5.61
MW104	8th Avenue North ROW	119 to 129	42.68	09/06/12	SES	24.72	17.96
				12/21/12	SES	24.31	18.37
				03/29/13	SES	25.78	16.90
				01/06/14	SES	28.87	13.81
				10/19/15	SES	30.04	12.64
				02/01/16	SES	30.90	11.78
				03/20/17	PES	25.00	17.68
				04/14/17	PES	26.58	16.10
				04/28/17	PES	30.11	12.57
				05/05/17	PES	30.71	11.97
				05/12/17	PES	30.43	12.25
				05/19/17	PES	30.60	12.08
				06/30/17	PES	33.10	9.58
				10/11/17	PES	32.69	9.99
MW105	Roy Street ROW	130 to 140	44.69	09/05/12	SES	26.85	17.84
				12/21/12	SES	26.26	18.43
				03/29/13	SES	28.47	16.22
			44.17	01/06/14	SES	32.48	11.69
				04/02/15	SES	28.56	15.61
				06/16/15	SES	28.59	15.58
				10/19/15	SES	31.15	13.02
				02/01/16	SES	31.58	12.59
				03/20/17	PES	25.86	18.31
				03/24/17	PES	26.22	17.95
				04/14/17	PES	26.71	17.46
				04/28/17	PES	34.10	10.07
				05/05/17	PES	34.40	9.77
				05/12/17	PES	34.91	9.26
				05/19/17	PES	35.39	8.78
				06/12/17	PES	38.85	5.32

Table 3

Summary of Groundwater Elevations
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Sample Location	Property	Screen Interval (ft below TOC)	Top of Casing Elevation (feet)	Sample Date	Measured By	Depth to Groundwater[a]	Groundwater Elevation [b]
				10/11/17	PES	38.22	5.95
MW106	SDOT Property South of Roy Street	130 to 140	51.99	09/05/12	SES	34.09	17.90
				03/29/13	SES	34.92	17.07
				01/06/14	SES	37.15	14.84
				10/19/15	SES	40.11	11.88
				02/01/16	SES	41.02	10.97
				04/14/17	PES	36.78	15.21
				06/30/17	PES	40.60	11.39
MW113	9th Avenue North ROW	70 to 80	32.94	12/21/12	SES	14.15	18.79
				03/29/13	SES	16.95	15.99
				01/06/14	SES	23.35	9.59
				06/16/15	SES	16.46	16.48
				10/19/15	SES	18.24	14.70
				02/01/16	SES	17.87	15.07
			32.90	03/20/17	PES	13.60	19.30
				03/24/17	PES	13.65	19.25
				04/14/17	PES	13.80	19.10
				04/28/17	PES	24.10	8.80
				05/05/17	PES	24.94	7.96
				05/12/17	PES	25.68	7.22
				05/19/17	PES	26.01	6.89
				06/12/17	PES	31.15	1.75
				10/11/17	PES	31.00	1.90
MW122	Alley Between 8th and 9th Avenue	105 to 119	30.03	01/06/14	SES	17.61	12.42
				10/19/15	SES	15.59	14.44
				02/01/16	SES	15.75	14.28
				03/20/17	PES	11.62	18.41
				03/24/17	PES	11.57	18.46
				04/14/17	PES	11.76	18.27
				04/28/17	PES	19.98	10.05
				05/05/17	PES	20.43	9.60
				05/12/17	PES	20.94	9.09
				05/19/17	PES	21.30	8.73
				06/12/17	PES	25.23	4.80
				10/11/17	PES	24.93	5.10
MW123	Westlake Avenue North ROW	70 to 80	27.51	01/06/14	SES	15.69	11.82
				03/20/17	PES	8.50	19.01
				03/24/17	PES	8.60	18.91
				06/12/17	PES	24.68	2.83
				10/11/17	PES	24.43	3.08
MW124	Valley Street ROW	110 to 120	56.24	01/06/14	SES	40.50	15.74
				03/20/17	PES	39.33	16.91
				03/24/17	PES	40.59	15.65
				04/14/17	PES	41.54	14.70
				04/28/17	PES	41.81	14.43
				05/05/17	PES	41.28	14.96
				05/12/17	PES	41.52	14.72
				05/19/17	PES	41.60	14.64
				06/12/17	PES	42.95	13.29

Table 3

Summary of Groundwater Elevations
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Sample Location	Property	Screen Interval (ft below TOC)	Top of Casing Elevation (feet)	Sample Date	Measured By	Depth to Groundwater[a]	Groundwater Elevation [b]
				10/11/17	PES	43.95	12.29
MW128	Westlake Avenue North	60 to 70	No TOC	04/22/15	SES	12.91	–
				10/19/15	SES	14.15	–
				02/01/16	SES	14.23	–
			28.59	03/20/17	PES	10.00	18.59
				03/24/17	PES	10.04	18.55
				04/14/17	PES	10.13	18.46
				04/28/17	PES	25.30	3.29
				05/05/17	PES	26.35	2.24
				05/12/17	PES	27.06	1.53
				05/19/17	PES	27.44	1.15
				06/12/17	PES	33.41	-4.82
				10/11/17	PES	30.51	-1.92
FMW-129	SDOT Property South of Roy Street	84 to 89	No TOC	10/19/15	SES	25.20	–
				02/01/16	SES	25.25	–
			38.31	04/14/17	PES	19.78	18.53
				04/28/17	PES	25.30	13.01
				05/05/17	PES	29.55	8.76
				05/12/17	PES	30.25	8.06
				05/19/17	PES	30.74	7.57
				06/12/17	PES	34.90	3.41
MW-133	Property	129 to 139	39.77	10/11/17	PES	27.57	12.20
MW-137	Property	105 to 115	51.46	10/11/17	PES	39.66	11.80
MW-138	Dexter Ave N	105 to 115	57.06	10/11/17	PES	44.78	12.28
MW-140	Roy Street	129.5 to 139.5	50.20	10/11/17	PES	39.55	10.65
MW-141	Property	95 to 105	39.32	10/11/17	PES	29.40	9.92

NOTES:

TOCs were surveyed relative to an established datum of 521.41 feet prior to 2012. TOCs were resurveyed by Axis Survey and Mapping of Kirkland, WA on March 16th, 2012, relative to an arbitrary benchmark of 499.89 feet above mean sea level, and by Bush, Roed & Hitchings, Inc. of Seattle, WA in February, October, and December 2012 and March 2013 using the North American Vertical Datum 1988.

[a] As measured in feet below a fixed spot on the well casing rim.

[b] Calculated by subtracting the depth to groundwater from the casing elevation. Groundwater elevation in angled monitoring well calculated subtracting the product of the measured depth to groundwater in the angled well by the sine of its angle.

**Monitoring well was installed at a 25 degree angle from the vertical point of penetration. Depth to groundwater measurements and sample interval account for angled length of well, not vertical depth. Groundwater elevations corrected to account for angle.

-- = unknown
ROW = right-of-way
TOC = top of casing
B&V = Black & Veach
DOF = Dalton, Olmsted & Fuglevand, Inc.
EPJ = E.P. Johnson Construction, Inc.
TD = Total Depth

PES = PES Environmental, Inc.
GeoEngineers = GeoEngineers, Inc.
Retec = Remediation Technologies, Inc.
Roux = Roux Associates
SES = SoundEarth Strategies, Inc.
Urban = Urban Redevelopment
Urban = Urban Redevelopment

Table 4

Summary of Property Data Gaps
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Data Gap Number	Data Gap	Location	Primary Media	Constituents	Pre-Interim Action Investigations	
					Exploration Locations	Rationale
1	Delineation of the lateral and vertical extent of PCE in shallow soil and exceeding the state dangerous waste criteria	Near B-9, G-MW1, Sump No. 4, and Sump No. 5	Soil	CVOCs	B-206, B-207, B-210, B-211, B-213, B-213, B-216, B-218, B-220, B-221, B-222, B-223, MW-132, MW-133, and MW-137	Locations to supplement existing pre-ERH/SVE locations, confirm post-ERH/SVE conditions, and delineate extent of contamination found during the pre-interim action investigation
2	Delineation of the vertical extent of soil contamination at the Property	E.g.: B-8, B-9, DB-3, DB-7, DB-8, DB-10, DB-12	Soil	CVOCs	B-205 through B-219, MW-132 through MW-138, and MW-140	Sample soil within and below the depth treated by ERH/SVE and below previously identified CVOCs
3	Delineation of the vertical extent of CVOCs beneath the Property sumps	Multiple sumps, including Sump 4	Groundwater	CVOCs	B-206 through B-209, B-211, MW-132, MW-133, and MW-134	Soil and groundwater sampled during drilling to document the vertical CVOC profile, at least one location drilled to the base of the deep aquifer with additional deep aquifer wells along the south Property boundary
4	Definition of the lateral and vertical extent of the Site CVOC groundwater plume, with CVOC concentrations in the farthest wells below the cleanup levels	Site wide	Groundwater	CVOCs	MW-133, MW-138, MW-139, and MW-141	Sampling in the shallow, intermediate, deep, and base of deep water-bearing zone wells to fill in gaps in the monitoring network; data to be used in conjunction with current results from the existing well network
5	Documention of the current conditions in the area treated by ERH/SVE	Property	Soil Groundwater	CVOCs, GRO	B-206 through B-211, B-216 though B-218, B-220 through B-223, MW-132 through MW-137	Sample soil within and below the depth treated by ERH/SVE and below previously identified CVOCs

Notes:
1. The proposed exploration locations are shown on Figures 29 and 30
2. GRO = gasoline range organics
3. CVOCs = chlorinated volatile organic compounds
4. MNA = monitored natural attenuation parameters
5. Physical parameters include grain size, vertical hydraulic conductivity, and dry bulk density, as appropriate
6. Property = Former American Linen Supply property
7. Site wide = extent of media impacted by contaminants from the property

Table 5

Summary of 2017 Monitoring and Investigation
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Monitoring Well	Area Location	Groundwater Monitoring							New Boring and Monitoring Well Installations										
		Water Level Monitoring			Monitoring Well Sampling				Soil Samples								Reconnaissance Groundwater Samples		
			Extraction Monitoring		Groundwater Laboratory Analyses				Chemical Analysis			Physical Analysis						Laboratory Analyses	
		Periodic Events	Continuous Monitoring	Periodic Events	GRO	VOCs	MNA	Field	Sample Depth (ft bgs)	GRO	VOCs	Sample Depth (ft bgs)	Grain Size	Bulk Density	f_{oc}	Vertical K	Sample Depth (ft bgs)	GRO	VOCs
Shallow Water Bearing Zone Wells																			
MW-8	800 Roy St Parcel	X	–	–	–	X	–	X	–	–	–	–	–	–	–	–	–	–	–
MW-9	8th Ave N ROW	X	–	X	X	X	–	X	–	–	–	–	–	–	–	–	–	–	–
MW121	8th Ave N ROW	X	–	X	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–
MW125	Valley Street ROW	X	–	X	X	X	–	X	–	–	–	–	–	–	–	–	–	–	–
MW214	Valley Street ROW	X	–	–	–	X	–	X	–	–	–	–	–	–	–	–	–	–	–
SCS-2	Seattle City Light Parking Lot	X	–	–	X	X	–	X	–	–	–	–	–	–	–	–	–	–	–
SMW-3	Valley Street ROW	X	–	–	–	X	–	X	–	–	–	–	–	–	–	–	–	–	–
SCL-MW101	Alley Between 8th & 9th Ave	X	–	–	–	X	–	X	–	–	–	–	–	–	–	–	–	–	–
SCL-MW105	Alley Between 8th & 9th Ave	X	–	–	–	X	–	X	–	–	–	–	–	–	–	–	–	–	–
R-MW2	Property	X	–	X	–	X	–	X	–	–	–	–	–	–	–	–	–	–	–
R-MW3	Property	X	X	X	X	X	–	X	–	–	–	–	–	–	–	–	–	–	–
R-MW5	Dexter Ave N ROW	X	–	–	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–
R-MW6	Property	X	–	X	X	X	X	X	–	–	–	–	–	–	–	–	–	–	–
F5	Property	X	–	X	X	X	–	X	–	–	–	–	–	–	–	–	–	–	–
F9	Property	X	–	X	X	X	–	X	–	–	–	–	–	–	–	–	–	–	–
F13	Property	X	–	X	X	X	X	X	–	–	–	–	–	–	–	–	–	–	–
G12	Property	X	–	X	–	X	–	X	–	–	–	–	–	–	–	–	–	–	–
J5	Property	X	–	X	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–
J15	Property	X	–	X	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–
K8	Property	X	–	X	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–
M15	Property	X	–	X	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–
N7	Property	X	–	X	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–
Intermediate A Water-Bearing Zone Wells																			
GEI-1	Block 37	X	–	–	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–
MW107	8th Ave N ROW	X	–	X	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–
MW108	Alley Between 8th & 9th Ave	X	–	–	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–
MW109	Alley Between 8th & 9th Ave	X	–	–	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–
MW110	Alley Between 8th & 9th Ave	X	–	–	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–
MW115	9th Ave N ROW	X	–	–	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–
MW116	9th Ave N ROW	X	X	X	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–
MW119	South Adjoining Property	X	X	X	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–
MW120	8th Ave N ROW	X	–	–	–	X	–	X	–	–	–	–	–	–	–	–	–	–	–
MW131	South part of the Property	X	–	X	X	X	X	X	–	–	–	–	–	–	–	–	–	–	–
BB-8	Roy Street ROW	X	–	–	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–
Intermediate B Water-Bearing Zone Wells																			
W-MW-01	8th Ave N ROW	X	–	X	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–
W-MW-02	8th Ave N ROW	X	–	X	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–
MW111	Alley Between 8th & 9th Ave	X	–	–	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–
MW112	Dexter Ave N ROW	X	–	–	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–
MW126	Alley Between 8th & 9th Ave	X	–	–	–	X	–	X	–	–	–	–	–	–	–	–	–	–	–

Table 5

Summary of 2017 Monitoring and Investigation
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

		Groundwater Monitoring							New Boring and Monitoring Well Installations										
		Water Level Monitoring			Monitoring Well Sampling				Soil Samples								Reconnaissance Groundwater Samples		
			Extraction Monitoring		Groundwater Laboratory Analyses				Chemical Analysis			Physical Analysis						Laboratory Analyses	
Monitoring Well	Area Location	Periodic Events	Continuous Monitoring	Periodic Events	GRO	VOCs	MNA	Field	Sample Depth (ft bgs)	GRO	VOCs	Sample Depth (ft bgs)	Grain Size	Bulk Density	f_{oc}	Vertical K	Sample Depth (ft bgs)	GRO	VOCs
MW130	West part of the Property	X	X	X	X	X	X	X	–	–	–	–	–	–	–	–	–	–	–
MW-132	Center of the Property	–	–	–	X	X	–	X	20, 35, 50, 55, 60, 70, 83	X	X	53, 82	X	–	X	–	–	–	–
MW-134	Northeast part of the Property	–	–	–	X	X	–	X	20, 43, 50, 60, 70, 80, 90	X	X	–	–	–	–	–	–	–	–
MW-135	North-central part of the Property	–	–	–	X	X	–	X	14, 20, 30, 36, 40, 45, 55, 65, 80	X	X	60	X	X	–	X	–	–	–
MW-136	Southwest corner of the Property	–	–	–	X	X	–	X	35, 44, 50, 65, 75, 85, 95	–	X	77	X	–	–	–	–	–	–
MW-139	South-central part of the Property	–	–	–	X	X	–	X	20, 31, 41, 51, 60, 70, 80	–	X	80	X	–	–	–	–	–	–
Deep Water-Bearing Zone Wells																			
FMW-3D	Block 31	X	–	–	–	X	–	X	–	–	–	–	–	–	–	–	–	–	–
FMW-129	Roy Street ROW	X	X	–	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–
FMW-131	Block 37	X	–	X	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–
GEI-2	Block 37	X	–	–	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–
MW102	Valley Street ROW	X	X	X	–	X	–	X	–	–	–	–	–	–	–	–	–	–	–
MW103	Alley Between 8th & 9th Ave	X	–	X	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–
MW104	8th Ave N ROW	X	–	X	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–
MW105	Roy Street ROW	X	X	X	–	X	–	X	–	–	–	–	–	–	–	–	–	–	–
MW106	West of Roy St	X	–	–	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–
MW113	9th Ave N ROW	X	X	X	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–
MW122	Alley East of 800 Roy St	X	X	X	–	X	–	X	–	–	–	–	–	–	–	–	–	–	–
MW123	Westalke Ave N ROW	X	–	–	–	X	–	X	–	–	–	–	–	–	–	–	–	–	–
MW124	Valley Street ROW	X	–	X	–	X	–	X	–	–	–	–	–	–	–	–	–	–	–
MW128	Westlake Ave N ROW	X	–	X	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–
MW-133	West part of the Property	–	–	–	X	X	–	X	20, 35, 45, 55, 58, 65, 75, 85, 95, 105, 120, 130, 135, 141	X	X	106	X	–	–	–	80 - 82, 90 - 92	X	X
MW-137	South-central part of the Property	–	–	–	X	X	–	X	25, 45, 75, 85, 95, 115	X	X	50, 90, 115	X	–	X	–	76 - 78, 107 - 109	X	X
MW-138	Dexter Ave N ROW	–	–	–	X	X	–	X	15, 25, 35, 45, 56, 65, 75, 85, 95, 105, 115	–	X	115	X	–	–	–	115 - 117	–	X
MW-140	Roy Street ROW	–	–	–	X	X	–	X	15, 25, 35, 45, 55, 65, 75, 90, 110, 130, 140	–	X	80, 90	X	X	–	X	–	–	–
MW-141	Roy Street ROW	–	–	–	X	X	–	X	15, 35, 46, 56, 65, 75, 85, 95, 105	–	X	–	–	–	–	–	105 - 107	–	X
Temporary Borings																			
B-201	Property	–	–	–	–	–	–	–	10, 30, 35	–	X	30	X	–	–	–	–	–	–
B-202	Property	–	–	–	–	–	–	–	5, 20, 50	X	X	10, 45	X	–	–	–	–	–	–
B-203	Property	–	–	–	–	–	–	–	5, 25, 40, 50, 80	X	X	30, 75	X	–	–	–	–	–	–
B-204	Property	–	–	–	–	–	–	–	20, 40, 45	–	X	40	X	–	–	–	–	–	–
B-205	Property	–	–	–	–	–	–	–	10, 55, 65, 75	X	X	63, 79	X	–	X	–	40 - 42	X	X
B-206	Property	–	–	–	–	–	–	–	15, 30, 40, 49, 52, 56, 59, 70, 80	X	X	47, 50	X	X	–	X	–	–	–
B-207	Property	–	–	–	–	–	–	–	30, 41, 49, 55, 60, 70, 80, 90	X	X	50, 52	X	–	X	–	–	–	–
B-208	Property	–	–	–	–	–	–	–	20, 35, 50, 60, 70, 80	–	X	56	X	–	–	–	–	–	–
B-209	Property	–	–	–	–	–	–	–	20, 35, 50, 60, 70, 75, 80	–	X	57, 73	X	–	X	–	–	–	–
B-210	Property	–	–	–	–	–	–	–	6, 15, 20, 35, 46, 60, 70, 80	X	X	60	X	–	–	–	–	–	–
B-211	Property	–	–	–	–	–	–	–	20, 35, 50, 57, 60, 65, 70, 80, 90, 100, 110, 120	–	X	83	X	–	–	–	120 - 122	X	X
B-212	Dexter Ave N ROW	–	–	–	–	–	–	–	15, 21, 35, 45, 55, 65, 75, 85, 95, 100	X	X	54	X	–	–	–	–	–	–
B-213	Dexter Ave N ROW	–	–	–	–	–	–	–	15, 22, 35, 45, 55, 65, 75, 85, 95, 105, 115, 125	–	X	99, 125	X	–	X	–	90 - 92	X	X
B-214	Dexter Ave N ROW	–	–	–	–	–	–	–	15, 25, 35, 45, 55, 65, 75, 85, 95, 105, 115, 120	–	X	–	–	–	–	–	–	–	–

Table 5

Summary of 2017 Monitoring and Investigation
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

		Groundwater Monitoring							New Boring and Monitoring Well Installations										
		Water Level Monitoring			Monitoring Well Sampling				Soil Samples								Reconnaissance Groundwater Samples		
			Extraction Monitoring		Groundwater Laboratory Analyses				Chemical Analysis			Physical Analysis						Laboratory Analyses	
Monitoring Well	Area Location	Periodic Events	Continuous Monitoring	Periodic Events	GRO	VOCs	MNA	Field	Sample Depth (ft bgs)	GRO	VOCs	Sample Depth (ft bgs)	Grain Size	Bulk Density	f_{oc}	Vertical K	Sample Depth (ft bgs)	GRO	VOCs
B-215	Roy Street ROW	–	–	–	–	–	–	–	15, 25, 35, 45, 55, 65, 75, 85, 95	–	X	–	–	–	–	–	–	–	–
B-216	Property	–	–	–	–	–	–	–	20, 40, 55, 65, 85, 95	–	X	76	X	–	–	–	–	–	–
B-217	Property	–	–	–	–	–	–	–	15, 25, 35, 42, 55, 65, 75, 85, 95, 106, 115	–	X	97	X	–	–	–	–	–	–
B-218	Property	–	–	–	–	–	–	–	12.5, 19, 25, 40, 50	–	X	–	–	–	–	–	–	–	–
B-219	Property	–	–	–	–	–	–	–	42, 50, 60, 70, 80	–	X	73	X	–	–	–	–	–	–
B-220	Property	–	–	–	–	–	–	–	15, 29, 32, 40, 50	–	X	–	–	–	–	–	–	–	–
B-221	Property	–	–	–	–	–	–	–	16, 22, 33, 37, 45, 50, 60, 70	–	X	–	–	–	–	–	–	–	–
B-222	Property	–	–	–	–	–	–	–	17, 25, 34, 42, 50	–	X	–	–	–	–	–	–	–	–
B-223	Property	–	–	–	–	–	–	–	16, 22, 30, 39, 47	–	X	–	–	–	–	–	–	–	–

Notes:
1. Property = 700 Dexter Avenue North
2. Periodic monitoring conducted with an electronic water level probe and continuous monitoring conducted with a pressure transducer and datalogger
3. GRO = gasoline-range organics using NWTPH-Gx
4. VOCs = volatile organic compounds using EPA Method 8260C
5. MNAs = monitored natural attenuation parameters: Anions: Nitrate, Sulfate, Chloride using EPA 300.0; total iron and manganese using EPA 6020/200.8; total organic carbon using SM5310B; alkalinity using SM2320B; ferrous iron using Hach kit 8146; dissolved methane, dissolved ethane, and dissolved ethene using RSK-175
6. Field parameters include pH, temperature, specific conductance, dissolved oxygen, and oxidation/reduction potential
7. Grain size = full grain size distribution using ASTM D422/D4464
8. Bulk density = dry bulk density using ASTM D2937
9. foc = fraction organic carbon using the Walkley-Black method
10. Vertical K = vertical hydraulic conductivity using ASTM Method D5084

Table 6

Soil and Groundwater Chemical Detection Statistics
Former American Linen Supply, 700 Dexter Avenue North, Seattle, Washington

		Soil										Groundwater									
			On-Property			Off-Property			On and Off Property				Shallow Water Bearing Zone			Intermediate Water Bearing Zone			Deep Water Bearing Zone		
Chemical Name	CAS #	Screening Level (mg/kg)	Frequency of Detection	Maximum Detection (mg/kg)	Minimum Detection (mg/kg)	Frequency of Detection	Maximum Detection (mg/kg)	Minimum Detection (mg/kg)	Frequency of Detection	Maximum Detection (mg/kg)	Minimum Detection (mg/kg)	Screening Level (µg/L)	Frequency of Detection	Maximum Detection (µg/L)	Minimum Detection (µg/L)	Frequency of Detection	Maximum Detection (µg/L)	Minimum Detection (µg/L)	Frequency of Detection	Maximum Detection (µg/L)	Minimum Detection (µg/L)
GRO	None	30	48%	641 z	0.0353 U	29%	4,100	0.0385 U	36%	4,100	0.0353 U	800	55%	150,000	31.6 U	44%	240,000 xy	28.9	33%	63.3 J	41.2 U
DRO	None	2,000	25%	230 x	50 U	17%	610	5.90 U	17%	610	5.90 U	500	61%	26,000	34.0	15%	210 x	50 U	–	–	–
ORO	None	2,000	0%	–	250 U	16%	–	12 U	14%	–	12 U	500	26%	25,000	250 U	5%	440 x	100 U	–	–	–
Benzene	71-43-2	0.030	9%	0.304	0.000281 U	16%	10.0	0.000285 U	12%	10.0	0.000281 U	0.5	50%	20,000	0.001 U	18%	14.1	0.0896 U	8%	3.84	0.0896 U
Toluene	108-88-3	0.273	12%	0.580	0.000400 J	13%	160	0.000454 U	12%	160	0.000400 J	72	49%	22,000	0.412 U	21%	17.6 E	0.100 J	27%	3.90	0.412 U
Ethylbenzene	100-41-4	0.343	4%	4.74	0.000309 U	13%	54.0	0.000311 U	8%	54.0	0.000309 U	29	28%	3,100	0.158 U	7%	28.6	0.158 U	0%	–	0.158 U
Total Xylenes	1330-20-7	0.831	5%	6.02	0.000400 J	14%	300	0.000730 U	9%	300	0.000400 J	10,000	33%	15,000	0.316 U	7%	55.1	0.316 U	2%	0.396 J	0.316 U
PCE	127-18-4	0.025	72%	8,270	0.000290 U	17%	19.0	0.000289 U	48%	8,270	0.000289 U	2.4	60%	176,000	0.199 U	54%	220,000	0.199 U	25%	194	0.199 U
TCE	79-01-6	0.030	51%	113	0.000293 U	12%	1.02	0.000290 U	34%	113	0.000290 U	1	55%	13,000	0.153 U	62%	5,310	0.153 U	36%	492	0.153 U
cDCE	156-59-2	0.050	48%	329	0.000247 U	13%	1.55	0.000244 UJ	33%	329	0.000244 UJ	16	68%	9,300	0.0933 U	73%	21,300	0.0933 U	51%	7,280	0.093 U
tDCE	156-60-5	0.050	18%	0.700	0.000275 U	1%	0.00830	0.000274 U	11%	0.700	0.000274 U	100	40%	1,000	0.152 U	35%	97 ht	0.152 U	12%	28.2	0.152 U
VC	75-01-4	0.050	22%	17.0	0.000306 U	1%	0.0990	0.000302 U	13%	17.0	0.000302 U	0.2	56%	1,100	0.118 U	72%	7,500	0.118 U	47%	290 ve	0.118 U

Notes:

1. µg/L = micrograms per liter
2. mg/kg = milligrams per kilogram
3. GRO = gasoline-range organics
4. DRO = diesel-range organics
5. ORO = oil-range organics
6. PCE = perchloroethylene (tetrachloroethene)
7. TCE = trichloroethene
8. cDCE = cis-1,2-dichloroethene
9. tDCE = trans-1,2-dichloroethene
10. VC = vinyl chloride
11. y = The GRO result in the sample is due to a pattern of peaks that is consistent with the chlorinated volatiles detected by the 8260C analysis
12. x = The sample chromatographic pattern does not resemble the fuel standard used for quantitation
13. z = Gasoline/petroleum detection result is likely elevated due to high detections of CVOCs
14. – = value not detected or not analyzed
15. U = not detected at or above the laboratory method detection limit (MDL)
16. J = the identification of the analyte is acceptable; the reported value is an estimate
17. ht = The analysis was performed outside the method the method or client-specified holding time requirement
18. E = Estimated value. The reported range exceeds the calibration range of the analysis
19. ve = Estimated value due to the reported range exceeding the calibration range of the analysis

Table 7

Petroleum Hydrocarbons and VOCs Detected in 2017 Groundwater Samples
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Sample Location	Property	Sample Date	Sampling Method	GRO	Acetone	Benzene	n-Butylbenzene	sec-Butylbenzene	tert-Butylbenzene	Carbon Disulfide	Chlorethane	Chloroform	Chloromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cDCE	tDCE	1,2-Dichloropropane	di-isopropyl ether	Ethylbenzene
			Screening Level	800	7,200	0.5	400	800	800	800	–	80	–	7.68	0.38	7	16	100	0.71	–	29
Shallow Water Bearing Zone																					
F13	Property	03/27/17	Peristaltic	31.6 U	1.42 J	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.218 J	0.152 U	0.190 U	0.0924 U	0.158 U
		06/22/17	Peristaltic	31.6 U	1.38 J	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 UJ	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.194 J	0.152 U	0.190 U	0.0924 U	0.158 U
F5	Property	03/28/17	Peristaltic	234	38.3	0.515	0.143 U	0.134 U	0.183 U	0.202 J	0.769	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	516	4.31	0.190 U	0.0924 U	0.158 U
		06/22/17	Peristaltic	31.6 U	37.9	0.374 J	0.143 U	0.134 U	0.183 U	0.101 UJ	2.89	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	10.4	0.485 J	0.190 U	0.0924 U	0.158 U
F9	Property	03/27/17	Peristaltic	31.6 U	1.40 J	0.529	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.158 J	0.539	0.190 U	0.0924 U	0.158 U
		06/22/17	Peristaltic	31.6 U	1.74 J	0.471 J	0.143 U	0.134 U	0.183 U	0.101 UJ	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	6.10	0.610	0.190 U	0.0924 U	0.158 U
G12	Property	03/27/17	Peristaltic	–	2.71 J	0.243 J	0.143 U	0.134 U	0.183 U	0.101 U	0.344 J	0.0860 U	0.153 U	0.114 U	0.108 U	1.55	95.9	1.97	0.190 U	0.0924 U	0.158 U
		06/30/17	Peristaltic	–	1.65 J	0.282 J	0.143 U	0.134 U	0.183 U	0.101 U	0.539 J	0.0860 U	0.153 U	0.114 U	0.108 U	2.31	115	2.94	0.190 U	0.0924 U	0.158 U
J15	Property	03/27/17	Peristaltic	–	1.82 J	0.188 J	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	1.78	46.3	1.18	0.190 U	0.0924 U	0.158 U
		06/26/17	Peristaltic	–	1.49 J	0.173 J	0.143 U	0.134 U	0.183 U	0.101 UJ	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	1.84	39.8	1.06	0.190 U	0.0924 U	0.158 U
(dup)		06/26/17	Peristaltic	–	1.91 J	0.173 J	0.143 U	0.134 U	0.183 U	0.101 UJ	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	1.81	39.3	1.03	0.190 U	0.0924 U	0.158 U
J5	Property	03/21/17	Peristaltic	–	3.24 U	0.580	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.453 J	253	1.73	0.190 U	0.0924 U	0.158 U
		06/26/17	Peristaltic	–	1.15 J	0.252 J	0.143 U	0.134 U	0.183 U	0.101 UJ	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.425 J	366	1.94	0.190 U	0.0924 U	0.158 U
K8	Property	03/21/17	Peristaltic	–	3.26 U	0.239 J	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	1.47	123	0.680	0.190 U	0.0924 U	0.158 U
		06/26/17	Peristaltic	–	1.07 J	0.246 J	0.143 U	0.134 U	0.183 U	0.101 UJ	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	1.34	140	0.750	0.190 U	0.0924 U	0.158 U
M15	Property	03/27/17	Peristaltic	–	1.45 J	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.631	32.7	0.561	0.190 U	0.0924 U	0.158 U
(dup)		03/27/17	Peristaltic	–	1.79 J	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.196 J	0.0860 U	0.153 U	0.114 U	0.108 U	0.588	31.7	0.513	0.190 U	0.0924 U	0.158 U
		06/26/17	Peristaltic	–	1.05 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 UJ	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.508	25.8	0.523	0.190 U	0.0924 U	0.158 U
MW121	Property	03/28/17	Peristaltic	–	2.32 J	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.768	0.152 U	0.190 U	0.0924 U	0.158 U
		06/20/17	Peristaltic	–	1.05 U	0.186 J	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 UJ	0.188 U	1.13	0.152 U	0.190 U	0.0924 UJ	0.158 U
MW125	Valley Street ROW	03/22/17	Peristaltic	31.6 U	3.20 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.341 J	0.152 U	0.190 U	0.0924 U	0.158 U
		06/28/17	Bladder	31.6 U	1.05 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	0.0924 U	0.158 U
MW-214	Valley Street ROW	03/30/17	Peristaltic	–	1.75 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	0.0924 U	0.158 U
(dup)		03/30/17	Peristaltic	–	1.27 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	0.0924 U	0.158 U
(dry)		06/21/17	Peristaltic	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
MW-8	800 Aloha Street Parcel	03/20/17	Peristaltic	–	3.68 U	0.145 J	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	0.0924 U	0.175 J
(dry)		06/27/17	Peristaltic	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
MW-9	8th Ave N ROW	03/20/17	Peristaltic	52.8 J	4.08 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.140 J	0.152 U	0.190 U	0.0924 U	0.158 U
		06/20/17	Peristaltic	31.6 U	1.05 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 UJ	0.188 U	0.214 J	0.152 U	0.190 U	0.0924 UJ	0.158 U
(dup)		06/20/17	Peristaltic	31.6 U	1.05 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 UJ	0.188 U	0.211 J	0.152 U	0.190 U	0.0924 UJ	0.158 U
N7	Property	03/30/17	Peristaltic	–	2.16 U	0.178 J	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.773	125	0.396 J	0.190 U	0.0924 U	0.158 U
		06/27/17	Peristaltic	–	1.41 J	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.313 J	0.0860 U	0.153 U	0.114 U	0.108 U	1.00	153	0.955	0.190 U	0.0924 U	0.158 UJ
R-MW2	Property	03/21/17	Peristaltic	–	3.29 U	0.272 J	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.341 J	0.152 U	0.190 U	0.0924 U	0.158 U
		06/15/17	Peristaltic	–	1.48 J	0.694	0.143 U	0.180 J	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.199 J	0.188 U	0.682	0.152 U	0.190 U	0.0924 U	0.158 U
R-MW3	Property	03/21/17	Peristaltic	31.6 U	14.3 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.575	0.152 U	0.190 U	0.0924 U	0.158 U
		06/28/17	Peristaltic	31.6 U	5.00 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.735	0.152 U	0.190 U	0.0924 U	0.158 U

Table 7

Petroleum Hydrocarbons and VOCs Detected in 2017 Groundwater Samples
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Sample Location	Property	Sample Date	Sampling Method	n-Hexane	Isopropylbenzene	p-Isopropyltoluene	MEK	Methylene Chloride	MIBK	Napthalene	n-propylbenzene	PCE	Toluene	1,1,1-Trichloroethane	TCE	CFC-113	1,2,4-TMB	1,2,3-TMB	1,3,5-TMB	VC	Total Xylenes
			Screening Level	**480**	**800**	–	**4,800**	**4.6**	**640**	**160**	**800**	**2.4**	**72**	**200**	**1**	**240,000**	–	–	**80**	**0.2**	**10,000**
Shallow Water Bearing Zone																					
F13	Property	03/27/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.094 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	**0.936**	0.316 U
		06/22/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.094 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	**1.32**	0.316 U
F5	Property	03/28/17	Peristaltic	0.305 U	0.126 U	0.138 U	**93.1 J**	1.07 U	**0.888 J**	0.174 U	0.162 U	0.199 U	0.727 U	0.094 U	**0.241 J**	0.164 U	0.123 U	0.0739 U	0.124 U	**90.6**	0.316 U
		06/22/17	Peristaltic	0.305 U	0.126 U	0.138 U	**41.2**	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	**0.708**	0.094 U	0.153 U	0.164 4	0.123 U	0.0739 U	0.124 U	**63.9**	0.316 U
F9	Property	03/27/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.195 U	0.162 U	0.199 U	**2.04**	0.094 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
		06/22/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.195 U	0.162 U	0.199 U	**1.70**	0.094 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	**3.57**	0.316 U
G12	Property	03/27/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.094 U	**0.233 J**	0.164 U	0.123 U	0.0739 U	0.124 U	**28.4**	0.316 U
		06/30/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.094 U	**0.323 J**	0.164 U	0.123 U	0.0739 U	0.124 U	**31.5**	0.316 U
J15	Property	03/27/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	**0.495 J**	0.094 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	**6.99**	0.316 U
		06/26/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	**0.459 J**	0.094 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	**6.30**	0.316 U
(dup)		06/26/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	**0.551**	0.094 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	**6.73**	0.316 U
J5	Property	03/21/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	**285**	0.412 U	0.094 U	**78.5**	0.164 U	0.123 U	0.0739 U	0.124 U	**29.6**	0.316 U
		06/26/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	**36.1**	**0.506**	0.094 U	**37.1**	0.164 U	0.123 U	0.0739 U	0.124 U	**77.7**	0.316 U
K8	Property	03/21/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	**82.5**	0.412 U	0.094 U	**22.0**	0.164 U	0.123 U	0.0739 U	0.124 U	**0.461 J**	0.316 U
		06/26/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	**67.9**	0.412 U	0.094 U	**28.7**	0.164 U	0.123 U	0.0739 U	0.124 U	**0.456 J**	0.316 U
M15	Property	03/27/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.094 U	**0.733**	0.164 U	0.123 U	0.0739 U	0.124 U	**13.2**	0.316 U
(dup)		03/27/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.094 U	**0.670**	0.164 U	0.123 U	0.0739 U	0.124 U	**12.0**	0.316 U
		06/26/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	**0.233 J**	0.412 U	0.094 U	**1.80**	0.164 U	0.123 U	0.0739 U	0.124 U	**15.0**	0.316 U
MW121	Property	03/28/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 UJ	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.094 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	**5.82**	0.316 U
		06/20/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 UJ	1.07 U	0.823 U	0.174 UJ	0.162 U	0.199 U	**0.774**	0.094 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	**7.68**	0.316 U
MW125	Valley Street ROW	03/22/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	**0.285 J**	0.412 U	0.094 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
		06/28/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 UJ	0.162 U	0.199 U	0.412 U	0.0940 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
MW-214	Valley Street ROW	03/30/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.094 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
(dup)		03/30/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.094 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
(dry)		06/21/17	Peristaltic	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
MW-8	800 Aloha Street Parcel	03/20/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.195 U	0.162 U	0.199 U	0.412 U	0.094 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
(dry)		06/27/17	Peristaltic	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
MW-9	8th Ave N ROW	03/20/17	Peristaltic	**0.311 J**	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.094 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	**0.324 J**	0.316 U
		06/20/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 UJ	1.07 U	0.823 U	0.174 UJ	0.162 U	0.199 U	**0.562**	0.094 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
(dup)		06/20/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 UJ	1.07 U	0.823 U	0.174 UJ	0.162 U	0.199 U	**0.548**	0.094 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
N7	Property	03/30/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.189 U	0.162 U	**280**	0.412 U	0.094 U	**50.4**	0.164 U	0.123 U	0.0739 U	0.124 U	**0.310 J**	0.316 U
		06/27/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 UJ	1.07 U	0.823 U	0.174 U	0.162 U	**205**	0.412 U	0.094 U	**85.1**	0.164 U	0.123 U	0.0739 U	0.124 U	**0.386 J**	0.316 U
R-MW2	Property	03/21/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.094 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	**0.522**	0.316 U
		06/15/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.094 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	**0.609**	0.316 U
R-MW3	Property	03/21/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	**1.38**	0.412 U	0.094 U	**0.714**	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
		06/28/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 UJ	0.162 U	**0.834**	0.412 U	0.0940 U	**0.582**	0.164 U	0.123 U	0.0739 U	0.124 U	**0.424 J**	0.316 U

Table 7

Petroleum Hydrocarbons and VOCs Detected in 2017 Groundwater Samples
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Sample Location	Property	Sample Date	Sampling Method	GRO	Acetone	Benzene	n-Butylbenzene	sec-Butylbenzene	tert-Butylbenzene	Carbon Disulfide	Chlorethane	Chloroform	Chloromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cDCE	tDCE	1,2-Dichloropropane	di-isopropyl ether	Ethylbenzene
			Screening Level	**800**	**7,200**	**0.5**	**400**	**800**	**800**	**800**	–	**80**	–	**7.68**	**0.38**	**7**	**16**	**100**	**0.71**	–	**29**
R-MW5	Dexter Ave N ROW	03/23/17	Peristaltic	–	1.05 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.933 U	0.152 U	0.190 U	0.0924 U	0.158 U
		06/16/17	Bladder	–	1.05 UJ	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	0.0924 U	0.158 U
R-MW6	8th Ave N ROW	03/21/17	Peristaltic	**42.8 J**	3.14 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	**0.977**	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	**20.0**	**0.242 J**	0.190 U	0.0924 U	0.158 U
		06/20/17	Peristaltic	**38.5 J**	1.05 U	**0.167 J**	0.143 U	0.134 U	0.183 U	0.101 U	0.141	0.0860 U	0.153 U	0.114 U	0.108 UJ	**0.337 J**	**37.3**	**0.445 J**	0.190 U	0.0924 UJ	0.158 U
SCL-MW101	Alley Between 8th & 9th Ave	03/28/17	Peristaltic	–	1.05 U	**6.74**	**7.17**	**7.33**	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	0.0924 U	**0.598**
		06/14/17	Peristaltic	–	1.05 U	**18.6**	**6.97**	**8.01**	**0.219 J**	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	0.0924 U	**17.1**
SCL-MW105	Alley Between 8th & 9th Ave	03/28/17	Peristaltic	–	5.25 U	**257**	**4.61**	**3.67**	0.915 U	0.505 U	0.705 U	**20.9**	0.765 U	0.570 U	0.540 U	0.940 U	0.466 U	0.760 U	0.950 U	0.462 U	**26.5**
		06/15/17	Peristaltic	–	1.05 UJ	**208**	**4.77**	**4.25**	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	0.0924 U	**109**
SCS-2	800 Aloha Street Parcel	03/20/17	Peristaltic	**1,660**	**78.8**	**51.8**	**2.49**	**2.02**	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	**1.41**	**155**
		06/12/17	Peristaltic	**901**	**7.95 J**	**58.9**	**1.97**	**1.78**	0.183 U	**0.147 J**	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	**1.07**	**141**
SMW-3	Valley Street ROW	03/30/17	Peristaltic	–	1.40 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	0.0924 U	0.158 U
		06/21/17	Peristaltic	–	1.05 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	0.0924 U	0.158 UJ
Intermediate A Water-Bearing Zone																					
BB-8	Roy Street ROW	03/22/17	Peristaltic	–	2.52 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.1140 U	0.108 U	0.188 U	**3.10**	0.152 U	0.190 U	0.0924 U	0.158 U
		06/14/17	Peristaltic	–	**1.50 J**	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.1140 U	0.108 U	0.188 U	**12.6**	**0.155 J**	0.190 U	0.0924 U	0.158 U
GEI-1	Block 37	03/24/17	Peristaltic	–	**2.90 J**	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	0.0924 U	0.158 U
		06/13/17	Bladder	–	1.05 UJ	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	0.0924 U	**0.244 J**
MW107	8th Ave N ROW	03/27/17	Peristaltic	–	**11.0 J**	**0.204 J**	0.143 U	0.134 U	0.183 U	0.101 U	**0.406 J**	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	**6.82**	**14.0**	0.190 U	0.0924 U	0.158 U
		06/19/17	Peristaltic	–	**2.99 J**	**0.238 J**	0.143 U	0.134 U	0.183 U	**0.162 J**	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 UJ	0.188 U	**7.29**	**12.6**	0.190 U	0.0924 UJ	0.158 U
MW108	Alley Between 8th & 9th Ave	03/28/17	Peristaltic	–	**1.40 J**	**1.59**	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	**0.588**	**278**	**0.899**	0.190 U	0.0924 U	0.158 U
		06/27/17	Bladder	–	**2.03 J**	**1.26**	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	**0.512**	**165**	**0.748**	0.190 U	0.0924 U	0.158 UJ
MW109	Alley Between 8th & 9th Ave	03/29/17	Peristaltic	–	1.05 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	**12.6**	0.152 U	0.190 U	0.0924 U	0.158 U
		06/27/17	Bladder	–	**1.20 J**	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	**0.583**	**163**	**1.17**	0.190 U	0.0924 U	0.158 UJ
MW110	Alley Between 8th & 9th Ave	03/23/17	Peristaltic	–	2.62 U	**0.330 J**	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	**5.23**	**644**	**4.72**	0.190 U	0.0924 U	0.158 U
		06/27/17	Bladder	–	2.62 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	**5.30**	**1,120**	**2.66**	0.190 U	0.0924 U	0.158 UJ
MW115	9th Ave N ROW	03/22/17	Peristaltic	–	2.67 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	**0.643**	0.152 U	0.190 U	0.0924 U	0.158 U
		06/22/17	Bladder	–	1.05 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 UJ	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	**0.523**	0.152 U	0.190 U	0.0924 U	0.158 U
MW116	9th Ave N ROW	03/21/17	Peristaltic	–	3.32 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	0.0924 U	0.158 U
		06/16/17	Bladder	–	1.05 UJ	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	0.0924 U	0.158 U
MW119	9th Ave N ROW	03/29/17	Peristaltic	–	**1.28 J**	**0.139 J**	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	**42.9**	**0.334 J**	0.190 U	0.0924 U	0.158 U
		06/28/17	Bladder	–	3.73 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	**5.99**	**0.167 J**	0.190 U	0.0924 U	0.158 U
MW120	8th Ave N ROW	03/28/17	Peristaltic	–	1.05 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	**1.88**	0.108 U	**0.303 J**	**18.4**	0.152 U	**0.768**	0.0924 U	0.158 U
		06/28/17	Bladder	–	3.40 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	**1.57**	**0.211 J**	**0.251 J**	**16.0**	0.152 U	**0.762**	0.0924 U	0.158 U
MW131	Property	03/27/17	Peristaltic	**91.9 J**	**1.93 J**	**0.199 J**	0.143 U	0.134 U	0.183 U	0.101 U	**0.462 J**	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	**243**	**0.981**	0.190 U	0.0924 U	0.158 U
		06/20/17	Peristaltic	31.6 U	5.25 U	0.448 U	0.715 U	0.670 U	0.915 U	0.505 U	0.705 U	0.430 U	0.765 U	0.570 U	0.540 UJ	0.940 U	**2.55**	0.760 U	0.950 U	0.462 UJ	0.790 U
Intermediate B Water-Bearing Zone																					
MW111	Alley Between 8th & 9th Ave	03/23/17	Peristaltic	–	3.09 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	**1.40**	0.152 U	0.190 U	0.0924 U	0.158 U
		06/14/17	Bladder	–	1.05 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	**1.24**	0.152 U	0.190 U	0.0924 U	0.158 U

Table 7

Petroleum Hydrocarbons and VOCs Detected in 2017 Groundwater Samples
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Sample Location	Property	Sample Date	Sampling Method	n-Hexane	Isopropylbenzene	p-Isopropyltoluene	MEK	Methylene Chloride	MIBK	Napthalene	n-propylbenzene	PCE	Toluene	1,1,1-Trichloroethane	TCE	CFC-113	1,2,4-TMB	1,2,3-TMB	1,3,5-TMB	VC	Total Xylenes
		Screening Level		**480**	**800**	–	**4,800**	**4.6**	**640**	**160**	**800**	**2.4**	**72**	**200**	**1**	**240,000**	–	–	**80**	**0.2**	**10,000**
R-MW5	Dexter Ave N	03/23/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	**0.338** J	0.412 U	0.094 U	**0.186** J	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
	ROW	06/16/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	**0.257** J	0.412 U	0.094 U	**0.245** J	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
R-MW6	8th Ave N	03/21/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	**1.08**	0.412 U	0.094 U	**3.17**	0.164 U	0.123 U	0.0739 U	0.124 U	**8.65**	0.316 U
	ROW	06/20/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 UJ	1.07 U	0.823 UJ	0.174 UJ	0.162 U	**1.19**	**0.619**	0.094 U	**0.878**	0.164 U	0.123 U	0.0739 U	0.124 U	**43.9**	0.316 U
SCL-MW101	Alley Between	03/28/17	Peristaltic	**0.612** J	**19.3**	0.138 U	1.28 U	1.07 U	0.823 U	**2.09**	**62.7**	0.199 U	0.624 U	0.094 U	0.153 U	0.164 U	**4.84**	**1.50**	0.124 U	0.118 U	**2.08**
	8th & 9th Ave	06/14/17	Peristaltic	**3.39** J	**29.9**	0.138 U	1.28 U	1.07 U	0.823 U	**4.76**	**75.3**	0.199 U	**1.68**	0.094 U	0.153 U	0.164 U	**1.12**	**2.03**	**0.185** J	0.118 U	**3.50**
SCL-MW105	Alley Between	03/28/17	Peristaltic	**58.6**	**66.9**	**0.915** J	6.40 U	5.35 U	4.12 U	**3.64**	**134**	0.995 U	**16.3**	0.470 U	0.765 U	0.820 U	0.615 U	**8.81**	**3.51**	0.590 U	**33.9**
	8th & 9th Ave	06/15/17	Peristaltic	**65.1**	**67.3**	**1.08**	1.28 U	1.07 U	0.823 U	**5.20**	**126**	0.199 U	**14.3**	0.094 U	0.153 U	0.164 U	**0.562**	**9.29**	**3.45**	0.118 U	**40.8**
SCS-2	800 Aloha	03/20/17	Peristaltic	**3.96**	**19.0**	**0.379** J	1.28 U	1.07 U	0.823 U	**61.8** J	**43.9**	0.199 U	**9.54**	0.094 U	0.153 U	0.164 U	**60.3**	**59.3**	**5.36**	0.118 U	**181**
	Street Parcel	06/12/17	Peristaltic	**4.86** J	**16.3**	**0.298** J	1.28 U	1.07 U	0.823 U	**54.3**	**34.2**	0.199 U	**4.49**	0.094 U	0.153 U	0.164 U	**41.7**	**51.2**	**2.83**	0.118 U	**70**
SMW-3	Valley Street	03/30/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.094 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 UJ	0.316 U
	ROW	06/21/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 UJ	1.07 U	0.823 U	0.174 U	0.162 U	0.199 UJ	0.412 U	0.094 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
Intermediate A Water-Bearing Zone																					
BB-8	Roy Street	03/22/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	**30.4**	0.412 U	0.094 U	**4.95**	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
	ROW	06/14/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	**0.184** J	0.162 U	**26.0**	0.412 U	0.094 U	**8.57**	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
GEI-1	Block 37	03/24/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.207 U	0.162 U	0.199 U	0.412 U	0.094 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
		06/13/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	**1.02** J	0.162 U	0.199 U	0.412 U	0.094 U	0.153 U	0.164 U	**0.200** J	**0.200** J	0.124 U	0.118 U	0.316 U
MW107	8th Ave N	03/27/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	**0.224** J	**0.690** J	0.094 U	**0.370** J	0.164 U	0.123 U	0.0739 U	0.124 U	**34.5**	0.316 U
	ROW	06/19/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 UJ	1.07 U	0.823 UJ	0.174 UJ	0.162 U	0.199 U	**0.700**	0.094 U	**0.290** J	0.164 U	0.123 U	0.0739 U	0.124 U	**15.0**	0.316 U
MW108	Alley Between	03/28/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	**73.1**	0.479 U	0.094 U	**12.5**	0.164 U	0.123 U	0.0739 U	0.124 U	**52.3**	0.316 U
	8th & 9th Ave	06/27/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 UJ	1.07 U	0.823 U	0.174 U	0.162 U	**194**	0.479 U	0.094 U	**22.1**	0.164 U	0.123 U	0.0739 U	0.124 U	**52.8**	0.316 U
MW109	Alley Between	03/29/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.094 U	**0.198** J	0.164 U	0.123 U	0.0739 U	0.124 U	**3.49**	0.316 U
	8th & 9th Ave	06/27/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 UJ	1.07 U	0.823 U	0.174 U	0.162 U	**9.69** J	0.412 U	0.094 U	**141**	0.164 U	0.123 U	0.0739 U	0.124 U	**6.06**	0.316 U
MW110	Alley Between	03/23/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	**1,070**	0.412 U	0.094 U	**389**	0.164 U	0.123 U	0.0739 U	0.124 U	**1.45**	0.316 U
	8th & 9th Ave	06/27/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 UJ	1.07 U	0.823 U	0.174 U	0.162 U	**259**	0.412 U	0.094 U	**176**	0.164 U	0.123 U	0.0739 U	0.124 U	**152**	0.316 U
MW115	9th Ave N	03/22/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.094 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	**15.7**	0.316 U
	ROW	06/22/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.094 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	**8.45**	0.316 U
MW116	9th Ave N	03/21/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.094 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
	ROW	06/16/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.094 U	**0.303** J	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
MW119	9th Ave N	03/29/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	**5.47**	0.412 U	0.094 U	**10.7**	0.164 U	0.123 U	0.0739 U	0.124 U	**0.272** J	0.316 U
	ROW	06/28/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 UJ	0.162 U	**19.0**	**0.726**	0.0940 U	**12.4**	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	**0.562** J
MW120	8th Ave N	03/28/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	**13.9**	0.458 U	**0.277** J	**5.81**	**0.417** J	0.123 U	0.0739 U	0.124 U	**0.871**	0.316 U
	ROW	06/28/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	**0.384** J	0.162 U	**18.0**	0.412 U	**0.278** J	**6.97**	**0.418** J	0.123 U	0.0739 U	0.124 U	**0.988**	0.316 U
MW131	Property	03/27/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	**0.462** J	0.094 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	**804**	0.316 U
		06/20/17	Peristaltic	1.52 U	0.630 U	0.690 U	6.40 UJ	5.35 U	4.12 U	0.870 UJ	0.810 U	0.995 U	2.06 U	0.094 U	0.765 U	0.820 U	0.615 U	0.370 U	0.620 U	**435**	1.58 U
Intermediate B Water-Bearing Zone																					
MW111	Alley Between	03/23/17	Peristaltic	**0.306** J	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.094 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	**5.22**	0.316 U
	8th & 9th Ave	06/14/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.094 U	**0.408** J	0.164 U	0.123 U	0.0739 U	0.124 U	**3.22**	0.316 U

Table 7

Petroleum Hydrocarbons and VOCs Detected in 2017 Groundwater Samples
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Sample Location	Property	Sample Date	Sampling Method	GRO	Acetone	Benzene	n-Butylbenzene	sec-Butylbenzene	tert-Butylbenzene	Carbon Disulfide	Chlorethane	Chloroform	Chloromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cDCE	tDCE	1,2-Dichloropropane	di-isopropyl ether	Ethylbenzene
			Screening Level	**800**	**7,200**	**0.5**	**400**	**800**	**800**	**800**	–	**80**	–	**7.68**	**0.38**	**7**	**16**	**100**	**0.71**	–	**29**
MW112	Dexter Ave N	03/22/17	Bladder	–	2.80 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	0.0924 U	0.158 U
	ROW	06/16/17	Bladder	–	**9.22 J**	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	0.0924 U	0.158 U
MW126	Alley Between	03/28/17	Peristaltic	–	1.05 U	**0.148 J**	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	**0.826**	0.153 U	0.114 U	0.108 U	0.188 U	**0.283 J**	0.152 U	0.190 U	0.0924 U	0.158 U
	8th & 9th Ave	06/15/17	Bladder	–	1.05 UJ	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	0.0924 U	**0.179 J**
MW130	Property	03/29/17	Bladder	**8,890 z**	**23.7 J**	1.79 U	2.86 U	2.68 U	3.66 U	2.02 U	2.82 U	1.72 U	3.06 U	2.28 U	2.16 U	**102**	**7,880**	**39.3**	3.80 U	1.85 U	3.16 U
		06/30/17	Bladder	**10,300 Jz**	10.5 U	0.896 U	1.43 U	1.34 U	1.83 U	1.01 U	1.41 U	0.860 U	1.53 U	1.14 U	1.08 U	**94.3**	**20,100**	**55.6**	1.90 U	0.924 U	1.58 U
(dup)		06/30/17	Bladder	**15,000 Jz**	10.5 U	0.896 U	1.43 U	1.34 U	1.83 U	1.01 U	1.41 U	0.860 U	1.53 U	1.14 U	1.08 U	**85.0**	**21,300**	**57.3**	1.90 U	0.924 U	1.58 U
W-MW-01	8th Ave N	03/30/17	Peristaltic	–	1.56 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	**0.491 J**	0.152 U	0.190 U	0.0924 U	0.158 U
	ROW	06/19/17	Bladder	–	1.05 U	**0.158 J**	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 UJ	0.188 U	**0.320 J**	0.152 U	0.190 U	0.0924 UJ	0.158 U
W-MW-02	8th Ave N	03/27/17	Peristaltic	–	**19.3 J**	**0.270 J**	0.143 U	0.134 U	0.183 U	0.101 U	**0.204 J**	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	**33.0**	**2.16**	0.190 U	0.0924 U	0.158 U
	ROW	06/19/17	Bladder	–	**8.12 J**	**0.307 J**	0.143 U	0.134 U	0.183 U	**0.386 J**	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 UJ	0.188 U	**18.2**	**0.746**	0.190 U	0.0924 UJ	0.158 U
MW-132	Property	09/25/17	Bladder	95.9 U	**5.91 J**	0.448 U	0.715 U	0.670 U	0.915 U	0.505 U	0.705 U	0.430 U	0.765 U	0.570 U	0.540 U	0.940 U	**196**	0.760 U	0.950 U	0.462 U	0.790 U
MW-134	Property	09/22/17	Bladder	–	5.64 U	0.448 U	0.715 U	0.670 U	0.915 U	0.505 U	0.705 0	0.430 U	0.765 U	0.570 U	0.540 U	0.940 U	**86.2**	0.760 U	0.950 U	0.462 U	0.790 U
MW-135	Property	09/25/17	Bladder	**10,900 z**	105 UJ	8.96 U	14.3 U	13.4 U	18.3 U	10.1 U	14.1 U	8.60 U	15.3 U	11.4 U	10.8 U	**87.2**	**16,100**	15.2 U	19.0 U	9.24 U	15.8 U
MW-136	Property	09/25/17	Bladder	55.2 U	**7.30 J**	**0.332 J**	0.143 U	0.134 U	0.183 U	**0.685**	0.141 U	**0.198 J**	0.153 U	0.114 U	0.108 U	0.188 U	**18.7**	0.152 U	0.190 U	0.0924 U	0.158 U
MW-139	Property	09/25/17	Bladder	62.2 U	**2.87 J**	0.0896 U	0.143 U	0.134 U	0.183 U	**1.18**	0.141 U	**1.33**	0.153 U	0.114 U	0.108 U	0.188 U	**1.42**	0.152 U	0.190 U	0.0924 U	0.158 U
Deep Water-Bearing Zone																					
FMW-129	SDOT Property	04/10/17	Peristaltic	–	5.25 U	0.448 U	0.715 U	0.670 U	0.915 U	0.505 U	0.705 U	0.430 U	0.765 U	0.570 U	0.540 U	**4.86**	**1,420**	**5.05**	0.950 U	0.462 U	0.790 U
	S of Roy St	06/23/17	Bladder	–	**1.15 J**	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 UJ	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	**1.37**	**474**	**1.21**	0.190 U	0.0924 U	0.158 U
FMW-131	Block 37	03/24/17	Peristaltic	–	**2.31 J**	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	**45.6**	0.152 U	0.190 U	0.0924 U	0.158 U
		06/23/17	Bladder	–	1.05 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 UJ	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	**3.61**	0.152 U	0.190 U	0.0924 U	0.158 U
FMW-3D	Block 31	03/24/17	Peristaltic	–	**1.89 J**	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	0.0924 U	0.158 U
		06/23/17	Bladder	–	1.05 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 UJ	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	0.0924 U	0.158 U
GEI-2	Block 37	03/24/17	Peristaltic	–	**1.74 J**	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	**2.25**	0.152 U	0.190 U	0.0924 U	0.158 U
		06/23/17	Bladder	–	1.05 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 UJ	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	**16.3**	0.152 U	0.190 U	**0.130 J**	0.158 U
MW102	Valley Street	03/29/17	Bladder	–	**1.36 J**	0.0896 U	0.143 U	0.134 U	0.183 U	**0.161 J**	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	**0.223 J**	0.152 U	0.190 U	0.0924 U	0.158 U
	ROW	06/15/17	Bladder	–	1.05 UJ	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	0.0924 U	0.158 U
MW103	Alley Between	03/23/17	Peristaltic	–	2.87 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	**0.301 J**	0.0860 U	0.153 U	**0.195 J**	0.108 U	**3.69**	**240**	**0.405 J**	0.190 U	0.0924 U	0.158 U
	8th & 9th Ave	06/14/17	Bladder	–	**1.76 J**	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141	0.0860 U	0.153 U	0.114 U	0.108 U	**1.98**	**120**	**0.369 J**	0.190 U	0.0924 U	0.158 U
MW104	8th Ave N	03/30/17	Peristaltic	–	1.84 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	**3.97**	0.152 U	0.190 U	0.0924 U	0.158 U
	ROW	06/30/17	Bladder	–	**1.45 J**	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	**0.387 J**	**1.54**	0.152 U	0.190 U	0.0924 U	0.158 U
MW105	Roy Street	04/21/17	Bladder	–	**1.44 J**	0.0896 U	0.143 U	0.134 U	0.183 U	**0.192 J**	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	**0.155 J**	0.152 U	0.190 U	0.0924 U	0.158 U
	ROW	06/14/17	Bladder	–	**1.18 J**	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	**0.180 J**	0.152 U	0.190 U	0.0924 U	0.158 U
MW106	SDOT Property	04/14/17	Bladder	–	**1.53 J**	0.0896 U	0.143 U	0.134 U	0.183 U	**0.641**	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	0.0924 U	0.158 U
	S of Roy St	06/30/17	Bladder	–	**1.65 J**	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	0.0924 U	0.158 U
MW113	9th Ave N	03/22/17	Peristaltic	–	3.28 U	**2.60**	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	**10.7**	**7,280**	**25.4**	**0.240 J**	0.0924 U	0.158 U
	ROW	06/16/17	Bladder	–	**1.90 J**	**0.468 J**	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	**0.474 J**	0.108 U	**5.93**	**4,750**	**28.2**	0.190 U	0.0924 U	0.158 U

Table 7

Petroleum Hydrocarbons and VOCs Detected in 2017 Groundwater Samples
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Sample Location	Property	Sample Date	Sampling Method	n-Hexane	Isopropylbenzene	p-Isopropyltoluene	MEK	Methylene Chloride	MIBK	Napthalene	n-propylbenzene	PCE	Toluene	1,1,1-Trichloroethane	TCE	CFC-113	1,2,4-TMB	1,2,3-TMB	1,3,5-TMB	VC	Total Xylenes
		Screening Level		**480**	**800**	–	**4,800**	**4.6**	**640**	**160**	**800**	**2.4**	**72**	**200**	**1**	**240,000**	–	–	**80**	**0.2**	**10,000**
MW112	Dexter Ave N	03/22/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.094 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
	ROW	06/16/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	**8.5**	0.174 U	0.162 U	0.199 U	0.412 U	0.094 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
MW126	Alley Between	03/28/17	Peristaltic	**0.466** J	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.563 U	0.094 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
	8th & 9th Ave	06/15/17	Bladder	0.305 U	**0.245** J	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	**0.636**	0.199 U	0.412 U	0.094 U	0.153 U	0.164	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
MW130	Property	03/29/17	Bladder	6.10 U	2.52 U	2.76 U	25.6 U	21.4 U	16.5 U	3.48 U	3.24 U	**721**	8.24 U	1.88 U	**830**	3.28 U	2.46 U	1.48 U	12.9 U	**186**	6.32 U
		06/30/17	Bladder	3.05 U	1.26 U	1.38 U	12.8 U	10.7 U	8.23 U	1.74 U	1.62 U	**6,760** J	4.12 U	0.940 U	**4,020**	1.64 U	1.23 U	0.739 U	1.24 U	**597**	3.16 U
(dup)		06/30/17	Bladder	3.05 U	1.26 U	1.38 U	12.8 U	10.7 U	8.23 U	1.74 U	1.62 U	**11,100** J	4.12 U	0.940 U	**5,310**	1.64 U	1.23 U	0.739 U	1.24 U	**549**	3.16 U
W-MW-01	8th Ave N	03/30/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	**0.330** J	0.412 U	0.0940 U	**0.203** J	0.164 U	0.123 U	0.0739 U	0.124 U	**1.83**	0.316 U
	ROW	06/19/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 UJ	1.07 U	0.823 UJ	0.174 UJ	0.162 U	0.199 U	**0.931**	0.0940 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	**1.09**	0.316 U
W-MW-02	8th Ave N	03/27/17	Peristaltic	0.305 U	0.126 U	0.138 U	**13.8**	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	**0.961** J	0.0940 U	**0.259** J	0.164 U	0.123 U	0.0739 U	0.124 U	**36.4**	0.316 U
	ROW	06/19/17	Bladder	0.305 U	0.126 U	0.138 U	**3.57** J	1.07 U	**0.929** J	0.174 UJ	0.162 U	0.199 U	**0.970**	0.0940 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	**25.6**	0.316 U
MW-132	Property	09/25/17	Bladder	1.52 U	0.630 U	0.690 U	6.40 U	5.35 U	4.12 U	0.870 U	0.810 U	0.995 U	2.06 U	0.470 U	**1.95** J	0.820 U	0.615 U	0.370 U	0.620 U	**1.76** J	1.58 U
MW-134	Property	09/22/17	Bladder	1.52 U	0.630 U	0.690 U	6.40 U	5.35 U	4.12 U	0.870 U	0.810 U	0.995 U	2.06 U	0.470 U	0.765 U	0.820 U	0.615 U	0.370 U	0.620 U	**229**	1.58 U
MW-135	Property	09/25/17	Bladder	30.5 U	12.6 U	13.8 U	128 U	107 U	82.3 U	17.4 U	16.2 U	**10,400**	41.2 U	9.40 U	**2,480**	16.4 U	12.3 U	7.39 U	12.4 U	**82.0** J	31.6 U
MW-136	Property	09/25/17	Bladder	0.305 U	0.126 U	0.138 U	**1.43** J	1.07 U	0.823 U	0.174 U	0.162 U	**15.4**	0.412 U	0.0940 U	**10.7**	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
MW-139	Property	09/25/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	**1.10** J	0.823 U	0.174 U	0.162 U	0.199 U	**0.516**	0.0940 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	**0.246** J	0.316 U
Deep Water-Bearing Zone																					
FMW-129	SDOT Property	04/10/17	Peristaltic	1.52 U	0.630 U	0.690 U	6.40 U	5.35 U	4.12 U	**1.42** J	0.810 U	**194**	2.06 U	0.470 U	**492**	0.820 U	0.615 U	0.370 U	0.620 U	**0.885** J	1.58 U
	S of Roy St	06/23/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	5.35 U	0.823 U	0.174 U	0.162 U	**81.1**	0.412 U	0.0940 U	**182**	0.164 U	0.123 U	0.0739 U	0.124 U	**4.13**	0.316 U
FMW-131	Block 37	03/24/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.273 U	0.162 U	0.199 U	0.412 U	0.0940 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	**0.249** J	0.316 U
		06/23/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.0940 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	**0.264** J	0.316 U
FMW-3D	Block 31	03/24/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.0940 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
		06/23/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.0940 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
GEI-2	Block 37	03/24/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 UJ	1.07 U	0.823 U	0.271 U	0.162 U	0.199 U	0.412 U	0.0940 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	**6.94**	0.316 U
		06/23/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.0940 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	**127**	0.316 U
MW102	Valley Street	03/29/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.0940 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
	ROW	06/15/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.0940 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
MW103	Alley Between	03/23/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	1.99 U	**0.464** J	0.0940 U	**23.1**	0.164 U	0.123 U	0.0739 U	0.124 U	**157**	0.316 U
	8th & 9th Ave	06/14/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	**0.626**	0.412 U	0.0940 U	**23.0**	0.164 U	0.123 U	0.0739 U	0.124 U	**69.2**	0.316 U
MW104	8th Ave N	03/30/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.217 U	0.162 U	0.199 U	0.412 U	0.0940 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
	ROW	06/30/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	**5.83**	**0.903**	0.0940 U	**5.21**	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	**0.396** J
MW105	Roy Street	04/21/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	**0.544** J	0.0940 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	**1.95**	0.316 U
	ROW	06/14/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	**1.41** J	0.162 U	0.199 U	0.412 U	0.0940 U	**0.356** J	0.164 U	**0.216** J	0.0739 U	0.124 U	**0.514**	0.316 U
MW106	SDOT Property	04/14/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.0940 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
	S of Roy St	06/30/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	**0.419** J	0.0940 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
MW113	9th Ave N	03/22/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.0940 U	**27.1**	0.164 U	0.123 U	0.0739 U	0.124 U	**63.5**	0.316 U
	ROW	06/16/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	**0.522**	0.412 U	0.0940 U	**148**	0.164 U	0.123 U	0.0739 U	0.124 U	**53.3**	0.316 U

Table 7

Petroleum Hydrocarbons and VOCs Detected in 2017 Groundwater Samples
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Sample Location	Property	Sample Date	Sampling Method	GRO	Acetone	Benzene	n-Butylbenzene	sec-Butylbenzene	tert-Butylbenzene	Carbon Disulfide	Chloroethane	Chloroform	Chloromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cDCE	tDCE	1,2-Dichloropropane	di-isopropyl ether	Ethylbenzene
			Screening Level	800	7,200	0.5	400	800	800	800	–	80	–	7.68	0.38	7	16	100	0.71	–	29
MW122	Alley Between	03/28/17	Peristaltic	–	**1.11 J**	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	0.0924 U	0.158 U
	8th & 9th Ave	06/14/17	Bladder	–	1.05 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	0.0924 U	0.158 U
MW123	Westlake Ave N	04/01/17	Peristaltic	–	2.83 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	**0.141 J**	0.158 U
	ROW	06/24/17	Bladder	–	1.05 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	0.0924 U	0.158 U
MW124	Valley Street	03/29/17	Bladder	–	**1.35 J**	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	**1.37**	0.153 U	0.114 U	0.108 U	0.188 U	**0.661**	0.152 U	0.190 U	0.0924 U	0.158 U
(dup)	ROW	03/29/17	Bladder	–	**1.21 J**	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	**1.30**	0.153 U	0.114 U	0.108 U	0.188 U	**0.600**	0.152 U	0.190 U	0.0924 U	0.158 U
		06/15/17	Bladder	–	1.05 UJ	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	**0.614**	0.153 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	0.0924 U	0.158 U
MW128	Westlake Ave N	03/29/17	Peristaltic	–	1.05 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	**7.16**	0.152 U	0.190 U	0.0924 U	0.158 U
	ROW	06/21/17	Bladder	–	**1.07 J**	**3.84**	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 UJ	0.188 U	**109**	0.152 U	0.190 U	0.0924 UJ	0.158 U
MW-133	Property	09/25/17	Bladder	41.2 U	**2.02 J**	0.0896 U	0.143 U	0.134 U	0.183 U	**0.439 J**	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	**1.87**	**13.3**	**1.13**	0.190 U	0.0924 U	0.158 U
MW-137	Property	09/25/17	Bladder	58.5 U	2.84 U	0.0896 U	0.143 U	0.134 U	0.183 U	**2.27**	0.141 U	0.0860 U	0.153 U	0.114 U	0.108 U	0.188 U	**62.0**	0.152 U	0.190 U	0.0924 U	0.158 U
MW-138	Dexter Ave N	09/21/17	Bladder	**63.3 J**	**5.55 J**	0.179 U	0.286 U	0.268 U	0.366 U	0.202 U	0.282 U	0.172 U	0.306 U	0.228 U	0.216 U	0.376 U	0.187 U	0.304 U	0.380 U	0.185 U	0.316 U
MW-140	Roy Street	09/22/17	Bladder	–	2.11 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	**0.754 J**	0.114 U	0.108 U	**0.226 J**	**0.477 J**	0.152 U	0.190 U	0.0924 U	0.158 U
(dup)	ROW	09/22/17	Bladder	–	3.74 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	**2.13**	0.114 U	0.108 U	**0.211 J**	**0.523**	0.152 U	0.190 U	0.0924 U	0.158 U
MW-141	Property	09/22/17	Bladder	–	4.56 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	**2.07**	0.114 U	0.108 U	0.188 U	**0.345 J**	0.152 U	0.190 U	0.0924 U	0.158 U
			Number of Analytes Measured	27	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114
			Number of Analytes Detected	11	51	39	6	7	1	11	13	6	2	4	2	32	83	40	3	4	9
			Frequency of Detection	41%	45%	34%	5%	6%	1%	10%	11%	5%	2%	4%	2%	28%	73%	35%	3%	4%	8%
			Maximum Detection	15,000 Jz	105.0 UJ	257	7.17	8.01	0.219 J	2.27	2.89	20.9	2.13	1.88	0.540 U	102	21,300	57.3	0.768	1.41	155
			Minimum Detection	31.6 U	1.05 U	0.0896 U	0.143 U	0.134 U	0.183 U	0.101 U	0.141 U	0.0860 U	0.1530 U	0.114 U	0.108 U	0.188 U	0.0933 U	0.152 U	0.190 U	0.0924 U	0.158 U

Notes:
1. All groundwater sampling perfomed after 2016 conducted by PES Environmental, Inc.
2. – = data not available
3. Detected results shown in bold, detections above the screening level (see Table 3) highlighted in gray
4. dup = field duplicate sample
5. U = not detected at or above the laboratory method detection limit (MDL); detections above the MDL but below the laboratory reported detection limit (RDL) are qualified with a "J"
6. J = the identification of the analyte is acceptable; the reported value is an estimate
7. B = the same analyte is found in the associated blank
8. z = No/low level gasoline/petroleum detection; result is likely elevated due to high detections of CVOCs
9. GRO = gasoline range organics
10. Chloroethane is also known as ethyl chloride
11. cDCE = cis-1,2-dichloroethene
12. tDCE = trans-1,2-dichloroethene
13. Isopropylbenzene is also known as cumene
14. MEK = methyl ethyl ketone (2-Butanone)
15. MIBK = methyl isobutyl ketone (4-Methyl-2-penatone)
16. CFC-113 = 1,1,2-trichlorotrifluoroethane
17. PCE = perchloroethylene (tetrachloroethene)
18. TCE = trichloroethene
19. 1,2,4-TMB = 1,2,4-trimethylbenzene
20. 1,3,5-TMB = 1,3,5-trimethylbenzene
21. VC = vinyl chloride

Table 7

Petroleum Hydrocarbons and VOCs Detected in 2017 Groundwater Samples
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Sample Location	Property	Sample Date	Sampling Method	n-Hexane	Isopropylbenzene	p-Isopropyltoluene	MEK	Methylene Chloride	MIBK	Napthalene	n-propylbenzene	PCE	Toluene	1,1,1-Trichloroethane	TCE	CFC-113	1,2,4-TMB	1,2,3-TMB	1,3,5-TMB	VC	Total Xylenes
			Screening Level	**480**	**800**	–	**4,800**	**4.6**	**640**	**160**	**800**	**2.4**	**72**	**200**	**1**	**240,000**	–	–	**80**	**0.2**	**10,000**
MW122	Alley Between	03/28/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.0940 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
	8th & 9th Ave	06/14/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	**0.382 J**	0.199 U	0.412 U	0.0940 U	**0.162 J**	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
MW123	Westlake Ave N	04/01/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.0940 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
	ROW	06/24/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.0940 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
MW124	Valley Street	03/29/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	**1.60**	0.785 U	0.0940 U	**0.596**	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
(dup)	ROW	03/29/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	**1.22**	0.675 U	0.0940 U	**0.433**	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
		06/15/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.0940 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
MW128	Westlake Ave N	03/29/17	Peristaltic	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.0940 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	**72.4**	0.316 U
	ROW	06/21/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 UJ	1.07 U	0.823 U	0.174 UJ	0.162 U	0.199 U	**0.541**	0.0940 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	**195**	0.316 U
MW-133	Property	09/25/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	**1.07 J**	0.162 U	**12.7**	**0.748**	0.0940 U	**16.2**	0.164 U	0.123 U	0.0739 U	0.124 U	**0.239 J**	0.316 U
MW-137	Property	09/25/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	**15.0**	**3.90**	0.0940 U	**19.1**	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
MW-138	Dexter Ave N	09/21/17	Bladder	**1.91 J**	0.252 U	0.276 U	2.56 U	2.14 U	1.65 U	0.348 U	0.324 U	0.398 U	**2.60**	0.188 U	0.306 U	0.328 U	0.246 U	0.148 U	0.248 U	0.236 U	0.632 U
MW-140	Roy Street	09/22/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.0940 U	**0.450 J**	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
(dup)	ROW	09/22/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.0940 U	**0.456 J**	0.164 U	0.123 U	0.0739 U	0.124 U	0.118 U	0.316 U
MW-141	Property	09/22/17	Bladder	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	**0.941**	0.0940 U	0.153 U	0.164 U	0.123 U	0.0739 U	0.124 U	**0.457 J**	0.316 U
			Number of Analytes Measured	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114
			Number of Analytes Detected	10	7	4	5	1	3	12	8	39	31	2	53	4	7	7	5	68	8
			Frequency of Detection	9%	6%	4%	4%	1%	3%	11%	7%	34%	27%	2%	46%	4%	6%	6%	4%	60%	7%
			Maximum Detection	65.1	67.3	1.08	93.1 J	1.10 J	8.50	61.8 J	134	11,100 J	16.3	0.278 J	5,310	0.418 J	60.3	59.3	5.36	804	181
			Minimum Detection	0.305 U	0.126 U	0.138 U	1.28 U	1.07 U	0.823 U	0.174 U	0.162 U	0.199 U	0.412 U	0.094 U	0.153 U	0.164 U	0.123 U	0.074 U	0.124 U	0.118 U	0.316 U

Notes:

1. – = screening level not yet determined
2. Detected results shown in bold, detections above the screening level (see Table 3) highlighted in gray
3. dup = field duplicate sample
4. U = not detected at or above the laboratory method detection limit (MDL); detections above the MDL but below the laboratory reported detection limit (RDL) are qualified with a "J"
5. J = the identification of the analyte is acceptable; the reported value is an estimate
6. B = the same analyte is found in the associated blank
7. * = the chromatogram does not resemble the fuel standard; likely due to the presence of PCE, TCE,
8. GRO = gasoline range organics
9. Chloroethane is also known as ethyl chloride
10. cDCE = cis-1,2-dichloroethene
11. tDCE = trans-1,2-dichloroethene
12. Isopropylbenzene is also known as cumene
13. MEK = methyl ethyl ketone (2-Butanone)
14. MIBK = methyl isobutyl ketone (4-Methyl-2-penatone)
15. CFC-113 = 1,1,2-trichlorotrifluoroethane
16. PCE = perchloroethylene (tetrachloroethene)
17. TCE = trichloroethene
18. 1,2,4-TMB = 1,2,4-trimethylbenzene
20. 1,3,5-TMB = 1,3,5-trimethylbenzene
21. VC = vinyl chloride

Table 8

Groundwater Monitored Natural Attenuation Parameters
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Sample Location	Property	Sample Date	Sampled By	Alkalinity (mg $CaCO_3$/L)	Chloride (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	TOC (mg/L)	Iron (mg/L)			Total Manganese (mg/L)	Dissolved Gases (µg/L)		
									Total	Ferrous	Ferric		Methane	Ethane	Ethene
Shallow Water-Bearing Zone															
F13	Property	3/27/17	PES	266	8.85	<0.0227	68.3	10.0	24.2	1.0	23.2	0.651	510	<0.296	<0.422
		6/22/17	PES	484	12.6	<0.0227	6.13	10.9	29.3	1.5	27.8	0.806	2,610	<0.296	<0.422
J5	Property	3/21/17	PES	53.4	28.0	0.0584 J	16.3	4.1	1.09	0.6	0.49	0.474	2,370	<0.296	29.4
		6/26/17	PES	209	45.1	<0.0227	8.85	11.4	2.91	–	–	2.24	9,600	19.6	34.4
J15	Property	3/27/17	PES	476	24.2	<0.0227	55.8	20.0	5.52	2.0	3.5	3.34	3,100	<0.296	<0.422
		6/26/17	PES	486	22.0	<0.0227	60.3	19.1	2.66	1.5	1.2	3.09	2,220	<0.296	<0.422
(dup)		6/26/17	PES	543	22.1	<0.0227	60.4	19.0	3.02	1.5	1.5	3.03 V	2.34	<0.296	<0.422
K8	Property	3/21/17	PES	70.3	10.1	0.103	27.2	5.93	0.0622 J	0.0	0.0622	0.242	41.4	<0.296	<0.422
		6/26/17	PES	97.5	14.7	0.307	25.8	6.45	0.0411 J	0.0	0.0411	0.296	72.7	<0.296	<0.422
M15	Property	3/27/17	PES	830	11.6	<0.0227	40.4	11.4	3.76	2.75	1.01	6.07	11,500	<0.296	<0.422
(dup)		3/27/17	PES	817	11.6	<0.0227	40.4	11.7	3.77	–	–	6.17	10,400	<0.296	<0.422
		6/26/17	PES	904	11.0	<0.0227	47.2	11.0	3.32	–	–	6.32	7,250	<0.296	<0.422
MW121	8th Ave N ROW	12/26/13	SES	790	18.6	<0.025	200	–	2.39	1.90	0.49	6.47	346	<5.0	<5.0
		3/28/17	PES	848	12.2	<0.0227	643	17.9	33.3	2.0	31.3	13.2	479	2.04	<0.422
		6/20/17	PES	930	13.3	<0.0227	61.2 J	16.5	27.1	3.0	24.1	11.0	2,140	8.88	<0.422
MW125	Valley Street ROW	12/26/13	SES	650	112	0.076	12.8	–	2.39	1.47	0.92	1.85	455	6.34	<5.0
MW-9	8th Ave N ROW	12/16/13	SES	56	3.76	0.059	6.08	–	3.32	3.41	0	0.778	6.24	<5.0	<5.0
N7	Property	3/30/17	PES	118	4.73	6.87	25.2	1.35	0.120	0.0	0.12	1.50	11,000	<0.296	<0.422
		6/27/17	PES	235	8.76	6.290	48.4	2.71	1.45	0.25	1.20	3.31	8,430	<0.296	<0.422
R-MW5	Dexter Ave N ROW	3/23/17	PES	183	32.2	0.0549 J	33.0	3.94	2.94	1.0	1.94	4.24	118	<0.296	<0.422
		6/16/17	PES	152	58.3	0.253	21.8	2.59	2.74	–	–	1.29	275	<0.296	<0.422
R-MW6	8th Ave N ROW	3/21/17	PES	586	5.72	0.191	119	6.28	5.02	–	–	6.24	9,410	<0.296	<0.422
		6/20/17	PES	718	11.1	<0.0227	85.7	13.6	27.0	1.5	25.5	8.28	6,980	10.7	11.2
Intermediate "A" Water-Bearing Zone															
BB-8	Roy Street ROW	12/29/13	SES	270	12.6	3.68	84.6	–	0.085	0.01	0.08	0.252	<5.0	<5.0	<5.0
		3/22/17	PES	254	7.87	3.17	41.5	2.25	0.125	0.0	0.125	0.0705	0.412 J	<0.296	<0.422
		6/14/17	PES	290	10.2	2.74	56.9	3.34	0.0348 J	0.0	0.035	0.0475	<0.287	<0.296	<0.422
GEI-1	Block 37	3/24/17	PES	564	8.9	<0.0227	<0.0774	11.7	23.8	1.0	22.8	3.10	20,500	<0.296	<0.422
		6/13/17	PES	304	15	0.0792 J	25.3	6.73	9.05	–	–	1.50	10,600	<0.296	<0.422
MW107	8th Ave N ROW	12/16/13	SES	340	70.8	<0.025	165	–	1.35	0.43	0.92	0.358	8.69	<5.0	<5.0
		3/27/17	PES	559	122	0.0262	<0.0774	147	17.6	2.0	15.6	1.12	8.38	<0.296	159
		6/19/17	PES	651	89.7	<0.0227	<0.0774	91.0	10.5	1.5	9.0	0.955	7,350	<0.296	205
MW108	Alley Between	12/17/13	SES	600	25.8	0.075	12.5	–	17.5	21.7	0	1.96	2,110	22.8	<5.0
	8th & 9th Ave N	3/28/17	PES	577	22.1	<0.0227	106	7.3	19.7	2.5	17.2	2.27	1,740	36.4	2.20
		6/27/17	PES	679	20.6	<0.0227	101	8.6	21.8	2.0	19.8	2.20	3,940	47.8	<0.422

Table 8

Groundwater Monitored Natural Attenuation Parameters
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Sample Location	Property	Sample Date	Sampled By	Alkalinity (mg $CaCO_3$/L)	Chloride (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	TOC (mg/L)	Iron (mg/L)			Total Manganese (mg/L)	Dissolved Gases (µg/L)		
									Total	Ferrous	Ferric		Methane	Ethane	Ethene
MW109	Alley Between	12/17/13	SES	670	16.1	<0.025	34.6	–	12.6	16.2	0	4.04	1,400	5.89	<5.0
	8th & 9th Ave N	3/29/17	PES	498	6.90	0.0255 J	31.4	10.8	12.0	1.5	10.5	3.01	2,000	7.21	<0.422
		6/17/17	PES	693	13.3	<0.0227	42.5	12.2	14.6	1.5	13.1	3.90	2,540	8.65	<0.422
MW110	Alley Between	12/19/13	SES	390	20.4	0.603	158	–	0.079	0.04	0.04	3.28	7.66	<5.0	<5.0
	8th & 9th Ave N	3/23/17	PES	425	36.2	0.652	108	7.98	0.948 J	0.1	0.848	3.90	125	1.21 J	<0.422
		6/27/17	PES	516	27.0	<0.0227	160	4.91	0.115 B	0.0	0.115	2.13	95.5	17.4	<0.422
MW114	SDOT Property S of Roy	12/18/13	SES	190	31.2	0.032	98.8	–	0.075	0.03	0.05	0.629	<5.0	<5.0	<5.0
MW115	9th Ave N ROW	12/19/13	SES	580	22.1	<0.025	3.35	–	6.24	6.69	0	1.44	2,550	<5.0	<5.0
		3/22/17	PES	417	28.5	<0.0227	35.9	7.69	5.69	1.5	4.19	1.32	215	<0.296	<0.422
		6/22/17	PES	401	33.0	<0.0227	46.1	7.39	6.19	1.5	4.69	1.19	3,570	4.98	<0.422
MW116	9th Ave N ROW	12/19/13	SES	310	26.2	<0.025	14.5	–	2.48	2.65	0	1.14	1,750	<5.0	<5.0
		3/21/17	PES	432	22.0	<0.0227	25.7	7.34	6.01	3.9	2.11	0.869	8,590	<0.296	<0.422
		6/16/17	PES	377	25.1	<0.0227	9.31	6.80	6.69	1.8	4.89	0.793	8,610	<0.296	<0.422
MW117	Dexter Ave N ROW	12/18/13	SES	200	9.11	<0.025	56.3	–	1.49	2.03	0	0.344	<5.0	<5.0	<5.0
MW119	9th Ave N ROW	12/19/13	SES	310	12.1	<0.025	3.34	–	19.4	18.6	0.8	2.55	3,450	<5.0	<5.0
		3/29/17	PES	255	20.5	0.164	14.9	6.84	17.1	2.0	15.1	2.98	819	<0.296	<0.422
		6/28/17	PES	360	13.7	<0.0227 J	56.1	9.09	5.66	1.5	4.2	1.25	73.5	<0.296	<0.422
MW120	8th Ave N ROW	12/19/13	SES	290	36.5	0.069	99.4	–	0.288	0.17	0.12	0.319	10.1	<5.0	<5.0
MW131	Property	3/27/17	PES	911	141	<0.0227	<0.0774	8.93	7.98	1.90	6.08	1.06	16,200	<0.296	280
		6/20/17	PES	1,050	122	<0.0227	0.724 J	10.8	7.42	–	–	1.01	10,700	<0.296	332
Intermediate "B" Water-Bearing Zone															
MW111	Alley Between	12/17/13	SES	170	47.3	<0.025	4.73	–	0.168	0.18	0	0.135	14.7	<5.0	<5.0
	8th & 9th Ave N	3/23/17	PES	179	22.9	0.068 J	8.25	0.918 J	0.391	0.1	0.3	0.151	136	5.75	4.17
		6/14/17	PES	202	23.2	<0.0227	8.97	1.20	0.298	–	–	0.142	231	7.73	6.71
MW112	Dexter Ave N ROW	12/26/13	SES	160	12.3	0.064	44.9	–	0.560	0.23	0.33	0.106	<5.0	<5.0	<5.0
		3/22/17	PES	188	10.6	<0.0227	45.2	1.35	0.238	–	–	0.0411	4.89	<0.296	<0.422
		6/16/17	PES	240	1.15	0.162	1.26 J	5.48	2.56	–	–	0.0871	1.78	<0.296	<0.422
MW130	Property	3/29/17	PES	276	100	<0.0227	7.07	10.7	1.19	1.0	0.19	0.555	619	1.62	30.0
		6/30/17	PES	339	115	<0.0227	6.23	1.84 J	0.907	0.0	0.907	0.532	1040	2.47	64.5
	(dup)	6/30/17	PES	335	111	<0.0227	6.16	9.68 J	0.876	0.0	0.876	0.527	1120	2.33	69.1
W-MW-01	8th Ave N ROW	3/30/17	PES	211	23.8	<0.0227	29.0	1.84	18.2	0.25	18.0	0.542	367	0.757 J	1.27 J
		6/19/17	PES	250	27.6	0.0727 J	28.3	3.00	9.48	–	–	0.321	461	<0.296	<0.422
W-MW-02	8th Ave N ROW	12/16/13	SES	240	105	<0.025	101	–	0.672	0.87	0	0.676	8.91	<5.0	<5.0
		3/27/17	PES	455	142	<0.0227 J	<0.0774	204	47.5	1.75	45.8	4.12	6,740	<0.296	8.32
		6/19/17	PES	520	103	<0.0227 J	<0.0774	116	33.7	32.2	1.5	2.98	16,900	<0.296	3.71

Table 8

Groundwater Monitored Natural Attenuation Parameters
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Sample Location	Property	Sample Date	Sampled By	Alkalinity (mg $CaCO_3$/L)	Chloride (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	TOC (mg/L)	Iron (mg/L)			Total Manganese (mg/L)	Dissolved Gases (µg/L)		
									Total	Ferrous	Ferric		Methane	Ethane	Ethene
Deep Water-Bearing Zone															
FMW-129	SDOT Property S of Roy	4/10/17	PES	308	44.2	<0.0227	124	2.74	0.365	0.00	0.365	0.402	279	26.8	<0.422
		6/23/17	PES	296	36.1	0.0914 J	95.5	1.70	9.92			0.412	276	14.7	<0.422
FMW-131	Block 37	3/24/17	PES	166	6.12	<0.0227	0.738	2.18	0.598	0.5	0.098	1.03	159	1.19 J	<0.422
		6/23/17	PES	273	28.1	0.109	29.2	1.56	2.39			1.26	87.4	<0.296	<0.422
GEI-2	Block 37	3/24/17	PES	420	12.5	<0.0227	<0.0774	8.14	24.0	0.25	23.8	0.898	15.1	<0.296	<0.422
		6/23/17	PES	458	23.0	<0.0227	<0.0774	6.84	14.9			0.483	10,500	23.8	42.5
MW103	Alley Between	12/18/13	SES	380	48.8	<0.025	0.99	–	1.14	1.39	0	1.10	67.5	9.14	13.5
	8th & 9th Ave N	3/23/17	PES	337	48.4	<0.0227	36.3	1.97	1.68	0.25	1.43	1.09	433	82.5	34.1
		6/14/17	PES	339	34.7	<0.0227	28.1	2.58	4.56			0.936	863	84.6	43.1
MW104	8th Ave N ROW	12/17/13	SES	310	28.9	<0.025	23.1	–	5.45	5.03	0.42	0.757	25.4	<5.0	<5.0
		3/30/17	PES	253	36.0	<0.0227	18.8	3.44	0.487	–	–	0.178	170	3.35	2.71
		6/30/17	PES	218	11.7	<0.0227	6.05	1.68	1.77	0.0	1.77	0.360	40.6	<0.296	<0.422
MW105	Roy Street ROW	12/29/13	SES	440	48.3	0.716	29.3	–	2.91	2.01	0.90	1.24	44.5	<5.0	6.14
MW106	SDOT Property S of Roy	4/14/17	PES	309	28.7	<0.0227	17.9	5.9	14.1	0.0	14.1	1.08	79.5	<0.296	2.62
		6/30/17	PES	305	27.3	<0.0227	18.0	10.0	4.96	0.0	4.96	0.779	38.7	<0.296	<0.442
MW113	9th Ave N ROW	12/19/13	SES	96	23.5	0.280	17.4	–	0.119	0.03	0.09	0.0248	<5.0	<5.0	<5.0
		3/22/17	PES	594	65.5	0.0295 J	55.4	27.0	7.46	4.0	3.46	0.757	3.53	<0.296	<0.422
		6/16/17	PES	587	57.5	<0.0227	41.9	18.0	14.4	1.5	12.9	0.990	6,520	147	<0.422
MW124	Valley Street ROW	12/26/13	SES	160	5.96	1.22	0.73	–	1.46	0.39	1.07	0.125	<5.0	<5.0	<5.0
MW128	Westlake Ave N ROW	3/29/17	PES	387	15.9	<0.0227	<0.0774	4.84	10.5	1.8	8.7	0.227	12,600	13.2	64.8
		6/21/17	PES	1,050	24.6	<0.0227	<0.0774	7.81	23.0	–	–	0.704	19,600	33.4	45.1

NOTES:

1. mg/L = milligrams per liter
2. ug/L = micrograms per liter
3. $mgCaCO_3$/L= milligrams of calcium carbonate per liter
4. µS/cm = microSiemens per centimeter
5. mV = millivolts
6. ORP = oxidation-reduction potential
7. < = not detected at concentration
8. Ferric iron = total iron minus ferrous iron; if total iron < ferrous iron, ferric iron is reported as 0
9. PES = PES Environmental, Inc.
10. SES = SoundEarth Strategies, Inc.
11. Q = Sample was prepared and/or analyzed past recommended holding time.
12. V = The sample concentration is too high to evaluate accurate spike recoveries.

Table 9

Groundwater Field Parameters
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Sample Location	Property	Sample Date	pH	Specific Conductance (μS/cm)	Temperature (^oC)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	ORP (mv)	Ferrous Iron (mg/L)
Shallow Water-Bearing Zone									
F13	Property	3/27/17	6.80	756	15.4	3.4	0.86	-139	1.0
		6/22/17	7.00	865	20.2	–	0.27	-148	1.5
F5	Property	3/28/17	6.05	1,001	10.9	5.8	0.99	-50.5	–
		6/22/17	6.38	1,080	19.5	–	0.80	-87.1	–
F9	Property	3/27/17	6.69	1,270	16.6	3.1	0.74	-151	–
		6/22/17	6.76	1,309	27.5	–	0.24	-149	–
G12	Property	3/27/17	7.34	1,296	20.7	–	0.41	150	1.25
		6/30/17	6.88	1,239	29.1	–	1.30	-87	–
J5	Property	3/21/17	6.95	251	15.1	4.6	0.70	-114	0.6
		6/26/17	6.94	484	19.8	–	0.42	-143	–
J15	Property	3/27/17	7.42	935	14.1	–	0.48	141	2.0
		6/26/17	6.86	920	20.8	–	0.44	-99	1.5
K8	Property	3/21/17	7.70	251	18.3	-0.3	0.80	-121	0.0
		6/26/17	7.76	257	22.3	–	0.25	-4	0.0
M15	Property	3/27/17	7.16	1,544	18.7	–	0.60	140	2.75
		6/26/17	6.71	1,440	25.6	–	0.70	-84	–
MW121	Property	12/26/13	6.89	1,610	–	–	4.16	-30	1.9
		3/28/17	6.63	2,608	14.4	2.9	0.99	-122	2.0
		6/20/17	8.29	2,437	19.9	–	0.52	-88	3.0
MW125	Valley Street ROW	12/26/13	6.28	1,414	–	–	8.68	22	1.47
		3/22/17	6.62	1,296	14.6	3.7	1.00	-116	–
		6/28/17	6.71	984	17.1	–	1.91*	-101	–
MW214	Valley Street ROW	3/30/17	7.47	467	11.0	3.6	5.91	-70.1	–
(dry)		6/21/17	–	–	–	–	–	–	–
MW-8	800 Aloha Street Parcel	3/20/17	6.47	1,080	14.2	11.4	1.30	-4.0	–
(dry)		6/27/17	–	–	–	–	–	–	–
MW-9	8th Ave N ROW	12/16/13	6.72	132	–	–	0.20	263	3.41
		3/20/17	6.64	1,203	13.0	0.0	1.00	-109	–
		6/20/17	6.41	1,391	20.8	–	0.76	-93	–
N7	Property	3/30/17	6.82	350	15.9	2.8	1.11	-73.8	0.0
		6/27/17	6.83	505	24.9	1.7	1.74*	-3.5	0.25
R-MW2	Property	3/21/17	7.00	723	11.4	17.6	0.80	-161	–
		6/15/17	6.78	766	15.5	–	0.43	-161	–
R-MW3	Property	3/21/17	7.06	1,616	16.7	4.1	0.90	-38.7	–
		6/28/17	7.11	1,258	23.5	–	1.01	-131.6	–
R-MW5	8th Ave N ROW	3/23/17	6.12	537	17.1	–	0.80	-36.6	1.0
		6/16/17	5.85	516	17.6	–	1.12	-370.4	–
R-MW6	8th Ave N ROW	3/21/17	6.56	1,280	14.8	6.6	0.80	-38.5	–
		6/20/17	6.57	1,407	18.0	–	0.84	-55.5	1.5
SCL-MW101	Alley Between 8th & 9th Ave N	3/28/17	7.34	834	11.8	–	0.35	118	–
		6/14/17	6.35	628	17.9	–	0.12	-49	–
SCL-MW105	Alley Between 8th & 9th Ave N	3/28/17	7.19	1,049	12.6	–	0.50	136	–
		6/15/17	6.45	1,086	15.8	–	1.11	-95	–

Table 9

Groundwater Field Parameters
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Sample Location	Property	Sample Date	pH	Specific Conductance (μS/cm)	Temperature (^oC)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	ORP (mv)	Ferrous Iron (mg/L)
SCS-2	800 Aloha Street Parcel	3/20/17	6.50	947	13.0	1.6	1.00	-142	–
		6/12/17	6.41	761	17.3	–	0.59	-31	–
SMW-3	Valley Street ROW	3/30/17	6.48	743	11.8	2.9	0.98	-85.7	–
		6/21/17	6.35	589	20.9	–	0.41	-57.3	–
Intermediate "A" Water-Bearing Zone									
BB-8	Roy Street ROW	12/29/13	6.56	8,560	–	–	0.72	224	0.01
		3/22/17	6.74	621	14.6	-0.6	1.80	-22.9	0.0
		6/14/17	6.29	649	14.5	–	1.12	187.9	0.0
GEI-1	Block 37	3/24/17	6.41	1,127	12.0	24.1	0.80	-103	1.0
		6/13/17	6.65	553	14.9	–	0.56	-38	–
MW107	8th Ave N ROW	12/16/13	6.62	900	–	–	1.14	22	0.43
		3/27/17	7.10	1,434	13.7	–	0.50	141	2.0
		6/19/17	6.24	1,434	22.5	–	0.77	-30	1.5
MW108	Alley Between 8th & 9th Ave N	12/17/13	6.36	1,570	–	–	0.50	-72	21.7
		3/28/17	6.65	1,410	13.6	2.0	0.97	-98.9	2.5
		6/27/17	6.72	1,252	16.3	–	4.45*	-108.0	2.0
MW109	Alley Between 8th & 9th Ave N	12/17/13	6.68	1,540	–	–	0.31	-78	16.2
		3/29/17	6.59	916	14.9	2.8	0.77	-115	1.5
		6/27/17	6.72	1129	16.9	–	3.85*	-107	1.5
MW110	Alley Between 8th & 9th Ave N	12/19/13	8.82	888	–	–	0.52	291	0.04
		3/23/17	6.66	1,109	13.1	0.4	1.05	-46.5	0.1
		6/27/17	7.13	1,010	17.2	–	1.42*	56.7	0.0
MW115	9th Ave N ROW	12/19/13	6.80	1,220	–	–	0.71	-61	6.69
		3/22/17	7.28	880	14.8	–	0.51	160	1.5
		6/22/17	6.85	778	20.2	–	0.39	-102	1.5
MW116	9th Ave N ROW	12/19/13	6.84	498	–	–	0.67	75	2.65
		3/21/17	7.05	814	13.3	6.2	0.80	-127	3.9
		6/16/17	6.86	749	18.7	–	0.41	-641	1.8
MW119	9th Ave N ROW	12/19/13	9.56	579	–	–	0.34	295	18.6
		3/29/17	6.41	631	13.4	2.4	0.85	-90.7	2.0
		6/28/17	6.29	676	17.4	–	4.88*	11.0	1.5
MW120	8th Ave N ROW	12/19/13	6.63	743	–	–	1.30	-13	0.17
		3/28/17	7.93	622	9.5	–	0.75	123	–
		6/28/17	6.60	568	17.8	–	1.33*	91	–
MW131	Property	3/27/17	7.01	2,045	19.5	2.4	0.85	-134	1.9
		6/20/17	15.39[a]	2,071	21.9	–	0.62	-86	–
Intermediate "B" Water-Bearing Zone									
MW111	Alley Between 8th & 9th Ave N	12/17/13	7.58	498	–	–	1.19	-99	0.18
		3/23/17	7.62	447	14.0	-0.5	1.23	-147	0.1
		6/14/17	7.29	431	19.7	–	1.15	-33	–
MW112	Dexter Ave N ROW	12/26/13	7.79	378	–	–	2.58	223	0.23
		3/22/17	7.96	419	14.9	–	0.93	132	–
		6/16/17	7.11	49	22.0	–	5.22	-457	–

Table 9

Groundwater Field Parameters
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Sample Location	Property	Sample Date	pH	Specific Conductance (μS/cm)	Temperature (°C)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	ORP (mv)	Ferrous Iron (mg/L)
MW126	Alley Between 8th & 9th Ave N	3/28/17	7.41	397	12.8	2.0	1.37	-112	–
		6/15/17	7.69	385	15.9	–	0.70	-64	–
MW130	Property	3/29/17	7.18	751	9.6	–	2.66	132	1.0
		6/30/17	7.32	858	29.7	–	0.99	-70	0.0
MW-132	Property	9/25/17	8.52[a]	652	27.3	39.7[b]	0.70	-151.2	–
MW-134	Property	9/22/17	13.08[a]	565	19.0	MAX[b]	0.91	-47.7	–
MW-135	Property	9/25/17	9.11[a]	871	25.3	208[b]	1.10	-24.8	–
MW-136	Property	9/25/17	10.07[a]	465	24.2	MAX[b]	0.60	-61.0	–
MW-139	Property	9/25/17	9.65[a]	340	26.4	MAX[b]	0.60	-163	–
W-MW-01	8th Ave N ROW	3/30/17	7.63	536	16.7	–	0.62	111	0.25
		6/19/17	7.11	564	22.7	–	1.31	-23	–
W-MW-02	8th Ave N ROW	12/16/13	7.05	999	–	–	0.30	-84	0.87
		3/27/17	6.53	1,239	17.8	–	0.41	135	1.75
		6/19/17	6.02	1,326	20.0	–	1.45*	-11	1.50
Deep Water-Bearing Zone									
FMW-129	SDOT Property S of Roy	4/10/17	8.88	891	12.4	–	0.82	-116	0.0
		6/23/17	6.82	703	20.2	–	0.60	-31	1.0
FMW-131	Property	3/24/17	6.73	342	13.3	2.9	0.84	-41.6	0.5
		6/23/17	6.71	552	15.4	–	0.78	25.1	0.25
FMW-3D	Block 31	3/24/17	6.85	302	13.7	16.9	1.06	-74.7	–
		6/23/17	6.81	356	19.9	–	0.48	-16.5	–
GEI-2	Block 37	3/24/17	6.43	890	12.6	0.5	0.84	-77.6	0.25
		6/23/17	6.68	804	16.0	–	0.45	-80.0	1.0
MW102	Valley Street ROW	3/29/17	7.87	417	11.6	–	1.55	148	–
		6/15/17	7.89	292	16.8	–	0.69	-88	–
MW103	Alley Between 8th & 9th Ave N	12/18/13	10.45	735	–	–	0.26	267	1.39
		3/23/17	7.49	799	13.4	–	0.91	155	0.25
		6/12/17	7.35	648	17.0	–	0.31	-88	1.75
MW104	8th Ave N ROW	12/17/13	8.49	591	–	–	0.48	245	5.03
		3/30/17	6.28	667	8.7	–	1.84	131	–
		6/30/17	7.70	383	25.5	–	0.23	-131	0.0
MW105	Roy Street ROW	12/29/13	7.49	1,165	–	–	1.26	216	2.01
		4/21/17	7.47	785	17.1	105	2.34	-36.8	–
		6/12/17	7.37	734	17.1	–	0.70	-64.1	–
MW106	SDOT Property S of Roy	4/14/17	9.47	726	15.1	457	2.00	1.7	0.0
		6/30/17	7.69	566	19.7	–	0.40	-128.2	0.0
MW113	9th Ave N ROW	12/19/13	10.0	267	–	–	0.26	264	0.03
		3/22/17	6.54	1,426	15.2	2.1	1.10	-79.1	4.0
		6/16/17	6.52	1,145	12.9	–	0.57	-5.7	1.5
MW122	Alley Between 8th & 9th Ave N	3/28/17	7.89	519	13.5	–	0.64	109	–
		6/14/17	7.72	374	16.7	–	0.46	-69	–
MW123	Westlake Ave N ROW	4/1/17	6.85	795	13.1	14.5	1.10	-117	–
		6/24/17	6.89	737	17.3	–	1.07	-89	–

Table 9

Groundwater Field Parameters
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Sample Location	Property	Sample Date	pH	Specific Conductance (μS/cm)	Temperature (^oC)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	ORP (mv)	Ferrous Iron (mg/L)
MW124	Valley Street ROW	12/26/13	7.84	285	–	–	1.43	217	0.39
		3/29/17	7.96	306	13.9	–	1.06	117	–
		6/15/17	7.64	292	16.5	–	0.50	9	–
MW128	Westlake Ave N ROW	3/29/17	6.62	800	12.5	7.0	0.99	-88.0	1.8
		6/21/17	6.74	1588	17.8	–	0.56	-78.8	–
MW-133	Property	9/25/17	9.85[(a)]	372	24.0	–	0.80	-156.5	–
MW-137	Property	9/25/17	9.22[(a)]	342	26.0	223[(b)]	0.60	-147.5	–
MW-138	Dexter Ave N ROW	9/21/17	8.32[(a)]	390	18.1	MAX[(b)]	0.52	-331.3	–
MW-140	Roy St ROW	9/22/17	7.99[(a)]	560	21.6	200[(b)]	0.73	-208.8	–
MW-141	Property	9/22/17	9.90[(a)]	398	24.0	MAX[(b)]	0.40	-392.8	–

Notes:
1. – = not measured
2. [(a)] = pH meter not giving stable/reliable reading
3. [(b)] = Turbidity reading collected and read with a turbidmeter after water sample collection.
4. * =
5. MAX = Turbidity greater than instrument upper detection limit.

Table 10

Summary of Soil Physical Properties
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Location	Sample Depth (feet)	Unit	Sample USCS	Component Percentage			Hydraulic Conductivity Based On Grain Size Analysis (cm/sec)			Lab K (cm/sec)	TOC (mg/kg)	f_{oc} (g/g)	Dry Bulk Density (pcf)	Moisture Content (%)
				Gravel	Sand	Silt/ Clay	Max	Median	Min					
B-201	30	Int. A	SM	5.5	72.2	22.3	–	–	–	–	–	–	–	–
B-202	10	Shallow	SM	15.2	64.4	20.4	–	–	–	–	–	–	–	–
B-202	45	Int. A	SM	18.1	63.0	18.9	–	–	–	–	–	–	–	–
B-203	30	Int. A	SP	0.9	89.1	10.0	–	–	–	–	–	–	–	–
B-203	75	Int. B	ML	4.2	44.2	51.6	–	–	–	–	–	–	–	–
B-204	40	Int. A	SM	11.6	46.1	42.3	–	–	–	–	–	–	–	–
B-205	63	Int. B	SM	1.3	60.29	38.46	2.62E-03	1.12E-03	3.71E-04	–	–	–	–	–
B-205	79	Int. B	ML	–	–	–	–	–	–	–	1,450	1.45E-03	–	–
B-206	47	Int. A	SM	6.7	58.3	35.0	3.33E-03	1.43E-03	4.73E-04	–	–	–	–	–
B-206	48	Int. A	SM	3.0	77.0	19.9	8.43E-04	3.62E-04	1.20E-04	–	–	–	–	–
B-206	50 - 51	Int. A	SM	–	–	–	–	–	–	1.54E-06	–	–	114.8	10.2
B-207	50	Int. A	SM	13.3	54.8	31.9	3.70E-03	1.59E-03	5.25E-04	–	–	–	–	–
B-207	52	Int. B	ML	–	–	–	–	–	–	–	1,500	1.50E-03	–	–
B-208	56 - 57	Int. B	SM	4.8	62.2	33.0	3.47E-03	1.49E-03	4.93E-04	–	–	–	–	–
B-209	57	Int. B	SM	4.1	55.8	40.2	2.44E-03	1.05E-03	3.46E-04	–	–	–	–	–
B-209	73	Int. B	SM	–	–	–	–	–	–	–	1,900	1.90E-03	–	–
B-210	59 - 60	Int. B	SM	6.9	48.8	44.2	1.87E-03	8.03E-04	2.66E-04	–	–	–	–	–
B-211	83	Deep	SP	5.4	90.3	4.3	7.60E-02	3.26E-02	1.08E-02	–	–	–	–	–
B-212	54	Int. B	ML	0.0	1.6	98.4	8.65E-06	3.71E-06	1.23E-06	–	–	–	–	–
B-213	99	Deep	SM	3.1	81.9	15.1	1.07E-02	4.59E-03	1.52E-03	–	–	–	–	–
B-213	125	Deep	SM	–	–	–	–	–	–	–	390	3.90E-04	–	–
B-216	77	Int. B	SM	2.9	65.0	32.1	3.66E-03	1.57E-03	5.20E-04	–	–	–	–	–
B-217	97 - 99	Deep	SP	32.1	61.0	6.9	4.42E-02	1.90E-02	6.27E-03	–	–	–	–	–
B-219	73	Int. B	SM	4.1	72.6	23.3	5.98E-03	2.57E-03	8.49E-04	–	–	–	–	–
MW-132	53	Int. A	SM	4.4	69.8	25.8	4.43E-03	1.90E-03	6.29E-04	–	–	–	–	–
MW-132	82	Int. B	ML	–	–	–	–	–	–	–	2,100	2.10E-03	–	–
MW-133	106	Deep	GM	52.3	41.1	6.6	5.68E-02	2.44E-02	8.06E-03	–	–	–	–	–
MW-135	50	Int. A	SM	6.0	75.0	19.0	7.86E-03	3.37E-03	1.12E-03	–				
MW-135	60 - 60.5	Int. B	SM	–	–	–	–	–	–	9.32E-07	–	–	127.4	10.9
MW-136	77	Int. B	ML	0.0	0.9	99.1	1.65E-06	7.08E-07	2.34E-07	–	–	–	–	–
MW-137	50	Int. A	ML	0.0	0.1	99.9	3.75E-06	1.61E-06	5.32E-07	–	–	–	–	–
MW-137	90	Int. B	ML	–	–	–	–	–	–	–	2,450	2.45E-03	–	–

Table 10

Summary of Soil Physical Properties
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Location	Sample Depth (feet)	Unit	Sample USCS	Component Percentage			Hydraulic Conductivity Based On Grain Size Analysis (cm/sec)			Lab K (cm/sec)	TOC (mg/kg)	f_{oc} (g/g)	Dry Bulk Density (pcf)	Moisture Content (%)
				Gravel	Sand	Silt/ Clay	Max	Median	Min					
MW-137	115	Deep	SP	11.2	81.6	7.3	2.98E-02	1.28E-02	4.24E-03	–	–	–	–	–
MW-138	65	Int. A	SM	9.6	73.5	16.9	1.21E-02	5.18E-03	1.71E-03	–	–	–	–	–
MW-138	115	Deep	SP	19.7	73.1	7.2	3.57E-02	1.53E-02	5.07E-03	–	–	–	–	–
MW-139	80	Int. B	SM	0.3	82.7	17.0	8.94E-03	3.84E-03	1.27E-03	–	–	–	–	–
MW-140	80 - 80.5	Int. B	ML/SM	6.7	54.5	38.7	2.40E-03	1.03E-03	3.41E-04	8.53E-07	–	–	112.4	12.6
MW-140	100	Deep	SP	18.5	78.7	2.9	9.38E-02	4.02E-02	1.33E-02	–	–	–	–	–

Notes:
1. Depths in feet below ground surface.
2. cm/sec = centimeters per second.
3. – = not determined.
3. Int. A = Intermediate A water-bearing zone, Int. B = water-bearing zone, Deep = deep water-bearing zone.
4. UCSC = Unified Soil Classification System symbol; GP = poorly graded gravel, SP = poorly graded sand, SM = silty sand, ML = sandy silt, silt with sand, or silt.
5. Grain size determined using ASTM D422/D4464M (sieve/laser or hydrometer).
6. Lab did not run hydrometer below No. 400 (except on samples B-212 at 54 ft, MW-136 at 77 ft, MW-137 at 50 ft, and B-206 at 50 ft). Remaining pan weights distributed evenly across 25, 15.6, and 5 microns for hydraulic conductivity based on grain size analysis calculations.
7. Horizontal hydraulic conductivity based on grain size distributions calculated using the Kozeny-Carmen Equation.
8. Laboratory hydraulic conductivity (K) determined using ASTM D-5084.
9. f_{oc} determined using the Walkley-Black method.
10. Dry bulk density and moisture content determined using ASTM D2937.

Table 11

Preliminary Screening Levels
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Chemical Name	CAS #	Soil Screening Levels: Historical Lab PQLs (mg/kg)	Soil: Current Lab PQLs (mg/kg)	Soil, Unsaturated, Protection of Residential Groundwater: Level (mg/kg)	Soil, Unsaturated, Protection of Residential Groundwater: Basis	Soil, Unsaturated, Protection of Surface Water: Level (mg/kg)	Soil, Unsaturated, Protection of Surface Water: Basis	Soil, Saturated: Screening Level (mg/kg)	Soil, Saturated: Basis	Groundwater Screening Levels: Historical Lab PQLs (µg/L)	Groundwater: Current Lab PQLs (µg/L)	Groundwater, Protection of Residential Groundwater: Level (µg/L)	Groundwater, Protection of Residential Groundwater: Basis	Groundwater, Protection of Surface Water: Level (µg/L)	Groundwater, Protection of Surface Water: Basis	Vapor Intrusion Screening Levels: Groundwater (µg/L)	Vapor Intrusion: Sub-Slab Soil Vapor (µg/m³)
acetone	67-64-1	0.5	0.05	28.9	Leach	–	–	2.07	Leach	10	25	7,200	Method B	–	–	–	–
benzene	71-43-2	0.0008 - 0.05	0.001	0.028	Leach	0.050	Leach/PQL	0.030	Leach	0.35	0.5	5	MCL	0.5	CWA	2.4	10.7
n-butylbenzene	104-51-8	–	0.001	14.1	Leach	–	–	0.703	Leach	1	0.5	400	Method B	–	–	–	–
sec-butylbenzene	135-98-8	0.05	0.001	25.0	Leach	–	–	1.25	Leach	1	0.5	800	Method B	–	–	–	–
tert-butylbenzene	98-06-6	0.05	0.001	8,000	Method B	–	–	–	–	–	0.5	800	Method B	–	–	–	–
2-butanone (MEK)	78-93-3	0.5	0.01	19.7	Leach	–	–	0.983	Leach	10	2.5	4,800	Method B	–	–	1,739,130	76,190
carbon disulfide	75-15-0	–	0.001	5.65	Leach	–	–	0.266	Leach	–	0.5	800	Method B	–	–	400	10,667
chloroethane (ethyl chloride)	75-00-3	0.5	0.005	–	–	–	–	–	–	1	0.5	–	–	–	–	18,286	152,381
chloroform	67-66-3	0.05	0.005	0.0750	Leach	0.094	Leach	0.005	Leach/PQL	1	0.5	80	MCL	100	CWA	1.2	3.6
chloromethane	74-87-3	0.5	0.0025	–	–	–	–	–	–	10	2.5	–	–	–	–	153	1,371
1,1-dichloroethane	75-34-3	0.05	0.001	0.0419	Leach	–	–	0.003	Leach	1	0.5	7.68	Method B	–	–	11.2	52
1,2-dichloroethane (EDC)	107-06-2	0.05	0.001	0.0232	Leach	0.0183	Leach	0.002	Leach	0.5	0.5	0.481	Method B	0.38	CWA	4.2	3.21
1,1-dichloroethene	75-35-4	0.05	0.001	0.0501	Leach	5.01	Leach	0.050	Leach/PQL	1	0.5	7	MCL	700	CWA	130	3,048
cis-1,2-dichloroethene (cDCE)	156-59-2	0.0008 - 0.05	0.001	0.080	Leach	0.080	Leach	0.050	Leach/PQL	1	0.5	16	MCL	–	–	–	–
trans-1,2-dichloroethene (tDCE)	156-60-5	0.0007 - 0.05	0.001	0.41	Leach	0.54	Leach	0.050	Leach/PQL	1	0.5	100	MCL	100	CWA	–	–
1,2-dichloropropane	78-87-5	0.05	0.001	0.0257	Leach	0.004	Leach	0.002	Leach	1	0.5	5	MCL	0.71	ECY	3.89	8
di-isopropyl ether	108-20-3	–	0.001	–	–	–	–	–	–	–	0.5	–	–	–	–	–	–
ethylbenzene	100-41-4	0.0008 - 0.05	0.001	6.05	Leach	2.51	Leach	0.343	Leach	1	0.5	70	MCL	29	CWA	2,783	15,238
n-hexane	110-54-3	–	0.001	96.2	Leach	–	–	1.77	Leach	–	1.0	480	Method B	–	–	7.8	10,667
isopropylbenzene (cumene)	98-82-8	0.05	0.001	15.0	Leach	–	–	0.751	Leach	1	0.5	800	Method B	–	–	720	6,095
p-isopropyltoluene	99-87-6	0.05	0.001	–	–	–	–	–	–	1	0.5	–	–	–	–	–	–
4-methyl-2-pentanone (MIBK)	108-10-1	0.5	0.01	2.73	Leach	–	–	0.136	Leach	10	2.5	640	Method B	–	–	471,429	45,714
methylene chloride	75-09-2	0.05	0.001	0.0218	Leach	0.020	Leach	0.00148	Leach	0.5	0.5	5	MCL	4.6	CWA	4,434	8,333
naphthalene	91-20-3	0.05	0.005	4.46	Leach	–	–	0.236	Leach	1	0.5	160	Method B	–	–	8.93	2
n-propylbenzene	103-65-1	0.05	0.001	16.8	Leach	–	–	0.840	Leach	1	0.5	800	Method B	–	–	–	–
tetrachloroethene (PCE)	127-18-4	0.0008 - 0.025	0.001	0.053	Leach	0.026	Leach/PQL	0.025	Leach/PQL	1	0.5	5	MCL	2.4	NTR	23	320
toluene	108-88-3	0.0008 - 0.05	0.005	4.65	Leach	0.335	Leach	0.273	Leach	1	1.0	1,000	MCL	72	CWA	15,584	76,190
tph, diesel- and oil-range organics	None	25 - 100	50	2,000	Method A	–	–	–	–	50 - 250	200	500	Method A	–	–	–	–
tph: gasoline range, benzene present	None	1 - 30	5	30	Method A	–	–	–	–	50 - 100	100	800	Method A	–	–	–	–
tph: gasoline range, no detectable benzene	None	1 - 30	5	100	Method A	–	–	–	–	50 - 100	100	1,000	Method A	–	–	–	–
1,1,1-trichloroethane (TCA)	71-55-6	0.05	0.001	1.58	Leach	372	Leach	0.0843	Leach	1	0.5	200	MCL	47,000	ECY	5,238	76,190
trichloroethene (TCE)	79-01-6	0.0008 - 0.03	0.001	0.030	Leach/PQL	0.030	Leach/PQL	0.030	Leach/PQL	1	0.5	4	MCL	1	CWA/PQL	1.6	12
1,1,2-trichlorotrifluoroethane (CFC 113)	76-13-1	–	0.001	10,850	Leach	–	–	543	Leach	–	0.5	240,000	Method B	–	–	1,100	457,143
1,2,4-trimethylbenzene	95-63-6	0.05	0.001	–	–	–	–	–	–	1	0.5	–	–	–	–	28.4	107
1,2,3-trimethylbenzene	526-73-8	–	0.001	–	–	–	–	–	–	–	0.5	–	–	–	–	–	–
1,3,5-trimethylbenzene	108-67-8	0.05	0.001	1.33	Leach	–	–	0.0667	Leach	1	0.5	80	Method B	–	–	–	–
vinyl chloride (VC)	75-01-4	0.0007 - 0.05	0.001	0.050	Leach/PQL	0.050	Leach/PQL	0.050	Leach/PQL	0.2	0.5	2	MCL	0.2	CWA/PQL	0.35	9.30
xylene;m-	108-38-3	0.1	NA	13.5	Leach	–	–	0.772	Leach	2	NA	–	–	–	–	310	1,524
xylene;o-	95-47-6	0.05	NA	14.7	Leach	–	–	0.844	Leach	1	NA	–	–	–	–	440	1,524
xylene;p-	106-42-3	0.1	NA	17.2	Leach	–	–	0.956	Leach	2	NA	–	–	–	–	–	–
xylenes	1330-20-7	0.0016 - 0.15	0.003	14.6	Leach	–	–	0.831	Leach	0.5 - 1	1.5	10,000	MCL	–	–	–	–

NOTES:

a. CAS # = Chemical Abstracts Service Registry Number.

b. Screening levels for the chlorinated VOCs either presented in or using the methods outlined in Ecology's draft technical memorandum dated January 28, 2016, re: preliminary cleanup levels and screening levels for American Linen Supply.

c. Method A cleanup levels (unrestricted land use) from the Model Toxics Control Act (WAC 173-340).

d. Leach = leaching to groundwater.

e. MCL = maximum contaminant level

f. CWA = clean water act, for protection of human health through consumption of both water and organisms.

g. NTR = national toxics rule, for protection of human health through comsumption of both water and organisms.

h. ECY = human health criterion for comsumption of water and organisms (WAC-173-201A, August 1, 2016).

i. PQL = screening level adjusted upward to the practical quantitation limit.

j. Sub-slab soil gas screening levels from Ecology Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action (October, 2009; revised February 2016).

m. – = not available.

n. Selected preliminary screening levels highlighted in gray.

Table 12

Groundwater Natural Attenuation Screening
700 Dexter Avenue North, Seattle, Washington

Sample Location	Property	Sample Date	Preliminary EPA Anaerobic Biodegradation Screening Score														
			Alky	Chloride	Nitrate	Sulfate	TOC	Iron II	Methane	Ethane/ Ethene	pH	DO	ORP	TCE	cDCE	VC	Total Score
Shallow Water-Bearing Zone																	
F13	Property	3/27/17	0	0	2	0	0	3	3	0	0	0	2	0	0	2	12
		6/22/17	1	2	2	2	0	3	3	0	0	3	2	0	0	2	20
J5	Property	3/21/17	0	2	2	2	0	0	3	2	0	0	2	2	2	2	19
		6/26/17	0	2	2	2	0	0	3	2	0	3	2	2	2	2	22
J15	Property	3/27/17	1	2	2	0	2	3	3	0	0	3	0	0	2	2	20
		6/26/17	1	2	2	0	0	3	3	0	0	3	1	0	2	2	19
K8	Property	3/21/17	0	0	2	0	0	0	0	0	0	0	2	2	2	2	10
		6/26/17	0	2	2	0	0	0	0	0	0	3	1	2	2	0	12
M15	Property	3/27/17	1	0	2	0	0	3	3	0	0	0	0	2	2	2	15
		6/26/17	1	0	2	0	0	0	3	0	0	0	1	2	2	2	13
MW121	8th Ave N ROW	12/26/13	1	2	2	0	0	3	0	0	0	0	1	0	0	2	11
		3/28/17	1	2	2	0	0	3	0	0	0	0	2	0	2	2	14
		6/20/17	1	2	2	0	0	3	3	0	0	0	1	0	2	2	16
MW125	Valley Street ROW	12/26/13	1	2	2	2	0	3	0	0	0	-3	1	0	0	0	8
MW-9	8th Ave N ROW	12/16/13	0	0	2	2	0	3	0	0	0	3	0	0	2	2	14
N7	Property	3/30/17	0	0	0	0	0	0	3	0	0	0	1	2	2	2	10
		6/27/17	0	0	0	0	0	0	3	0	0	0	1	2	2	2	10
R-MW5	Dexter Ave N ROW	3/23/17	0	2	2	0	0	3	0	0	0	0	1	2	0	0	10
		6/16/17	0	2	2	0	0	0	0	0	0	0	2	0	0	0	6
R-MW6	8th Ave N ROW	3/21/17	1	0	2	0	0	0	3	0	0	0	1	2	2	2	13
		6/20/17	1	0	2	0	0	3	3	2	0	0	1	2	2	2	18
Intermediate "A" Water-Bearing Zone																	
BB-8	Roy Street ROW	12/29/13	0	2	0	0	0	0	0	0	0	0	0	2	2	0	6
		3/22/17	0	0	0	0	0	0	0	0	0	0	1	2	2	0	5
		6/14/17	0	0	0	0	0	0	0	0	0	0	0	2	2	0	4
GEI-1	Block 37	3/24/17	1	0	2	0	0	3	3	0	0	0	2	0	0	0	11
		6/13/17	0	2	2	0	0	0	3	0	0	0	1	0	0	0	8
MW107	8th Ave N ROW	12/16/13	1	2	2	0	0	0	0	0	0	0	1	2	2	2	12
		3/27/17	1	2	2	2	2	3	0	0	0	3	0	2	2	2	21
		6/19/17	1	2	2	2	2	3	3	3	0	0	1	0	2	2	23
MW108	Alley Between 8th & 9th Ave N	12/17/13	1	2	2	2	0	3	3	2	0	3	1	2	2	2	25
		3/28/17	1	2	2	0	0	3	3	2	0	0	1	2	2	2	20

Table 12

Groundwater Natural Attenuation Screening
700 Dexter Avenue North, Seattle, Washington

Sample Location	Property	Sample Date	Preliminary EPA Anaerobic Biodegradation Screening Score														
			Alky	Chloride	Nitrate	Sulfate	TOC	Iron II	Methane	Ethane/ Ethene	pH	DO	ORP	TCE	cDCE	VC	Total Score
		6/27/17	1	2	2	0	0	3	3	2	0	0	2	2	2	2	21
MW109	Alley Between 8th & 9th Ave N	12/17/13	1	2	2	0	0	3	3	0	0	3	1	2	2	2	21
		3/29/17	1	0	2	0	0	3	3	0	0	0	2	2	2	2	17
		6/17/17	1	2	2	0	0	3	3	0	0	0	2	2	2	2	19
MW110	Alley Between 8th & 9th Ave N	12/19/13	1	2	2	0	0	0	0	0	0	0	0	2	2	2	11
		3/23/17	1	2	2	0	0	0	0	0	0	0	1	2	2	2	12
		6/27/17	1	2	2	0	0	0	0	2	0	0	0	2	2	2	13
MW114	SDOT S of Property	12/18/13	0	2	2	0	0	0	0	0	0	0	1	2	2	2	11
MW115	9th Ave N ROW	12/19/13	1	2	2	2	0	3	3	0	0	0	1	2	2	2	20
		3/22/17	1	2	2	0	0	3	0	0	0	0	0	2	2	2	14
		6/22/17	1	2	2	0	0	3	3	0	0	3	2	0	2	2	20
MW116	9th Ave N ROW	12/19/13	0	2	2	2	0	3	3	0	0	0	0	0	0	0	12
		3/21/17	1	2	2	0	0	3	3	0	0	0	2	0	0	0	13
		6/16/17	1	2	2	2	0	3	3	0	0	3	2	0	0	0	18
MW117	Dexter Ave N ROW	12/18/13	0	0	2	0	0	3	0	0	0	0	1	0	0	0	6
MW119	9th Ave N ROW	12/19/13	0	2	2	2	0	3	3	0	-2	3	0	0	2	2	17
		3/29/17	0	2	2	2	0	3	3	0	0	0	1	2	2	0	17
		6/28/17	1	2	2	0	0	3	0	0	0	0	1	2	2	0	13
MW120	8th Ave N ROW	12/19/13	0	2	2	0	0	0	0	0	0	0	1	2	2	2	11
MW131	Property	3/27/17	1	2	2	0	0	3	3	3	0	0	2	0	2	2	20
		6/20/17	1	2	2	0	0	0	3	3	0	0	1	0	2	2	16
Intermediate "B" Water-Bearing Zone																	
MW111	Alley Between 8th & 9th Ave N	12/17/13	0	2	2	2	0	0	0	0	0	0	1	0	2	2	11
		3/23/17	0	2	2	2	0	0	0	0	0	0	2	0	2	2	12
		6/14/17	0	2	2	2	0	3	0	2	0	0	1	0	2	2	16
MW112	Dexter Ave N ROW	12/26/13	0	2	2	0	0	0	0	0	0	0	0	0	0	0	4
		3/22/17	0	0	2	0	0	3	0	0	0	0	0	0	0	0	5
		6/16/17	0	0	2	0	0	3	0	0	0	0	2	0	0	0	7
MW130	Property	3/29/17	0	2	2	2	0	3	3	2	0	0	0	2	2	2	20
		6/30/17	1	2	2	2	0	0	3	2	0	0	1	2	2	2	19
W-MW-01	8th Ave N ROW	3/30/17	0	2	2	0	0	0	0	0	0	0	0	0	2	2	8
		6/19/17	0	2	2	0	0	3	0	0	0	0	1	0	0	2	10

Table 12

Groundwater Natural Attenuation Screening
700 Dexter Avenue North, Seattle, Washington

Sample Location	Property	Sample Date	Preliminary EPA Anaerobic Biodegradation Screening Score														
			Alky	Chloride	Nitrate	Sulfate	TOC	Iron II	Methane	Ethane/ Ethene	pH	DO	ORP	TCE	cDCE	VC	Total Score
W-MW-02	8th Ave N ROW	12/16/13	0	2	2	0	0	0	0	0	0	3	1	2	2	2	14
		3/27/17	1	2	2	2	2	3	3	0	0	3	0	0	2	2	22
		6/19/17	1	2	2	0	2	3	3	0	0	0	1	0	2	2	18
Deep Water-Bearing Zone																	
FMW-129	SDOT S of Property	4/10/17	0	2	2	0	0	0	0	2	0	0	2	2	2	0	12
		6/23/17	0	2	2	0	0	0	0	2	0	0	1	2	2	2	13
FMW-131	Block 37	3/24/17	0	0	2	2	0	0	0	0	0	0	1	0	2	0	7
		6/23/17	0	2	2	0	0	0	0	0	0	0	1	0	2	0	7
GEI-2	Block 37	3/24/17	1	2	2	0	0	0	0	0	0	0	1	0	2	2	10
		6/23/17	1	2	2	0	0	0	3	2	0	3	1	0	2	2	18
MW103	Alley Between 8th & 9th Ave N	12/18/13	1	2	2	2	0	3	0	2	-2	3	0	2	2	2	19
		3/23/17	1	2	2	0	0	0	0	3	0	0	0	2	2	2	14
		6/14/17	1	2	2	0	0	0	3	3	0	3	1	2	2	2	21
MW104	8th Ave N ROW	12/17/13	0	2	2	0	0	3	0	0	0	3	0	0	2	0	12
		3/30/17	0	2	2	2	0	3	0	0	0	0	0	0	2	0	11
		6/30/17	0	0	2	2	0	0	0	0	0	3	2	2	2	0	13
MW105	Roy Street ROW	12/29/13	1	2	2	0	0	3	0	0	0	0	0	0	0	2	10
MW106	SDOT Property S of Roy	4/14/17	0	2	2	2	0	0	0	0	-2	0	1	0	0	0	5
		6/30/17	0	2	2	2	0	0	0	0	0	3	2	0	0	0	11
MW113	9th Ave N ROW	12/19/13	0	2	2	2	0	0	0	0	-2	3	0	2	2	2	13
		3/22/17	1	2	2	0	2	3	0	0	0	0	1	2	2	2	17
		6/16/17	1	2	2	0	0	3	3	3	0	0	1	2	2	2	21
MW124	Valley Street ROW	12/26/13	0	0	0	2	0	0	0	0	0	0	0	2	2	0	6
MW128	Westlake Ave N ROW	3/29/17	1	2	2	0	0	3	3	2	0	0	1	0	2	2	18
		6/21/17	1	2	2	0	0	0	3	2	0	0	1	0	2	2	15

NOTES:

1. EPA = US Environmental Protection Agency
2. Alky = alkalinity; TOC = total organic carbon; Iron II = ferrous iron; DO = dissolved oxygen; ORP = oxidation/reduction potential
3. TCE = trichloroethene; cDCE = cis-1,2-dichloroethene; VC = vinyl chloride
2. Screening based on Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water (Publication EPA/600/R-98/128), September 1998.
3. Evaluation of total screening score:
   - a. 0 - 5 Inadequate evidence for anaerobic biodegradation of CVOCs
   - b. 6 - 14 Limited evidence for anaerobic biodegradation of CVOCs
   - c. 15 - 20 Adequate evidence for anaerobic biodegradation of CVOCs
   - d. >20 Strong evidence for anaerobic biodegradation of CVOCs

Table 13

Treatment Zone Area, Size, and Contaminant Mass Information
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Treatment Zone	Elevation (feet)		Area (ft^2)	Volume (cubic yards)		CVOC Mass (pounds) within Treatment Zone		CVOC Mass (pounds) on the Property by Treatment Zone Depth	Percent of Total CVOC Mass above Screening Level on Property	
	Top	Bottom		Soil Above Remediation Level	Total Soil in Treatment Zone	Soil Above Remediation Level	Total Soil in Treatment Zone		Soil Above Remediation Level	Total Soil in Treatment Zone
A	5	-10	18,530	5,960	10,290	60.8	63.6	69.2	43%	45%
B	-10	-25	20,220	6,440	11,230	43.7	46.5	49.4	31%	33%
C	-25	-40	7,780	2,310	4,320	15.6	16.2	17.5	11%	12%
D	-40	-55	3,270	920	1,820	3.0	3.3	4.2	2%	2%
	Totals for All Treatment Zones:			15,630	27,660	123	130	140	88%	92%

Notes: Total CVOC mass (in pounds) on the Property above screening levels = 140.3

CVOC = chlorinated volatile organic compound

Remediation level is established at 0.5 mg/kg for PCE

Table 14

Interim Action Technology Screening
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Technology	Description	Application to Interim Action	Selected for Interim Action?	Rationale for Inclusion or Exclusion
On-Property Source Removal and Mass Reduction				
Excavation - Development Related	Excavation of soil on the Property to the depths required for building construction.	Used for source removal (soil and groundwater) across entire Property down to elevations between 11.5 and 6.5 ft (approximately 28 to 33 ft deep). Includes approximately 65,000 cubic yards of soil, and shoring and dewatering required for construction.	Yes	Excavation of the source area associated with construction of the garage is retained as a component of the IA since it is very effective at eliminating source area contaminant mass and is a permanent solution.
Excavation - Below Proposed Development	Extending excavation of soil to encompass soils exceeding PCE remediation level.	Would be used to remove source soil and groundwater for the entire Property below proposed development down to elevation -55 ft (approximately 95 ft deep). Includes an additional 146,000 cubic yards of soil requiring disposal and backfill, plus significant additional shoring and dewatering.	No	Deep source area excavation is eliminated from consideration because excavation of soil to 95 ft deep is very difficult, generates large quantities of waste requiring off site disposal compared to *in situ* treatment for the same soil and groundwater, and is extremely expensive.
In Situ Chemical Oxidation	*In-situ* chemical oxidation (“ISCO”) consists of injecting a strong chemical oxidant into a groundwater source area or plume to chemically convert contaminants to less harmful or inert compounds, ultimately carbon dioxide and water. A range of oxidants are available including permanganate compounds, persulfate-based oxidants, ozone, and modified Fenton's reagents (MFR).	Would be applied to soil in the treatment zones defined in Section 8. 5 and shown on Figures 30 through 33 and includes soil and groudwater between elevations 5 ft and -55 ft.	Yes	ISCO is retained. ISCO approaches that utilize the stronger oxidant types such as MFR are preferred, since they are more effective than enhanced reductive dechlorination ("ERD") or *in situ* chemical reduction (“ISCR”) at reducing contaminant mass in higher concentration source areas, including areas with residual NAPL. In addition, the oxidation reactions occur quickly, which would allow for multiple applications in a relatively short period of time.
Enhanced Reductive Dechlorination	ERD is an *in situ* treatement technology that consists of emplacing organic substrates (e.g., emulsified vegetable oil ("EVO")) and/or microorganisms in an aquifer to enhance or accelerate reductive dechlorination of CVOCs. Under reductive conditions (e.g., anaerobic or absence of oxygen), CVOCs degrade to less chlorinated degradation products, and the end products of ERD treatment include ethene and/or ethane gas.	Would be applied to soil in the treatment zones defined in Section 8. 5 and shown on Figures 30 through 33 and includes soil and groudwater between elevations 5 ft and -55 ft.	Yes	ERD using EVO is retained since it provides ongoing treatment after being injected for periods of up to 2 to 5 years, and would be effective at treating the residual contamination remaining after more aggressive short-term treatment using ISCO is accomplished. ERD has also been pilot tested at the Property (SES, 2016). The pilot test showed that injecting significant amounts of aqueous amendments into the subsurface is technically feasible and that ERD is effective at reducing dissolved phase CVOC concentrations

Table 14

Interim Action Technology Screening
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Technology	Description	Application to Interim Action	Selected for Interim Action?	Rationale for Inclusion or Exclusion
In Situ Chemical Reduction	ISCR involves the injection of a strong reducing agent into the subsurface. These reducing agents can either directly degrade organic compounds (e.g., CVOCs) to nontoxic or less toxic compounds, or create conditions that facilitate or enhance biological treatment of these compounds. Zero valent iron ("ZVI") is the most commonly used reductant, and is used to treat CVOCs, among other compounds.	Would be applied to soil in the treatment zones defined in Section 8. 5 and shown on Figures 30 through 33 and includes soil and groudwater between elevations 5 ft and -55 ft.	No	ISCR technologies do not appear well suited to the subsurface conditions present on the Property and are eliminated from further consideration. ZVI is the primary reductant used for CVOC sites and, while it can effectively treat dissolved phase CVOCs, it is not very efficient at treating sorbed contamination and requires diffusion of contaminants into the dissolved phase. This is a very slow process and it would be very difficult to emplace enough ZVI to address the sorbed mass over the extended time it would take to desorb.
Off-Property Migration Control				
Barrier Wall	Also referred to as a cutoff wall, this approach uses a physical barrier, often a low permeability slurry wall, to encircle an area of contamination, thereby controlling the flow of contaminated groundwater from inside the containment wall. This approach can be used in conjunction with hydraulic containment to either limit the amount of groundwater that needs to be extracted or to minimize hydraulic gradients across the barrier wall.	Would require installation of an approximately an 100 ft deep slurry wall in the ROWs on all four sides of the property, or an approximately 60 ft deep wall installed in the bottom of the garage excvation.	No	Constructing this type of containment structure is not feasible due to extreme utility and traffic conflicts (regarding construction in the ROWs) or constructability issue (regarding construction in the bottom of the excavation).
Hydraulic Containment	This approach, also referred to as pump and treat, would extract groundwater from wells and then treating the extracted contaminated groundwater in an above-ground treatment system prior to discharge to surface water. By extracting a sufficient volume of water, contaminated groundwater would be prevented from migrating beyond the extraction wells.	Groundwater extraction wells would be installed in the ROWs just downgradient from the Property on Roy Street and 8th Avenue. Extracted groundwater would be piped to above-ground treatment system located on the Property.	No	Hydraulic containment would require active extraction and treatment operations for an extended period at signficant expense. Also, construction and operation of groundwater treatment system on the Property would be very difficult to integrate with proposed development.
Perimeter *In Situ* Treatement System	This approach uses an *in situ* treatment technology to create a reactive treatment zone oriented to intercept and treat a contaminated groundwater plume. This approach can use a wide variety of *in situ* technologies similar to those described above for the source area treatment. However, ERD using EVO will be used in this application based on previous pilot test results documenting it's effectiveness.	Perimeter injection wells would be installed in the ROWs just downgradient from the Property on Roy Street and 8th Avenue. Injections of EVO would be conducted following well installation and then periodically as needed until cleanup action objectives are met.	Yes	Use of a *in situ* treatment utilizing injection of EVO in perimeter injection wells is retained since it would integrate with the on-Property *in situ* treatment approach also provides longer-term treatment downgradient of the injection wells for periods of up to 2 to 5 years.

Table 15

Interim Action Performance Monitoring Well Soil Samples
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Well Number	Site Location	Estimated Screen Depth (ft bgs)	Estimated Screen Elevation (ft)	Soil Samples Collected for Analysis During Drilling		Soil Sample Analyses			Rationale
				Number	Rationale	VOCs	GRO	Other	
MW-142	8th Ave N ROW, near MW121	40 to 50	2 to -8	0	samples will be collected in adjacent deeper boring	–	–	–	Located to monitor the Intermediate A water-bearing zone downgradient of the northeast Property quadrant adjacent to a shallow water-bearing zone well
MW-143	8th Ave N ROW, near MW121	70 to 80	-28 to -38	8	1/10 ft starting at 10 ft bgs	X	–	X	Located to monitor the Intermediate B water-bearing zone downgradient of the northeast Property quadrant adjacent to a shallow water-bearing zone well
MW-144	East side of 8th Ave N ROW, north of Roy Street	40 to 50	5 to -5	0	samples will be collected in adjacent deeper boring	–	–	–	Located to monitor the Intermediate A water-bearing zone downgradient of the southeast Property quadrant
MW-145	East side of 8th Ave N ROW, north of Roy Street	70 to 80	-25 to -35	8	1/10 ft starting at 10 ft bgs	X	–	X	Located to monitor the Intermediate B water-bearing zone downgradient of the southeast Property quadrant
MW-146	South side of Roy Street ROW, near MW106	40 to 50	12 to 2	0	samples will be collected in adjacent deeper boring	–	–	–	Located to monitor the Intermediate A water-bearing zone south of the central part of the Property, adjacent to shallow and deep water-bearing zone wells
MW-147	South side of Roy Street ROW, near MW106	70 to 80	-18 to -28	8	1/10 ft starting at 10 ft bgs	X	–	X	Located to monitor the Intermediate B water-bearing zone south of the central part of the Property, adjacent to shallow and deep water-bearing zone wells
MW-148	South side of the Roy St ROW, near MW105	70 to 80	-26 to -36	8	1/10 ft starting at 10 ft bgs	X	–	X	Located to monitor the Intermediate B water-bearing zone southeast of the southeast Property quadrant, adjacent to shallow and deep water-bearing zone wells
MW-149	Northeast quadrant of the Property	35 to 45	0 to -10	0	samples already collected in the vicinity	–	–	–	Located to monitor the Intermediate A water-bearing zone in the northeast Property quadrant during interim action injections
MW-150	Northeast quadrant of the Property	50 to 60	-15 to -25	0	samples already collected in the vicinity	–	–	–	Located to monitor the Intermediate B water-bearing zone in the northeast Property quadrant during interim action injections

Table 15

Interim Action Performance Monitoring Well Soil Samples
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Well Number	Site Location	Estimated Screen Depth (ft bgs)	Estimated Screen Elevation (ft)	Soil Samples Collected for Analysis During Drilling		Soil Sample Analyses			Rationale
				Number	Rationale	VOCs	GRO	Other	
MW-151	Southwest quadrant of the Property	35 to 45	5 to -5	0	samples already collected in the vicinity	–	–	–	Located to monitor the Intermediate A water-bearing zone in the southwest Property quadrant during interim action injections
MW-152	Southwest quadrant of the Property	50 to 60	-10 to -20	0	samples already collected in the vicinity	–	–	–	Located to monitor the Intermediate B water-bearing zone in the southwest Property quadrant during interim action injections
MW-153	South side of the Roy St ROW, east of Dexter Ave N	120 to 130	-69 to -79	11	1/10 ft to 90 ft starting at 10 ft bgs; also at 110, 130 ft bgs	X	–	X	Located to monitor the deep water-bearing zone south of the southwest Property quadrant
MW-154	South side of the Roy St ROW, near MW106	25 to 35	27 to 17	0	samples will be collected in adjacent deeper boring	–	–	–	Located to monitor the shallow water-bearing zone south of the central part of the Property, adjacent to intermediate and deep water-bearing zone wells
MW-155	South side of the Roy St ROW, near MW105	20 to 30	24 to 14	0	samples will be collected in adjacent deeper boring	–	–	–	Located to monitor the shallow water-bearing zone southeast of the southeast Property quadrant, adjacent to intermediate and deep water-bearing zone wells
MW-156	East side of 8th Ave N, near MW-9	40 to 50	-6 to -16	0	samples will be collected in adjacent deeper boring	–	–	–	Located to monitor the Intermediate A water-bearing zone northeast of the northeast Property quadrant, adjacent to a shallow water-bearing zone well
MW-157	East side of 8th Ave N, near MW-9	70 to 80	-26 to -36	0	samples will be collected in adjacent deeper boring	–	–	–	Located to monitor the Intermediate B water-bearing zone northeast of the northeast Property quadrant, adjacent to a shallow water-bearing zone well
MW-158	East side of 8th Ave N, near MW-9	90 to 100	-46 to -56	9	1/10 ft starting at 20 ft bgs	X	X	X	Located to monitor the deep water-bearing zone northeast of the northeast Property quadrant, adjacent to shallow and intermediate water-bearing zone wells

Table 15

Interim Action Performance Monitoring Well Soil Samples
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Well Number	Site Location	Estimated Screen Depth (ft bgs)	Estimated Screen Elevation (ft)	Soil Samples Collected for Analysis During Drilling		Soil Sample Analyses			Rationale
				Number	Rationale	VOCs	GRO	Other	
MW-159	East side of 8th Ave N, near SV02	20 to 30	24 to 14	2	at top and bottom of well screen	–	–	–	Located to monitor the shallow water-bearing zone east of the Property mid-way between existing shallow monitoring wells

Notes:
1. ft bgs = feet below ground surface, depths approximate for planned explorations
2. Elevation = feet relative to the North American Vertical Datum of 1988 (NAVD 88)
3. VOCs = volatile organic compounds
4. GRO = gasoline range organics
5. CVOCs = chlorinated VOCs
6. Other = physical and transport parameters (e.g., grain size, vertical hydraulic conductivity, dry bulk density, and foc)
7. Property = former American Linen Supply property
8. X = parameters analyzed
9. – = not applicable or not analyzed

Table 16

Interim Action Groundwater Monitoring
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Monitoring Well Number	Site Location	Screen Depth (ft bgs)	Monitoring Phase: Baseline Before On-Property Injections	After Each On-Property Injection[a]	Quarterly During Dewatering[b]	Quarterly After Perimeter Well Injection[c]
Existing Shallow Monitoring Wells						
F13	Property	10-40	V, G	–	NA	NA
F5	Property	10-40	V, G	–	NA	NA
F9	Property	10-40	V, G	–	NA	NA
G12	Property	10-40	V, G	–	NA	NA
J15	Property	10-40	V, G	–	NA	NA
J5	Property	10-40	V, G	–	NA	NA
K8	Property	10-40	V, G	–	NA	NA
M15	Property	10-40	V, G	–	NA	NA
MW121	8th Ave N ROW	15-25	V, G	–	–	–
MW125	Valley Street ROW	15-30	V, G	–	V, G	V, G
MW-214	Valley Street ROW	TBD	V	–	–	–
MW-8	800 Aloha St Parcel	4.5-19	V	–	–	–
MW-9	8th Ave N ROW	7-22	V, G	–	V, G	V, G
N7	Property	10-40	V, G	–	NA	NA
R-MW2	Property	5-15	V, G	–	NA	NA
R-MW3	Property	7-17	V, G	–	NA	NA
R-MW5	Dexter Ave N ROW	15-30	V, G	–	V, G	V, G
R-MW6	8th Ave N ROW	12-22	V, G	–	V, G	V, G
SCL-MW101	Alley Between 8th & 9th Ave	TBD	V	–	–	–
SCL-MW105	Alley Between 8th & 9th Ave	25-30	V	–	–	–
SCS-2	Seattle City Light Parking Lot	TBD	V	–	–	–
SMW-3	Valley Street ROW	TBD	V	–	–	–
Proposed Shallow Monitoring Wells						
MW-154	Roy St ROW, near MW106	25-35	V, G	–	V, G	V, G
MW-155	Roy St ROW, near MW105	20-30	V, G	–	V, G	V, G
MW-159	8th Ave N ROW, near SV02	20-30	V, G	–	V, G	V, G
Existing Intermediate A Monitoring Wells						
BB-8	Roy Street ROW	30-40	V, G, GC	–	V, G, GC	V, G, GC
GEI-1	Block 37	26.8-36.8	V	–	–	–
MW107	8th Ave N ROW	35-45	V, G, GC	–	V, G, GC	V, G, GC
MW108	Alley Between 8th & 9th Ave	40-50	V	–	V	V
MW109	Alley Between 8th & 9th Ave	35-45	V	–	V	V
MW110	Alley Between 8th & 9th Ave	35-45	V	–	V	V
MW115	9th Ave N ROW	35-45	V	–	–	–
MW116	9th Ave N ROW	35-45	V	–	V	V
MW119	9th Ave N ROW S of Roy St	35-45	V	–	V	V
MW120	8th Ave N ROW	40-50	V, G, GC	–	V, G, GC	V, G, GC
MW131	Property	44-54	V, G, GC	V, G	NA	NA
Proposed Intermediate A Monitoring Wells						
MW-142	8th Ave N ROW	40-50	V, G, GC	–	V, G, GC	V, G, GC
MW-144	8th Ave N ROW	40-50	V, G, GC	–	V, G, GC	V, G, GC
MW-146	Roy Street ROW	40-50	V, G, GC	–	V, G, GC	V, G, GC

Table 16

Interim Action Groundwater Monitoring
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Monitoring Well Number	Site Location	Screen Depth (ft bgs)	Monitoring Phase: Baseline Before On-Property Injections	After Each On-Property Injection[a]	Quarterly During Dewatering[b]	Quarterly After Perimeter Well Injection[c]
MW-149	Property	35-45	V, G, GC	V, G	NA	NA
MW-151	Property	35-45	V, G, GC	V, G	NA	NA
MW-156	8th Ave N, near MW-9	40-50	V, G, GC	–	V, G, GC	V, G, GC
Existing Intermediate B Monitoring Wells						
MW111	Alley Between 8th & 9th Ave	70-80	V	–	V	V
MW112	Dexter Ave N ROW	75-85	V, G, GC	–	V, G, GC	V, G, GC
MW126	Alley Between 8th & 9th Ave	85-95	V	–	V	V
MW130	Property	70-80	V, G, GC	V, G	NA	NA
W-MW-01	8th Ave N ROW	70-80	V, G, GC	V, G	V, G, GC	V, G, GC
W-MW-02	8th Ave N ROW	70-80	V, G, GC	V, G	V, G, GC	V, G, GC
MW-132	Property	70-80	V, G, GC	V, G	NA	NA
MW-134	Property	80-90	V, G, GC	V, G	NA	NA
MW-135	Property	70-80	V, G, GC	V, G	NA	NA
MW-136	Property	85-95	V, G, GC	V, G	NA	NA
MW-139	Property	70-80	V, G, GC	V, G	NA	NA
Proposed Intermediate B Monitoring Wells						
MW-143	8th Ave N ROW	70-80	V, G, GC	–	V, G, GC	V, G, GC
MW-145	8th Ave N ROW	70-80	V, G, GC	–	V, G, GC	V, G, GC
MW-147	Roy Street ROW	70-80	V, G, GC	–	V, G, GC	V, G, GC
MW-148	Roy Street ROW	70-80	V, G, GC	–	V, G, GC	V, G, GC
MW-150	Property	50-60	V, G, GC	V, G	NA	NA
MW-152	Property	50-60	V, G, GC	V, G	NA	NA
MW-157	8th Ave N, near MW-9	70-80	V, G, GC	–	V, G, GC	V, G, GC
Existing Deep Monitoring Wells						
FMW-129	SDOT property S of Roy St	84-89	V	–	V	V
FMW-131	Block 37	63-73	V	–	–	–
FMW-3D	Block 31	59-69	V	–	–	–
GEI-2	Block 37	50.5-60.5	V	–	–	–
MW102	Valley Street ROW	115-125	V, G, GC	–	V, G, GC	V, G, GC
MW103	Alley Between 8th & 9th Ave	103.5-113.5	V	–	V	V
MW104	8th Ave N ROW	119-129	V, G, GC	V, G	V, G, GC	V, G, GC
MW105	Roy Street ROW	130-140	V, G, GC	–	V, G, GC	V, G, GC
MW106	West of Roy St	130-140	V, G, GC	–	V, G, GC	V, G, GC
MW113	9th Ave N ROW	70-80	V	–	–	–
MW122	Alley Between 8th & 9th Ave	105-119	V	–	–	–
MW123	Westalke Ave N ROW	70-80	V	–	–	–
MW124	Valley Street ROW	110-120	V, G, GC	–	–	–
MW128	Westlake Ave N ROW	60-70	V	–	–	–
MW-133	Property	129-139	V, G, GC	V, G	NA	NA
MW-137	Property	105-115	V, G, GC	V, G	NA	NA
MW-138	Dexter Ave N ROW	105-115	V, G, GC	V, G	V, G, GC	V, G, GC

Table 16

Interim Action Groundwater Monitoring
Former American Linen Supply
700 Dexter Avenue North, Seattle, Washington

Monitoring Well Number	Site Location	Screen Depth (ft bgs)	Monitoring Phase			
			Baseline Before On-Property Injections	After Each On-Property Injection[a]	Quarterly During Dewatering[b]	Quarterly After Perimeter Well Injection[c]
MW-140	Roy Street ROW	130-140	V, G, GC	V, G	V, G, GC	V, G, GC
MW-141	Property	95-105	V, G, GC	V, G	NA	NA
Proposed Deep Monitoring Wells						
MW-153	Roy St ROW W of MW106	120-130	V, G, GC	–	V, G, GC	V, G, GC
MW-158	8th Ave N, near MW-9	90-100	V, G, GC	–	V, G, GC	V, G, GC

Notes:

[a] Three events in 2018 after injection of MFR and one event in 2018 after injection of EVO

[b] Five sampling rounds in 2018 and 2019 beginning approximately 3 months after on-Property EVO injection; the final sampling round will include six sets of co-located nested perimeter injection wells that will be sampled to document baseline conditions in the perimeter injection well network after completion of dewatering and prior to injection in the perimeter wells, with the samples analyzed for VOCs, GRO, and geochemical parameters

[c] Four events beginning approximtely 3 months after perimeter well injection in early 2020; six sets of co-located nested perimeter injection wells will be visually monitored for the presence of EVO, with a sample collected for analysis of total organic carbon if EVO not observed in a well

ft bgs = feet below ground surface, depths approximate for planned explorations

V = samples analyzed for VOCs (EPA Method 8260)

G = samples analyzed for GRO (Method NWTPH-Gx)

GC = samples analyzed for geochemical parameters (alkalinity, chloride, dissolved gases (methane, ethane, and ethene), nitrate, sulfate, total metals (ferric iron, ferrous iron, and manganese), and total organic carbon), see SAP for lab methods

All sampled wells monitored for groundwater levels and field parameters (dissolved oxygen, pH, oxidation-reduction potential, specific conductance, and temperature) during sampling

– = well not sampled

NA = not applicable since well previously decommissioned

TBD = to be determined

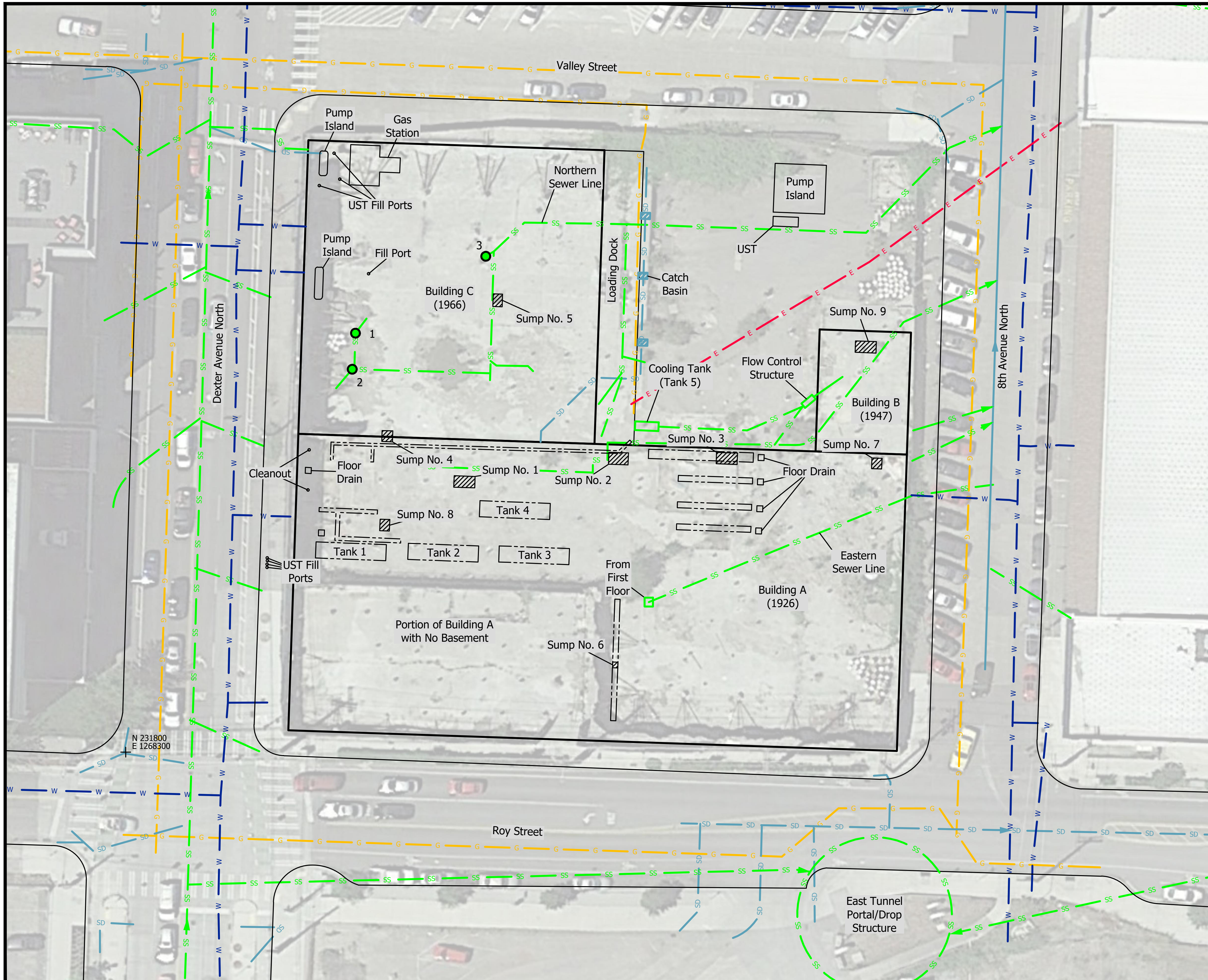
ILLUSTRATIONS

PES Environmental, Inc.
Engineering & Environmental Services

Property Location
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
1

1412.004.02.004	141300102004_IAWPU_1-4	WRH	1/18
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE



Explanation

- Water Line
- Sanitary Sewer Line and Cleanout
- 3 Cleanout
- Subsurface Trench
- Tank 3 — 6,000 Gallon Underground Storage Tank
- Natural Gas Pipeline
- Seasonal Creek and Pond
- Electrical Line
- Storm Drain Line
- Combined Main
- N 231800 E 1268300 — Coordinate Reference Point (NAD83, Washington State Plane North, US Feet)

N

0 40

SCALE IN FEET

Aerial Photo: June 27, 2016 (Google 2017)

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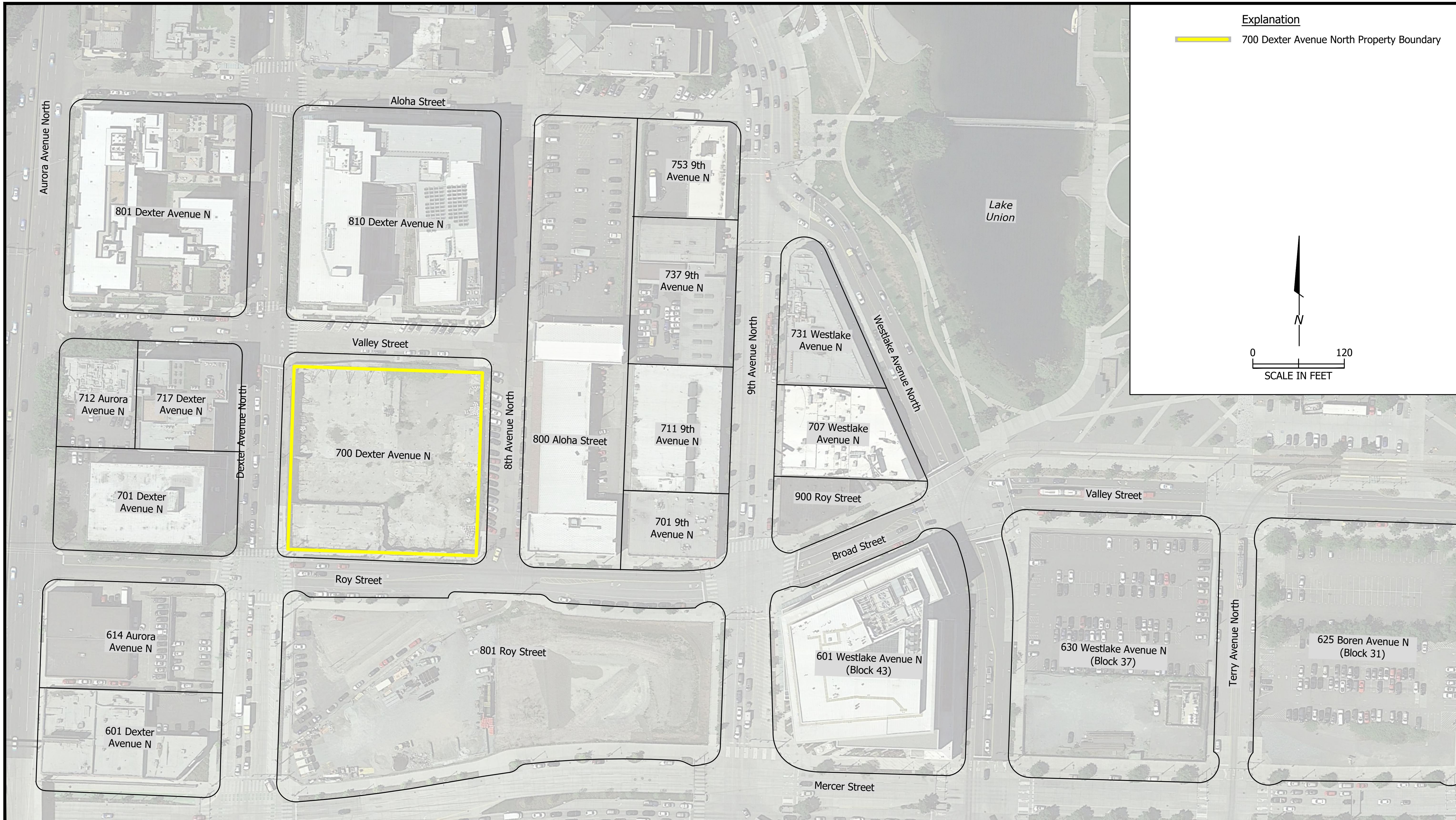
Engineering & Environmental Services

Property Map with Subsurface Features
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
2

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1412.004.02.004	141300102004_IAWPU_1-4	WRH	1/18



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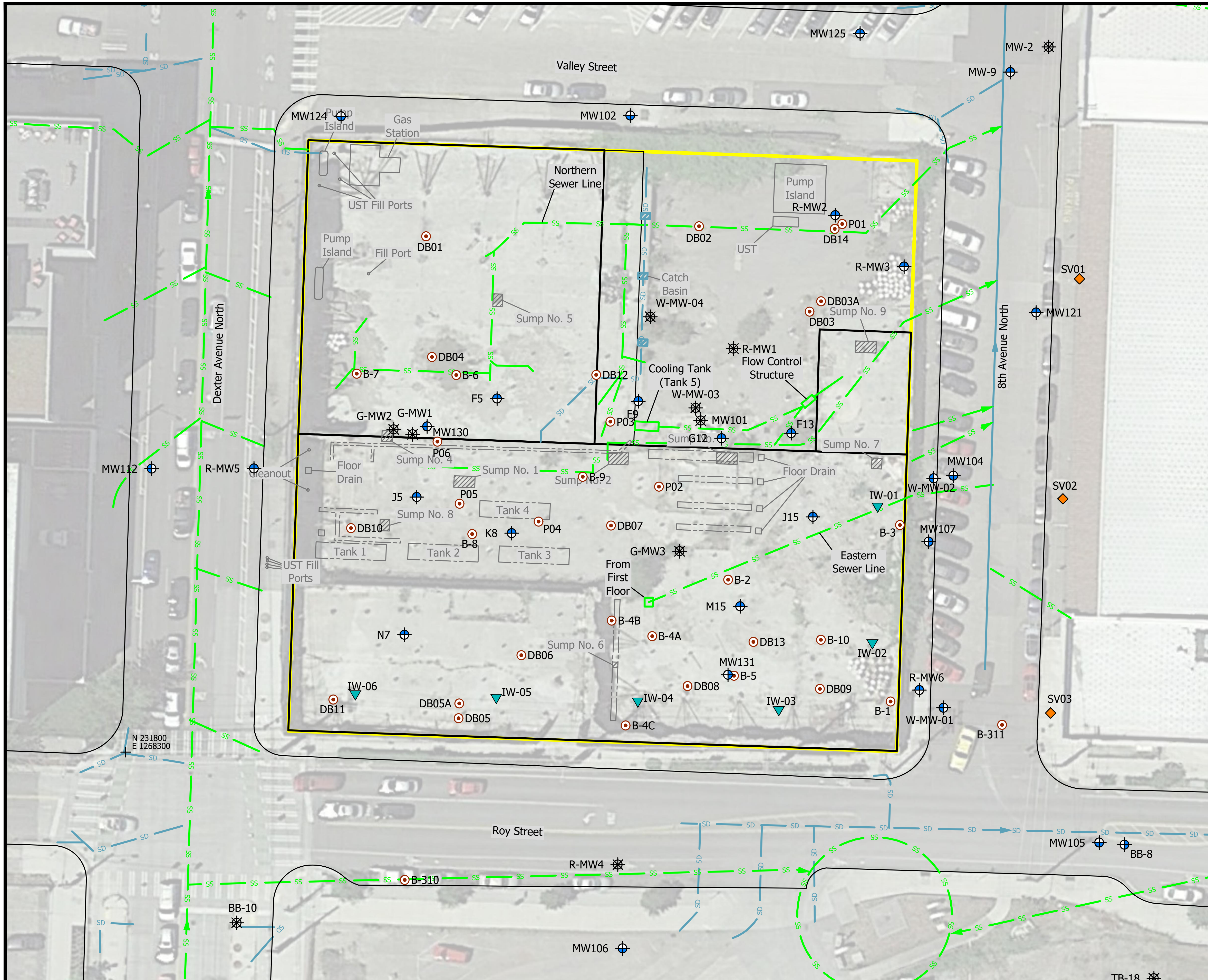
Surrounding Properties
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
3

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1412.004.02.004	141300102004_IAWPU_1-4	WRH	1/18



Explanation

- Approximate Property Boundary
- Sanitary Sewer Line
- Storm Drain Line
- Combined Main
- MW101 — Shallow Zone Monitoring Well
- MW107 — Intermediate Zone A Monitoring Well
- W-MW-02 — Intermediate Zone B Monitoring Well
- MW105 — Deep Zone Monitoring Well
- R-MW1 — Decommissioned Monitoring Well
- B-2 — Soil Boring Location
- SV01 — Soil Gas Monitoring Point
- N 231800 E 1268300 — Coordinate Reference Point (NAD83, Washington State Plane North, US Feet)

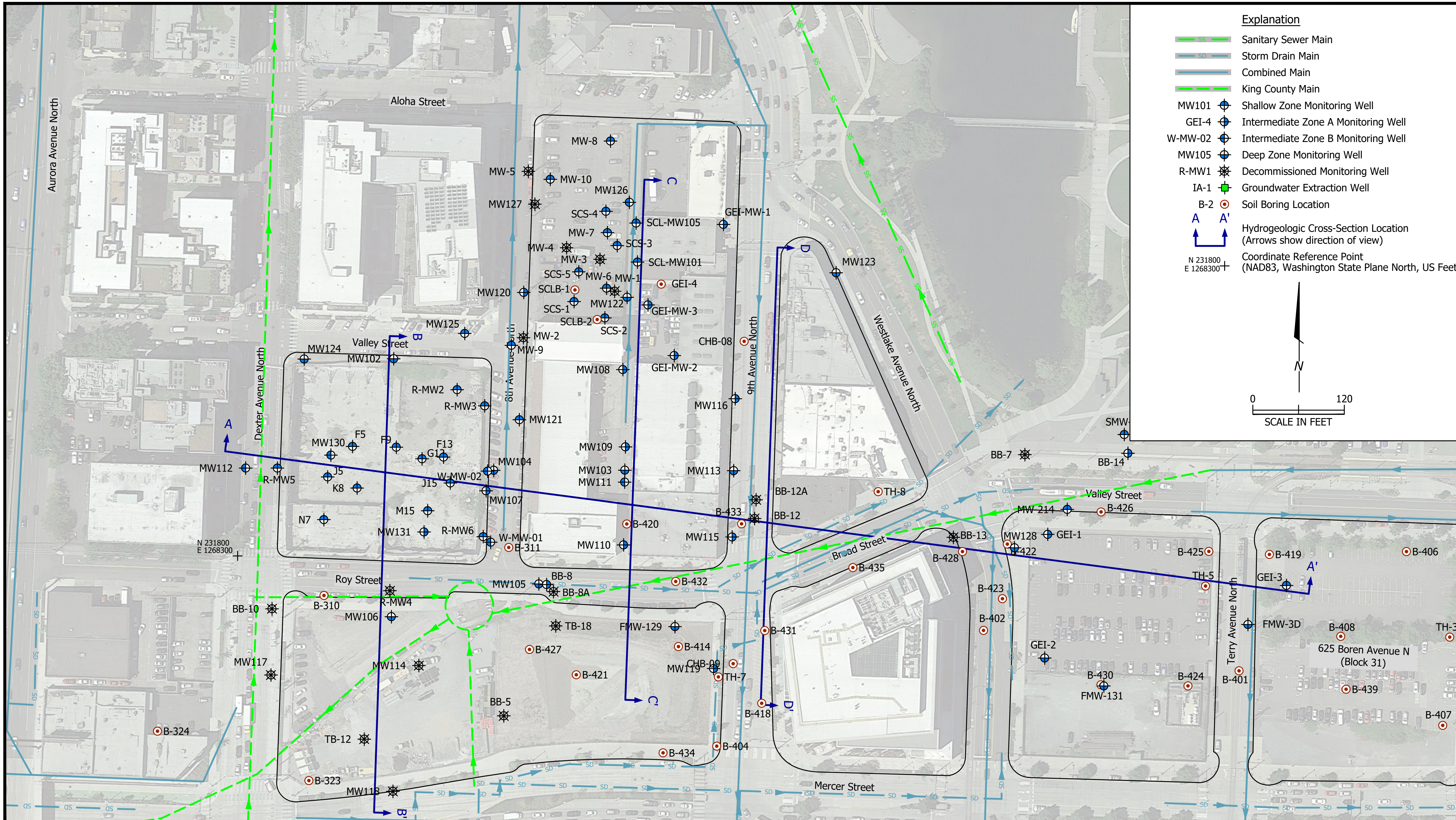
Aerial Photo: June 27, 2016 (Google 2017)

PES Environmental, Inc.
Engineering & Environmental Services

Property Exploration Location Map
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
4

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1412.004.02.004	141300102004_IAWPU_1-4	WRH	1/18



Site-Wide Exploration Location Map
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
5

PES Environmental, Inc.
Engineering & Environmental Services

1413.001.02.004	141300102004_IAWPU_5	WRH	1/18
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE

Explanation

- Approximate Property Boundary
- SS — Sanitary Sewer Line
- SD — Storm Drain Line
- Combined Main
- D10 — ERH/SVE Well Location
- C14 — Shallow Pilot Test Injection Location
- IW-1 — Intermediate A Pilot Test Injection Points
- N 231800 E 1268300 — Coordinate Reference Point (NAD83, Washington State Plane North, US Feet)

N

0 40
SCALE IN FEET

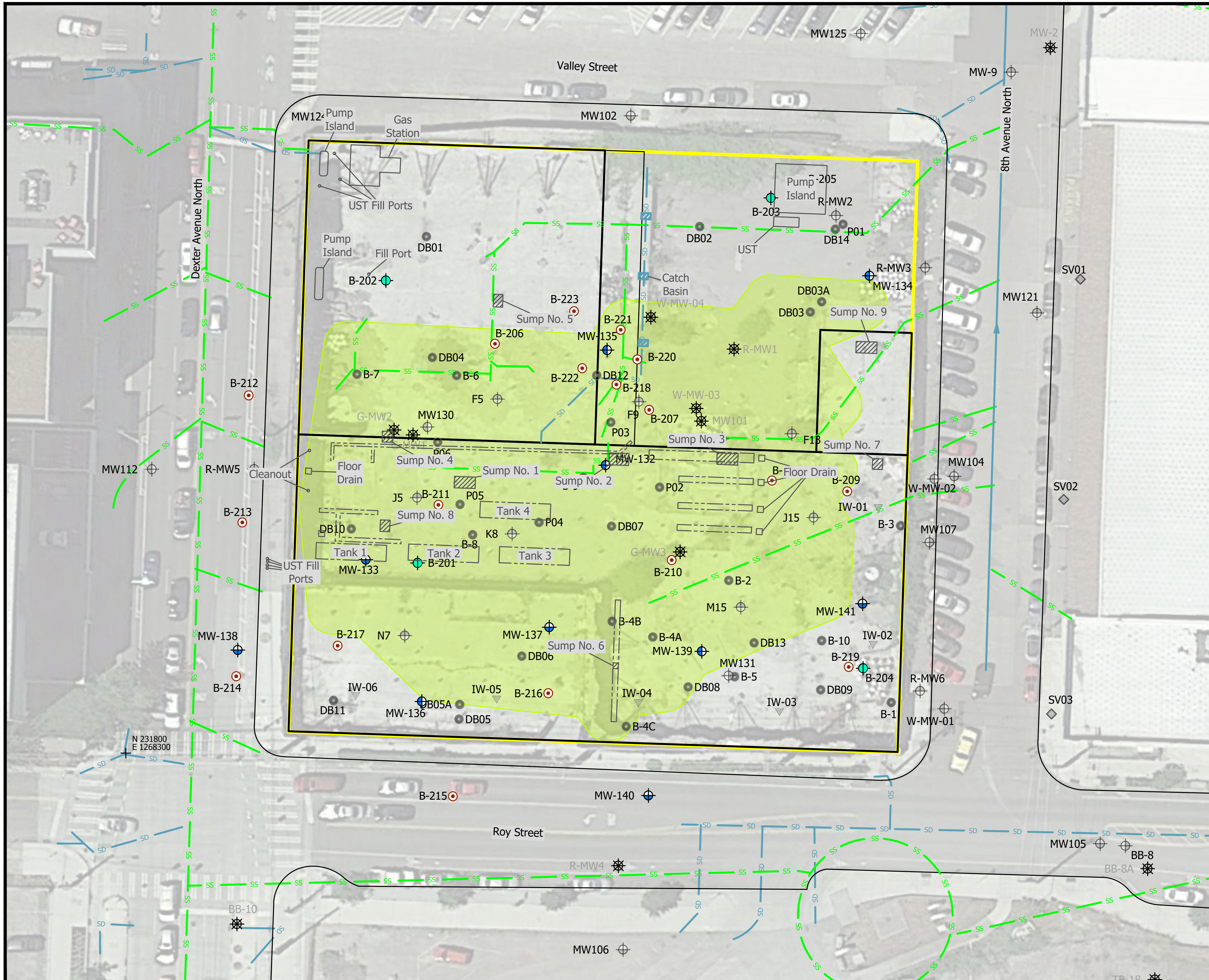
Aerial Photo: June 27, 2016 (Google 2017)

PES Environmental, Inc.
Engineering & Environmental Services

ERH/SVE System Layout and Pilot Study Wells
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
6

1412.004.02.004	141300102004_IAWPU_6	WRH	1/18
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE



Explanation

- Approximate Property Boundary
- Sanitary Sewer Line
- Storm Drain Line
- Combined Main
- MW101 — Shallow Monitoring Well
- MW107 — Intermediate A Monitoring Well
- W-MW-02 — Intermediate B Monitoring Well
- MW105 — Deep Monitoring Well
- B-2 — Soil Boring Location
- R-MW1 — Decommissioned Monitoring Well
- SV01 — Soil Vapor Well
- IW-04 — Injection Well
- MW-132 — 2017 Intermediate A Monitoring Well
- MW-134 — 2017 Intermediate B Monitoring Well
- MW-133 — 2017 Deep Monitoring Well
- B-205 — 2017 Soil Boring Location
- B-201 — 2017 Geotechnical Boring Location
- N 231800 E 1268300 — Coordinate Reference Point (NAD83, Washington State Plane North, US Feet)
- Approximate Extent of ERH/SVE Treatment Area

N

0 40

SCALE IN FEET

Aerial Photo: June 27, 2016 (Google 2017)

PES Environmental, Inc.
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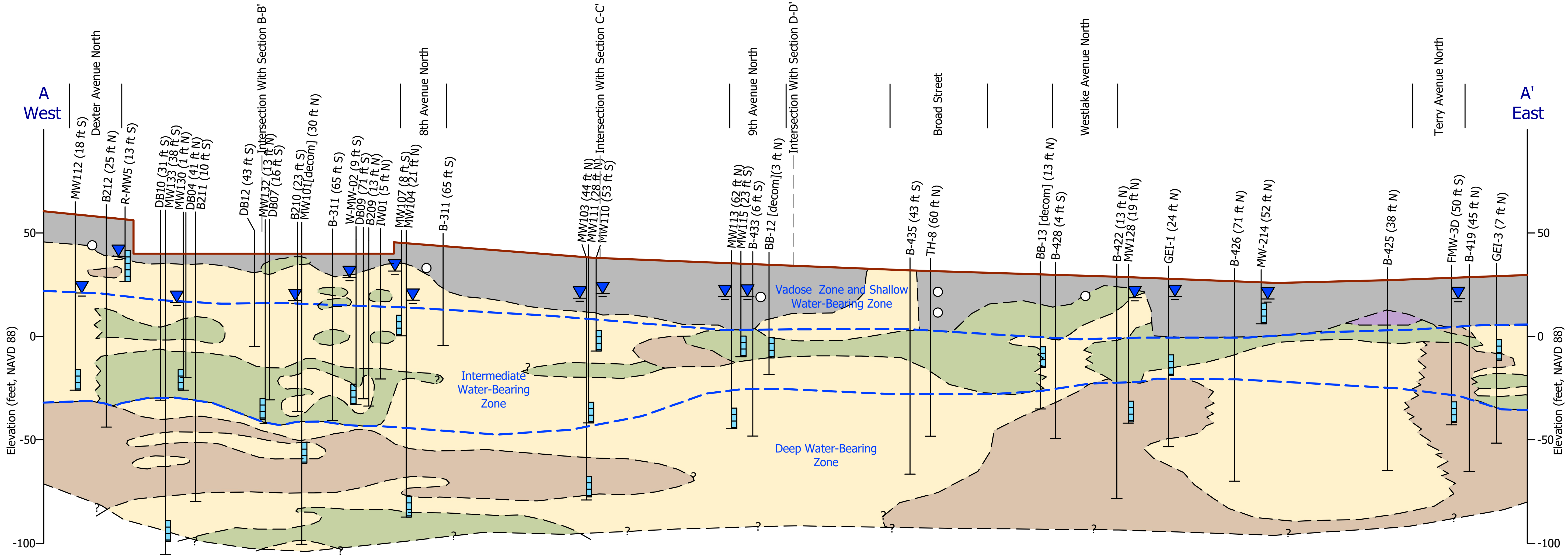
Pre-Interim Action Investigation
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
7

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1413.001.02.004	141300102004_IAWPU_7	WRH	1/18



Explanation

(red line)	Approximate Ground Surface Elevation
?— — — —?	Geologic Contact, queried where uncertain
MW112 (vertical line)	Lithologic Boring Location
[decom]	Decommissioned Well
(65 ft S)	Approximate distance and direction to feature from line of cross section
(triangle symbol)	Groundwater Elevation 3/24/2017
(circle symbol)	Approximate Sewer Pipe Location

	Soil Description based on Unified Soil Classification System
	Fill
Predominantly coarse-grained deposits	(GP) Poorly Graded Gravel (GW) Well-Graded Gravel (SP) Poorly Graded Sand (SW) Well-Graded Sand
Predominantly coarse-grained deposits	(GM) Silty Gravel (GC) Clayey Gravel (SM) Silty Sand (SC) Clayey Sand
Predominantly fine-grained deposits	(ML) Silt with or without sand and gravel (CL) Clay with or without sand and gravel
Predominantly fine-grained deposits	(PT) Peat

Vertical Scale in Feet: 0–50

Horizontal Scale in Feet: 0–100

Vertical Exaggeration 2:1

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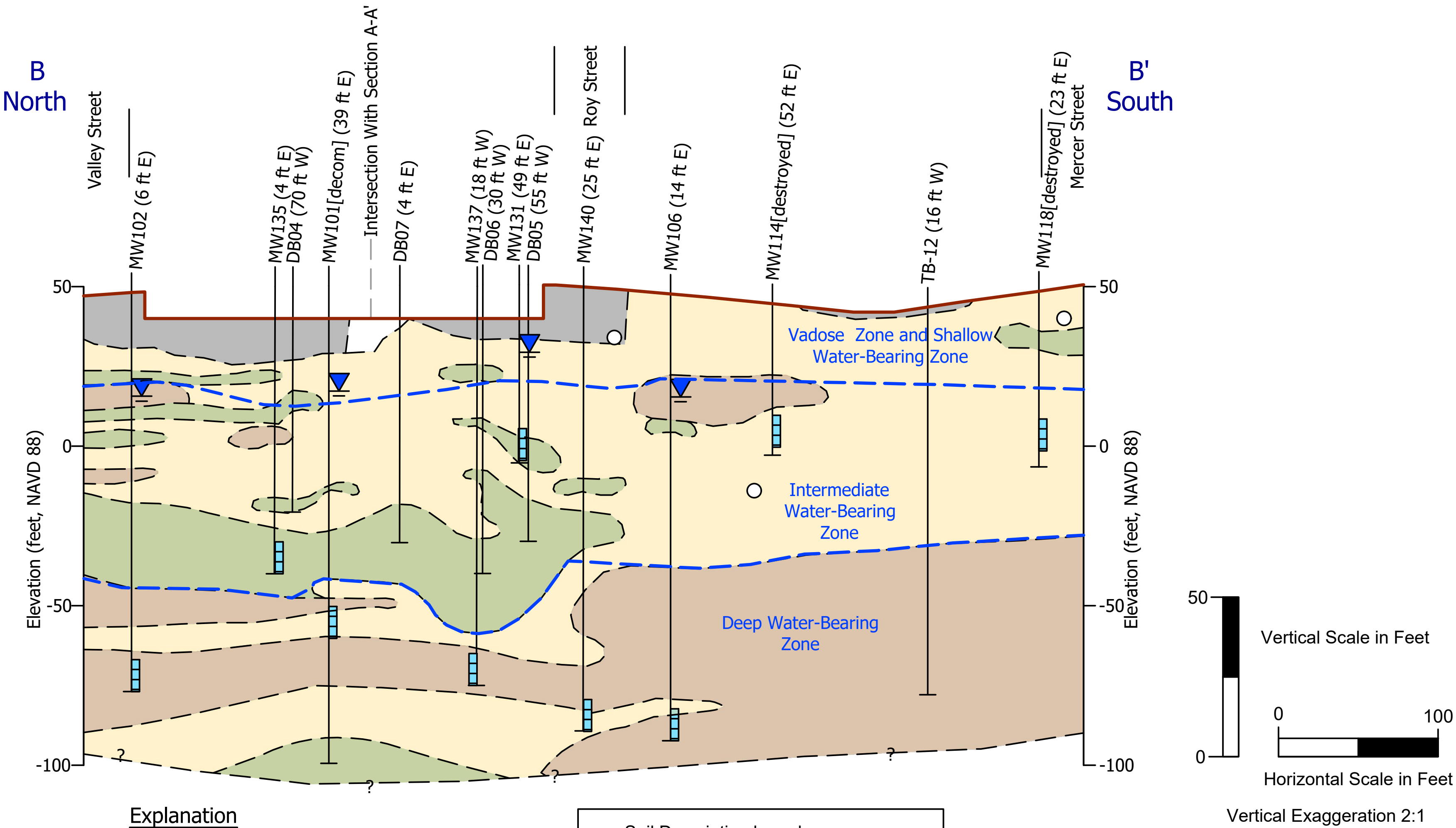
Cross Section A-A'
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
8

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1413.001.03.001	141300102004_IAWPU_8-11	WRH	1/18



Explanation

- Approximate Ground Surface Elevation
- ? — — — ? Geologic Contact, queried where uncertain
- MW102 — Lithologic Boring Location
- [decom] Decommissioned Well
- (65 ft S) Approximate distance and direction to feature from line of cross section
- ▼ Groundwater Elevation 3/24/2017
- ○ Approximate Sewer Pipe Location

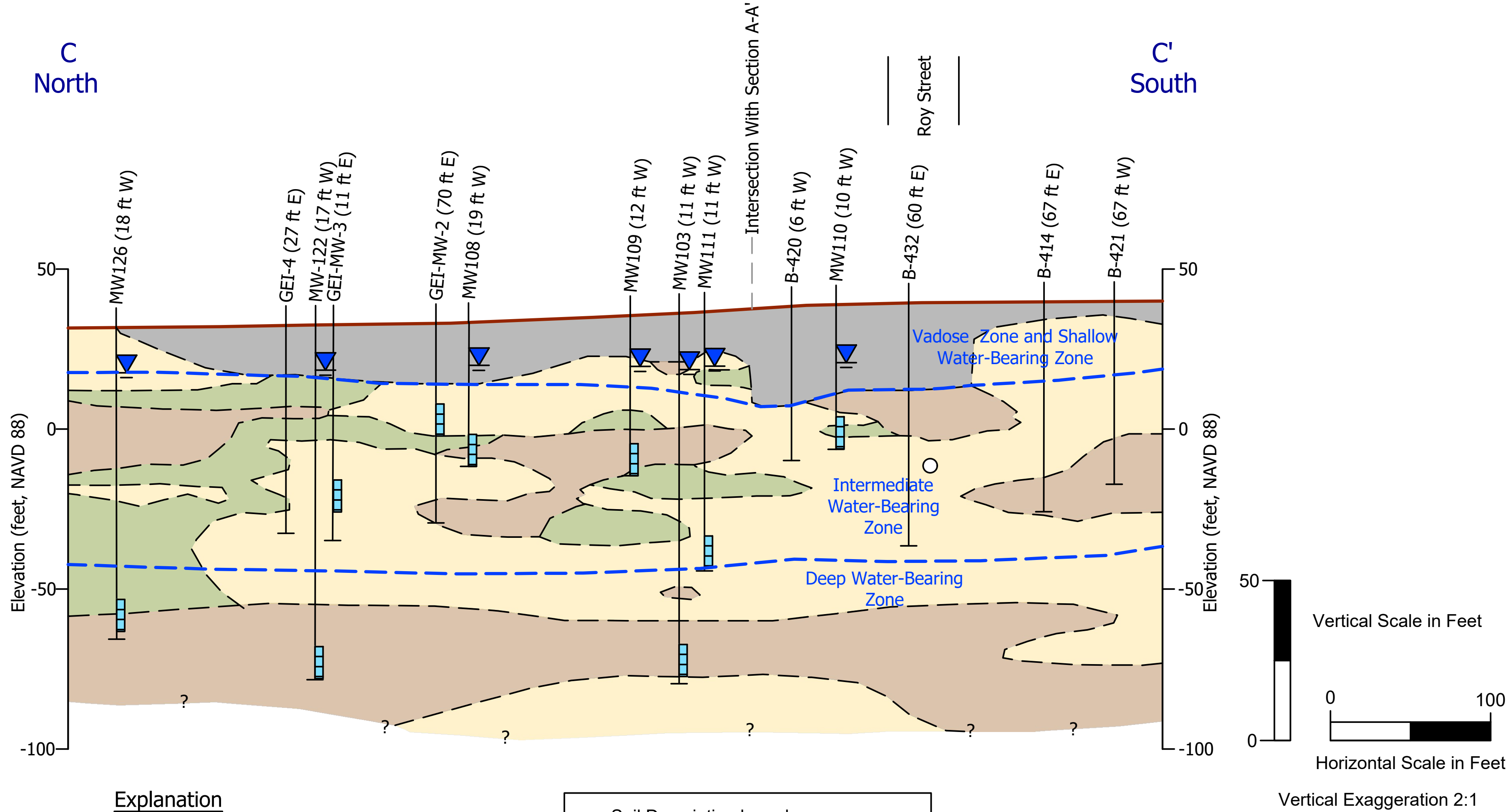
	Soil Description based on Unified Soil Classification System
	Fill
Predominantly coarse-grained deposits	(GP) Poorly Graded Gravel (GW) Well-Graded Gravel (SP) Poorly Graded Sand (SW) Well-Graded Sand
Predominantly coarse-grained deposits	(GM) Silty Gravel (GC) Clayey Gravel (SM) Silty Sand (SC) Clayey Sand
Predominantly fine-grained deposits	(ML) Silt with or without sand and gravel (CL) Clay with or without sand and gravel

PES Environmental, Inc.
Engineering & Environmental Services

Cross Section B-B'
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
9

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1413.001.03.001	141300102004_IAWPU_8-11	WRH	1/18



Explanation

- Approximate Ground Surface Elevation
- ? — — — ? Geologic Contact, queried with uncertain
- MW122 — Lithologic Boring Location
- [decom] Decommissioned Well
- (65 ft S) Approximate distance and direction to feature from line of cross section
- Groundwater Elevation 3/24/2017
- Approximate Sewer Pipe Location

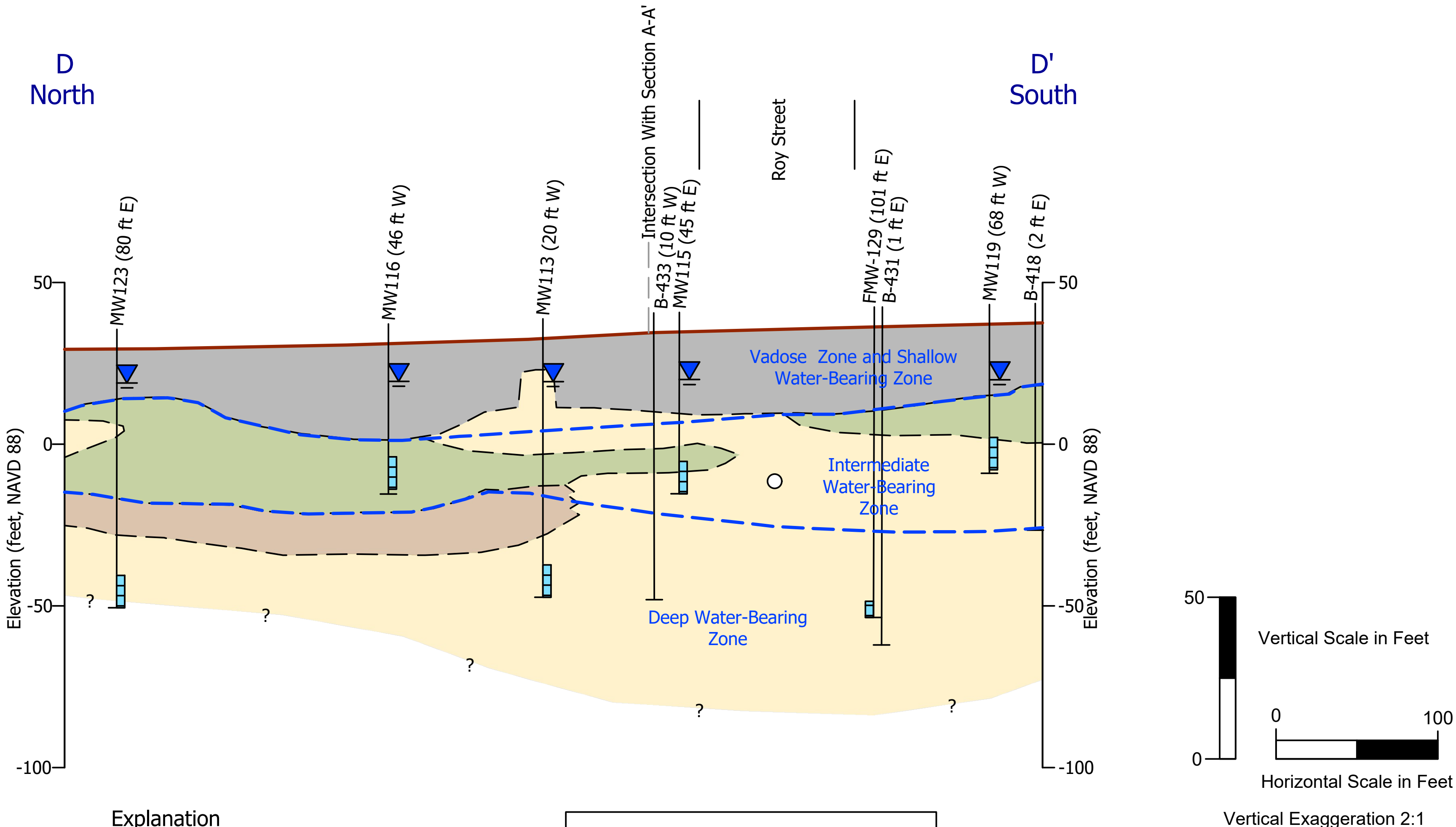
	Soil Description based on Unified Soil Classification System
	Fill
Predominantly coarse-grained deposits	(GP) Poorly Graded Gravel (GW) Well-Graded Gravel (SP) Poorly Graded Sand (SW) Well-Graded Sand
Predominantly coarse-grained deposits	(GM) Silty Gravel (GC) Clayey Gravel (SM) Silty Sand (SC) Clayey Sand
Predominantly fine-grained deposits	(ML) Silt with or without sand and gravel (CL) Clay with or without sand and gravel

PES Environmental, Inc.
Engineering & Environmental Services

Cross Section C-C'
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
10

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1413.001.03.001	141300102004_IAWPU_8-11	WRH	1/18



Explanation

Approximate Ground Surface Elevation

? — — — ? Geologic Contact, queried where uncertain

MW123 Lithologic Boring Location

[decom] Decommissioned Well

(65 ft S) Approximate distance and direction to feature from line of cross section

Groundwater Elevation 3/24/2017

Approximate Sewer Pipe Location

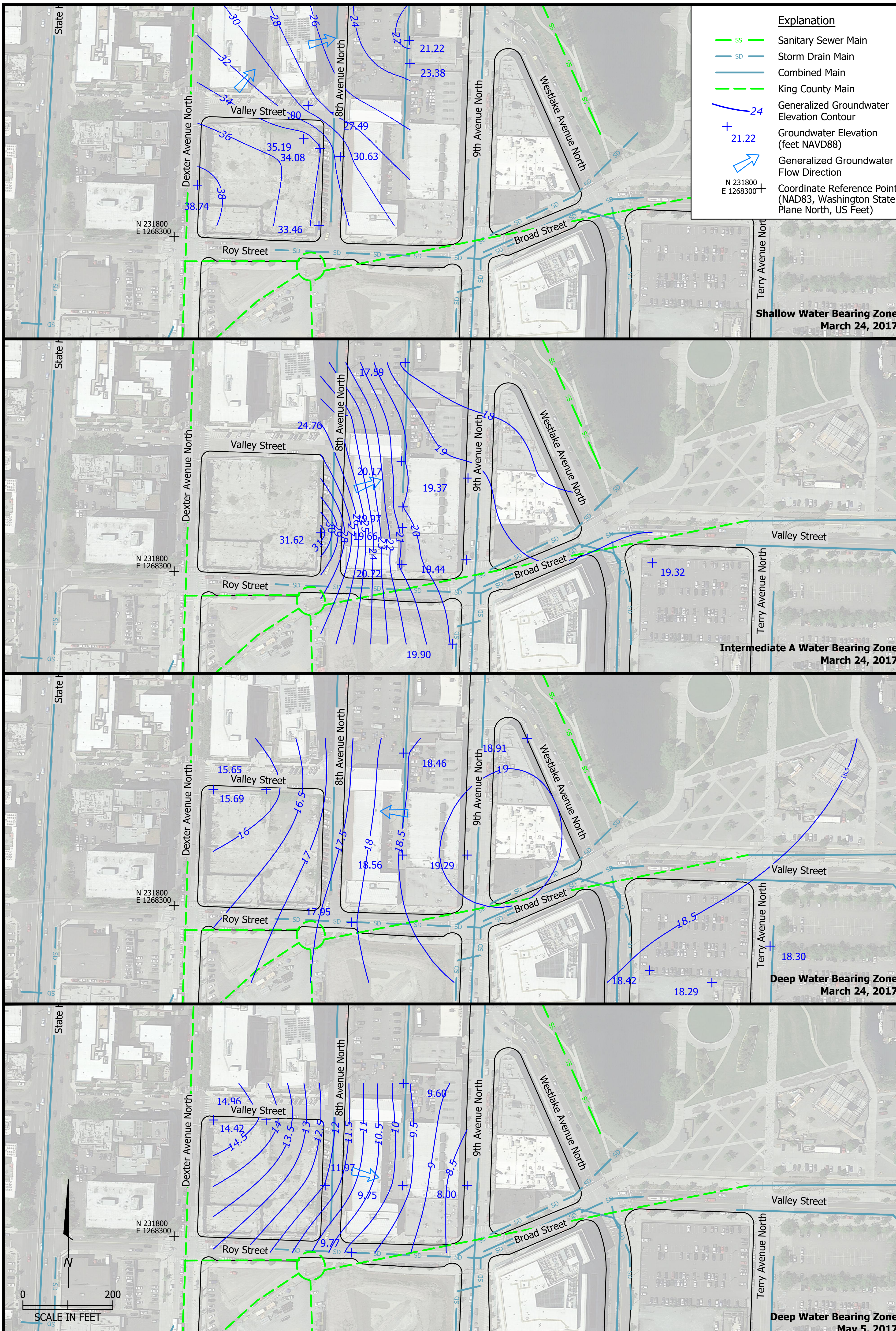
	Soil Description based on Unified Soil Classification System
	Fill
Predominantly coarse-grained deposits	(GP) Poorly Graded Gravel (GW) Well-Graded Gravel (SP) Poorly Graded Sand (SW) Well-Graded Sand
	(GM) Silty Gravel (GC) Clayey Gravel (SM) Silty Sand (SC) Clayey Sand
Predominantly fine-grained deposits	(ML) Silt with or without sand and gravel (CL) Clay with or without sand and gravel

PES Environmental, Inc.
Engineering & Environmental Services

Cross Section D-D'
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
11

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1413.001.03.001	141300102004_IAWPU_8-11	WRH	1/18

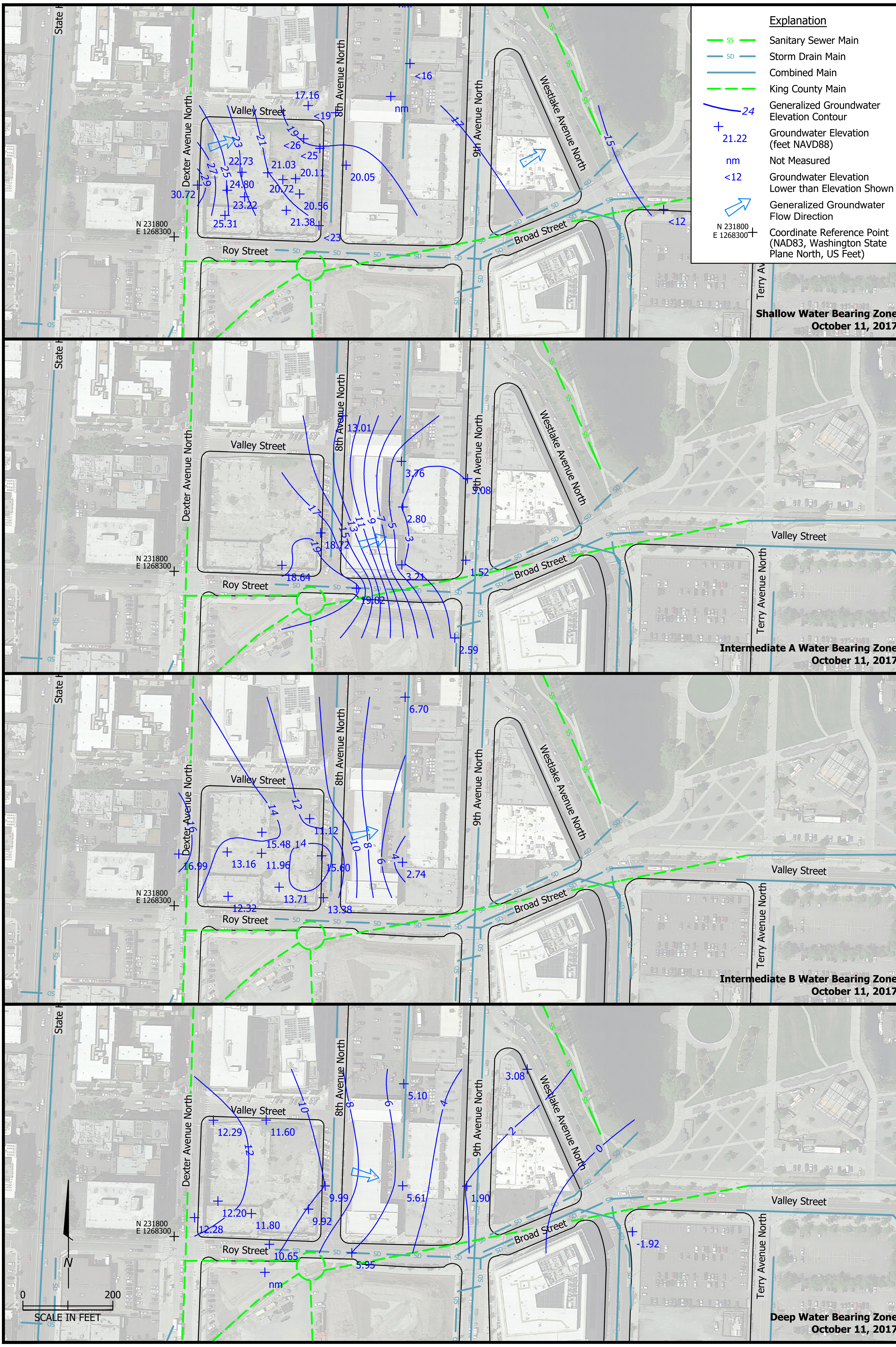


PES Environmental, Inc.
Engineering & Environmental Services

Groundwater Elevation Contours
March and May 2017
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

PLATE
12

1413.001.03.001	141300102004_IAWPU_12	WRH	1/18
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE

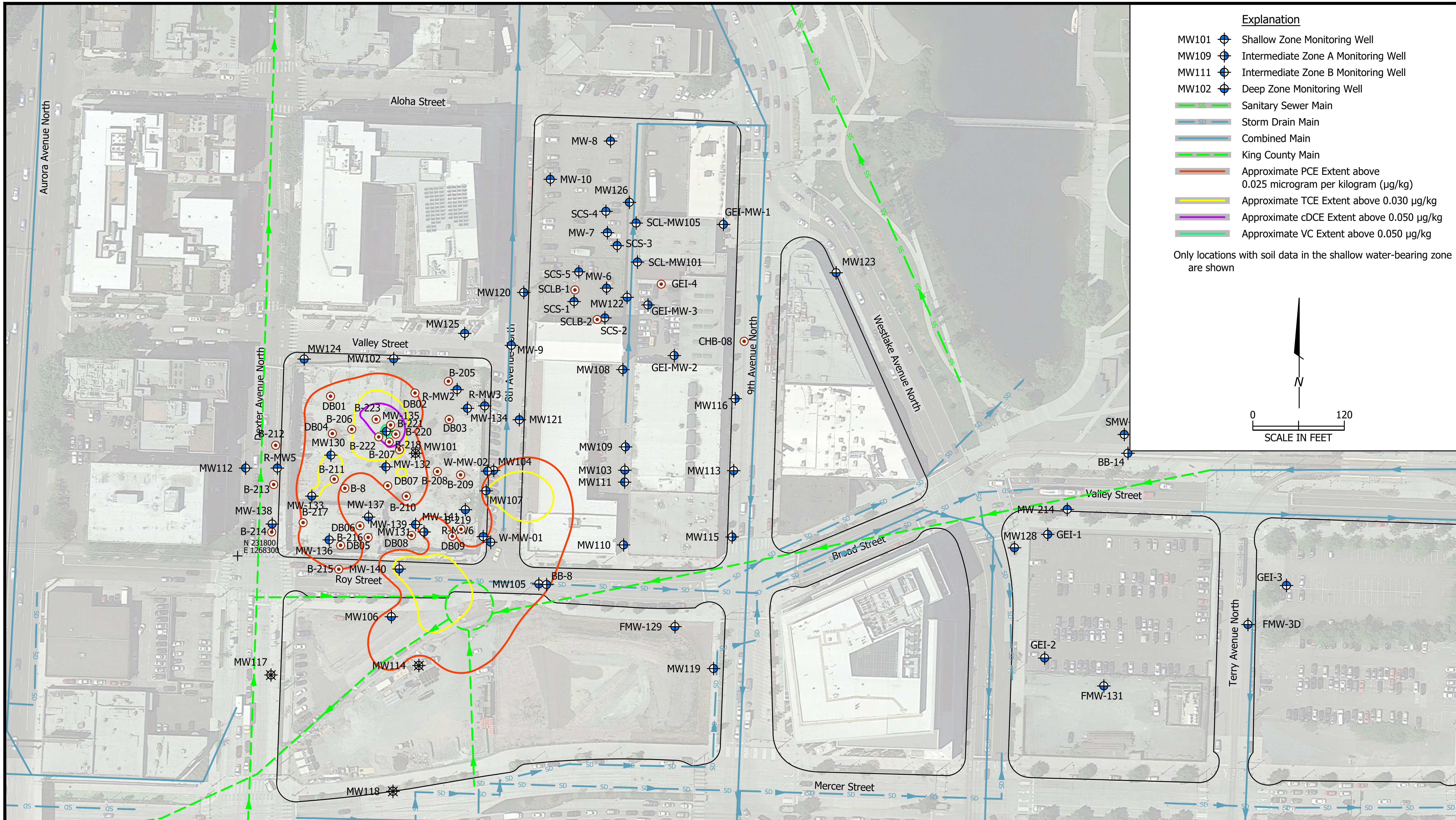


Groundwater Elevation Contours
October 11, 2017
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

PES Environmental, Inc.
Engineering & Environmental Services

PLATE
13

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1413.001.03.001	141300102004_IAWPU_13	WRH	1/18

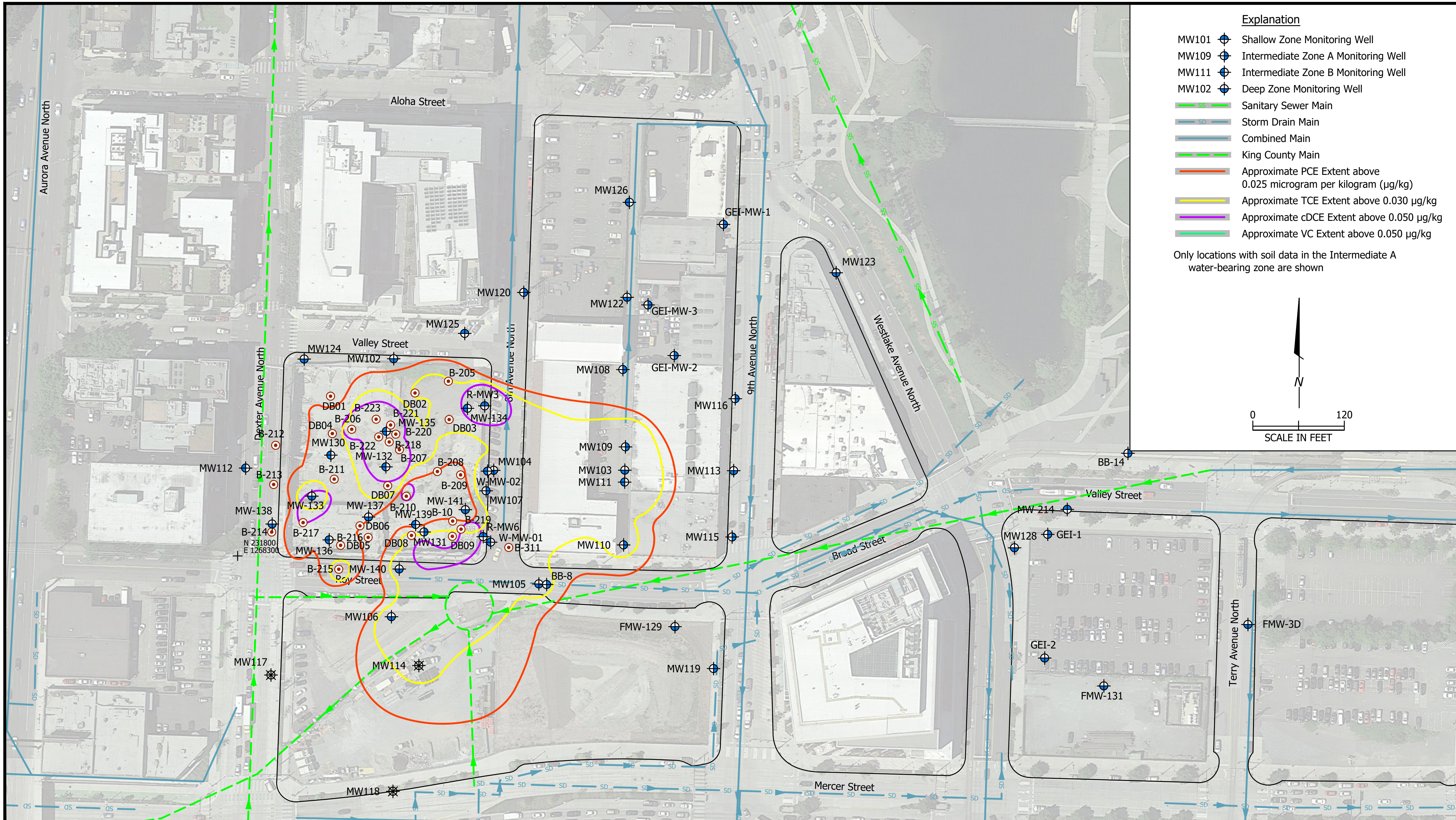


PES Environmental, Inc.
Engineering & Environmental Services

CVOCs in Soil - Shallow Water-Bearing Zone
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
14

1413.001.03.001	141300102004_IAWPU_14	WRH	1/18
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE

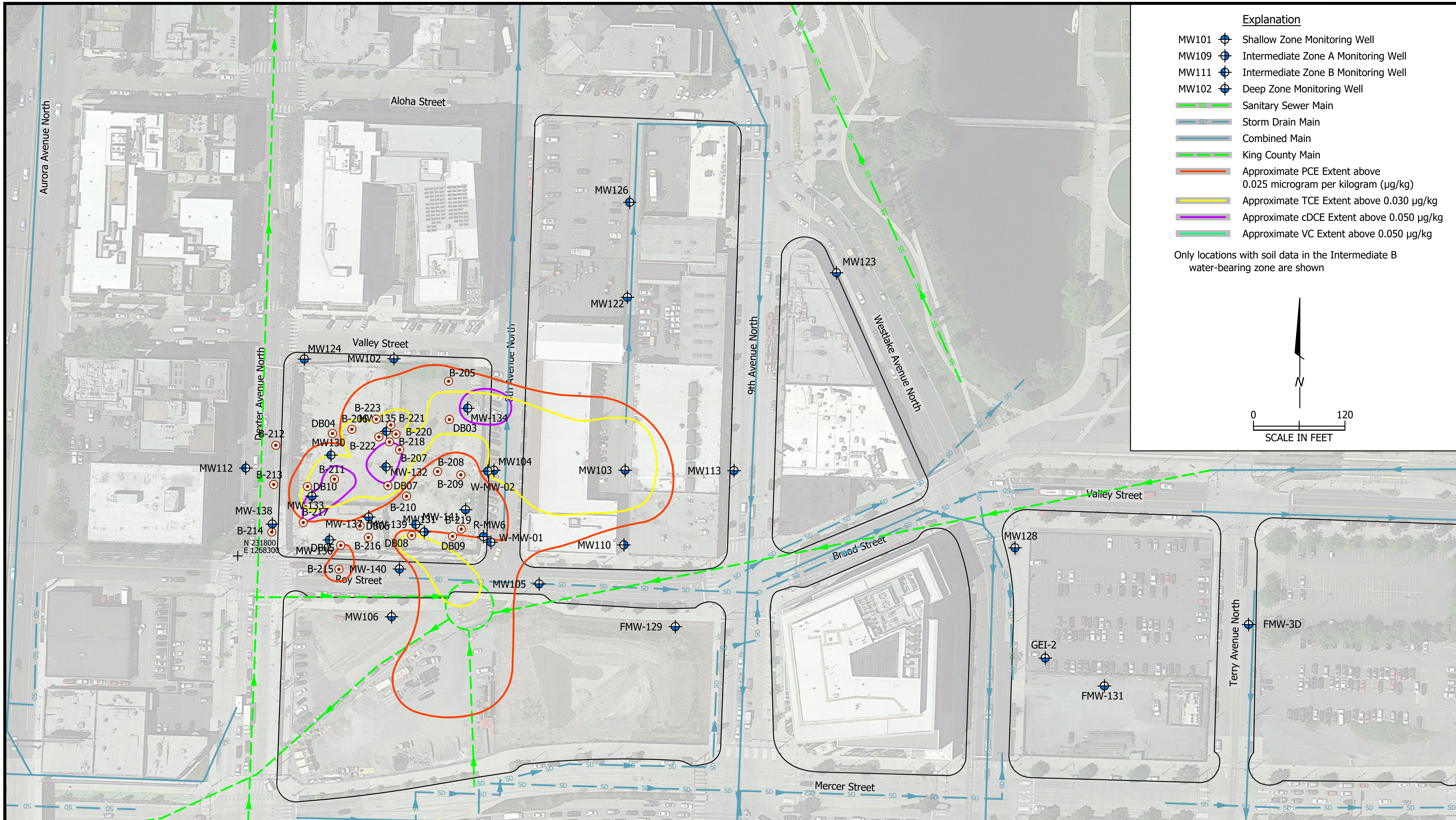


CVOCs in Soil - Intermediate A Water-Bearing Zone
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
15

PES Environmental, Inc.
Engineering & Environmental Services

1413.001.02.004	141300102004_IAWPU_15	WRH	1/18
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE

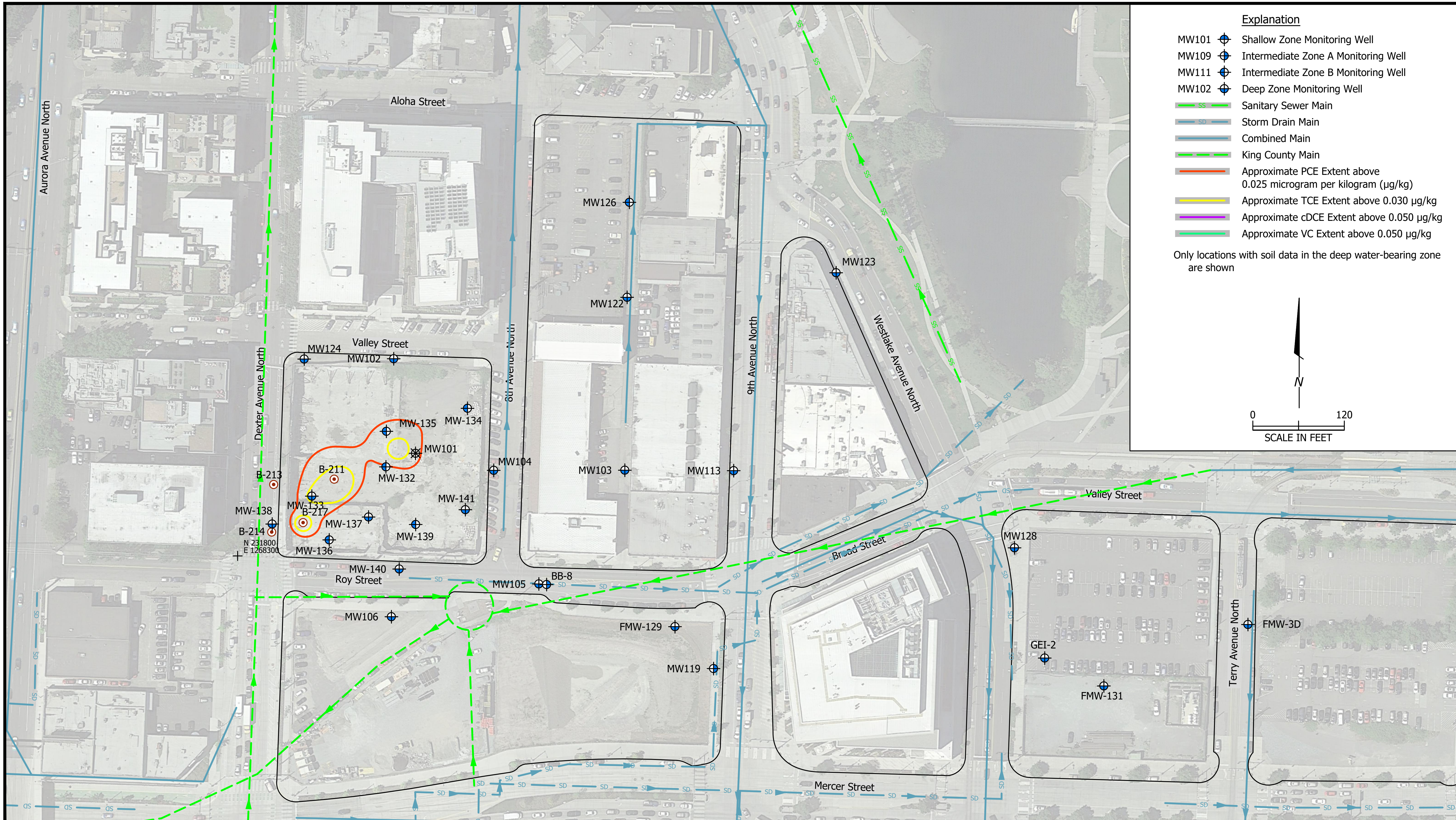


PES Environmental, Inc.
Engineering & Environmental Services

CVOCs in Soil - Intermediate B Water-Bearing Zone
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE 16

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1413.001.02.004	141300102004_IAWPU_16	WRH	1/18

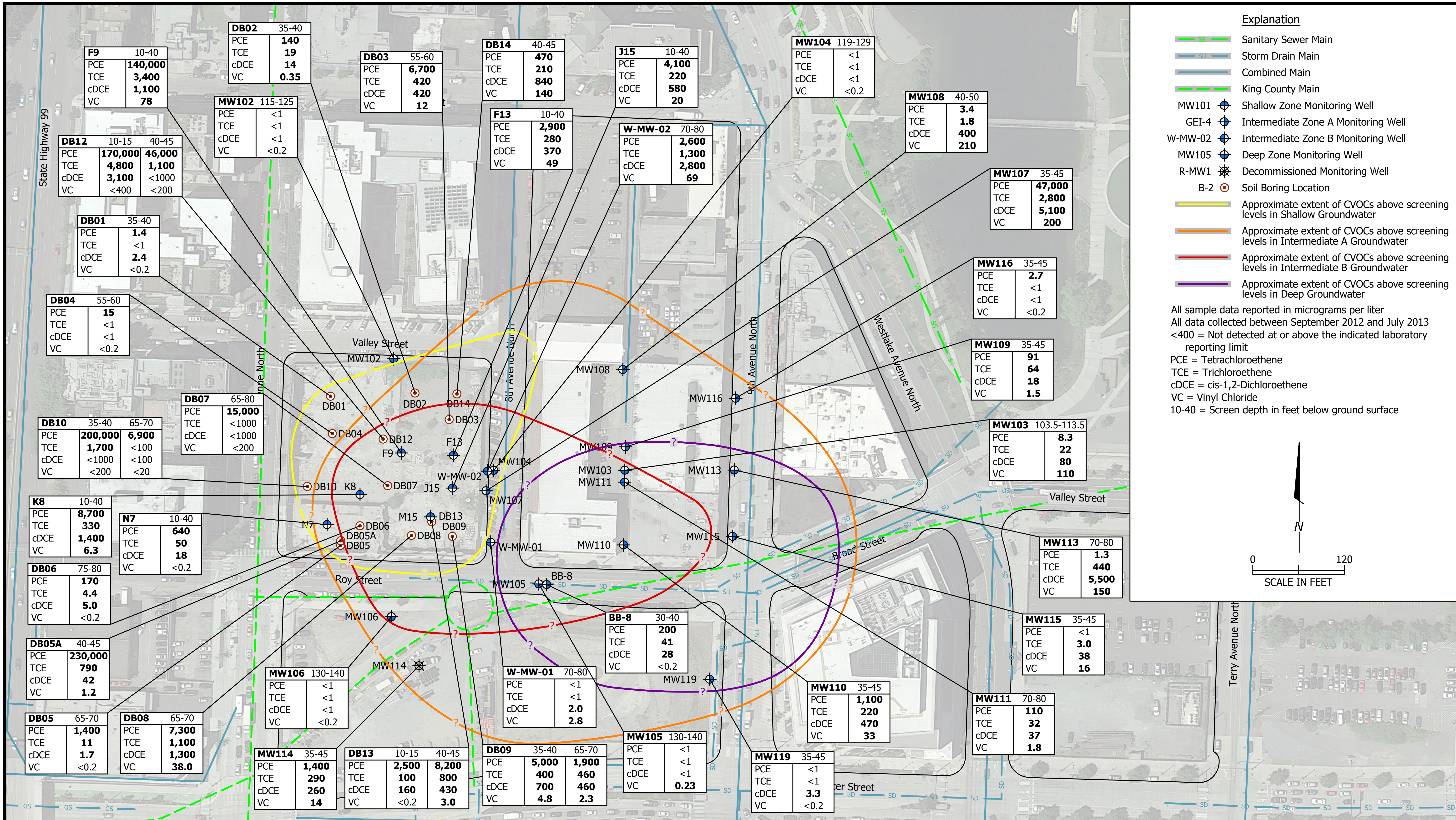


PES Environmental, Inc.
Engineering & Environmental Services

CVOCs in Soil - Deep Water-Bearing Zone
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
17

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1413.001.02.004	141300102004_IAWPU_17	WRH	1/18

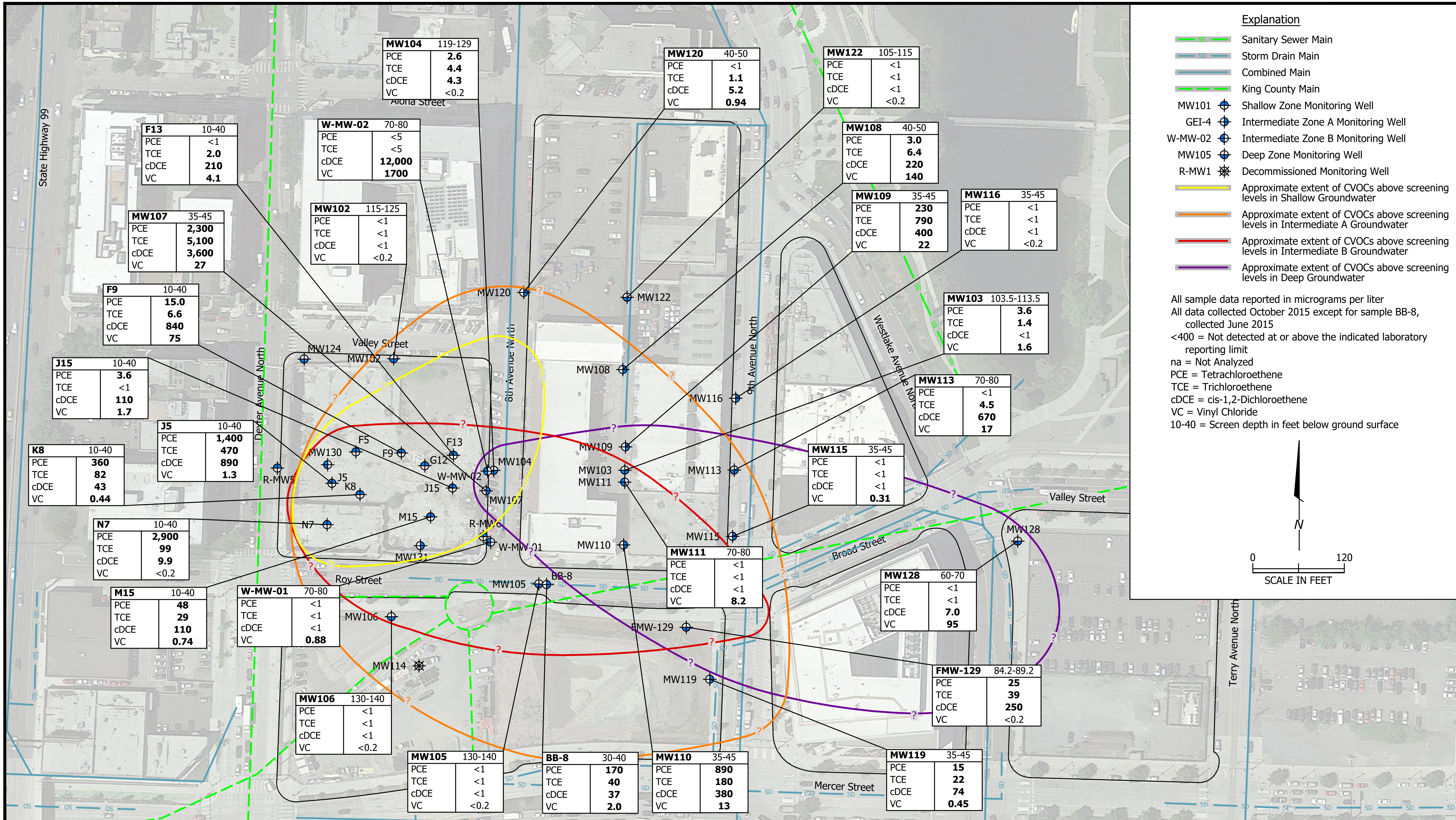


PES Environmental, Inc.
Engineering & Environmental Services

CVOCs in Groundwater Before 2013 Interim Action Implementation
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
18

1413.001.03.001	141300102004_IAWPU_18-19	WRH	1/18
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE

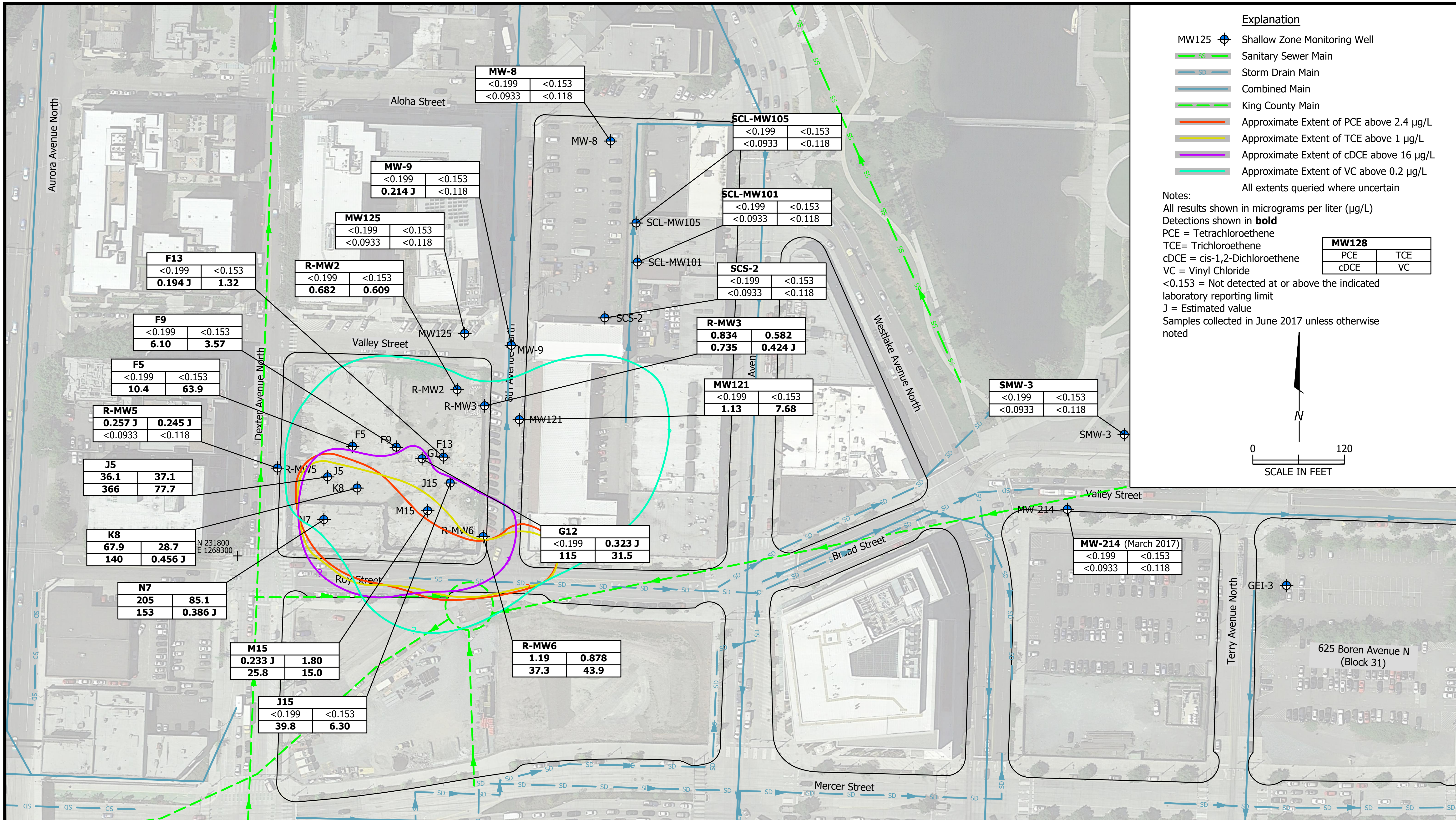


PES Environmental, Inc.
Engineering & Environmental Services

CVOCs in Groundwater After 2013 Interim Action Implementation
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE 19

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1413.001.03.001	141300102004_IAWPU_18-19	WRH	1/18

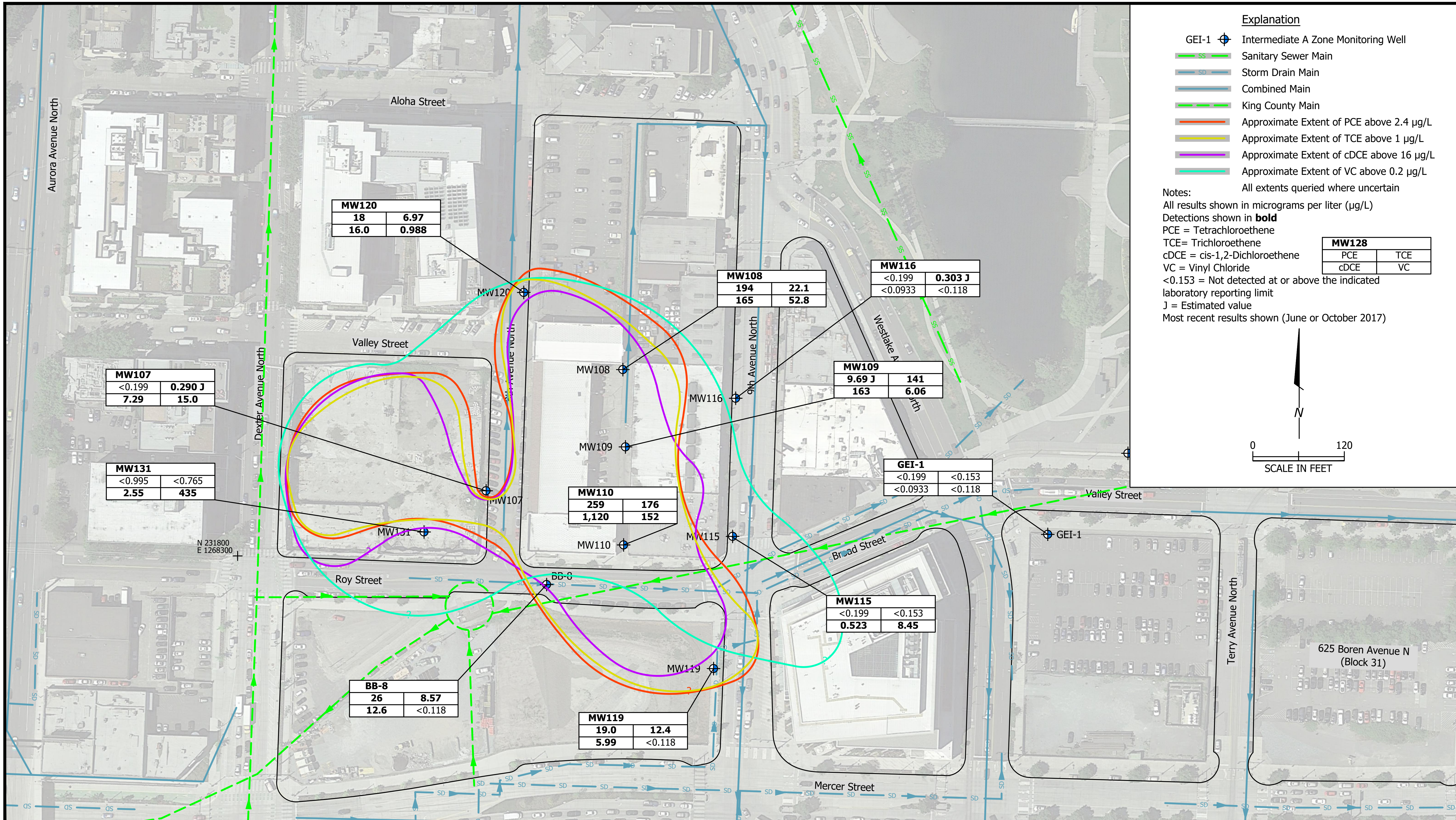


PES Environmental, Inc.
Engineering & Environmental Services

2017 CVOCs in Groundwater
Shallow Water-Bearing Zone
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
20

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1413.001.02.004	141300102004_IAWPU_20	WRH	1/18

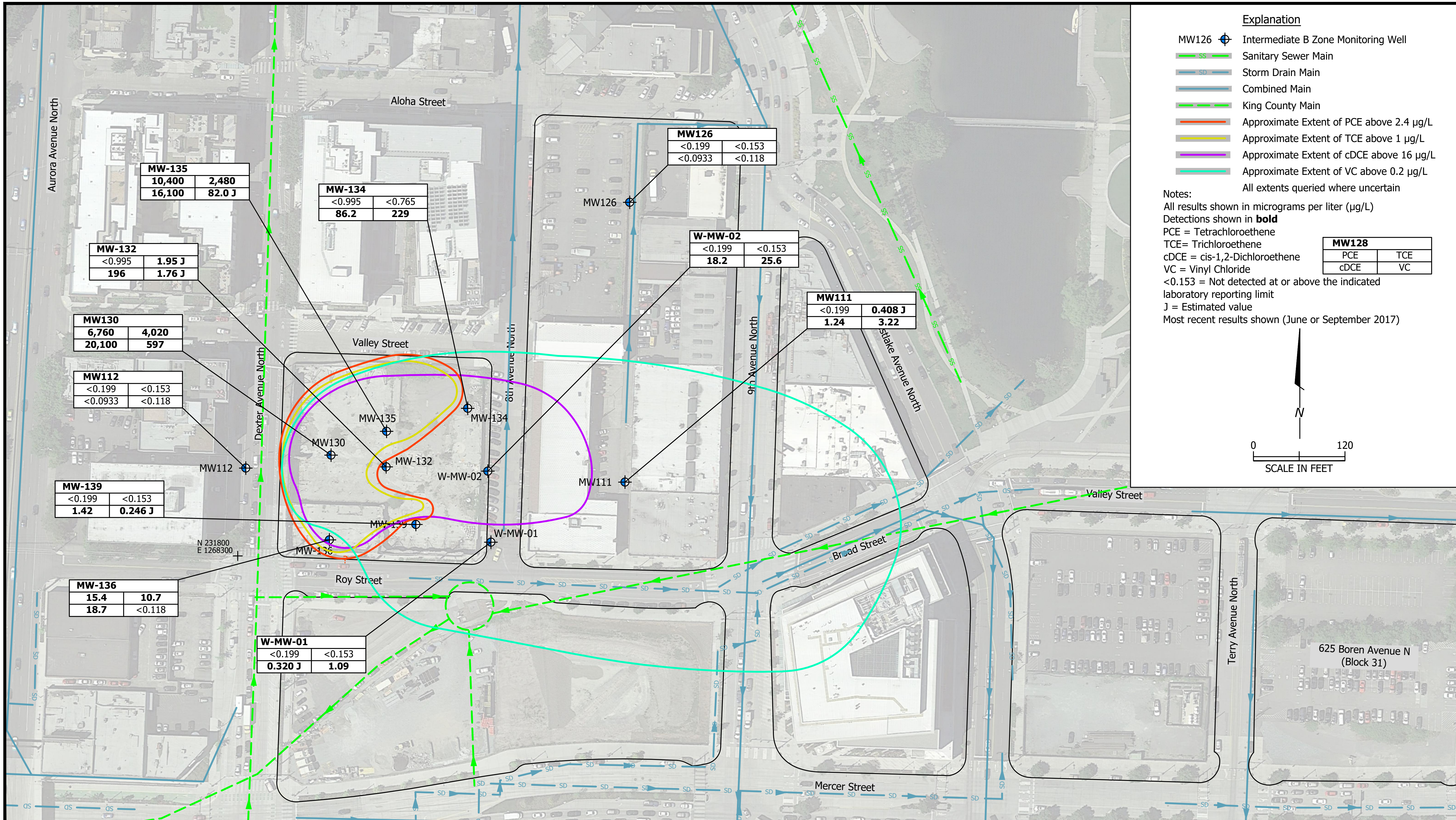


PES Environmental, Inc.
Engineering & Environmental Services

2017 CVOCs in Groundwater
Intermediate A Water-Bearing Zone
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
21

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1413.001.02.004	141300102004_IAWPU_21	WRH	1/18

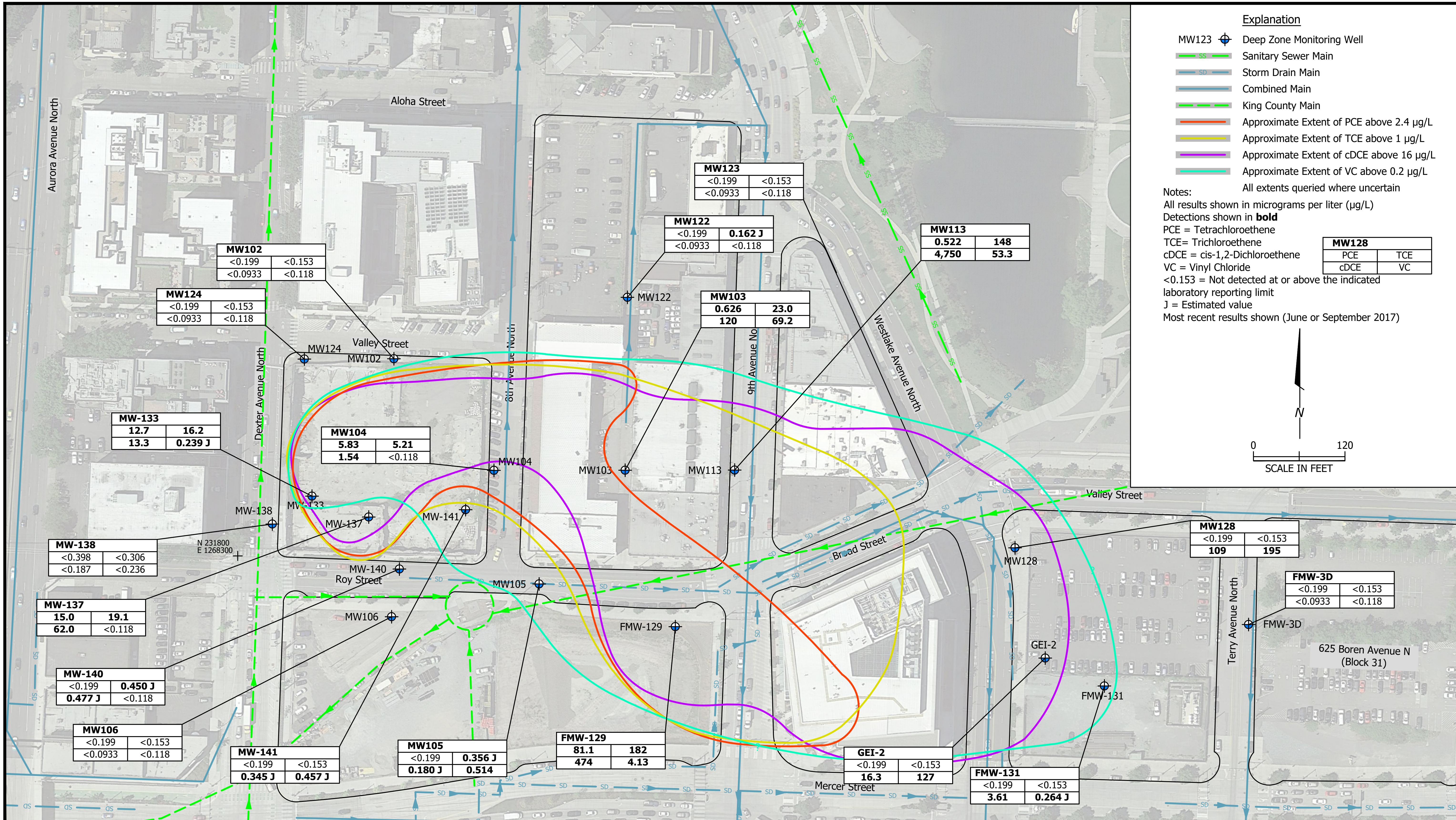


PES Environmental, Inc.
Engineering & Environmental Services

2017 CVOCs in Groundwater
Intermediate B Water-Bearing Zone
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
22

1413.001.02.004	141300102004_IAWPU_22	WRH	1/18
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE

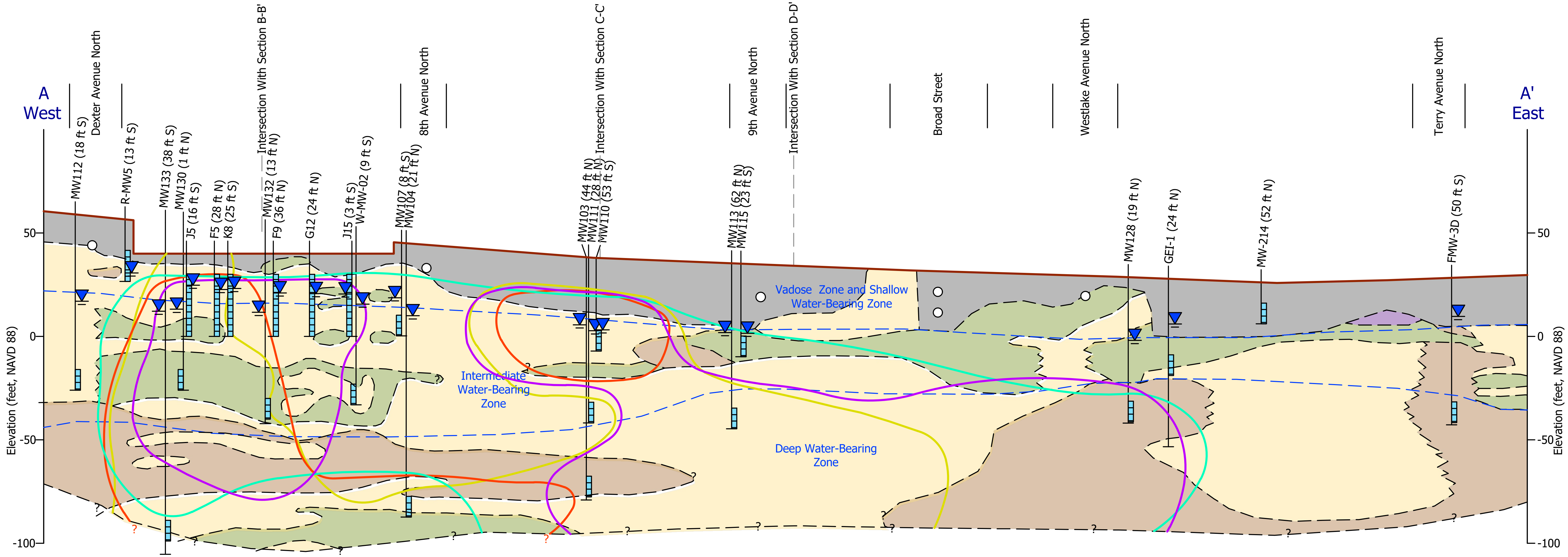


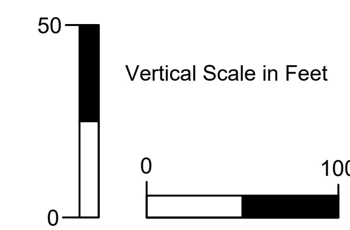
PES Environmental, Inc.
Engineering & Environmental Services

2017 CVOCs in Groundwater
Deep Water-Bearing Zone
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
23

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1413.001.02.004	141300102004_IAWPU_23	WRH	1/18





Vertical Exaggeration 2:1

Explanation

(red line)	Approximate Ground Surface Elevation
?— — — —?	Geologic Contact, queried where uncertain
MW112	Lithologic Boring Location
[decom]	Decommissioned Well
(65 ft S)	Approximate distance and direction to feature from line of cross section
▼	Latest Groundwater Elevation (June or October 2017)
○	Approximate Sewer Pipe Location

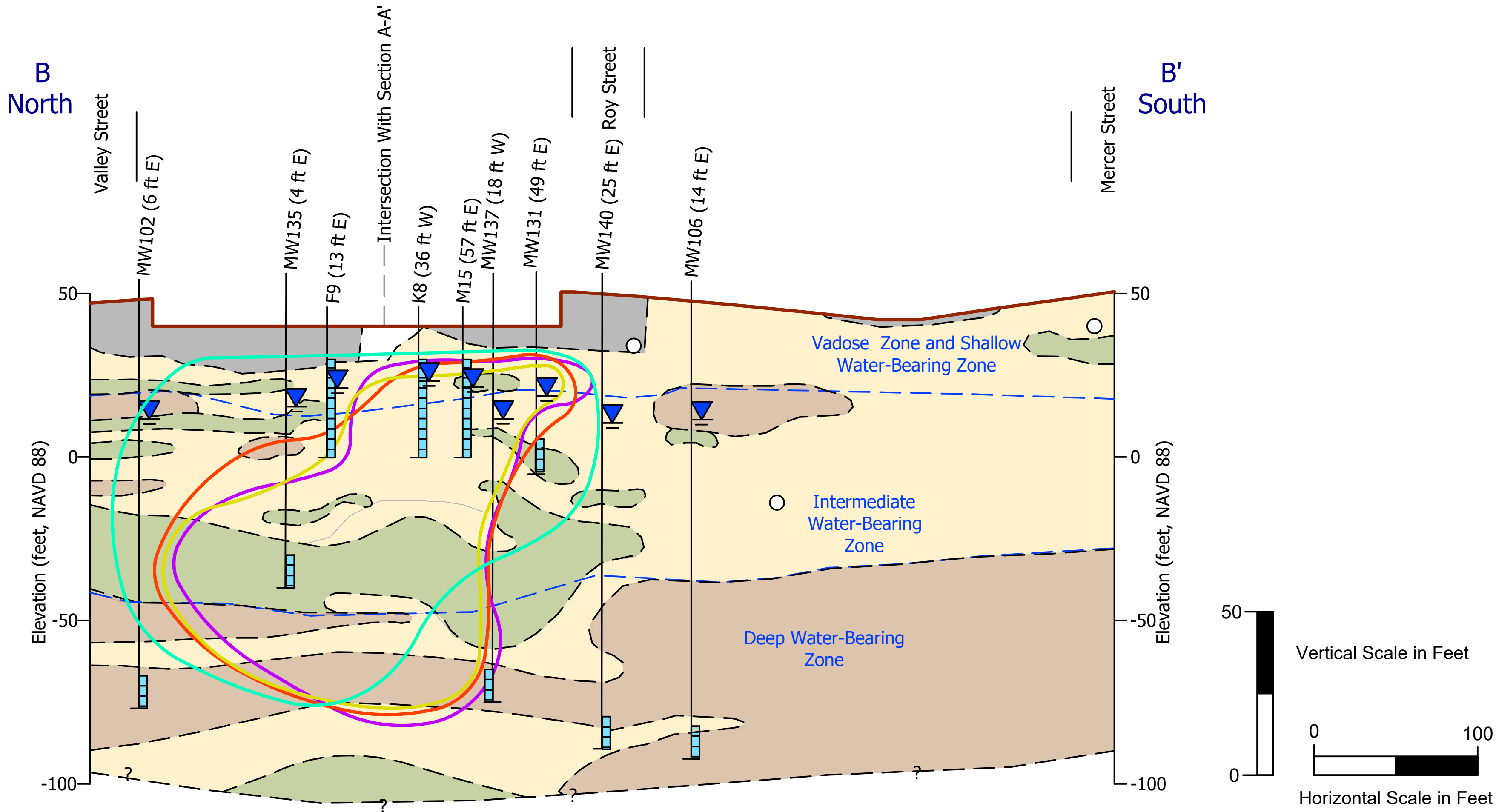
	Soil Description based on Unified Soil Classification System
	Fill
Predominantly coarse-grained deposits	(GP) Poorly Graded Gravel (GW) Well-Graded Gravel (SP) Poorly Graded Sand (SW) Well-Graded Sand
Predominantly coarse-grained deposits	(GM) Silty Gravel (GC) Clayey Gravel (SM) Silty Sand (SC) Clayey Sand
Predominantly fine-grained deposits	(ML) Silt with or without sand and gravel (CL) Clay with or without sand and gravel
Predominantly fine-grained deposits	(PT) Peat

PES Environmental, Inc.
Engineering & Environmental Services

2017 CVOCs in Groundwater
Cross Section A-A'
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
24

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1413.001.03.001	141300102004_IAWPU_24-27	WRH	1/18



Explanation

Approximate Ground Surface Elevation

? — — — ? Geologic Contact, queried where uncertain

MW123 Lithologic Boring Location

[decom] Decommissioned Well

(65 ft S) Approximate distance and direction to feature from line of cross section

Latest Groundwater Elevation (June or October 2017)

Approximate Sewer Pipe Location

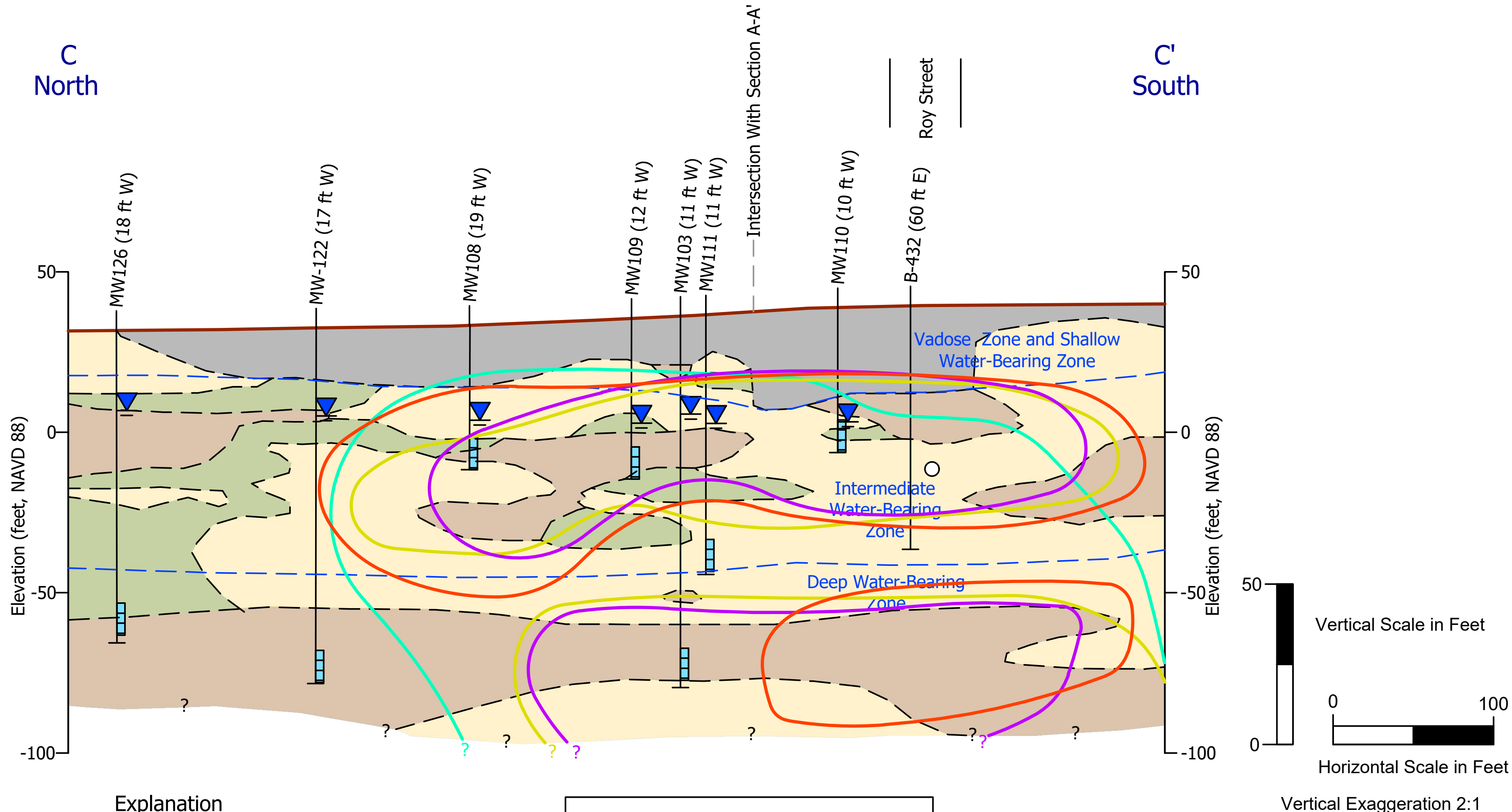
	Soil Description based on Unified Soil Classification System
	Fill
Predominantly coarse-grained deposits	(GP) Poorly Graded Gravel (GW) Well-Graded Gravel (SP) Poorly Graded Sand (SW) Well-Graded Sand
Predominantly coarse-grained deposits	(GM) Silty Gravel (GC) Clayey Gravel (SM) Silty Sand (SC) Clayey Sand
Predominantly fine-grained deposits	(ML) Silt with or without sand and gravel (CL) Clay with or without sand and gravel

PES Environmental, Inc.
Engineering & Environmental Services

2017 CVOCs in Groundwater
Cross Section B-B'
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
25

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1413.001.03.001	141300102004_IAWPU_24-27	WRH	1/18



Explanation

Approximate Ground Surface Elevation

? — — — ? Geologic Contact, queried with uncertain

MW123 Lithologic Boring Location

[decom] Decommissioned Well

(65 ft S) Approximate distance and direction to feature from line of cross section

Latest Groundwater Elevation (June or October 2017)

○ Approximate Sewer Pipe Location

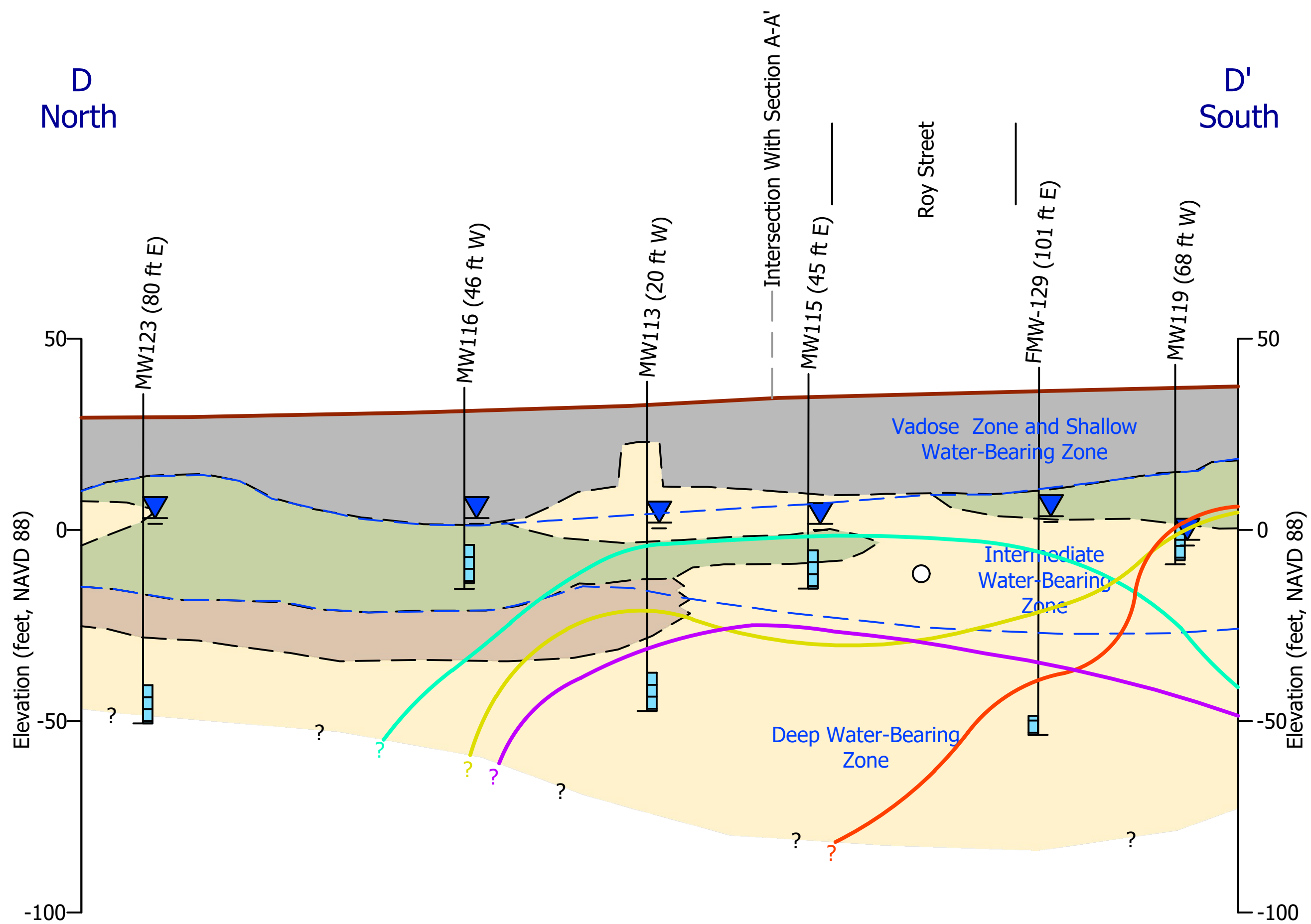
	Soil Description based on Unified Soil Classification System
	Fill
Predominantly coarse-grained deposits	(GP) Poorly Graded Gravel (GW) Well-Graded Gravel (SP) Poorly Graded Sand (SW) Well-Graded Sand
Predominantly coarse-grained deposits	(GM) Silty Gravel (GC) Clayey Gravel (SM) Silty Sand (SC) Clayey Sand
Predominantly fine-grained deposits	(ML) Silt with or without sand and gravel (CL) Clay with or without sand and gravel

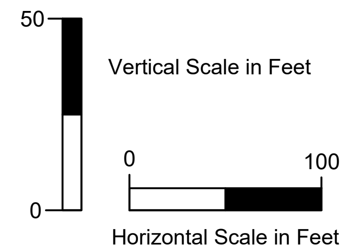
PES Environmental, Inc.
Engineering & Environmental Services

2017 CVOCs in Groundwater
Cross Section C-C'
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
26

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1413.001.03.001	141300102004_IAWPU_24-27	WRH	1/18





Vertical Exaggeration 2:1

Explanation

- Approximate Ground Surface Elevation
- ? — — — ? Geologic Contact, queried where uncertain
- MW123 Lithologic Boring Location
- [decom] Decommissioned Well
- (65 ft S) Approximate distance and direction to feature from line of cross section
- Latest Groundwater Elevation (June or October 2017)
- Approximate Sewer Pipe Location

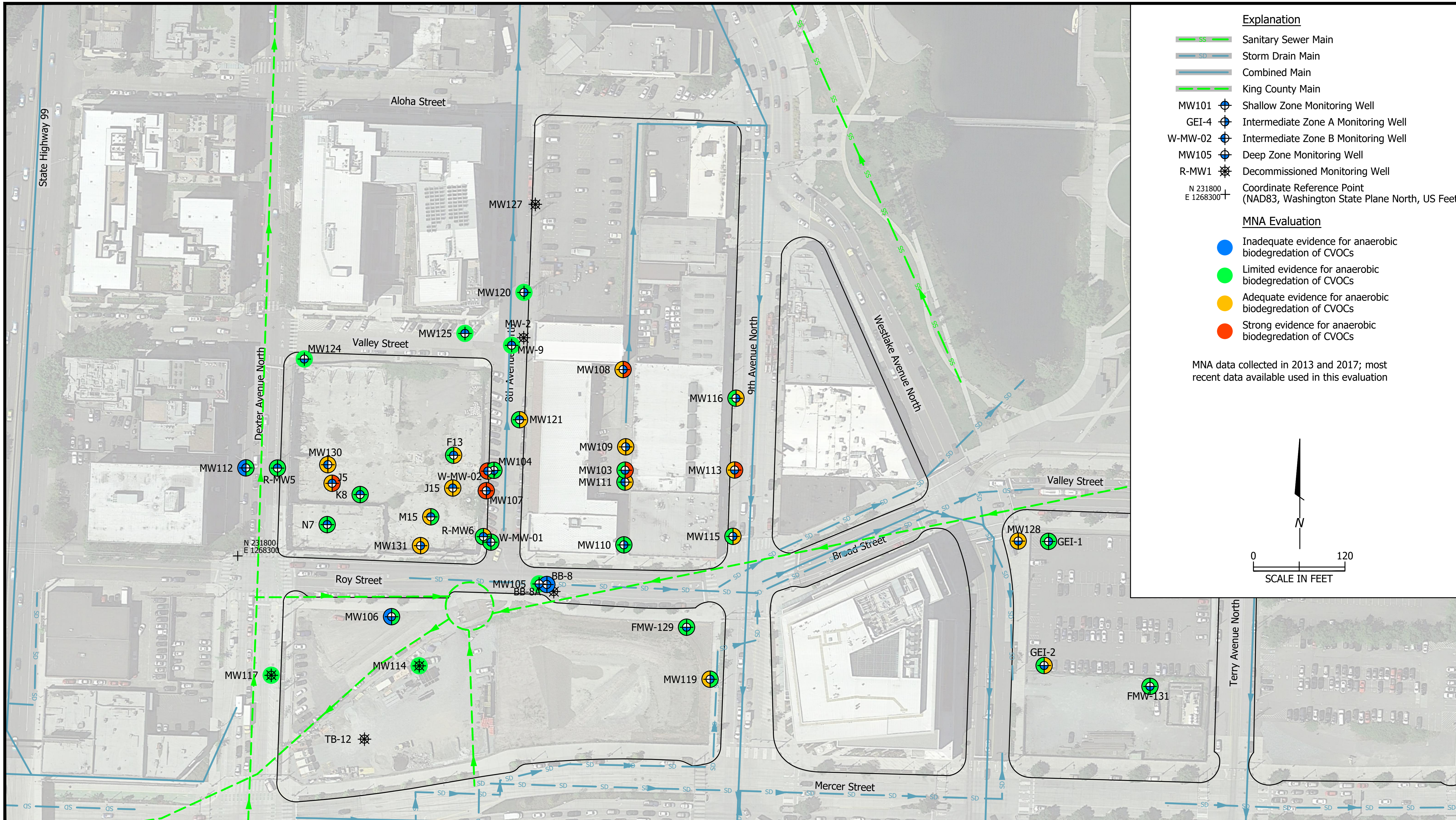
	Soil Description based on Unified Soil Classification System
	Fill
Predominantly coarse-grained deposits	(GP) Poorly Graded Gravel (GW) Well-Graded Gravel (SP) Poorly Graded Sand (SW) Well-Graded Sand
Predominantly coarse-grained deposits	(GM) Silty Gravel (GC) Clayey Gravel (SM) Silty Sand (SC) Clayey Sand
Predominantly fine-grained deposits	(ML) Silt with or without sand and gravel (CL) Clay with or without sand and gravel

PES Environmental, Inc.
Engineering & Environmental Services

2017 CVOCs in Groundwater
Cross Section D-D'
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
27

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1413.001.03.001	141300102004_IAWPU_24-27	WRH	1/18

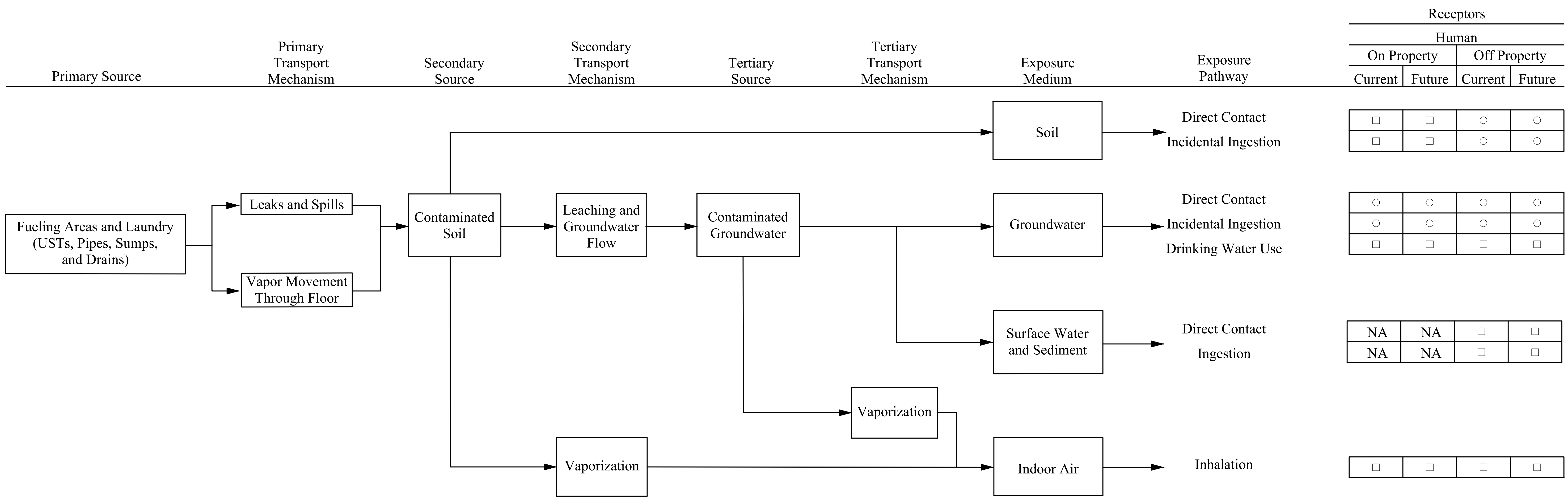


PES Environmental, Inc.
Engineering & Environmental Services

MNA Screening Results
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
28

1413.001.02.004	141300102004_IAWPU_28	WRH	1/18
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE



Legend

NA Not applicable

● Complete exposure pathway

○ Complete but minor exposure

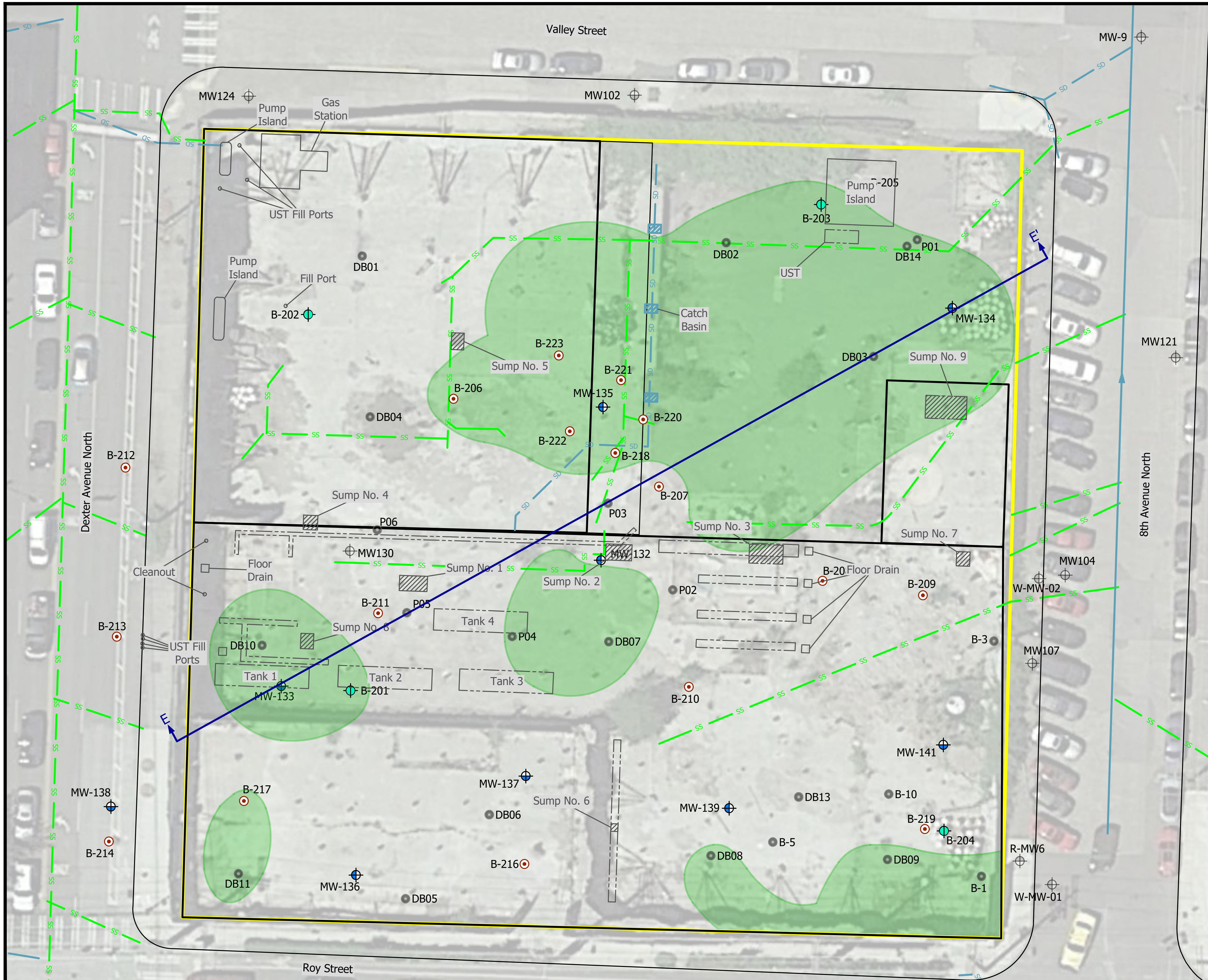
□ Incomplete exposure pathway

PES Environmental, Inc.
Engineering & Environmental Services

Conceptual Site Model
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
29

1413.001.02.004	141300102004_IAWPU_29	WRH	1/18
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE



Explanation

- Approximate Property Boundary
- Sanitary Sewer Line
- Storm Drain Line
- Combined Main
- MW101 — Shallow Monitoring Well
- MW107 — Intermediate A Monitoring Well
- W-MW-02 — Intermediate B Monitoring Well
- MW105 — Deep Monitoring Well
- B-2 — Soil Boring Location
- MW-132 — 2017 Intermediate A Monitoring Well
- MW-134 — 2017 Intermediate B Monitoring Well
- MW-133 — 2017 Deep Monitoring Well
- B-205 — 2017 Soil Boring Location
- B-201 — 2017 Geotechnical Boring Location
- N 231800 E 1268300 — Coordinate Reference Point (NAD83, Washington State Plane North, US Feet)
- Treatment Zone Horizontal Extent
- E E' — Cross Section Location (Arrows show direction of view)

Note: Only boring and well locations with soil data used in modeling are shown for clarity.

N

0 30
SCALE IN FEET

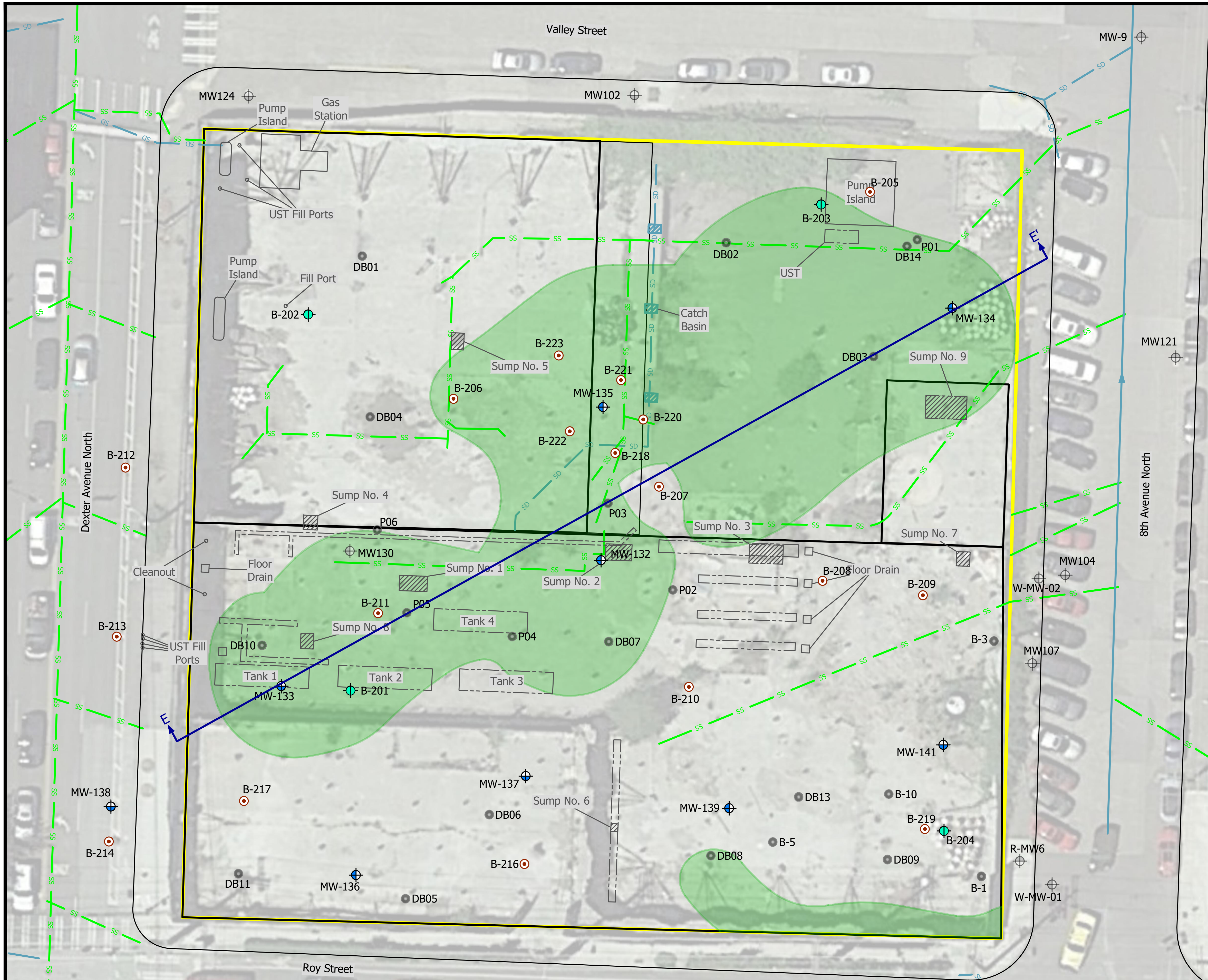
Aerial Photo: June 27, 2016 (Google 2017)

PES Environmental, Inc.
Engineering & Environmental Services

Treatment Zone A - Horizontal Extent
(Elevation 5 to -10 feet)
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
30

1413.001.02.004	141300102004_IAWPU_30	WRH	1/18
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE



Explanation

- Approximate Property Boundary
- Sanitary Sewer Line
- Storm Drain Line
- Combined Main
- MW101 Shallow Monitoring Well
- MW107 Intermediate A Monitoring Well
- W-MW-02 Intermediate B Monitoring Well
- MW105 Deep Monitoring Well
- B-2 Soil Boring Location
- MW-132 2017 Intermediate A Monitoring Well
- MW-134 2017 Intermediate B Monitoring Well
- MW-133 2017 Deep Monitoring Well
- B-205 2017 Soil Boring Location
- B-201 2017 Geotechnical Boring Location
- N 231800 E 1268300 Coordinate Reference Point (NAD83, Washington State Plane North, US Feet)
- Treatment Zone Horizontal Extent
- E E' Cross Section Location (Arrows show direction of view)

Note: Only boring and well locations with soil data used in modeling are shown for clarity.

N

0 30

SCALE IN FEET

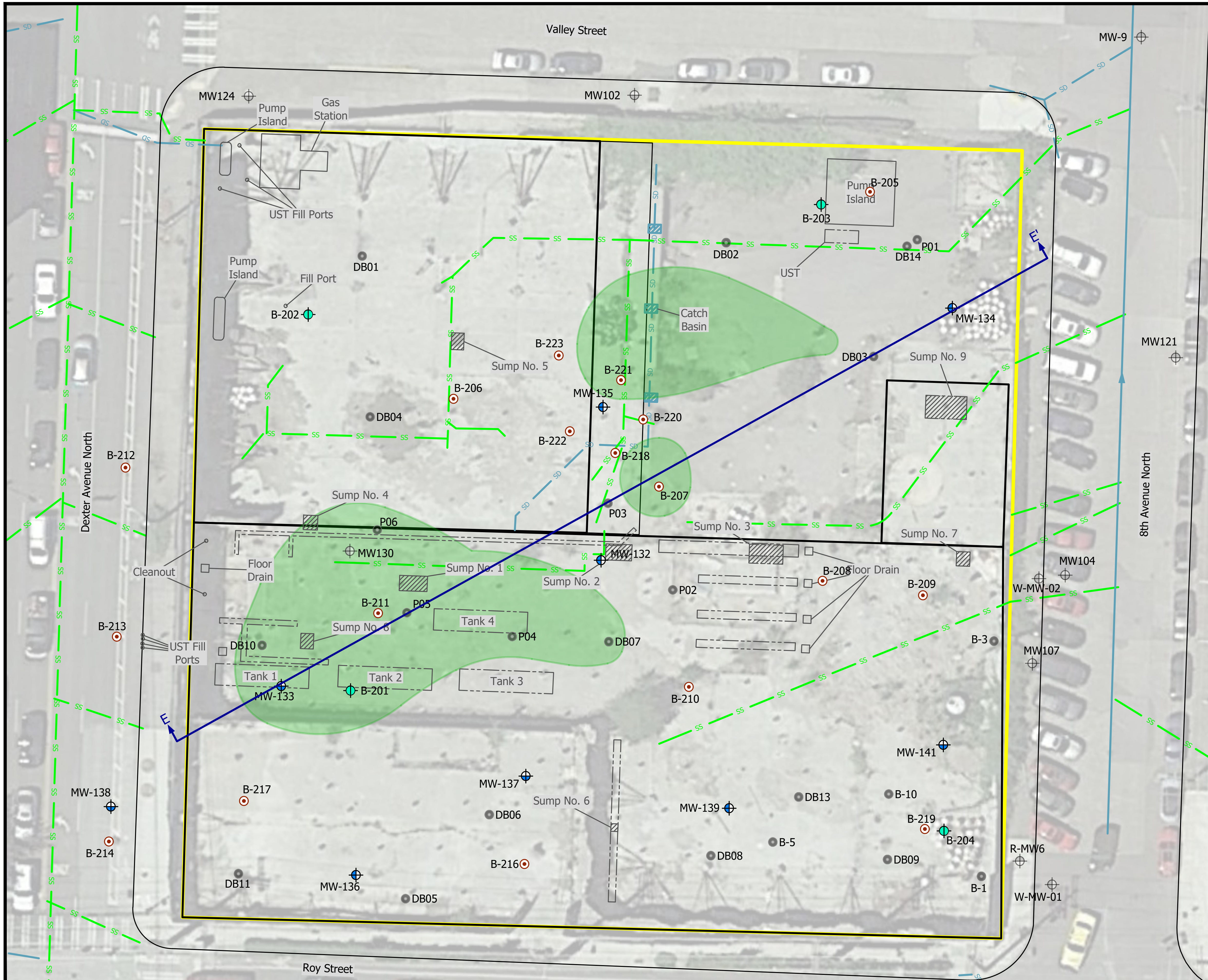
Aerial Photo: June 27, 2016 (Google 2017)

PES Environmental, Inc.
Engineering & Environmental Services

Treatment Zone B - Horizontal Extent
(Elevation -10 to -25 feet)
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
31

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1413.001.02.004	141300102004_IAWPU_31	WRH	1/18



Explanation

- Approximate Property Boundary
- Sanitary Sewer Line
- Storm Drain Line
- Combined Main
- MW101 Shallow Monitoring Well
- MW107 Intermediate A Monitoring Well
- W-MW-02 Intermediate B Monitoring Well
- MW105 Deep Monitoring Well
- B-2 Soil Boring Location
- MW-132 2017 Intermediate A Monitoring Well
- MW-134 2017 Intermediate B Monitoring Well
- MW-133 2017 Deep Monitoring Well
- B-205 2017 Soil Boring Location
- B-201 2017 Geotechnical Boring Location
- N 231800 E 1268300 Coordinate Reference Point (NAD83, Washington State Plane North, US Feet)
- Treatment Zone Horizontal Extent
- E E' Cross Section Location (Arrows show direction of view)

Note: Only boring and well locations with soil data used in modeling are shown for clarity.

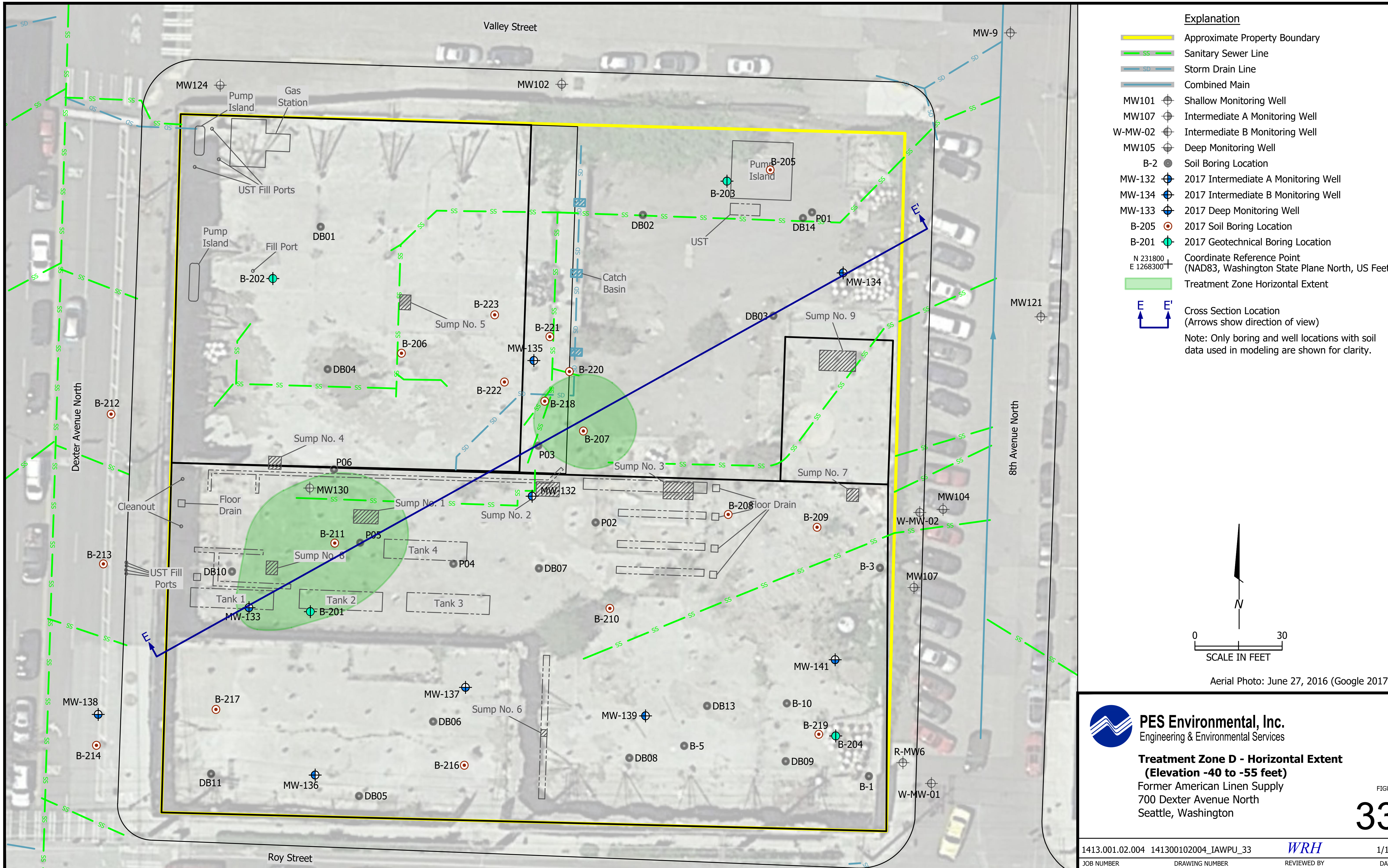
Aerial Photo: June 27, 2016 (Google 2017)

PES Environmental, Inc.
Engineering & Environmental Services

Treatment Zone C - Horizontal Extent
(Elevation -25 to -40 feet)
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
32

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1413.001.02.004	141300102004_IAWPU_32	WRH	1/18

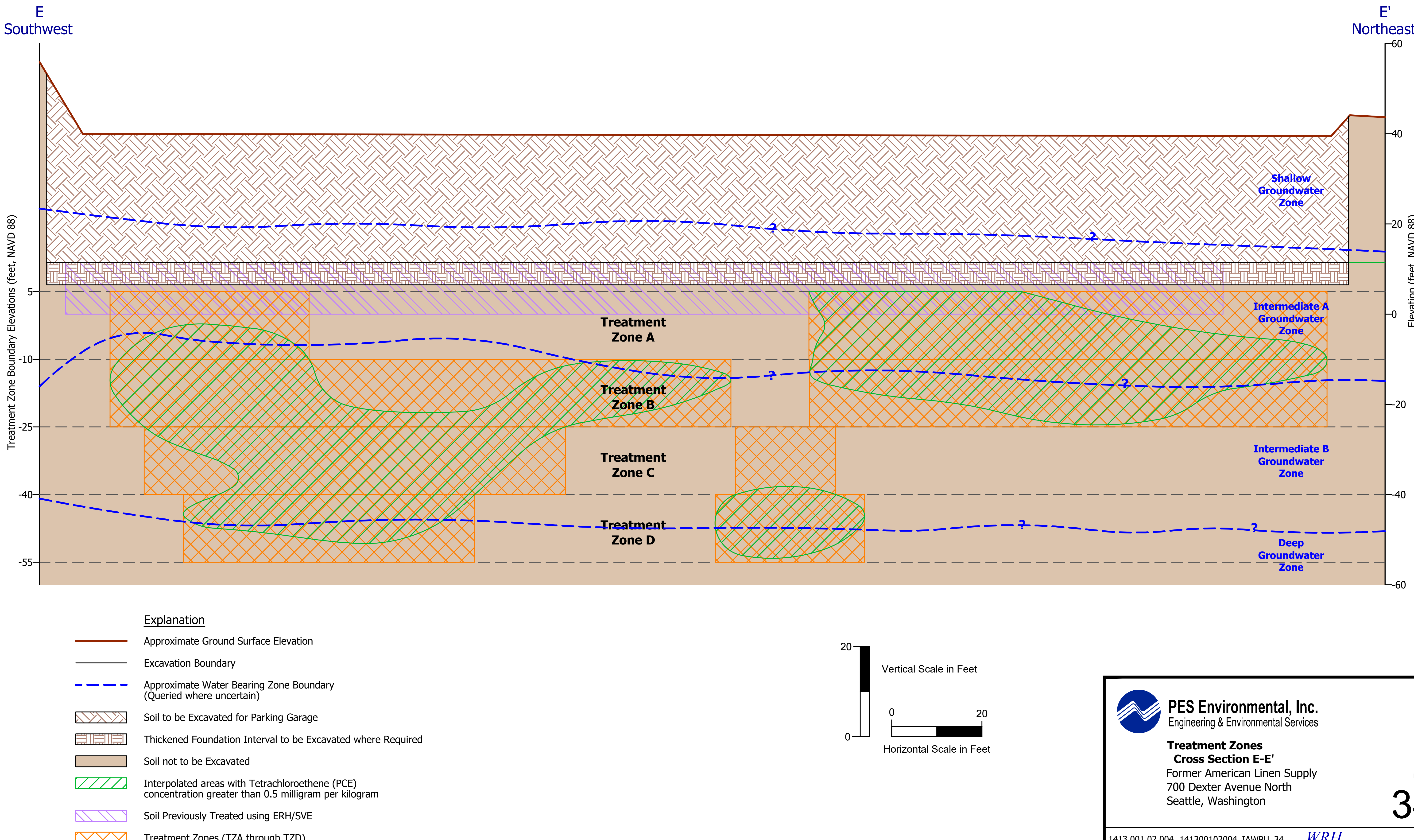


PES Environmental, Inc.
Engineering & Environmental Services

Treatment Zone D - Horizontal Extent
(Elevation -40 to -55 feet)
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
33

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1413.001.02.004	141300102004_IAWPU_33	WRH	1/18

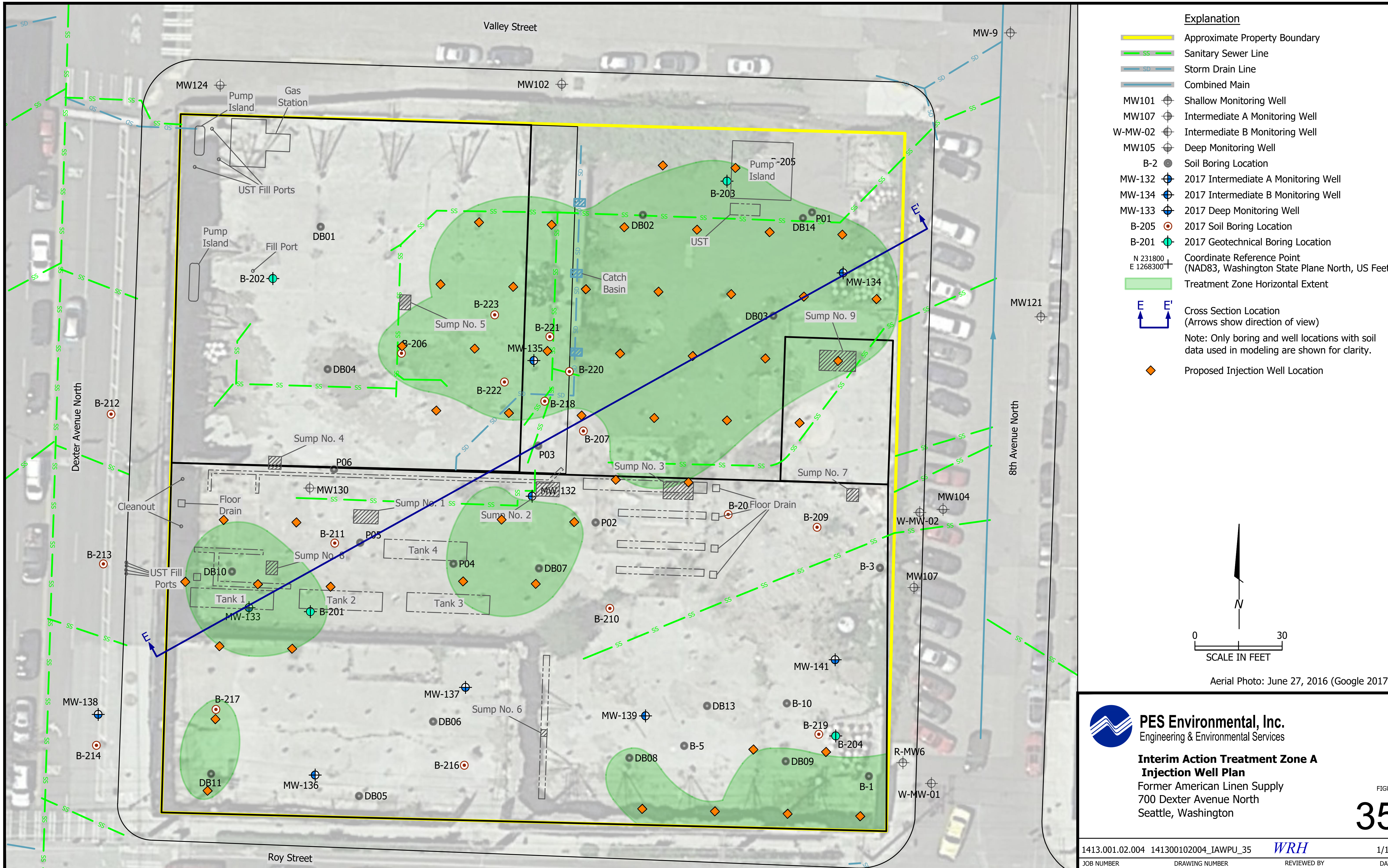


PES Environmental, Inc.
Engineering & Environmental Services

Treatment Zones
Cross Section E-E'
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
34

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1413.001.02.004	141300102004_IAWPU_34	WRH	1/18



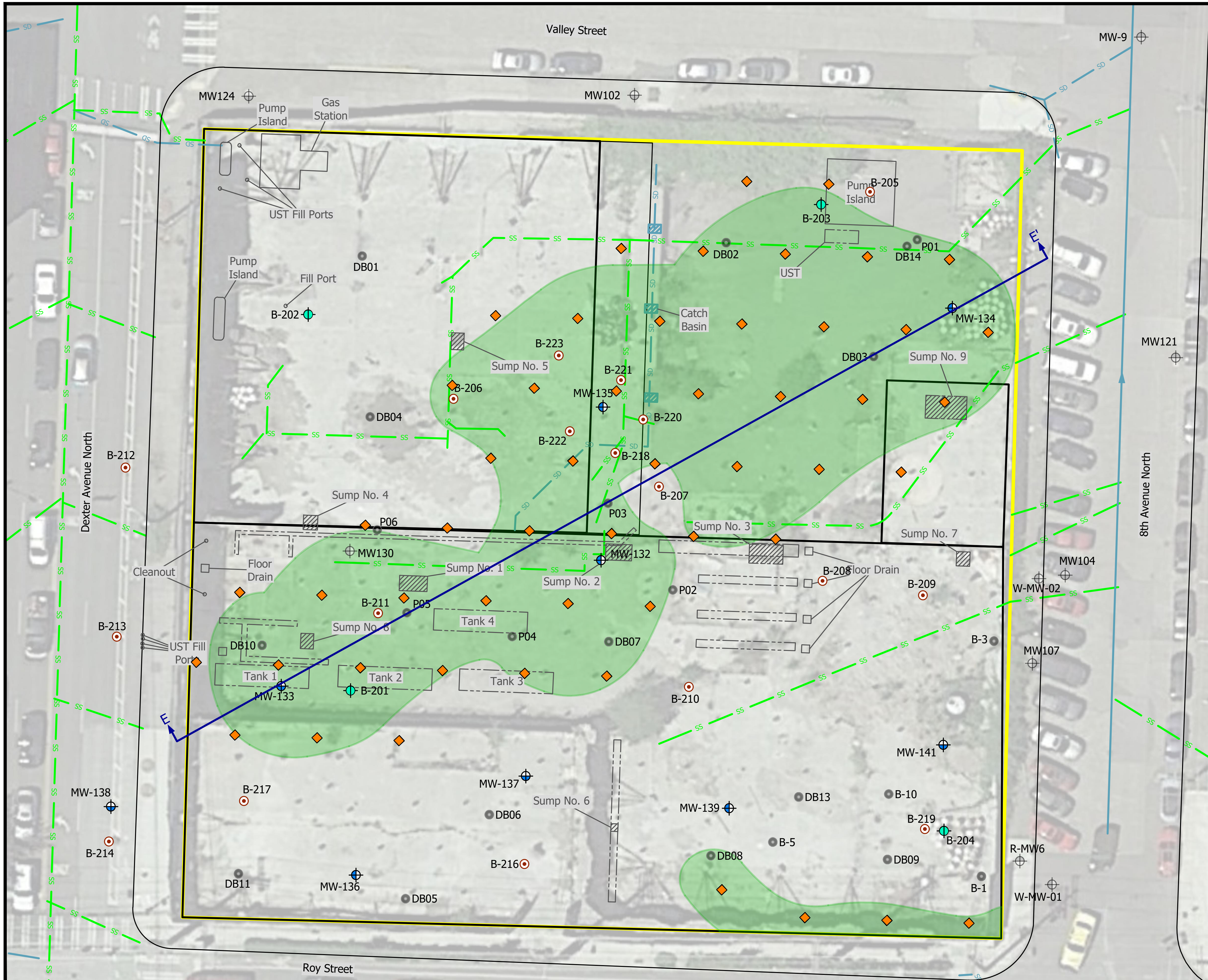
PES Environmental, Inc.
Engineering & Environmental Services

Interim Action Treatment Zone A Injection Well Plan

Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
35

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1413.001.02.004	141300102004_IAWPU_35	WRH	1/18



Explanation

- Approximate Property Boundary
- Sanitary Sewer Line
- Storm Drain Line
- Combined Main
- MW101 Shallow Monitoring Well
- MW107 Intermediate A Monitoring Well
- W-MW-02 Intermediate B Monitoring Well
- MW105 Deep Monitoring Well
- B-2 Soil Boring Location
- MW-132 2017 Intermediate A Monitoring Well
- MW-134 2017 Intermediate B Monitoring Well
- MW-133 2017 Deep Monitoring Well
- B-205 2017 Soil Boring Location
- B-201 2017 Geotechnical Boring Location
- N 231800 E 1268300 Coordinate Reference Point (NAD83, Washington State Plane North, US Feet)
- Treatment Zone Horizontal Extent
- E E' Cross Section Location (Arrows show direction of view)

Note: Only boring and well locations with soil data used in modeling are shown for clarity.

- Proposed Injection Well Location

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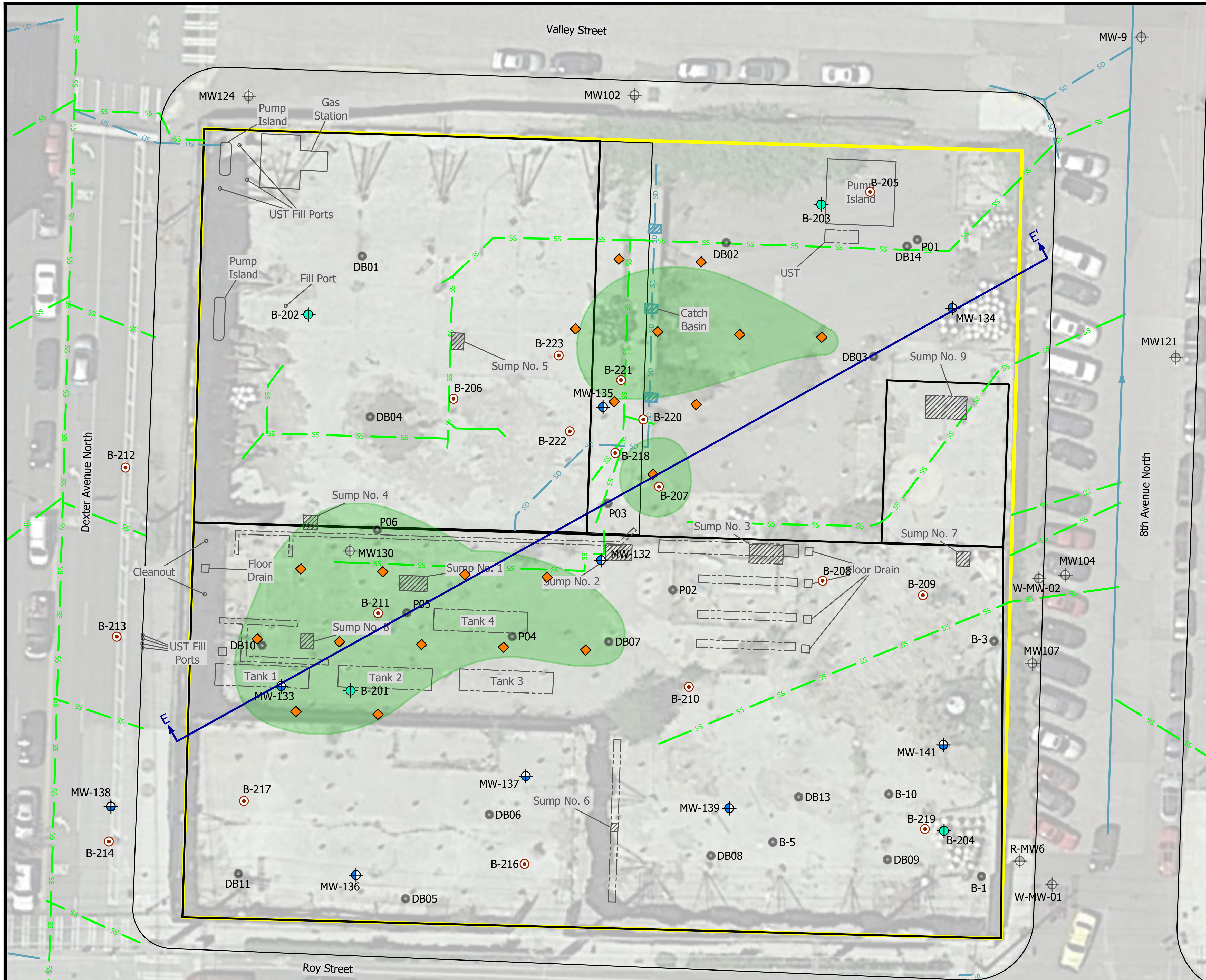
Interim Action Treatment Zone B Injection Well Plan
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
36

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1413.001.02.004	141300102004_IAWPU_36	WRH	1/18



Explanation

- Approximate Property Boundary
- Sanitary Sewer Line
- Storm Drain Line
- Combined Main
- MW101 Shallow Monitoring Well
- MW107 Intermediate A Monitoring Well
- W-MW-02 Intermediate B Monitoring Well
- MW105 Deep Monitoring Well
- B-2 Soil Boring Location
- MW-132 2017 Intermediate A Monitoring Well
- MW-134 2017 Intermediate B Monitoring Well
- MW-133 2017 Deep Monitoring Well
- B-205 2017 Soil Boring Location
- B-201 2017 Geotechnical Boring Location
- N 231800 E 1268300 Coordinate Reference Point (NAD83, Washington State Plane North, US Feet)
- Treatment Zone Horizontal Extent
- E E' Cross Section Location (Arrows show direction of view)

Note: Only boring and well locations with soil data used in modeling are shown for clarity.

- Proposed Injection Well Location

N

0 30

SCALE IN FEET

Aerial Photo: June 27, 2016 (Google 2017)

PES Environmental, Inc.
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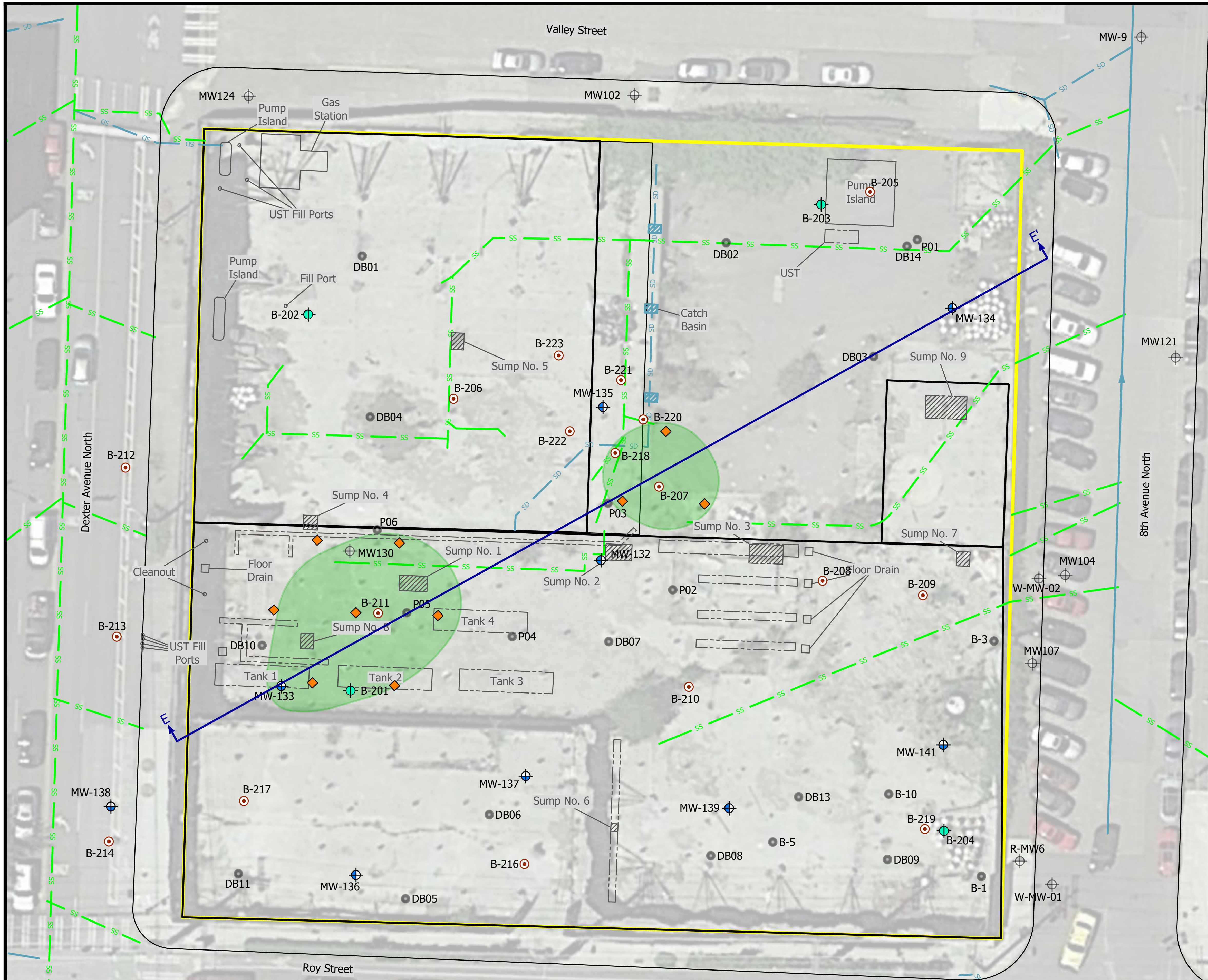
Interim Action Treatment Zone C
Injection Well Plan
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
37

1413.001.02.004	141300102004_IAWPU_37	WRH	1/18
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE



Explanation

- Approximate Property Boundary
- Sanitary Sewer Line
- Storm Drain Line
- Combined Main
- MW101 — Shallow Monitoring Well
- MW107 — Intermediate A Monitoring Well
- W-MW-02 — Intermediate B Monitoring Well
- MW105 — Deep Monitoring Well
- B-2 — Soil Boring Location
- MW-132 — 2017 Intermediate A Monitoring Well
- MW-134 — 2017 Intermediate B Monitoring Well
- MW-133 — 2017 Deep Monitoring Well
- B-205 — 2017 Soil Boring Location
- B-201 — 2017 Geotechnical Boring Location
- N 231800 E 1268300 — Coordinate Reference Point (NAD83, Washington State Plane North, US Feet)
- Treatment Zone Horizontal Extent
- E E' — Cross Section Location (Arrows show direction of view)
- Note: Only boring and well locations with soil data used in modeling are shown for clarity.
- Proposed Injection Well Location

N

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SCALE IN FEET

Aerial Photo: June 27, 2016 (Google 2017)

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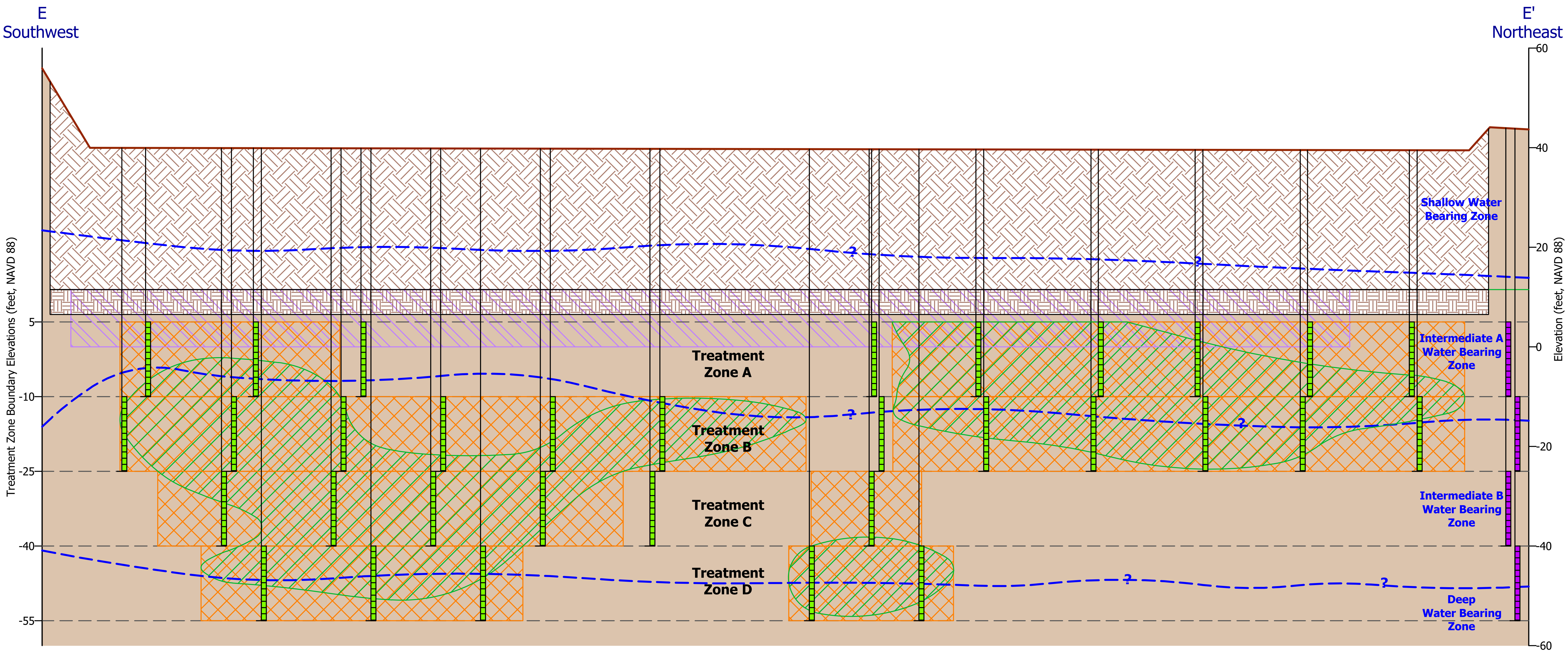
Interim Action Treatment Zone D
Injection Well Plan
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
38

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1413.001.02.004	141300102004_IAWPU_38	WRH	1/18



Explanation

- Approximate Ground Surface Elevation
- Excavation Boundary
- Approximate Water Bearing Zone Boundary (Queried where uncertain)
- Soil to be Excavated for Parking Garage
- Thickened Foundation Interval to be Excavated where Required
- Soil not to be Excavated
- Interpolated areas with Tetrachloroethene (PCE) concentration greater than 0.5 milligram per kilogram
- Soil Previously Treated using ERH/SVE
- Treatment Zone
- Source Area Injection Well
- Perimeter Injection Well

Vertical Scale in Feet: 0 – 20

Horizontal Scale in Feet: 0 – 20

Notes:
1. All wells shown are within 10 ft of the cross-section line.
2. See Figure 40 for injection well construction details.

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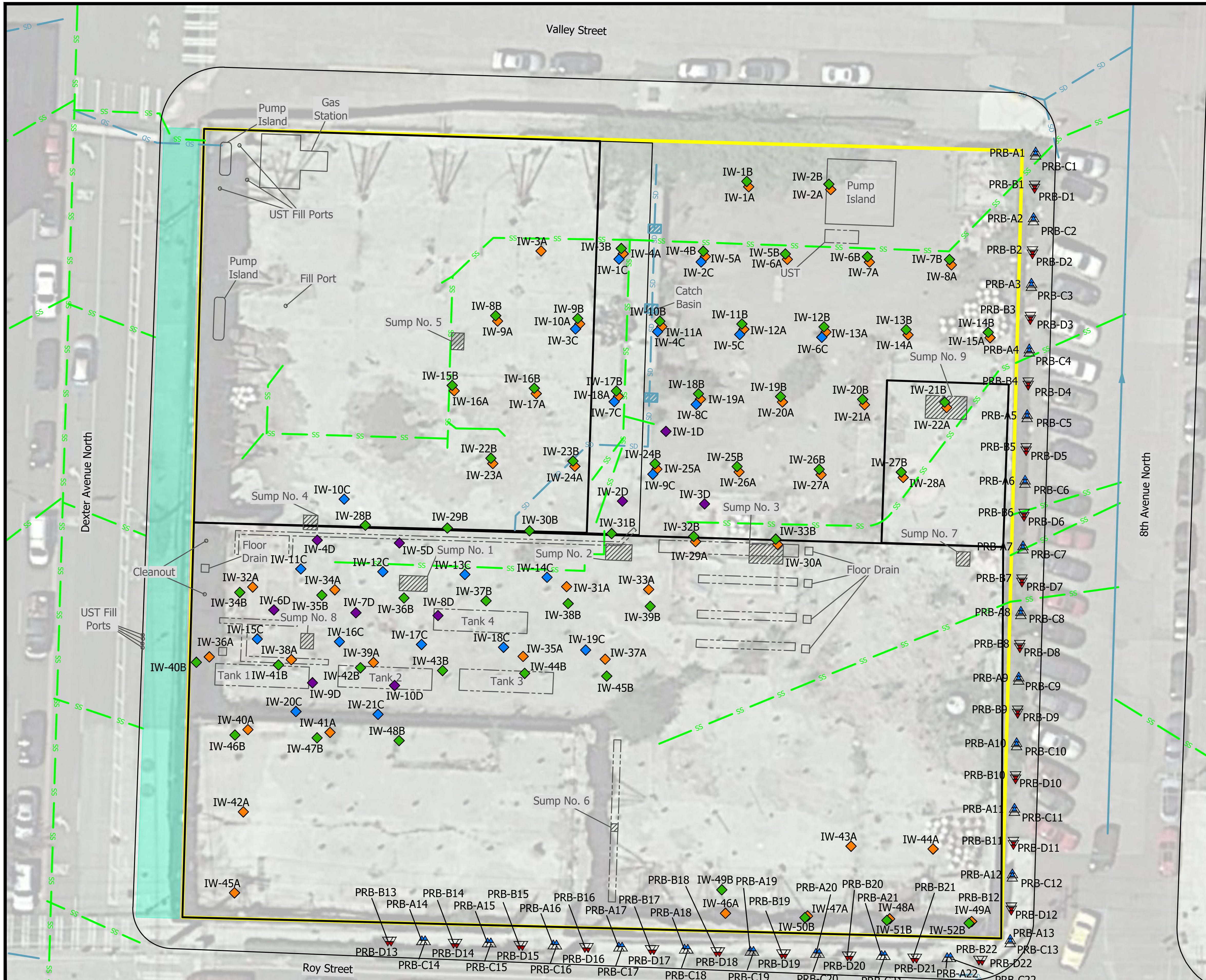
Injection Wells and Treatment Zones
Cross Section E-E'
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE 39

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1413.001.02.004	141300102004_IAWPU_39	WRH	1/18



Explanation

- Approximate Property Boundary
- Sanitary Sewer Line
- Storm Drain Line
- Combined Main
- N 231800 E 1268300 — Coordinate Reference Point (NAD83, Washington State Plane North, US Feet)
- Proposed Treatment Zone A Injection Well
- Proposed Treatment Zone B Injection Well
- Proposed Treatment Zone C Injection Well
- Proposed Treatment Zone D Injection Well
- Type 1 Perimeter Injection Well
- Type 2 Perimeter Injection Well
- Location of Contingent Upgradient Injection Wells

Note: Building design and construction activities will create space within the new utility alignment on Dexter Avenue to allow installation of the contingent upgradient injection wells, if Ecology determines they are necessary.

N

0 30
SCALE IN FEET

Aerial Photo: June 27, 2016 (Google 2017)

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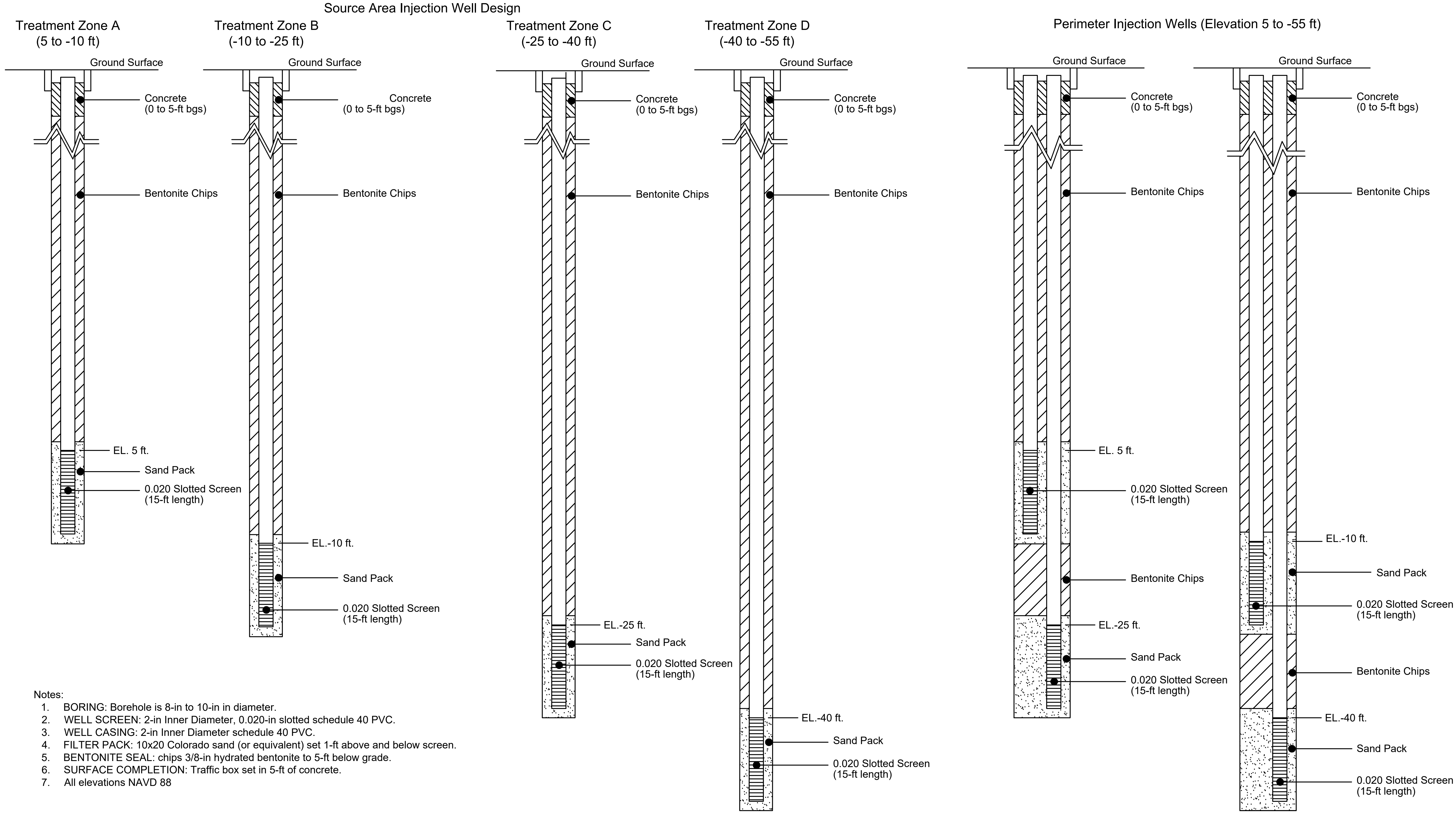
Interim Action Injection Wells and Contingency Injection Wells Plan
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
40

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1413.001.02.004	141300102004_IAWPU_40	WRH	1/18



Notes:
1. BORING: Borehole is 8-in to 10-in in diameter.
2. WELL SCREEN: 2-in Inner Diameter, 0.020-in slotted schedule 40 PVC.
3. WELL CASING: 2-in Inner Diameter schedule 40 PVC.
4. FILTER PACK: 10x20 Colorado sand (or equivalent) set 1-ft above and below screen.
5. BENTONITE SEAL: chips 3/8-in hydrated bentonite to 5-ft below grade.
6. SURFACE COMPLETION: Traffic box set in 5-ft of concrete.
7. All elevations NAVD 88

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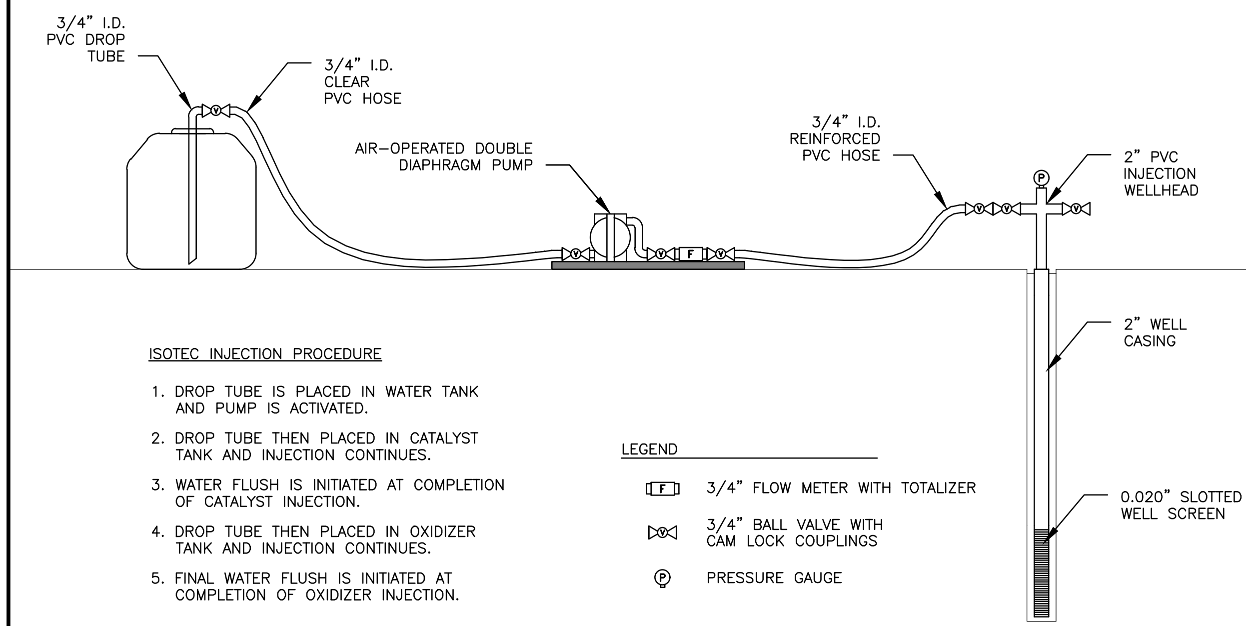
Injection Well Construction Schematics
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
41

1413.001.02.004	141300102004_IAWPU_41	WRH	1/18
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE

REAGENT INJECTION DIAGRAM



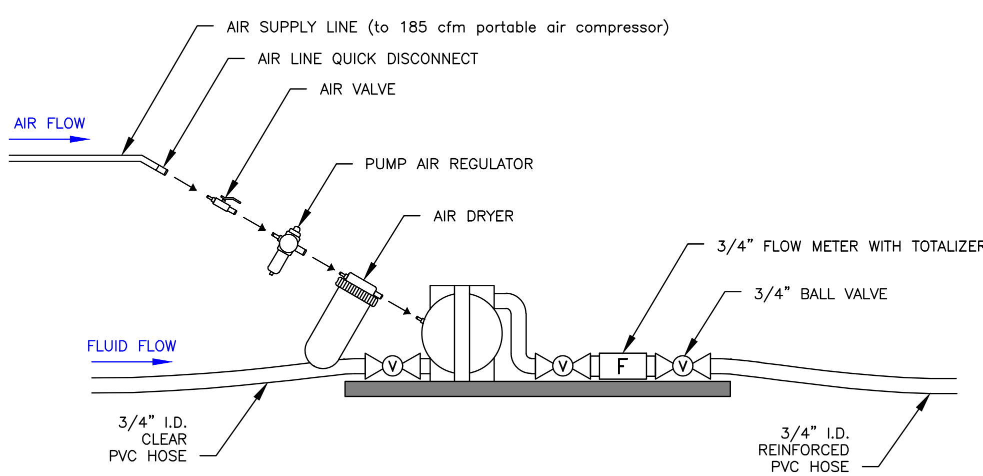
ISOTEC INJECTION PROCEDURE

1. DROP TUBE IS PLACED IN WATER TANK AND PUMP IS ACTIVATED.
2. DROP TUBE THEN PLACED IN CATALYST TANK AND INJECTION CONTINUES.
3. WATER FLUSH IS INITIATED AT COMPLETION OF CATALYST INJECTION.
4. DROP TUBE THEN PLACED IN OXIDIZER TANK AND INJECTION CONTINUES.
5. FINAL WATER FLUSH IS INITIATED AT COMPLETION OF OXIDIZER INJECTION.

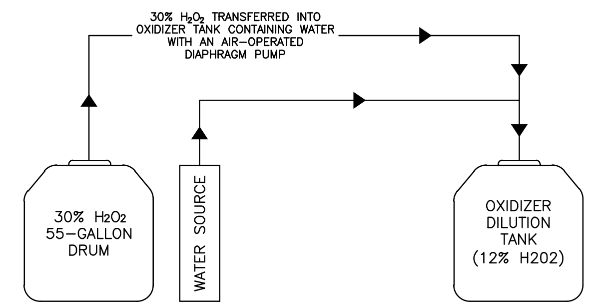
LEGEND

- F — 3/4" FLOW METER WITH TOTALIZER
- 3/4" BALL VALVE WITH CAM LOCK COUPLINGS
- P — PRESSURE GAUGE

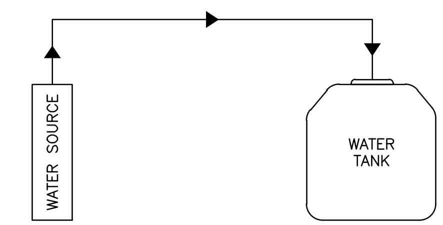
INJECTION PUMP INSTALLATION



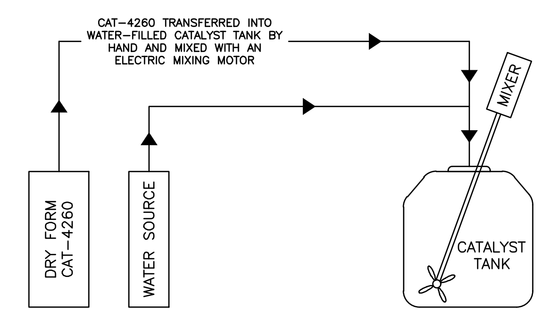
OXIDIZER TANK POCEDURES



WATER TANK PROCEDURES



CATALYST TANK PROCEDURES



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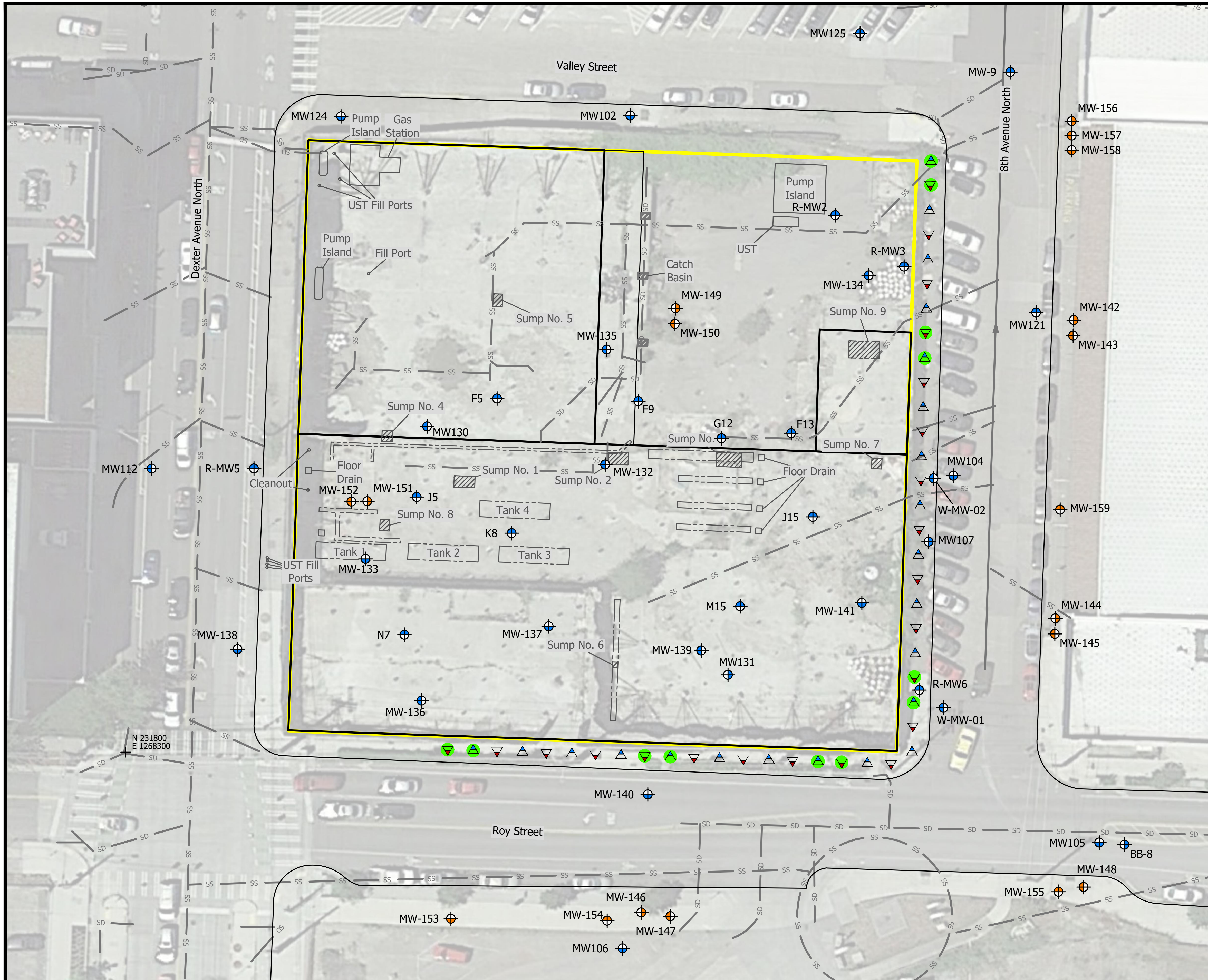
Injection Details
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

PLATE
42

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1413.001.02.004	141300102004_IAWPU_42	WRH	1/18



Explanation

- Approximate Property Boundary
- SS — Sanitary Sewer Line
- SD — Storm Drain Line
- Combined Main
- MW101 — Shallow Monitoring Well
- MW107 — Intermediate A Monitoring Well
- W-MW-02 — Intermediate B Monitoring Well
- MW105 — Deep Monitoring Well
- N 231800 E 1268300 — Coordinate Reference Point (NAD83, Washington State Plane North, US Feet)
- Type 1 Perimeter Injection Well
- Type 2 Perimeter Injection Well
- Proposed Shallow Monitoring Well
- Proposed Intermediate A Monitoring Well
- Proposed Intermediate B Monitoring Well
- Proposed Deep Monitoring Well
- Perimeter Injection wells to be sampled prior to injecting EVO

N

0 40
SCALE IN FEET

Aerial Photo: June 27, 2016 (Google 2017)

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Interim Action Performance Monitoring Wells
Former American Linen Supply
700 Dexter Avenue North
Seattle, Washington

FIGURE
43

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1413.001.02.004	141300102004_IAWPU_43	WRH	1/18