ARCADIS
Infrastructure · Water · Environment · Buildings

Imagine the result

Well Installation and Dual-Phase Extraction Pilot Test Report

Former Chevron Bulk Terminal No. 100-1327
1602 North Northlake Way
Seattle, Washington

April 15, 2015

ARCADIS

Ryan Brauchla
Field Technician

Scott Zorn
Project Manager

Peter Campbell, PE
Senior Engineer

PETER J CAMPBELL
STATE OF WASHINGTON
45051
REGISTERED
PROFESSIONAL ENGINEER

Exp 2/16

ARCADIS

Well Installation and Dual-Phase Extraction Pilot Test Report

Former Chevron Bulk Terminal No. 100-1327
1602 North Northlake Way
Seattle, Washington

Prepared for:
Chevron Environmental Management Company

Prepared by:
ARCADIS U.S., Inc.
1100 Olive Way
Suite 800
Seattle
Washington 98101
Tel 206 325 5254
Fax 206 325 8218

Our Ref.:
B0045799.0012
Date:
April 16, 2015

Tables

Figures

Appendices

Acronyms and Abbreviations

ARCADIS	ARCADIS U.S., Inc.
ASTs	aboveground storage tanks
bgs	below ground surface
CAP	Cleanup Action Plan
CD	Consent Decree
Chevron	Chevron Environmental Management Company
COCs	constituents of concern
CULs	cleanup levels

DNAPL	dense non-aqueous phase liquid
DPE	dual phase extraction
DRO	diesel range organics
Ecology	Washington State Department of Ecology
EPA	Environmental Protection Agency
GRO	gasoline-range organics
HASP	health and safety plan
HO	heavy range organics
HSA	Hollow Stem Auger
in. wc	inches of water column
lb/day	pounds per day
LNAPL	light non-aqueous phase liquid
mg/kg	milligrams per kilogram
Metro	King County, Seattle, Washington
MTCA	Model Toxics Control Act
NWTPH	Northwest Total Petroleum Hydrocarbons-gasoline range
PPCD	prospective purchaser consent decree
PID	photoionization detector
PVC	polyvinyl chloride
ROI	radius of influence
ROW	right of way
Site	Former Chevron Bulk Plant No. 100-1327 located at Facilities North / King County (Metro), Seattle, Washington
SOP	standard operating procedure
TOC	top of casing
Touchstone	Touchstone Corporation
UST	Underground Storage Tank
VOC	volatile organic compound

1. Introduction

On behalf of Chevron Environmental Management Company (Chevron) and King County, ARCADIS U.S., Inc. (ARCADIS) has prepared this Well Installation and Dual Phase Extraction (DPE) Pilot Test Report to document the actions performed at the at former Chevron Bulk Plant No. 100-1327 (the Site) along North Northlake Place and Woodlawn Avenue North, located at Facilities North/King County, Seattle, Washington (Metro). These activities were conducted to complete all requirements of the Metro-Chevron-Ecology Consent Decree (CD) #99-2-08651-1SEA and Exhibit A – Cleanup Action Plan (CAP) at former Chevron Bulk Plant No. 100-1327 (the Site) located at Facilities North/King County, Seattle, Washington (Metro). These actions include the installation of monitoring wells, an investigation of petroleum hydrocarbon impacts in the soil, and the activities and results of the DPE pilot test.

This report presents relevant background information, well installation activities, pilot test procedures, results and site-specific implementation considerations, in accordance with the *Dual Phase Extraction and Additional Soil Investigation Work Plan* submitted to the Washington State Department of Ecology (Ecology) on July 9, 2014 (ARCADIS 2014). A map of the Site and surrounding area is presented on **Figure 1**.

1.1 Report Organization

The remaining sections of this work plan are presented as follows:

- Section 2 summarizes the Site background and history.
- Section 3 discusses the well installation and soil boring activities.
- Section 4 discusses the DPE pilot test results.
- Section 5 discusses conclusions and recommendations.

2. Site Description and History

The Site is located at 1602 North Northlake Way along the north shore of Lake Union in a mixed-use residential and commercial neighborhood. The property is divided into two operable areas: a North Yard located on the north side of North Northlake Way and a South Yard located adjacent to the north shore of Lake Union and south of North Northlake Way. The Site boundary as outlined in the CAP includes a public right of

way (ROW) between the North Yard and South Yard. All portions of the Site are shown on **Figure 1**.

2.1 Site Subdivisions

2.1.1 North Yard

The portion of the Site that is located between North 34th Street (to the north) and North Northlake Place (to the south), and between Woodlawn Avenue North (to the west) and Densmore Avenue North (to the east) is defined as the North Yard. In 2007, the property development company Touchstone Corporation (Touchstone) entered into a prospective purchaser consent decree (PPCD) to perform additional cleanup activities and, in 2009, purchased the North Yard property. Touchstone began performing a remedial excavation in November 2014 for source removal of light non-aqueous phase liquid (LNAPL). Prior to excavation it was estimated that LNAPL was distributed throughout the North Yard over an area of nearly 40,000 square feet. Following Touchstone's excavation, the area where LNAPL may be present is estimated at approximately 900 square feet (ARCADIS 2014). The site is currently being dewatered in conjunction with current construction activities.

2.1.2 South Yard

The South Yard is bounded by Lake Union on the southwest, private property on the northwest, North Northlake Place on the northeast, and a property occupied by the Seattle Harbor Patrol on the southeast.

2.1.3 Public Right of Way between North and South Yard

The portion of the Site between the North Yard and South Yard at North Northlake Place and North Northlake Way is referred to as the public ROW in this report.

2.1.4 Offsite Area and Adjacent Sites

Other cleanup sites in the vicinity include but are not limited to Northlake Shipyard, with metals-impacted sediments as the primary medium of concern (Ecology, 1994), and the Gas Works Park site, with coal-tar (i.e., dense non-aqueous phase liquid [DNAPL]) and metals-impacted groundwater, soils, and sediments (Ecology, 2005). The Gas Works Park site also includes the Seattle Harbor Patrol, which previously had

underground storage tanks (USTs) and has been affected by migration of contaminants from Gas Works Park.

2.2 Historical Site Use

Between 1925 and 1927, Standard Oil of California (later Chevron) developed the North and South Yards as a marine bulk fuel storage and distribution facility. The North Yard included 11 aboveground storage tanks (ASTs), transfer piping, truck loading racks, and various small buildings. The petroleum product stored in the North Yard was linked to the South Yard fuel dock by underground piping. According to the CAP (Foster Wheeler, 1998), the ASTs historically stored gasoline, diesel, fuel oil, refined oil, gasoline distillates, and lubricating oils.

Metro acquired the property in 1982 and used it for diesel fueling operations until April 1992, when all remaining diesel products were removed from the Site. Only three truck deliveries of diesel were received in 1991 and according to Metro staff, no gasoline products were ever received or stored onsite by Metro. Metro decommissioned the fueling equipment in 1992 and used the property as a maintenance operations base until selling the North Yard as described in Section 2.2.1.

2.2.1 North Yard

The following summarizes the chronology of the North Yard:

- 1925 – Standard Oil Company of California (later Chevron) developed the North Yard and reportedly constructed the ASTs and piping.
- 1927 – Chevron constructed the garage along the northern boundary and the tank-truck loading racks.
- 1950 – Available maps show various small buildings and sheds associated with oil delivery on the southern portion on the North Yard.
- 1982 – Metro purchased the property for diesel fueling operations. Metro also used the North Yard property for parking, private offices, lunch and meeting rooms, restrooms, locker rooms, record storage, and a woodworking and paint shop.

- 1992 – Metro decommissioned fueling equipment and cleaned and capped pipelines leading from the North Yard to the South Yard.
- 1998 – Chevron, Metro, and Ecology entered into a CD for the Site.
- 2007 – Touchstone and Ecology entered into a PPCD for the North Yard.
- 2009 – Touchstone purchased the North Yard from Metro.
- 2014 – Touchstone remedial excavation and development activities

2.2.2 South Yard

The following summarizes the chronology of the South Yard:

- Prior to 1908 – Puget Sound Sheet Metal Works reportedly occupied the South Yard. A number of wood-frame buildings were reportedly present.
- 1912 – A tannery reportedly occupied the South Yard until the late 1920s.
- 1950 – Chevron used a building in the South Yard as a warehouse.
- 1960 – Chevron and a chemical company (California Spray and Chemical Company) reportedly occupied the South Yard. No information on California Spray and Chemical Company activities is available.
- 1982 – Metro purchased the South Yard property. Metro used the property in connection with its diesel fueling operations at the North Yard. Metro also used the South Yard property for storage of equipment and materials and for parking.
- 1992 – Metro decommissioned fueling equipment and cleaned and capped pipelines leading from North Yard to South Yard.
- 1998 – Chevron, Metro, and Ecology entered into a CD for the Site.

2.2.3 Public Right of Way between North and South Yard

Two sets of subsurface piping were used to transfer product from the South Yard to the North Yard. In 1992, the subsurface piping was cleaned and capped at the south wall of the AST containment area. In 1998, an inspection of piping pits and pipe connections indicated no surface or shallow (within 0.5 foot) petroleum staining or detection in the eight locations tested. The subsurface piping that was closed in place is located under the former North Yard office area, beneath the South Yard and under the dock.

3. Well Installation and Soil Borings

During the third quarter of 2014, ARCADIS over-drilled monitoring well MW-9 and replaced it with an extraction well (MW-9R) for the DPE pilot test. Additionally, three monitoring wells (EW-1, MW-29, and MW-30) were installed downgradient of MW-9R, and six soil borings (SB-1 through SB-6) were advanced. This section discusses these activities.

3.1 Pre-Field Activities

Prior to implementing field activities, the site-specific Health and Safety Plan (HASP) was modified and updated June 2014, for use by on-site personnel. The site-specific HASP addresses potential health and safety concerns and hazards that field personnel may encounter during the proposed field events. All personnel, including on-site subcontractors, were required to familiarize themselves with and sign the HASP.

Prior to commencing field work, all applicable permits were obtained from the Seattle Department of Transportation. Copies of the approved ROW permits for well installation and soil borings are included in **Appendix A**.

A detailed utility search was performed prior to initiating drilling to verify that proposed boring locations are not within a utility line or corridor. Three lines of evidence were gathered: One Call, private utility locator, and a review of utility as-built maps. In addition, each borehole was pre-cleared with a vacuum truck to 8 feet below ground surface (bgs).

3.2 Over-Drill and Replacement of MW-9

On July 16, 2014, well MW-9 was over-drilled and reinstalled in the same location, as a 6-inch-diameter well (MW-9R) to enhance DPE effectiveness. MW-9R was constructed to maximize the groundwater flow area, minimize the likelihood of well fouling with fine-grained sediment accumulation, and allow the use of a larger-diameter down-hole stinger or pump in the well. The borehole was advanced to a total depth of 24 feet bgs and the screen interval of MW-9R mirrored that of MW-9, with a total depth of 22.5 feet bgs. MW-9R was constructed of 6-inch diameter schedule 40 polyvinyl chloride (PVC) with 0.02-inch slots from 22.5 to 12.5 feet bgs. The sand pack of #10/20 silica sand was placed around the well screen to 1 foot above the top of screen. Bentonite seal was installed above the sand pack followed by neat cement to completion. A locking, water-tight well plug and flush-mounted, 18-inch diameter, traffic-rated well box was installed at ground surface.

During over-drilling, the drill cuttings were screened in the field for volatile organic compounds (VOCs) using a photoionization detector (PID), and were visually examined for the presence of LNAPL. PID readings, presence of LNAPL, soil types, and other pertinent geologic data were recorded on the boring logs included in **Appendix B**. A soil sample was collected for chemical analysis at the bottom of the boring (22.5-24 feet bgs). Analytical results are discussed in section 4.4 below. Field notes discussing drilling activities are included in **Appendix C**.

3.3 Downgradient Monitoring Well Installation

On July 15 and 16, 2014, three monitoring wells (EW-1, MW-29 and MW-30) were installed to monitor depth to water, measurable LNAPL and vacuum radius of influence (ROI) during the DPE events and collect performance monitoring data post-DPE implementation. Additionally, EW-1 was installed to potentially be used during DPE activities as an additional extraction well. The initial 8 feet of the boreholes were cleared using an air-knife and vacuum truck to reduce the potential for damage to underground utilities. The remainder of the soil boring was advanced using a hollow-stem auger (HSA) methodology and sampled using decontaminated 1.5-foot split spoon samplers.

EW-1, MW-29, and MW-30 are located approximately 5 feet southwest, 10 feet southwest, and 20 feet southeast of MW-9R, respectively, and are hydraulically downgradient of the extraction well. Monitoring well locations are identified on **Figure 1**. EW-1, MW-29 and MW-30 boreholes were advanced to a total depth of 24 feet bgs

with the wells installed to a total depth of 22.5 feet bgs and constructed of 4-inch diameter schedule 40 PVC with 0.02-inch slots from 22.5 to 7.5 feet bgs. The sand pack of #10/20 silica sand was placed from 24 to 22.5 feet bgs and around the well screen to 1 foot above the top of screen. Bentonite seal was installed above the sand pack followed by neat cement to completion. A locking, water-tight well plug and flush-mounted, 18-inch diameter, traffic-rated well box was installed at ground surface.

During drilling, soil samples were collected for lithological description, screened for VOCs using a PID, and visually examined for the presence of LNAPL at 2.5-foot intervals from 2.5 feet bgs to the bottom of the boring (24 feet bgs). PID readings, soil types, and other pertinent geologic data were recorded on boring logs included as **Appendix B**. Soil samples were collected for chemical analysis in each boring at the groundwater interface, or smear zone (12.5 feet bgs), and at the bottom of the borings (22.5 feet bgs). Duplicate soil samples were collected from MW-29 at 12.5 feet bgs (DUP-1) and MW-30 at 12.5 (DUP-2) and submitted for laboratory analysis quality assurance. Analytical results are discussed below, in section 4.4. Field notes taken during drilling activities are included in **Appendix C**.

3.4 Soil Boring Advancement

On August 14 and 15, 2014, six soil borings were advanced. Two soil borings (SB-1 and SB-2) were installed in Woodlawn Avenue North, adjacent to the location of former soil boring B-14 (SAIC, 2007), which contained concentrations of gasoline range organics (GRO) in excess of the cleanup level (CUL) at 12.5 feet bgs below or at the water table. Borings SB-3 through SB-6 were installed along the southern boundary of the North Yard, in North Northlake Place, to allow sampling in areas of historical soil exceedances at B-12 and B-23 at or near the water table (SAIC, 2007). The soil borings were advanced, as shown on **Figure 1**, between historical soil borings B-12 and B-23, which contained concentrations of diesel range organics (DRO) in excess of the DRO CUL at a depths of 12.5 and 10 feet bgs, respectively. The initial 8 feet of the borehole were cleared using an air-knife and vacuum truck to reduce the potential for damage to underground utilities. The remainder of the soil boring was advanced using HSA methodology and sampled using decontaminated 1.5-foot split spoon samplers. Drilling augers and sampling tools were decontaminated after drilling in accordance with ARCADIS's Field Equipment Decontamination Standard Operating Procedure (SOP).

Samples were collected at depths previously reported as containing contaminants of concern (COCs) in excess of Site CULs and at other depths where field screening

indicated that LNAPL may be present. Field testing of soil samples for the presence of LNAPL and/or sheen was conducted. Field testing procedures consisted of placing a representative soil sample from the split spoon into a decontaminated stainless steel bowl. Clean water was then added to the soil sample enough to saturate the soil, which was then agitated to allow any free products to come out of the soil. The surface of the water was then observed for the presence of LNAPL or sheen. No LNAPL or sheen was observed during soil boring installation activities. During drilling, soil samples were collected for lithological description and potential chemical analysis at 2.5-foot intervals from 2.5 feet bgs to the bottom of the boring (21.5 feet bgs). Soil analytical samples were collected at SB-1 through SB-4 from 12.5 feet bgs and at SB-5 and SB-6 from 10 feet bgs. A duplicate soil sample was collected from SB-1 at 12.5 feet bgs and submitted blind for laboratory analysis quality assurance. Soil boring logs are included in **Appendix B** and field notes are included in **Appendix C**. Soil analytical results are summarized in the following section.

3.5 Soil Sample Analytical Results

The soil samples were placed in laboratory-provided containers with appropriate preservatives and stored in an ice-chilled cooler prior to delivery to the analytical laboratory. Soil samples were analyzed for the following:

- GRO by Northwest Method NWTPH-Gx,
- DRO and heavy range organics (HO) by Northwest Method NWTPH-Dx, and
- Benzene by Environmental Protection Agency (EPA) Method 8260B.

The soil sample analytical results from soil samples collected from monitoring wells (EW-1, MW-29 and MW-30) and soil borings (SB-1 through SB-6) did not exceed the respective Site specific CULs developed in the Draft CAP (Foster Wheeler, 1998) with the exception of GRO detected in soil boring SB-1 at 12.5 feet bgs with a concentration of 6,700 milligrams per kilogram (mg/kg) and SB-2 at 12.5 feet bgs with a concentration of 21,000 mg/kg; however both samples were collected at or below the established groundwater level. All laboratory reporting limits were established below the respective site specific cleanup levels. Soil hydrocarbon analytical results are presented in **Table 1** and **Figure 2**. Laboratory analytical reports are included in **Appendix D**.

3.6 Waste Disposal

Soil cuttings and decontamination water were collected in labeled drums and temporarily stored onsite in the South Yard. Waste was removed from the Site on December 1, 2014 by Clean Harbors Environmental Services, and disposed of at appropriate waste facilities.

3.7 Survey

On October 30, 2014, all wells and soil borings drilled at the Site during this event were surveyed by Otak Inc. of Kirkland, WA, a licensed surveyor. The top of casing (TOC) elevation data is included in the well construction details presented in **Table 2**.

4. Dual Phase Extraction Pilot Test

As proposed in the work plan (ARCADIS 2014), ARCADIS performed a DPE pilot test. The test began on January 5, 2015 and continued to January 8, 2015. Post-pilot test gauging activities continued after the end of extraction activities. The following sections of the report will outline the remedial approach, the setup and operation of the DPE system, and the post-event monitoring activities.

4.1 Remedial Approach

In November 2014, Touchstone conducted an excavation in the North Yard. The excavation was conducted as part of cleanup activities for source removal of LNAPL under the 2007 PPCD issued to Touchstone. Touchstone performed the remedial excavation such that remaining LNAPL would be located within a finite horizontal and vertical area immediately adjacent to MW-9R. Development activities began after excavation which included dewatering of the North Yard.

To address this small area of remaining LNAPL in the immediate vicinity of MW-9R, DPE events were scheduled to be conducted while the North Yard was dewatered for excavation. During periods of falling water table conditions, like those that occur when Touchstone is dewatered the North Yard during excavation activities, LNAPL volume trapped in soil under two-phase conditions (water-saturated soil) located below the natural static water table is progressively exposed to three-phase conditions (air-water-LNAPL) as the soil is desaturated. Under three-phase conditions, LNAPL droplets in the soil coalesce, and the LNAPL phase is more mobile for a given saturation than under two-phase conditions. This enhances the mobility of the LNAPL in the

desaturated soil interval and causes LNAPL thickness to increase when the water table elevation drops. As the water table falls, LNAPL recovery is more efficient via gravity drainage (fluid extraction events). In some cases, applied high vacuum in conjunction with fluid extraction (DPE configuration) can further enhance liquid drainage by improving the dewatering cone of depression around the extraction well.

4.2 Dual Phase Extraction System and Equipment Setup

Equipment for the DPE pilot test included a mobile DPE system trailer, temporary manifold, 2-inch conveyance hosing, 1-inch stinger hose, oil/water separator and a water storage tank. On January 4, 2015, one day prior to the field event, ARCADIS barricaded the parking strip exclusion zone to prevent parked vehicles from blocking the staging area. On January 5, 2015, the DPE system trailer was staged in the exclusion zone as shown on **Figure 3**. This location was determined prior to starting work in order to establish a work area that would not impact ongoing construction activities in the North Yard. The mobile trailer was placed within a secondary containment berm to ensure that impacted groundwater was not released back to the ground surface in case of a spill. A portable tow-behind diesel generator powered the system trailer and was staged in back of the trailer within secondary containment. Emergency shutoffs were reviewed and emergency equipment was placed in a marked location.

The mobile trailer contained a 15 horsepower rotary claw blower capable of moving air at 270 cubic feet per minute at 22 inches of mercury vacuum. The blower extracted liquid and vapors through a system manifold to a vapor/liquid knockout tank. A pump capable of handling 15 gallons per minute (gpm) of water was onsite to transfer liquids into an oil/water separator. The purpose of the oil/water separator was to separate LNAPL from the extracted groundwater. A 630-gallon polyethylene tank was temporarily kept onsite to store recovered groundwater. The tank was staged just north of the DPE trailer within secondary containment. The water pump and polyethylene storage tank were not used during the DPE pilot test.

A 2-inch diameter, reinforced, flexible PVC vacuum hose was connected from the wellhead to a 3-inch diameter temporary DPE manifold containing a vapor flow control valve, a sampling port, a vacuum gauge, and a port for air flow measurements. A system flow sheet displaying the sampling locations is provided as **Figure 4,** and system installation details are shown on **Figure 5**. The 2-inch diameter conveyance hose reduced to a 1-inch flexible PVC vacuum hose at the well head to be used as a

stinger in DPE test well, MW-9R. The wellhead was equipped with a jet pump well seal to allow for an airtight seal around the groundwater extraction stinger.

4.3 Dual Phase Extraction Operation

Prior to testing, wells EW-1, MW-9R, MW-29, and MW-30 were gauged for depth-to-water and depth-to-bottom to obtain baseline measurements. LNAPL was not observed in any of the wells; baseline gauging data is included in **Table 3**. The water column in MW-9R was measured at 1.05 feet, so the stinger inlet was placed at a depth of 22.25 feet below TOC, approximately 6 inches above the bottom of the casing and 7 inches below the surface of the groundwater. When the test was started, a vacuum pressure of approximately 18.5 inches of mercury was applied to MW-9R and within 30 seconds all water in MW-9R had been evacuated.

The DPE pilot test was conducted for a total of 26 hours over the course of four days, between January 5 and 8, 2015 during normal working hours. At the end of each field day, field personnel contacted the ARCADIS engineer to discuss results from the pilot test. System readings, including runtime, flow rates, VOC concentrations, flow totalizer values, and system vacuum, were measured periodically during the pilot test. These readings and measurements are outlined in the following section.

4.4 Field and System Measurements

During DPE operations, system parameters were collected every half hour on the first day of system operations and on an hourly basis for the remainder of the event. A description of parameters collected, how they were collected, and what the data was used for is presented below. Field notes collected during the pilot test are included in **Appendix E**.

- Influent temperature and air speed were measured with an anemometer to calculate air flow rate;
- Influent PID and system runtime readings were measured and, together with the previously calculated air flow rate, used to calculate mass removal;
- Casing vacuum in extraction well MW-9R and response wells EW-1, MW-29, and MW-30 were used to calculate induced vacuum ROI;
- Stinger, manifold, and knockout tank vacuums and response well groundwater elevations were recorded;

- Volumes of extracted groundwater and LNAPL were also proposed to be monitored; however, a limited amount of liquid was extracted from MW-9R.

Influent flow rate was calculated, using the cross-sectional area of the influent conveyance pipe and the speed of the air travelling through it, to find the flow rate in actual cubic feet per minute. The influent temperature and vacuum was used to convert the flow rate to standard cubic feet per minute (SCFM). System flow rates during the pilot test ranged from approximately 62 SCFM to 74 SCFM with an average rate of approximately 71 SCFM. These values are summarized in **Table F-1** and **Chart F-1** in **Appendix F**.

VOC concentrations were measured at the manifold using a PID. The concentrations ranged from 394 parts per million by volume (ppmv) to 789.4 ppmv. It appears VOC concentrations decreased over time. Based on system runtime, during the first 18 hours of the test VOC measurements ranged approximately from 600 to 800 ppmv; for the remaining 8 hours, VOC measurements ranged from approximately 400 to 550 ppmv. These readings are summarized in **Table F-1** and **Chart F-2** in **Appendix F**.

Mass removal rates were calculated using the measured PID readings and calculated flow rates. Mass removal rates ranged from 8.82 pounds per day (lb/day) to 17.32 lb/day. During the pilot test, approximately 15 pounds of VOCs were removed from MW-9R. Over the course of pilot testing, VOC concentrations generally decreased. Based on system runtime, during the first 18 hours of the test, VOC mass removal rates ranged from 13.25 to 17.32 lb/day; for the remaining 8 hours, VOC measurements ranged from 8.82 to 11.74 lb/day. These values are summarized in **Table F-1**, **Chart F-3** and **Chart F-4** in **Appendix F**.

Applied or induced vacuum was recorded at each of the well heads during the pilot test. Vacuum readings generally decrease exponentially with distance. Therefore, in order to determine the ROI when the maximum sustainable vacuum was applied to MW-9R, the log of the average vacuum was plotted against the distance between MW-9R and each of the response wells. For the purpose of presenting the effective ROI, vacuum influence was considered present at induced vacuum levels of 0.10 inches of water column (in. wc) or greater (Kostecki, Calabrese, and Bonazountas 1992). An average vacuum of 5.35 inches of mercury (74.3 in. wc) were applied to MW-9R during the pilot test. Average induced vacuum values of 9.51 and 0.85 in. wc were recorded at EW-1 and MW-29, respectively. Induced vacuum was not detected at MW-30 greater than 0.01 inches of water column. These values determined an ROI of 33 feet.

Measured values are reported in **Table F-1** and ROI calculations are presented in **Chart F-5** in **Appendix F**.

Stinger, manifold, and knockout tank vacuums were recorded during the pilot test but were not used for calculations. Response well groundwater elevations were recorded in order to observe drawdown and to check for the presence of LNAPL. No LNAPL was observed in the response wells during the pilot test. Measured values are reported in **Table F-1 in Appendix F**.

4.5 Post-Event Monitoring

On January 9, 2015, DPE pilot test equipment was demobilized from the Site and post-event gauging began. Wells MW-9R, MW-29, MW-30, and EW-1 were gauged daily during the event and for two weeks following the event. Thereafter, they were gauged every two to three days for four additional weeks. The wells were gauged to determine the presence of LNAPL following the pilot test. No measurable LNAPL was observed during any of the gauging events. Groundwater elevations and PID readings were also recorded and are compiled in **Table 3**.

5. Summary

Two drilling events were conducted by ARCADIS during the third quarter of 2014 in order to facilitate a DPE pilot test event and confirm previous soil samples with COCs greater than the Site CULs. Monitoring well MW-9 was over-drilled and replaced with extraction well MW-9R, monitoring wells EW-1, MW-29, and MW-30 were installed downgradient of MW-9R, and soil borings SB-1 through SB-6 were advanced. During these drilling events, no soil impacts were noted in excess of the Site CULs within the unsaturated zone, as defined in the CAP.

During the DPE pilot test conducted in the first quarter of 2015, limited groundwater was recovered due to low water levels, caused by nearby Touchstone dewatering activities. Approximately 15 pounds of VOCs were removed from the subsurface by vapor extraction. VOC concentrations and mass recovery rates appeared to decrease over time; higher values were observed during the first 18 hours of the 26 hours (based on test runtime). Based on the observed vacuum at MW-9R and nearby monitoring wells, the calculated ROI was 33 feet.

LNAPL was not measured in monitoring wells EW-1, MW-9R, MW-29 and MW-30 during baseline measurements, DPE pilot testing, and the six week gauging period

following DPE pilot testing activities. These wells will be added to the semi-annual groundwater monitoring program to monitor potential LNAPL in the area.

6. References

ARCADIS, 2014. Cleanup Action Plan Compliance Work Plan, Former Chevron Bulk Terminal No. 100-1327, 1602 North Northlake Way, Seattle, Washington. July 9.

Ecology. 1994. Prospective Purchaser Consent Decree: Washington State Department of Ecology and Northlake Shipyard, Inc. August 12.

Ecology. 2005. WDOE Agreed Order for Gas Works Park Sediment Site. Issued to the City of Seattle and PSE. No. DE 2008. March 18.

Foster Wheeler. 1998. Draft Cleanup Action Plan, Former Chevron Bulk Plant 100-1327, Facilities North/King County Metro Transit, Lake Union Site, Prepared for Chevron Products Company & King County Metro Transit. November 24.

Kostecki, Calabrese, and Bonazountas, 1992. Hydrocarbon Contaminated Soils, Volume 2, Lewis Publishers, September 1.

SAIC. 2007. North Yard Investigation Report. Former Chevron Bulk Terminal #100-1327, Prepared for Chevron. October 29.

ARCADIS

Tables

Table 1

Soil Hydrocarbons Analytical Results

Former Chevron Bulk Plant #1001327
1602 North Northlake Place
Seattle, Washington

Boring ID	Date	Depth *(feet bgs)*	Benzene *(mg/kg)*	GRO *(mg/kg)*	DRO *(mg/kg)*	HO *(mg/kg)*
Soil Cleanup Level[1]			**4,530**	**4,520**	**5,140**	**5,780**
EW-1-12.5	7/15/2014	12.5	0.025 U	64	3.3 U	11 U
EW-1-22.5	7/15/2014	22.5	0.029 U	450	8.5	11 U
MW-9R-22.5	7/16/2014	22.5	0.035 U	1900	300	100
MW-29-12.5	7/15/2014	12.5	0.0004 U	4.2	110	75
DUP-1 (MW-29-12.5)	7/15/2014	12.5	0.0005 U	1.5	26	33
MW-29-22.5	7/15/2014	22.5	0.0004 U	0.9 U	3.2 U	11 U
MW-30-12.5	7/16/2014	12.5	0.028 U	46	310	670
DUP-2 (MW-30-12.5)	7/16/2014	12.5	0.030 U	46	270	1,000
MW-30-22.5	7/16/2014	22.5	0.0004 U	20	19	62
SB-1 12.5-13.5	8/13/2014	12.5-13.5	0.031 U	6,700	330	110
DUP-1 (SB-1 12.5-13.5)	8/13/2014	12.5-13.5	0.029 U	3,000	190	92
SB-2 12.5-13.5	8/13/2014	12.5-13.5	0.060 U	21,000	1,500	470
SB-3 12.5-13.5	8/13/2014	12.5-13.5	0.026 U	360	1,600	53 U
SB-4 12.5-13.5	8/13/2014	12.5-13.5	0.024 U	61	970	54 U
SB-5 10-11	8/14/2014	10-11'	0.085	1.7	3.3 U	11 U
SB-6 10-11	8/14/2014	10-11'	0.29	250	260	32

DUP = Duplicate
bgs = below ground surface
(mg/kg) = milligrams per kilogram
GRO = TPH as Gasoline Range Organics
DRO = TPH as Diesel Range Organics
HO = TPH as Heavy Oil Range Organics
U = Not detected, value shown is detection limit
TPH = Total Petroleum Hydrocarbons
EPA = Environmental Protection Agency
GRO analyzed by NWTPH-Gx
DRO and HO analyzed by NWTPH-Dx
BTEX analyzed by EPA Method 8021B

Analyte concentration exceeds site specific cleanup levels

NOTES

1 - Site specific cleanup levels developed in 1998 Draft Cleanup Action Plan.

Table 2
Construction Details
Former Chevron Bulk Plant #1001327
1602 North Northlake Place
Seattle, Washington

Well ID	Date of Installation	Total Depth (feet bgs)	Approximate Depth to Water (feet bgs)	Ground Surface Elevation (feet above msl)	Top of Casing Elevation (feet above msl)	Well Casing Diameter (inches)	Sreen Slot Diameter (inches)	Screened Interval (feet bgs)	Filter Pack Interval (feet bgs)	Bentonite Seal Interval (feet bgs)
EW-1	07/16/14	24.0	13.5	35.60	35.05	4	0.020	7.5 - 22.5	6.5 - 24.0	2.0 - 6.5
MW-9R	07/15/14	24.0	13.5	36.60	36.33	6	0.020	12.5 - 22.5	11.5 - 24.0	2.0 - 11.5
MW-29	07/15/14	24.0	13.5	34.65	34.06	4	0.020	7.5 - 22.5	6.5 - 24.0	2.0 - 6.5
MW-30	07/16/14	24.0	13.5	34.12	33.45	4	0.020	7.5 - 22.5	6.5 - 24.0	2.0 - 6.5
SB-1	08/13/14	21.5	17.5	39.15	--	--	--	--	--	3.0 - 21.5
SB-2	08/13/14	21.5	18.0	38.52	--	--	--	--	--	3.0 - 21.5
SB-3	08/13/14	21.5	19.0	33.00	--	--	--	--	--	3.0 - 21.5
SB-4	08/13/14	21.5	17.0	32.98	--	--	--	--	--	3.0 - 21.5
SB-5	08/14/14	21.5	20.0	32.72	--	--	--	--	--	3.0 - 21.5
SB-6	08/14/14	21.5	20.5	32.75	--	--	--	--	--	3.0 - 21.5

Notes:
bgs = below ground surface
msl = mean sea level
-- = not applicable

Table 3
Event and Post-Event Gauging Data
Former Chevron Bulk Plant #1001327
1602 North Northlake Place
Seattle, Washington

Well Number[1] (Well Casing Elevation) (feet above mean sea level)	Date Measured	Depth to Groundwater[2] (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation[3] (feet)
MW-9R	01/05/15	21.70	--	0.00	14.63
(36.33)	01/06/15	21.61	--	0.00	14.72
	01/07/15	21.65	--	0.00	14.68
	01/08/15	21.50	--	0.00	14.83
	01/09/15	21.49	--	0.00	14.84
	01/12/15	21.74	--	0.00	14.59
	01/13/15	21.74	--	0.00	14.59
	01/14/15	21.76	--	0.00	14.57
	01/15/15	21.74	--	0.00	14.59
	01/16/15	21.65	--	0.00	14.68
	01/19/15	21.41	--	0.00	14.92
	01/20/15	21.50	--	0.00	14.83
	01/21/15	21.53	--	0.00	14.80
	01/22/15	21.64	--	0.00	14.69
	01/23/15	21.70	--	0.00	14.63
	01/26/15	21.69	--	0.00	14.64
	01/28/15	21.71	--	0.00	14.62
	01/30/15	21.50	--	0.00	14.83
	02/02/15	21.57	--	0.00	14.76
	02/06/15	21.63	--	0.00	14.70
	02/09/15	21.60	--	0.00	14.73
	02/20/15	21.63	--	0.00	14.70
MW-29	01/05/15	18.80	--	0.00	15.26
(34.06)	01/06/15	18.76	--	0.00	15.30
	01/07/15	18.82	--	0.00	15.24
	01/08/15	18.61	--	0.00	15.45
	01/09/15	18.61	--	0.00	15.45
	01/12/15	18.61	--	0.00	15.45
	01/13/15	18.63	--	0.00	15.43
	01/14/15	18.67	--	0.00	15.39
	01/15/15	18.50	--	0.00	15.56
	01/16/15	18.65	--	0.00	15.41
	01/19/15	18.67	--	0.00	15.39
	01/20/15	18.60	--	0.00	15.46
	01/21/15	18.53	--	0.00	15.53
	01/22/15	18.65	--	0.00	15.41
	01/23/15	18.79	--	0.00	15.27
	01/26/15	18.70	--	0.00	15.36
	01/28/15	18.78	--	0.00	15.28
	01/30/15	18.64	--	0.00	15.42
	02/02/15	18.59	--	0.00	15.47
	02/06/15	18.65		0.00	15.41
	02/09/15	18.59	--	0.00	15.47
	02/20/15	19.26	--	0.00	14.80
MW-30	01/05/15	18.68	--	0.00	14.77
(33.45)	01/06/15	18.67	--	0.00	14.78
	01/07/15	18.70	--	0.00	14.75
	01/08/15	18.46	--	0.00	14.99
	01/09/15	18.50	--	0.00	14.95
	01/12/15	18.41	--	0.00	15.04
	01/13/15	18.45	--	0.00	15.00

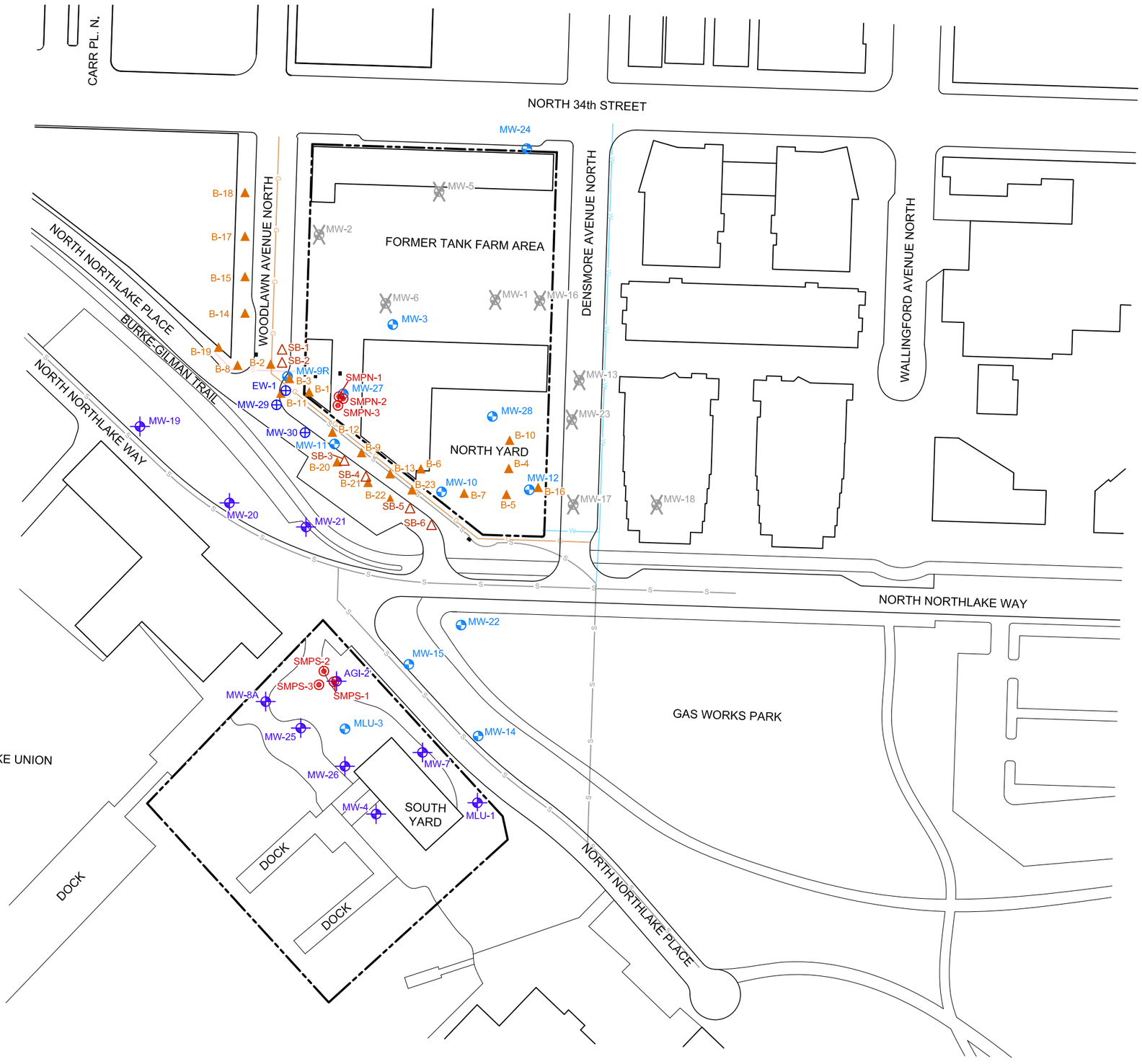
Table 3
Event and Post-Event Gauging Data
Former Chevron Bulk Plant #1001327
1602 North Northlake Place
Seattle, Washington

Well Number[1] (Well Casing Elevation) (feet above mean sea level)	Date Measured	Depth to Groundwater[2] (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation[3] (feet)
MW-30 (continued)	**01/14/15**	**18.61**	**--**	**0.00**	**14.84**
(33.45)	**01/15/15**	**18.59**	**--**	**0.00**	**14.86**
	01/16/15	**18.50**	**--**	**0.00**	**14.95**
	01/19/15	**18.53**	**--**	**0.00**	**14.92**
	01/20/15	**18.50**	**--**	**0.00**	**14.95**
	01/21/15	**18.42**	**--**	**0.00**	**15.03**
	01/22/15	**18.60**	**--**	**0.00**	**14.85**
	01/23/15	**18.72**	**--**	**0.00**	**14.73**
	01/26/15	**18.55**	**--**	**0.00**	**14.90**
	01/28/15	**18.63**	**--**	**0.00**	**14.82**
	01/30/15	**18.47**	**--**	**0.00**	**14.98**
	02/02/15	**18.52**	**--**	**0.00**	**14.93**
	02/06/15	**18.55**	**--**	**0.00**	**14.90**
	02/09/15	**18.60**	**--**	**0.00**	**14.85**
	02/20/15	**19.18**	**--**	**0.00**	**14.27**
EW-1	**01/05/15**	**21.70**	**--**	**0.00**	**13.35**
(35.05)	**01/06/15**	**21.67**	**--**	**0.00**	**13.38**
	01/07/15	**21.65**	**--**	**0.00**	**13.40**
	01/08/15	**21.72**	**--**	**0.00**	**13.33**
	01/09/15	**21.70**	**--**	**0.00**	**13.35**
	01/12/15	**21.80**	**--**	**0.00**	**13.25**
	01/13/15	**21.76**	**--**	**0.00**	**13.29**
	01/14/15	**21.80**	**--**	**0.00**	**13.25**
	01/15/15	**21.80**	**--**	**0.00**	**13.25**
	01/16/15	**21.76**	**--**	**0.00**	**13.29**
	01/19/15	**21.58**	**--**	**0.00**	**13.47**
	01/20/15	**21.60**	**--**	**0.00**	**13.45**
	01/21/15	**21.65**	**--**	**0.00**	**13.40**
	01/22/15	**21.74**	**--**	**0.00**	**13.31**
	01/23/15	**21.80**	**--**	**0.00**	**13.25**
	01/26/15	**21.69**	**--**	**0.00**	**13.36**
	01/28/15	**21.74**	**--**	**0.00**	**13.31**
	01/30/15	**21.71**	**--**	**0.00**	**13.34**
	02/02/15	**21.63**	**--**	**0.00**	**13.42**
	02/06/15	**21.76**	**--**	**0.00**	**13.29**
	02/09/15	**21.70**	**--**	**0.00**	**13.35**
	02/20/15	**21.71**	**--**	**0.00**	**13.34**

Notes:
[1]Well casing elevations listed in feet above mean sea level. Approximate monitoring well locations are shown on Figure 2.
[2]Below top of casing.
[3]Elevation referenced to Horizontal Datum NAD 83/98, State Plane Coordinates Washington North Zone and Vertical Datum NAVD 88
LNAPL = light non-aqueous phase liquid
Bold data measured during dewatering of site
"--" = not measured or not obtainable

ARCADIS

Figures



LEGEND:

- APPROXIMATE MONITORING WELL LOCATION
- APPROXIMATE SOIL BORING LOCATION
- GROUNDWATER MONITORING WELL
- ABANDONED MONITORING WELL
- COMPLIANCE MONITORING WELL
- SEPARATE–PHASE MONITORING POINT LOCATION
- 2007 BORING LOCATIONS
- CATCH BASIN
- NATURAL GAS LINE (APPROX.)
- UNDERGROUND ELECTRIC LINE (APPROX.)
- WATER LINE (APPROX.)
- SEWER LINE (APPROX.)

NOTES:

1. BASE MAP FROM A DRAWING BY SAIC TITLED "SITE MAP", DATED 09–14–07, @ A SCALE OF 1" = 60'. REVISED IN ACCORDANCE WITH A SURVEY DRAWING BY OTAK CONDUCTED IN APRIL & MAY, 2011.
2. ALL LOCATIONS OTHER THAN MONITORING WELLS ARE APPROXIMATE.

0 100' 200'

GRAPHIC SCALE

FORMER CHEVRON BULK PLANT No. 100-1327
FACILITIES NORTH / KING COUNTY (METRO)
SEATTLE, WASHINGTON

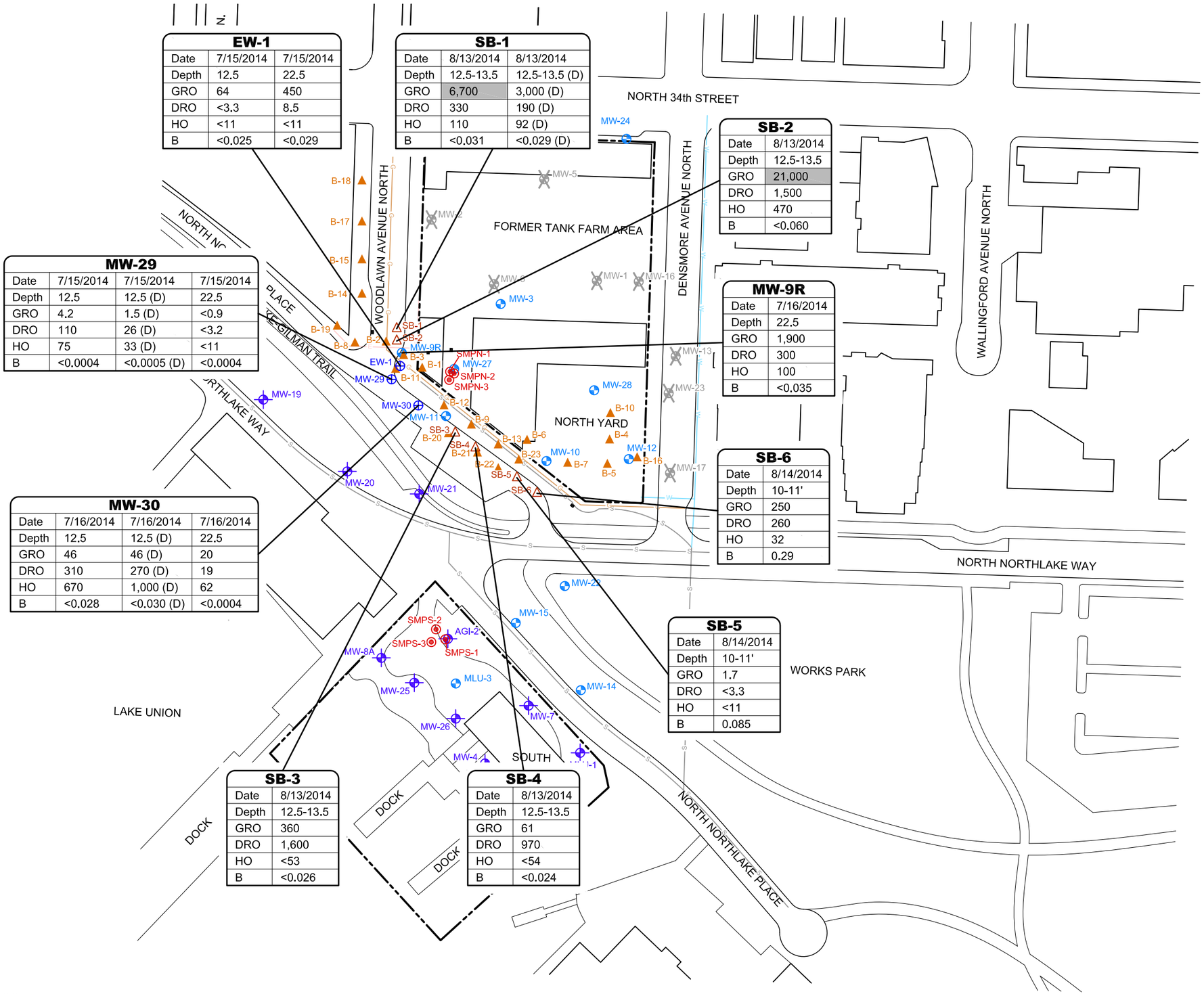
WELL INSTALLATION AND DUAL PHASE EXTRACTION PILOT TEST REPORT

SITE MAP

ARCADIS

FIGURE 1

CITY: SYRACUSE NY DIV/GROUP: ENVCAD DB: E. KRAHMER PIC: D. LAY PM: S. ZORN TM: S. MILES TR: E. EPPLE LYR: ON=*;OFF=REF
G:\ENVCAD\SYRACUSE\ACTIB\00457\9\0009\000100\DWG\45799B01.dwg LAYOUT: 1 SAVED: 2/27/2015 9:44 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 2/27/2015 10:00 AM BY: KRAHMER, ERIC
XREFS: 45799X03 45799X02 45799XLB
IMAGES: PROJECTNAME: ---



EW-1		
Date	7/15/2014	7/15/2014
Depth	12.5	22.5
GRO	64	450
DRO	<3.3	8.5
HO	<11	<11
B	<0.025	<0.029

SB-1		
Date	8/13/2014	8/13/2014
Depth	12.5-13.5	12.5-13.5 (D)
GRO	6,700	3,000 (D)
DRO	330	190 (D)
HO	110	92 (D)
B	<0.031	<0.029 (D)

SB-2	
Date	8/13/2014
Depth	12.5-13.5
GRO	21,000
DRO	1,500
HO	470
B	<0.060

MW-29			
Date	7/15/2014	7/15/2014	7/15/2014
Depth	12.5	12.5 (D)	22.5
GRO	4.2	1.5 (D)	<0.9
DRO	110	26 (D)	<3.2
HO	75	33 (D)	<11
B	<0.0004	<0.0005 (D)	<0.0004

MW-9R	
Date	7/16/2014
Depth	22.5
GRO	1,900
DRO	300
HO	100
B	<0.035

SB-6	
Date	8/14/2014
Depth	10-11'
GRO	250
DRO	260
HO	32
B	0.29

MW-30			
Date	7/16/2014	7/16/2014	7/16/2014
Depth	12.5	12.5 (D)	22.5
GRO	46	46 (D)	20
DRO	310	270 (D)	19
HO	670	1,000 (D)	62
B	<0.028	<0.030 (D)	<0.0004

SB-5	
Date	8/14/2014
Depth	10-11'
GRO	1.7
DRO	<3.3
HO	<11
B	0.085

SB-3	
Date	8/13/2014
Depth	12.5-13.5
GRO	360
DRO	1,600
HO	<53
B	<0.026

SB-4	
Date	8/13/2014
Depth	12.5-13.5
GRO	61
DRO	970
HO	<54
B	<0.024

LEGEND:

- APPROXIMATE MONITORING WELL LOCATION
- APPROXIMATE SOIL BORING LOCATION
- GROUNDWATER MONITORING WELL
- ABANDONED MONITORING WELL
- COMPLIANCE MONITORING WELL
- SEPARATE-PHASE MONITORING POINT LOCATION
- 2007 BORING LOCATIONS
- CATCH BASIN
- NATURAL GAS LINE (APPROX.)
- UNDERGROUND ELECTRIC LINE (APPROX.)
- WATER LINE (APPROX.)
- SEWER LINE (APPROX.)
- (D) DUPLICATE VALUE
- SHADED INDICATES VALUE GREATER THAN SITE CULS

SAMPLE ID	
Date	Month/Day/Year
Depth	Feet Below Ground Surface
GRO	Gasoline-Range Organics (mg/kg)
DRO	Diesel-Range Organics (mg/kg)
HO	Heavy Oil (mg/kg)
B	Benzene (mg/kg)

NOTES:

1. BASE MAP FROM A DRAWING BY SAIC TITLED "SITE MAP", DATED 09-14-07, @ A SCALE OF 1" = 60'. REVISED IN ACCORDANCE WITH A SURVEY DRAWING BY OTAK CONDUCTED IN APRIL & MAY, 2011.
2. ALL LOCATIONS OTHER THAN MONITORING WELLS ARE APPROXIMATE.

0 100' 200'

GRAPHIC SCALE

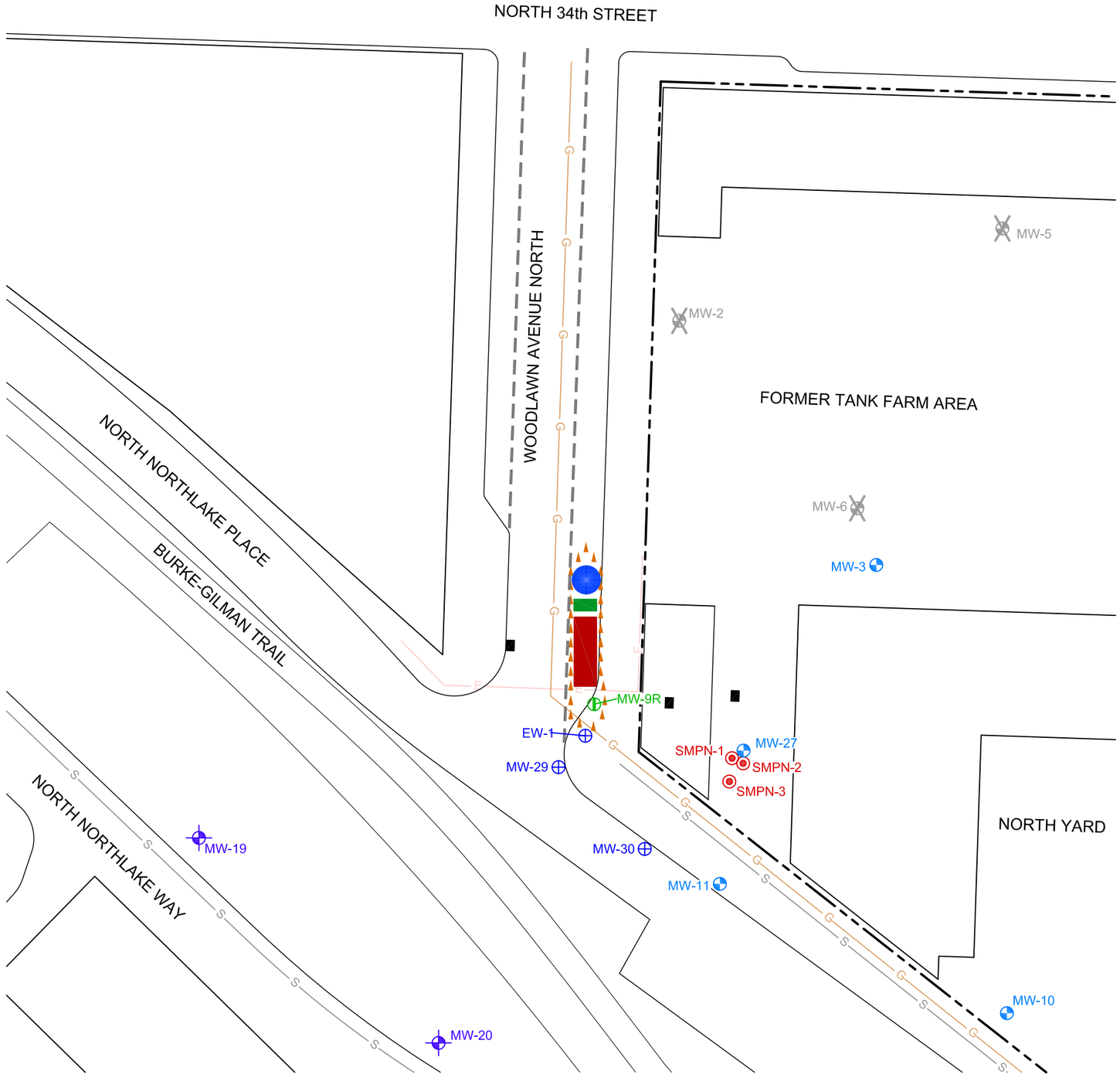
FORMER CHEVRON BULK PLANT No. 100-1327
FACILITIES NORTH / KING COUNTY (METRO)
SEATTLE, WASHINGTON

WELL INSTALLATION AND DUAL PHASE EXTRACTION PILOT TEST REPORT

SOIL ANALYTICAL RESULTS

ARCADIS

FIGURE 2



LEGEND:

- DPE EXTRACTION WELL
- DPE RESPONSE WELL
- GROUNDWATER MONITORING WELL
- ABANDONED MONITORING WELL
- COMPLIANCE MONITORING WELL
- SEPARATE–PHASE MONITORING POINT LOCATION
- CATCH BASIN
- PARKING LANE

PROPOSED SETUP LOCATION:

- TRAFFIC BARRICADES/CAUTION TAPE
- DPE SYSTEM TRAILER (8'x24')
- SYSTEM GENERATOR
- 6,500 GALLON TANK (10' DIAMETER)

NOTE:

1. BASE MAP FROM A DRAWING BY SAIC TITLED "SITE MAP", DATED 09–14–07, @ A SCALE OF 1"=60'. REVISED IN ACCORDANCE WITH A SURVEY DRAWING BY OTAK CONDUCTED IN APRIL & MAY, 2011.
2. ALL LOCATIONS OTHER THAN MONITORING WELLS ARE APPROXIMATE.

0 40' 80'

GRAPHIC SCALE

FORMER CHEVRON BULK PLANT No. 100-1327
FACILITIES NORTH / KING COUNTY (METRO)
SEATTLE, WASHINGTON

WELL INSTALLATION AND DUAL PHASE EXTRACTION PILOT TEST REPORT

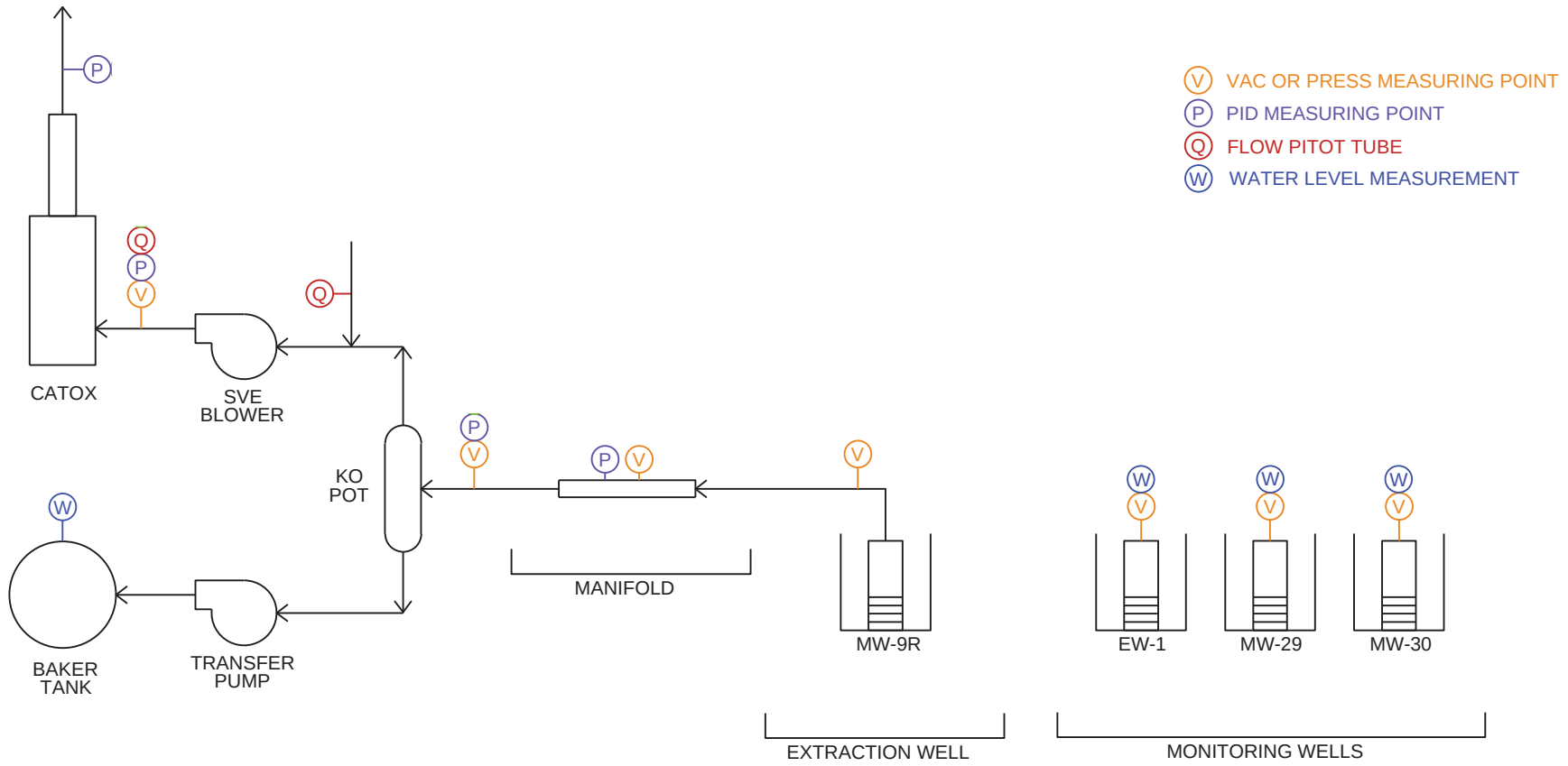
DUAL PHASE EXTRACTION SYSTEM LAYOUT

ARCADIS

FIGURE 3

CITY: SYRACUSE NY DIV/GROUP: EnvCAD DB: E. KRAHMER PIC: D. LAY PM: S. ZORN TM: S. MILES LYR:(Opt)ON=*;OFF=*REF* PAGESETUP: --- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 2/27/2015 10:12 AM BY: KRAHMER, ERIC
G:\ENVCAD\SYRACUSE\ACTIB0045799\0009\001100\DWG\45799G01.dwg LAYOUT: 3 SAVED: 2/27/2015 10:11 AM ACADVER: 18.1S (LMS TECH)
XREFS: 45799X04 45799XLB IMAGES: PROJECTNAME: ---

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\Emeryville\ACT\B0045799\0009\00100\DWG\45799D01.dwg LAYOUT: 4 SAVED: 2/27/2015 10:55 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 2/27/2015 10:58 AM BY: REYES, ALEC



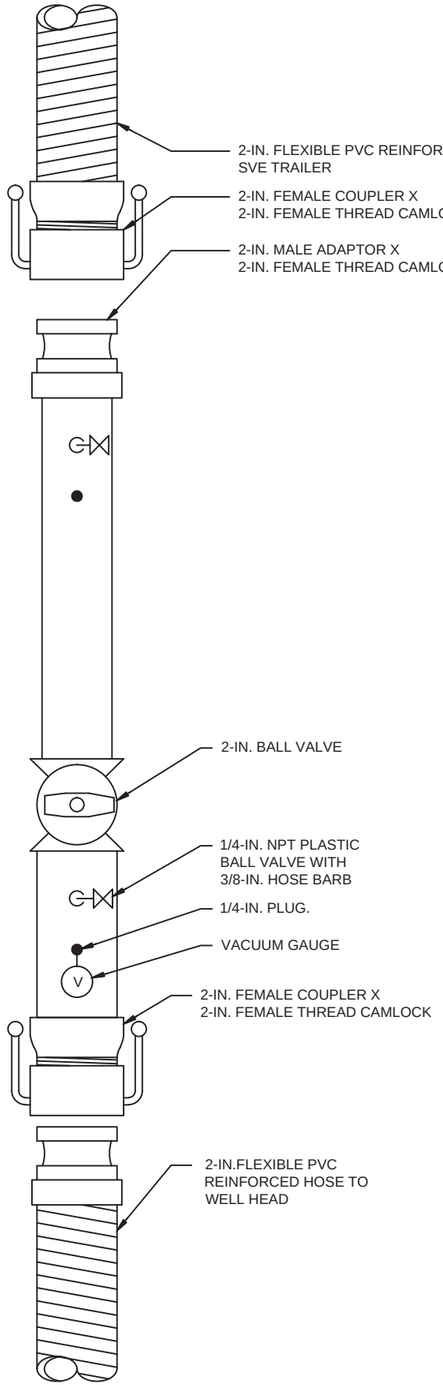
FORMER CHEVRON BULK PLANT No. 100-1327
FACILITIES NORTH / KING COUNTY (METRO)
SEATTLE, WASHINGTON

WELL INSTALLATION AND DUEL PHASE EXTRACTION PILOT TEST REPORT

TYPICAL DPE SYSTEM FLOWSHEET WITH SAMPLING LOCATIONS

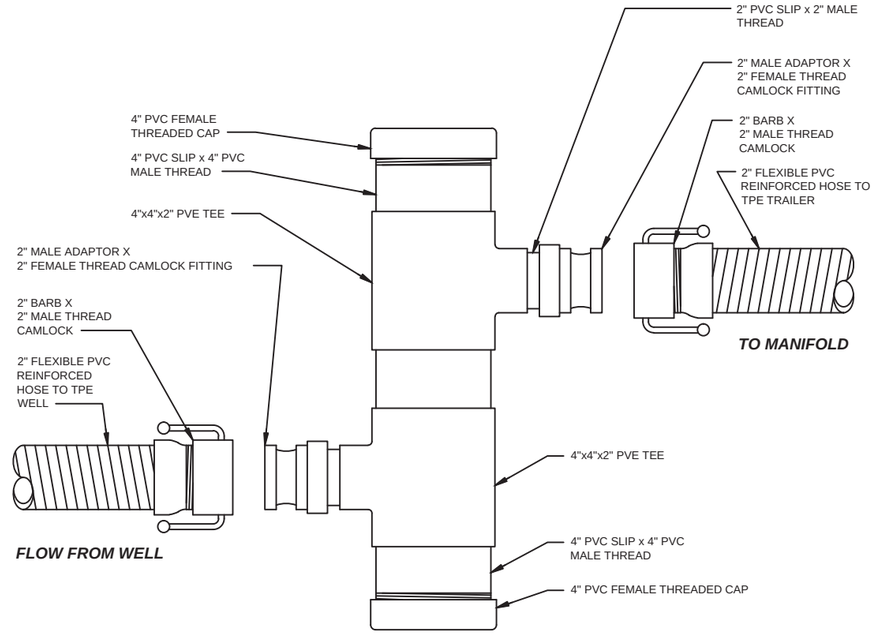
ARCADIS

FIGURE
4



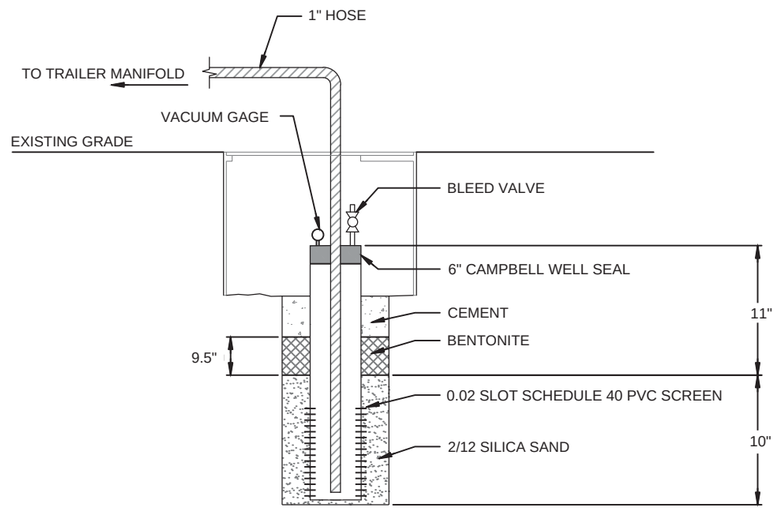
MOBILE DPE MANIFOLD

NOT TO SCALE



MINI CONDENSATION TRAP

NOT TO SCALE



6-INCH DPE WELL DETAIL

NOT TO SCALE

FORMER CHEVRON BULK PLANT No. 100-1327
FACILITIES NORTH / KING COUNTY (METRO)
SEATTLE, WASHINGTON

WELL INSTALLATION AND DUEL PHASE EXTRACTION PILOT TEST REPORT

DPE TREATMENT SYSTEM INSTALLATION DETAILS

ARCADIS

FIGURE
5

Appendix A

Right of Way (ROW) Permits

Seattle Dept of Transportation
Street Use Permits, 23rd Floor
700 Fifth Ave, Suite 2300
P O Box 34996
Seattle, WA 98124-4996

UTILITY PERMIT

Permit No.: 235724

PERMITTEE

Inspector: Daniel Conn
Inspection District: UNIVERSITY

LOCATION

Address: 1602 N NORTHLAKE WAY

Details: 5 LOCATIONS AT OR AROUND THE CORNER OF N NORTHLAKE PL AND WOODLAWN AVE. IMPACT TO SIDEWALK AND TRAVEL LANES.

Application Date: 5/21/14 11:36 am
Issue Date: 6/19/14 2:23 pm

PARTIES (* Primary Applicant)

Role	Name	Address	Phone	From	To
*24 Hour Contact	MILES, SAM	1100 OLIVE WAY, SUITE 800,,SEATTLE,WA,98101	(206)853-7428		
Permittee	MILES, SAM	1100 OLIVE WAY, SUITE 800,,SEATTLE,WA,98101	(206)726-4720		
Engineer	MILES, SAM	1100 OLIVE WAY, SUITE 800,,SEATTLE,WA,98101	(206)726-4720		

PERMITTED USES

Right of Way: NON-ARTERIAL **DPD #:** **To Be Restored By:** PERMITTEE

Use	Space	Start Date	Duration	Max Allowed Date	Sq. Ft.	Issued Date	Intended Vacate Date
51I	A	6/25/14	10	7/4/14	1500	6/19/14	7/4/14

Use	Space	Description	Conditions
51I	A	Prepatory or exploratory work for upcoming projects, including surveying, installing monitoring wells, and soil sampling	Soil borings or wells, non arterial. 5 LOCATIONS AT OR AROUND THE CORNER OF N NORTHLAKE PL AND WOODLAWN AVE. Street closure.

CONDITIONS OF USE

DESCRIPTION OF WORK :

Additional Notes: *Preparatory and exploratory work for upcoming projects, including surveying, installing wells/soil borings, and soil sampling at or around the corner of N Northlake Pl and Woodlawn Ave.*

ADDITIONAL CONDITIONS :

Additional Notes: *ADDITONAL DESCRIPTION, 1 OVER DRILL @ mw 9. Location 1 NE corner NE woodlawn ave, 2@ 1" wells, NE corner of N Northlake Pl, 2 soil borings Northeast side of North Northlake Pl-SE of Woodlawn Ave N.*

ADDITIONAL CONDITIONS 1 :

Additional Notes: *Contractor must place street closed signs at each end of alley to notify vehicle traffic. Contractor must notify all adjacent residents and businesses a minimum of 24 hours prior to any activity that will impact alley access. Garbage collection services must be provided access whenever necessary. Seattle Police Department must be contacted at the non-emergency number, (206) 625-5011, to notify that the street is closed to thru traffic.*

E1.15 :
MULCHING AND MATTING - Apply mulch to protect exposed soils and promote plant establishment.

E1.40 :
PERMANENT SEEDING AND PLANTING - Install temporary surface runoff control measures prior to seeding or planting to protect the surface from erosion until the vegetation is established. Establish permanent vegetation (e.g., grasses, legumes, trees, and shrubs) as rapidly as possible to prevent soil erosion by wind or water.

E1.45 :
SODDING - Establish permanent turf for immediate erosion protection or to stabilize drainage pathways where concentrated overland flow will occur.

E1.50 :
TOPSOILING - Preserve and use topsoil to enhance final site stabilization with vegetation and to provide a suitable growth medium for final site stabilization with vegetation.

E3.25 :
STORM DRAIN INLET PROTECTION - Install storm drain covers on stormwater structures less than 12 inches deep during construction. Install catch basin filter socks in stormwater structures greater than 12 inches deep. Place the storm drain or catch basin grate on top of the catch basin filter sock to hold it in place.

C1.20 :
USE OF CHEMICALS DURING CONSTRUCTION - Use only the recommended amounts of chemical materials and apply them in a proper manner. Neutralize the pH of concrete wash water from concrete mixers, if necessary.

C1.35 :

...ie Dept of Transportation
...eet Use Permits, 23rd Floor
...00 Fifth Ave, Suite 2300
P O Box 34996
Seattle, WA 98124-4996

UTILITY PERMIT

Permit No.: 235724

...AWCUTTING AND PAVING POLLUTION PREVENTION - Vacuum slurry and cuttings during the activity to prevent migration offsite and do not leave slurry and cuttings on permanent concrete or asphalt paving overnight. Dispose of collected slurry and cuttings, waste material, and demolition debris in a manner that does not violate groundwater or surface water quality standards. Implement preventative measures such as berms, barriers, secondary containment, and vactor trucks if observations indicate that a violation of water quality standards could occur.

C1.45 :
SOLID WASTE HANDLING AND DISPOSAL - Remove and dispose of accumulated solid waste at authorized disposal areas. Label waste containers and place them in a covered area with closed lids. Salvage and recycle any useful materials.

BMP5 :
SPILL PREVENTION AND CLEANUP-Keep a spill cleanup kit in a nearby vehicle or next to the work site so that it is easily accessible. Make sure the contents of the spill kit are appropriate for the types and quantities of materials used for this work task. Refill spill kit materials before beginning work.

BMP16 :
CONCRETE POURING, CONCRETE/ASPHALT CUTTING, AND ASPHALT APPLICATION - Sweep or shovel loose aggregate chunks and dust for recycling or proper disposal. Place storm drain covers or similarly effective containment devices over all storm drains located downslope or adjacent to the work area. Shovel or vacuum all slurry and remove from the site. Perform cleaning of concrete application and mixing equipment or concrete-delivery vehicles in a designated area where the rinse water is controlled.

BMP20 :
LANDSCAPING AND LAWN VEGETATION MANAGEMENT - Use proper fertilizer and herbicide application techniques to minimize nutrient pollution of stormwater. Implement proper landscaping and mulching techniques to prevent plant material and excess mulch from entering the separate storm drainage system. Do not dispose of collected vegetation in separate storm drainage systems, waterways, water bodies or greenbelt areas.

DAMAGED OR DESTROYED UTILITY :
SDOT makes no representation regarding the safety or integrity of the subject structure. If the structure is damaged or destroyed, SDOT will have no obligation to provide an alternative location for the permit utility.

TREE TRUNK OR ROOTS :
Contact the City Arborist Office (684-8733) a minimum of five working-days prior to digging within any landscaped areas in the street rights-of-way. The edge of all trenching must be at least five feet (5') from any street trees. When trenching near trees with trunks greater than twelve inches (12") in diameter, hand dig all trenching for a distance of ten feet (10'), measured five feet (5') radius from the tree trunk. When encountering tree roots, cut off cleanly with sharp saw (do not leave torn or ripped tree roots unattended). Do not cut roots greater than two inches (2") in diameter (contractor will have to hand tunnel underneath the roots). Do not paint ends of roots. Notify Landscape Maintenance at 684-4121 at least forty eight (48) hours in advance when working in landscaped areas or on trees.

FEES

Description	Date	Amount
ISSUANCE FEE - USE 511	06/19/2014	$146.00
Totals:		**$146.00**

STREET USE INSPECTOR

Daniel Conn (206) 386-4504

Permittee Roy C Hunt

Director Per Daniel Conn

GENERAL REQUIREMENTS

1. ***Nature of permit.*** This permit is issued pursuant to the Seattle Municipal Code (SMC), Chapter 15.04, for use and/or occupancy of the public right-of-way consistent with the terms and conditions set forth herein. This permit is wholly of a temporary nature, vests no permanent rights whatsoever, and is revocable pursuant to SMC 15.04.070.
2. ***Acceptance of terms, conditions, and requirements.*** Permittee accepts the terms, conditions, and requirements of this permit and agrees to comply with them to the satisfaction of the Seattle Department of Transportation, Street Use Division, or such other agency as may be designated by the City of Seattle. Permittee further agrees to comply with all applicable city ordinances, including but not limited to Title 15 SMC, and all applicable requirements of state and federal law.
3. ***Copy of permit.*** A copy of the issued permit and approved plans must be on site and available at all times.
4. ***Expiration of permit.*** This permit shall remain valid until revoked pursuant to SMC 15.04.070; provided that, the permit shall expire automatically if the authorized work does not begin within six months from the date the permit is issued.
5. ***Superiority of Street Improvement Permit.*** When a Street Improvement Permit exists, the rights acquired under the Street Improvement Permit supersedes those acquired under any other Street Use or Utility Permits.
6. ***Compliance with technical requirements and standards.*** All work within the public right-of-way shall be performed and completed in accordance with requirements set forth in the following technical documents published by the City of Seattle, as now or hereafter amended: Right-of-Way Improvements Manual; Standard Specifications for Road, Bridge, and Municipal Construction; Standard Plans for Municipal Construction; Street and Sidewalk Pavement Opening and Restoration Rule; and Traffic Control Manual for In-Street Work.
7. ***Scope of Work.*** The Permittee shall construct the improvements reflected in, and in accordance with, this permit and the City approved construction plans. Any and all revisions, omissions and / or additions to the scope of work shall be reviewed and approved by the City prior to implementation.
8. ***Street Use Notification.*** Construction work may be completed in several phases: site preparation (setting up traffic control, sawcutting, etc), ground breaking, and restoration. Before beginning any phase of work in the public right-of-way, the Permittee shall notify Street Use of each start date.

Permittee shall be responsible for notifying Street Use Job Start at (206) 684-5270 or SDOTJobStart@Seattle.gov a minimum of 2 business days prior to the start of work and provide the following information:

- Permit Number
- Job Site Address
- Start Date - Please specify if Job Start date is the same as the Excavation date. If the dates are different, please provide both dates.
- Brief Work Description
- Job Site Contact Name and Phone Number

Failure to do so shall result in a penalty of $300 or such other amount as may be established pursuant to SMC 15.04.074.
For Street Improvement Permits and Major Utility Permits, a preconstruction meeting is required prior to the start of construction, and the assigned inspector shall be notified a minimum of 2 business days prior to required inspections.

9. ***Utility notification prior to ground disturbance.*** The Permittee shall call Utility Underground Locator Center (1-800-424-5555) a minimum of 48 hours prior to ground disturbance.
10. ***Public notification.*** Permittee shall notify all potentially affected residents and businesses, at least one week prior to starting work within the public right-of-way.
11. ***Coordination of work.*** In performing work authorized by this permit, the Permittee shall coordinate with other contractors working in the public right-of-way to minimize the impact to the public.
12. ***Hours of work.*** Work performed within the public right-of-way shall occur only during hours authorized under all applicable codes, regulations, rules and permits.
13. ***Off-Hour Work.*** Work outside of normal working hours (8:00 am -5:00 pm Monday through Friday) requires a minimum of 3 business days advanced notice to the SDOT Street Use Inspection Supervisor prior to the off hours work. Work outside of normal working hours may also require a separate approved traffic control plan. A minimum of 2 hours of inspection time will be charged for inspection outside of normal working hours at the premium rate. A Stop Work order and/or a Citation may be issued for failure to notify a minimum of 3 business days in advance.
14. ***Inspection fees.*** Permittee shall pay for City inspections of work authorized under this permit per the current fee schedule as established pursuant to SMC 15.04.074, and to cover all other associated costs.
15. ***Billing.*** All fees and costs billed pursuant to this permit shall be paid to the City of Seattle within 30 days from the date of the invoice. Past due invoices may be subject to interest charges and / or sent to collections.
16. ***Deposits, Charges, and Future Billings.*** The Permittee is responsible for all permit charges. If a deposit was made for estimated future street use services, any unused portion of the deposit shall be refunded to the Permittee. Any charges in excess of the deposit shall be billed to the Permittee.
17. ***Corrective Work.*** The Permittee is responsible for any additional costs incurred by the City resulting from temporary or corrective measures required to bring the work area in compliance with standards that apply, including, but not limited to, temporary traffic control, requirements for temporary structures, temporary stabilization and temporary restoration when the Permittee is not on site.
18. ***Indemnification.*** The Permittee agrees to defend, indemnify, and hold harmless the City of Seattle, its officials, officers, employees, and agents against: (1) any liability, claims, causes of action, judgments, or expenses, including reasonable attorney fees, resulting directly or indirectly from any act or omission of the Permittee, its contractors, subcontractors, anyone directly or indirectly employed by them, and anyone for whose acts or omissions they may be liable, arising out of the Permittee's use or occupancy of the public right-of-way; and (2) all loss by the failure of the Permittee to fully or adequately perform, in any respect, all authorizations or obligations under this Permit.

EXISTING IMPROVEMENTS

1. ***Costs of damage to City property and improvements.*** Permittee shall be responsible for the costs of repairing any damage to city property or improvements resulting from work performed by or on behalf of the Permittee within the public right-of-way.
2. ***Utility protection.*** The Permittee shall be responsible for checking locations and providing adequate protection for all utilities in the work area.
3. ***Utility relocation.*** The Permittee shall be responsible for notifying affected utilities and requesting any necessary relocation.
4. ***Survey monuments.*** Prior to removing, destroying, disturbing, or covering a survey monument, such that the survey point is no longer visible or readily accessible, Permittee shall obtain a permit from the Department of Natural Resources pursuant to Washington Administrative Code, Chapter 332-120.

ENVIRONMENTAL PROTECTION

1. ***Best management practices required.*** The Permittee shall be responsible for the control of surface runoff, erosion and sediment at the construction site, as required by: the Stormwater Code (Title 22 Subtitle VIII SMC), the Standard Specifications for Road, Bridge, and Municipal Construction and Department of Planning and Development Director's Rule 16-2000, as now or hereafter amended. The site and the surrounding area shall generally be kept clean and free of construction debris or other material, including but not limited to mud, dust, rock, asphalt, and concrete. Waste materials shall be collected and disposed of at an appropriate disposal site. These materials shall be prevented from entering any part of the public sewer and storm drain system, and any surface waters.

TRAFFIC CONTROL REQUIREMENTS

1. ***Compliance with the Traffic Control Manual for In-Street Work.*** In order to provide safe and effective work areas and to ward, control, protect, and expedite vehicular and pedestrian traffic, signage for all construction within the public right-of-way shall comply with the City of Seattle Traffic Control Manual for In-Street Work, as now or hereafter amended. When required, the conditions on the traffic control plan shall supercede any conflicting provisions or requirements in the City of Seattle Manual for In Street Work. A copy of the current City of Seattle Traffic Control Manual for In-Street Work, and approved traffic control plan, when required, shall be on site at all times.
2. ***Lanes to remain open during peak hours.*** Traffic lanes shall not be closed during the following peak hours: 6:00 am-9:00 am and 3:00 pm-7:00 pm

in the Central Business District, and 7:00 am-9:00 am and 4:00 pm-6:00 pm for arterials elsewhere in the City, unless specifically noted on the approved traffic control plan.

3. ***Maintain access.*** Access shall be maintained or accommodated during construction.
4. ***Width of temporary traffic lanes.*** Temporary traffic lanes created during the permitted work shall be a minimum of 11 feet in width, unless otherwise approved on the traffic control plan.
5. ***Working within restricted curb spaces.*** When the project impacts a restricted curb space, such as parking stalls, meters, pay stations, and related signage, the Permittee shall obtain permission from SDOT Traffic Management prior to the start of work. Contact the SDOT Traffic Engineers at (206) 684-5086 prior to the start of work.
6. ***Temporary No Parking signs and easels.*** In areas without parking pay stations or parking meters, establishing a Temporary No Parking Zone requires placement of type T-38 or T-39 easels, and completion of an online verification form in conformance with the Traffic Control Manual for In-street Work. The Permittee shall contact SDOT's Traffic Permit Counter when working in pay-to-park areas (meters or pay station controlled).
7. ***Nighttime Illumination.*** Four or more Type B warning lights of sufficient brilliance to be seen from 500 feet, must be maintained at all times during the hours of darkness at the points of obstruction or excavation of any right-of-way.

Seattle Dept of Transportation
Street Use Permits, 23rd Floor
700 Fifth Ave, Suite 2300
P O Box 34996
Seattle, WA 98124-4996

UTILITY PERMIT

PERMITTEE

Permit No.: 235724

Inspector: Daniel Conn
Inspection District: UNIVERSITY

LOCATION

Address: 1602 N NORTHLAKE WAY

Details: 5 LOCATIONS AT OR AROUND THE CORNER OF N NORTHLAKE PL AND WOODLAWN AVE. IMPACT TO SIDEWALK AND TRAVEL LANES.

Application Date: 5/21/14 11:36 am
Issue Date: 6/24/14 11:41 am

PARTIES (* Primary Applicant)

Role	Name	Address	Phone	From	To
*24 Hour Contact	MILES, SAM	1100 OLIVE WAY, SUITE 800,,SEATTLE,WA,98101	(206)853-7428		
Permittee	MILES, SAM	1100 OLIVE WAY, SUITE 800,,SEATTLE,WA,98101	(206)726-4720		
Engineer	MILES, SAM	1100 OLIVE WAY, SUITE 800,,SEATTLE,WA,98101	(206)726-4720		

PERMITTED USES

Right of Way: NON-ARTERIAL **DPD #:** **To Be Restored By:** PERMITTEE

Use	Space	Start Date	Duration	Max Allowed Date	Sq. Ft.	Issued Date	Intended Vacate Date
~~51I~~	~~A~~	~~6/25/14~~	~~10~~	~~7/4/14~~	~~1500~~	~~6/19/14~~	~~7/4/14~~
51I	A	7/14/14	10	7/23/14	1	6/24/14	7/23/14

Use	Space	Description	Conditions
51I	A	Prepatory or exploratory work for upcoming projects, including surveying, installing monitoring wells, and soil sampling	Soil borings or wells, non arterial. 5 LOCATIONS AT OR AROUND THE CORNER OF N NORTHLAKE PL AND WOODLAWN AVE. Street closure.
51I	A	Prepatory or exploratory work for upcoming projects, including surveying, installing monitoring wells, and soil sampling	New start date. Soil borings or wells, non arterial. 5 LOCATIONS AT OR AROUND THE CORNER OF N NORTHLAKE PL AND WOODLAWN AVE. Street closure.

CONDITIONS OF USE

DESCRIPTION OF WORK :

Additional Notes: *Preparatory and exploratory work for upcoming projects, including surveying, installing wells/soil borings, and soil sampling at or around the corner of N Northlake Pl and Woodlawn Ave.*

ADDITIONAL CONDITIONS :

Additional Notes: *ADDITONAL DESCRIPTION, 1 OVER DRILL @ mw 9. Location 1 NE corner NE woodlawn ave, 2@ 1" wells, NE corner of N Northlake Pl, 2 soil borings Northeast side of North Northlake Pl-SE of Woodlawn Ave N.*

ADDITIONAL CONDITIONS 1 :

Additional Notes: *Contractor must place street closed signs at each end of alley to notify vehicle traffic. Contractor must notify all adjacent residents and businesses a minimum of 24 hours prior to any activity that will impact alley access. Garbage collection services must be provided access whenever necessary. Seattle Police Department must be contacted at the non-emergency number, (206) 625-5011, to notify that the street is closed to thru traffic.*

E1.15 :
MULCHING AND MATTING - Apply mulch to protect exposed soils and promote plant establishment.

E1.40 :
PERMANENT SEEDING AND PLANTING - Install temporary surface runoff control measures prior to seeding or planting to protect the surface from erosion until the vegetation is established. Establish permanent vegetation (e.g., grasses, legumes, trees, and shrubs) as rapidly as possible to prevent soil erosion by wind or water.

E1.45 :
SODDING - Establish permanent turf for immediate erosion protection or to stabilize drainage pathways where concentrated overland flow will occur.

E1.50 :
TOPSOILING - Preserve and use topsoil to enhance final site stabilization with vegetation and to provide a suitable growth medium for final site stabilization with vegetation.

E3.25 :
STORM DRAIN INLET PROTECTION - Install storm drain covers on stormwater structures less than 12 inches deep during construction. Install catch basin filter socks in stormwater structures greater than 12 inches deep. Place the storm drain or catch basin grate on top of the catch basin filter sock to hold it in place.

C1.20 :
USE OF CHEMICALS DURING CONSTRUCTION - Use only the recommended amounts of chemical materials and apply them in a proper manner. Neutralize the pH of concrete wash water from concrete mixers, if necessary.

8. ***Street Use Notification.*** Construction work may be completed in several phases: site preparation (setting up traffic control, sawcutting, etc), ground breaking, and restoration. Before beginning any phase of work in the public right-of-way, the Permittee shall notify Street Use of each start date. Permittee shall be responsible for notifying Street Use Job Start at (206) 684-5270 or SDOTJobStart@Seattle.gov a minimum of 2 business days prior to the start of work and provide the following information:
   - Permit Number
   - Job Site Address
   - Start Date - Please specify if Job Start date is the same as the Excavation date. If the dates are different, please provide both dates.
   - Brief Work Description
   - Job Site Contact Name and Phone Number

   Failure to do so shall result in a penalty of $300 or such other amount as may be established pursuant to SMC 15.04.074.
   For Street Improvement Permits and Major Utility Permits, a preconstruction meeting is required prior to the start of construction, and the assigned inspector shall be notified a minimum of 2 business days prior to required inspections.
9. ***Utility notification prior to ground disturbance.*** The Permittee shall call Utility Underground Locator Center (1-800-424-5555) a minimum of 48 hours prior to ground disturbance.
10. ***Public notification.*** Permittee shall notify all potentially affected residents and businesses, at least one week prior to starting work within the public right-of-way.
11. ***Coordination of work.*** In performing work authorized by this permit, the Permittee shall coordinate with other contractors working in the public right-of-way to minimize the impact to the public.
12. ***Hours of work.*** Work performed within the public right-of-way shall occur only during hours authorized under all applicable codes, regulations, rules and permits.
13. ***Off-Hour Work.*** Work outside of normal working hours (8:00 am -5:00 pm Monday through Friday) requires a minimum of 3 business days advanced notice to the SDOT Street Use Inspection Supervisor prior to the off hours work. Work outside of normal working hours may also require a separate approved traffic control plan. A minimum of 2 hours of inspection time will be charged for inspection outside of normal working hours at the premium rate. A Stop Work order and/or a Citation may be issued for failure to notify a minimum of 3 business days in advance.
14. ***Inspection fees.*** Permittee shall pay for City inspections of work authorized under this permit per the current fee schedule as established pursuant to SMC 15.04.074, and to cover all other associated costs.
15. ***Billing.*** All fees and costs billed pursuant to this permit shall be paid to the City of Seattle within 30 days from the date of the invoice. Past due invoices may be subject to interest charges and / or sent to collections.
16. ***Deposits, Charges, and Future Billings.*** The Permittee is responsible for all permit charges. If a deposit was made for estimated future street use services, any unused portion of the deposit shall be refunded to the Permittee. Any charges in excess of the deposit shall be billed to the Permittee.
17. ***Corrective Work.*** The Permittee is responsible for any additional costs incurred by the City resulting from temporary or corrective measures required to bring the work area in compliance with standards that apply, including, but not limited to, temporary traffic control, requirements for temporary structures, temporary stabilization and temporary restoration when the Permittee is not on site.
18. ***Indemnification.*** The Permittee agrees to defend, indemnify, and hold harmless the City of Seattle, its officials, officers, employees, and agents against: (1) any liability, claims, causes of action, judgments, or expenses, including reasonable attorney fees, resulting directly or indirectly from any act or omission of the Permittee, its contractors, subcontractors, anyone directly or indirectly employed by them, and anyone for whose acts or omissions they may be liable, arising out of the Permittee's use or occupancy of the public right-of-way; and (2) all loss by the failure of the Permittee to fully or adequately perform, in any respect, all authorizations or obligations under this Permit.

EXISTING IMPROVEMENTS

1. ***Costs of damage to City property and improvements.*** Permittee shall be responsible for the costs of repairing any damage to city property or improvements resulting from work performed by or on behalf of the Permittee within the public right-of-way.
2. ***Utility protection.*** The Permittee shall be responsible for checking locations and providing adequate protection for all utilities in the work area.
3. ***Utility relocation.*** The Permittee shall be responsible for notifying affected utilities and requesting any necessary relocation.
4. ***Survey monuments.*** Prior to removing, destroying, disturbing, or covering a survey monument, such that the survey point is no longer visible or readily accessible, Permittee shall obtain a permit from the Department of Natural Resources pursuant to Washington Administrative Code, Chapter 332-120.

ENVIRONMENTAL PROTECTION

1. ***Best management practices required.*** The Permittee shall be responsible for the control of surface runoff, erosion and sediment at the construction site, as required by: the Stormwater Code (Title 22 Subtitle VIII SMC), the Standard Specifications for Road, Bridge, and Municipal Construction and Department of Planning and Development Director's Rule 16-2000, as now or hereafter amended. The site and the surrounding area shall generally be kept clean and free of construction debris or other material, including but not limited to mud, dust, rock, asphalt, and concrete. Waste materials shall be collected and disposed of at an appropriate disposal site. These materials shall be prevented from entering any part of the public sewer and storm drain system, and any surface waters.

TRAFFIC CONTROL REQUIREMENTS

1. ***Compliance with the Traffic Control Manual for In-Street Work.*** In order to provide safe and effective work areas and to ward, control, protect, and expedite vehicular and pedestrian traffic, signage for all construction within the public right-of-way shall comply with the City of Seattle Traffic Control Manual for In-Street Work, as now or hereafter amended. When required, the conditions on the traffic control plan shall supercede any conflicting provisions or requirements in the City of Seattle Manual for In Street Work. A copy of the current City of Seattle Traffic Control Manual

Seattle Dept of Transportation
Street Use Permits, 23rd Floor
700 Fifth Ave, Suite 2300
P O Box 34996
Seattle, WA 98124-4996

UTILITY PERMIT

Permit No.: 235724

PERMITTEE

Inspector: Daniel Conn
Inspection District: UNIVERSITY

LOCATION

Address: 1602 N NORTHLAKE WAY

Details: 5 LOCATIONS AT OR AROUND THE CORNER OF N NORTHLAKE PL AND WOODLAWN AVE. IMPACT TO SIDEWALK AND TRAVEL LANES.

Application Date: 5/21/14 11:36 am
Issue Date: 6/19/14 2:23 pm

PARTIES (* Primary Applicant)

Role	Name	Address	Phone	From	To
*24 Hour Contact	MILES, SAM	1100 OLIVE WAY, SUITE 800,,SEATTLE,WA,98101	(206)853-7428		
Permittee	MILES, SAM	1100 OLIVE WAY, SUITE 800,,SEATTLE,WA,98101	(206)726-4720		
Engineer	MILES, SAM	1100 OLIVE WAY, SUITE 800,,SEATTLE,WA,98101	(206)726-4720		

PERMITTED USES

Right of Way: NON-ARTERIAL **DPD #:** **To Be Restored By:** PERMITTEE

Use	Space	Start Date	Duration	Max Allowed Date	Sq. Ft.	Issued Date	Intended Vacate Date
51I	A	6/25/14	10	7/4/14	1500	6/19/14	7/4/14

Use	Space	Description	Conditions
51I	A	Prepatory or exploratory work for upcoming projects, including surveying, installing monitoring wells, and soil sampling	Soil borings or wells, non arterial. 5 LOCATIONS AT OR AROUND THE CORNER OF N NORTHLAKE PL AND WOODLAWN AVE. Street closure.

CONDITIONS OF USE

DESCRIPTION OF WORK :

Additional Notes: *Preparatory and exploratory work for upcoming projects, including surveying, installing wells/soil borings, and soil sampling at or around the corner of N Northlake Pl and Woodlawn Ave.*

ADDITIONAL CONDITIONS :

Additional Notes: *ADDITONAL DESCRIPTION, 1 OVER DRILL @ mw 9. Location 1 NE corner NE woodlawn ave, 2@ 1" wells, NE corner of N Northlake Pl, 2 soil borings Northeast side of North Northlake Pl-SE of Woodlawn Ave N.*

ADDITIONAL CONDITIONS 1 :

Additional Notes: *Contractor must place street closed signs at each end of alley to notify vehicle traffic. Contractor must notify all adjacent residents and businesses a minimum of 24 hours prior to any activity that will impact alley access. Garbage collection services must be provided access whenever necessary. Seattle Police Department must be contacted at the non-emergency number, (206) 625-5011, to notify that the street is closed to thru traffic.*

E1.15 :
MULCHING AND MATTING - Apply mulch to protect exposed soils and promote plant establishment.

E1.40 :
PERMANENT SEEDING AND PLANTING - Install temporary surface runoff control measures prior to seeding or planting to protect the surface from erosion until the vegetation is established. Establish permanent vegetation (e.g., grasses, legumes, trees, and shrubs) as rapidly as possible to prevent soil erosion by wind or water.

E1.45 :
SODDING - Establish permanent turf for immediate erosion protection or to stabilize drainage pathways where concentrated overland flow will occur.

E1.50 :
TOPSOILING - Preserve and use topsoil to enhance final site stabilization with vegetation and to provide a suitable growth medium for final site stabilization with vegetation.

E3.25 :
STORM DRAIN INLET PROTECTION - Install storm drain covers on stormwater structures less than 12 inches deep during construction. Install catch basin filter socks in stormwater structures greater than 12 inches deep. Place the storm drain or catch basin grate on top of the catch basin filter sock to hold it in place.

C1.20 :
USE OF CHEMICALS DURING CONSTRUCTION - Use only the recommended amounts of chemical materials and apply them in a proper manner. Neutralize the pH of concrete wash water from concrete mixers, if necessary.

C1.35 :

SAWCUTTING AND PAVING POLLUTION PREVENTION - Vacuum slurry and cuttings during the activity to prevent migration offsite and do not leave slurry and cuttings on permanent concrete or asphalt paving overnight. Dispose of collected slurry and cuttings, waste material, and demolition debris in a manner that does not violate groundwater or surface water quality standards. Implement preventative measures such as berms, barriers, secondary containment, and vactor trucks if observations indicate that a violation of water quality standards could occur.

C1.45 :
SOLID WASTE HANDLING AND DISPOSAL - Remove and dispose of accumulated solid waste at authorized disposal areas. Label waste containers and place them in a covered area with closed lids. Salvage and recycle any useful materials.

BMP5 :
SPILL PREVENTION AND CLEANUP-Keep a spill cleanup kit in a nearby vehicle or next to the work site so that it is easily accessible. Make sure the contents of the spill kit are appropriate for the types and quantities of materials used for this work task. Refill spill kit materials before beginning work.

BMP16 :
CONCRETE POURING, CONCRETE/ASPHALT CUTTING, AND ASPHALT APPLICATION - Sweep or shovel loose aggregate chunks and dust for recycling or proper disposal. Place storm drain covers or similarly effective containment devices over all storm drains located downslope or adjacent to the work area. Shovel or vacuum all slurry and remove from the site. Perform cleaning of concrete application and mixing equipment or concrete-delivery vehicles in a designated area where the rinse water is controlled.

BMP20 :
LANDSCAPING AND LAWN VEGETATION MANAGEMENT - Use proper fertilizer and herbicide application techniques to minimize nutrient pollution of stormwater. Implement proper landscaping and mulching techniques to prevent plant material and excess mulch from entering the separate storm drainage system. Do not dispose of collected vegetation in separate storm drainage systems, waterways, water bodies or greenbelt areas.

DAMAGED OR DESTROYED UTILITY :
SDOT makes no representation regarding the safety or integrity of the subject structure. If the structure is damaged or destroyed, SDOT will have no obligation to provide an alternative location for the permit utility.

TREE TRUNK OR ROOTS :
Contact the City Arborist Office (684-8733) a minimum of five working-days prior to digging within any landscaped areas in the street rights-of-way. The edge of all trenching must be at least five feet (5') from any street trees. When trenching near trees with trunks greater than twelve inches (12") in diameter, hand dig all trenching for a distance of ten feet (10'), measured five feet (5') radius from the tree trunk. When encountering tree roots, cut off cleanly with sharp saw (do not leave torn or ripped tree roots unattended). Do not cut roots greater than two inches (2") in diameter (contractor will have to hand tunnel underneath the roots). Do not paint ends of roots. Notify Landscape Maintenance at 684-4121 at least forty eight (48) hours in advance when working in landscaped areas or on trees.

FEES

Description	Date	Amount
ISSUANCE FEE - USE 51I	06/19/2014	$146.00
Totals:		$146.00

STREET USE INSPECTOR

Daniel Conn (206) 386-4504

Permittee ______________________ Director Per ______________________

GENERAL REQUIREMENTS

1. ***Nature of permit.*** This permit is issued pursuant to the Seattle Municipal Code (SMC), Chapter 15.04, for use and/or occupancy of the public right-of-way consistent with the terms and conditions set forth herein. This permit is wholly of a temporary nature, vests no permanent rights whatsoever, and is revocable pursuant to SMC 15.04.070.
2. ***Acceptance of terms, conditions, and requirements.*** Permittee accepts the terms, conditions, and requirements of this permit and agrees to comply with them to the satisfaction of the Seattle Department of Transportation, Street Use Division, or such other agency as may be designated by the City of Seattle. Permittee further agrees to comply with all applicable city ordinances, including but not limited to Title 15 SMC, and all applicable requirements of state and federal law.
3. ***Copy of permit.*** A copy of the issued permit and approved plans must be on site and available at all times.
4. ***Expiration of permit.*** This permit shall remain valid until revoked pursuant to SMC 15.04.070; provided that, the permit shall expire automatically if the authorized work does not begin within six months from the date the permit is issued.
5. ***Superiority of Street Improvement Permit.*** When a Street Improvement Permit exists, the rights acquired under the Street Improvement Permit supersedes those acquired under any other Street Use or Utility Permits.
6. ***Compliance with technical requirements and standards.*** All work within the public right-of-way shall be performed and completed in accordance with requirements set forth in the following technical documents published by the City of Seattle, as now or hereafter amended: Right-of-Way Improvements Manual; Standard Specifications for Road, Bridge, and Municipal Construction; Standard Plans for Municipal Construction; Street and Sidewalk Pavement Opening and Restoration Rule; and Traffic Control Manual for In-Street Work.
7. ***Scope of Work.*** The Permittee shall construct the improvements reflected in, and in accordance with, this permit and the City approved construction plans. Any and all revisions, omissions and / or additions to the scope of work shall be reviewed and approved by the City prior to implementation.
8. ***Street Use Notification.*** Construction work may be completed in several phases: site preparation (setting up traffic control, sawcutting, etc), ground breaking, and restoration. Before beginning any phase of work in the public right-of-way, the Permittee shall notify Street Use of each start date.

Permittee shall be responsible for notifying Street Use Job Start at (206) 684-5270 or SDOTJobStart@Seattle.gov a minimum of 2 business days prior to the start of work and provide the following information:

- Permit Number
- Job Site Address
- Start Date - Please specify if Job Start date is the same as the Excavation date. If the dates are different, please provide both dates.
- Brief Work Description
- Job Site Contact Name and Phone Number

Failure to do so shall result in a penalty of $300 or such other amount as may be established pursuant to SMC 15.04.074.
For Street Improvement Permits and Major Utility Permits, a preconstruction meeting is required prior to the start of construction, and the assigned inspector shall be notified a minimum of 2 business days prior to required inspections.

9. ***Utility notification prior to ground disturbance.*** The Permittee shall call Utility Underground Locator Center (1-800-424-5555) a minimum of 48 hours prior to ground disturbance.
10. ***Public notification.*** Permittee shall notify all potentially affected residents and businesses, at least one week prior to starting work within the public right-of-way.
11. ***Coordination of work.*** In performing work authorized by this permit, the Permittee shall coordinate with other contractors working in the public right-of-way to minimize the impact to the public.
12. ***Hours of work.*** Work performed within the public right-of-way shall occur only during hours authorized under all applicable codes, regulations, rules and permits.
13. ***Off-Hour Work.*** Work outside of normal working hours (8:00 am -5:00 pm Monday through Friday) requires a minimum of 3 business days advanced notice to the SDOT Street Use Inspection Supervisor prior to the off hours work. Work outside of normal working hours may also require a separate approved traffic control plan. A minimum of 2 hours of inspection time will be charged for inspection outside of normal working hours at the premium rate. A Stop Work order and/or a Citation may be issued for failure to notify a minimum of 3 business days in advance.
14. ***Inspection fees.*** Permittee shall pay for City inspections of work authorized under this permit per the current fee schedule as established pursuant to SMC 15.04.074, and to cover all other associated costs.
15. ***Billing.*** All fees and costs billed pursuant to this permit shall be paid to the City of Seattle within 30 days from the date of the invoice. Past due invoices may be subject to interest charges and / or sent to collections.
16. ***Deposits, Charges, and Future Billings.*** The Permittee is responsible for all permit charges. If a deposit was made for estimated future street use services, any unused portion of the deposit shall be refunded to the Permittee. Any charges in excess of the deposit shall be billed to the Permittee.
17. ***Corrective Work.*** The Permittee is responsible for any additional costs incurred by the City resulting from temporary or corrective measures required to bring the work area in compliance with standards that apply, including, but not limited to, temporary traffic control, requirements for temporary structures, temporary stabilization and temporary restoration when the Permittee is not on site.
18. ***Indemnification.*** The Permittee agrees to defend, indemnify, and hold harmless the City of Seattle, its officials, officers, employees, and agents against: (1) any liability, claims, causes of action, judgments, or expenses, including reasonable attorney fees, resulting directly or indirectly from any act or omission of the Permittee, its contractors, subcontractors, anyone directly or indirectly employed by them, and anyone for whose acts or omissions they may be liable, arising out of the Permittee's use or occupancy of the public right-of-way; and (2) all loss by the failure of the Permittee to fully or adequately perform, in any respect, all authorizations or obligations under this Permit.

EXISTING IMPROVEMENTS

1. ***Costs of damage to City property and improvements.*** Permittee shall be responsible for the costs of repairing any damage to city property or improvements resulting from work performed by or on behalf of the Permittee within the public right-of-way.
2. ***Utility protection.*** The Permittee shall be responsible for checking locations and providing adequate protection for all utilities in the work area.
3. ***Utility relocation.*** The Permittee shall be responsible for notifying affected utilities and requesting any necessary relocation.
4. ***Survey monuments.*** Prior to removing, destroying, disturbing, or covering a survey monument, such that the survey point is no longer visible or readily accessible, Permittee shall obtain a permit from the Department of Natural Resources pursuant to Washington Administrative Code, Chapter 332-120.

ENVIRONMENTAL PROTECTION

1. ***Best management practices required.*** The Permittee shall be responsible for the control of surface runoff, erosion and sediment at the construction site, as required by: the Stormwater Code (Title 22 Subtitle VIII SMC), the Standard Specifications for Road, Bridge, and Municipal Construction and Department of Planning and Development Director's Rule 16-2000, as now or hereafter amended. The site and the surrounding area shall generally be kept clean and free of construction debris or other material, including but not limited to mud, dust, rock, asphalt, and concrete. Waste materials shall be collected and disposed of at an appropriate disposal site. These materials shall be prevented from entering any part of the public sewer and storm drain system, and any surface waters.

TRAFFIC CONTROL REQUIREMENTS

1. ***Compliance with the Traffic Control Manual for In-Street Work.*** In order to provide safe and effective work areas and to ward, control, protect, and expedite vehicular and pedestrian traffic, signage for all construction within the public right-of-way shall comply with the City of Seattle Traffic Control Manual for In-Street Work, as now or hereafter amended. When required, the conditions on the traffic control plan shall supercede any conflicting provisions or requirements in the City of Seattle Manual for In Street Work. A copy of the current City of Seattle Traffic Control Manual for In-Street Work, and approved traffic control plan, when required, shall be on site at all times.
2. ***Lanes to remain open during peak hours.*** Traffic lanes shall not be closed during the following peak hours: 6:00 am-9:00 am and 3:00 pm-7:00 pm

in the Central Business District, and 7:00 am-9:00 am and 4:00 pm-6:00 pm for arterials elsewhere in the City, unless specifically noted on the approved traffic control plan.

3. ***Maintain access.*** Access shall be maintained or accommodated during construction.
4. ***Width of temporary traffic lanes.*** Temporary traffic lanes created during the permitted work shall be a minimum of 11 feet in width, unless otherwise approved on the traffic control plan.
5. ***Working within restricted curb spaces.*** When the project impacts a restricted curb space, such as parking stalls, meters, pay stations, and related signage, the Permittee shall obtain permission from SDOT Traffic Management prior to the start of work. Contact the SDOT Traffic Engineers at (206) 684-5086 prior to the start of work.
6. ***Temporary No Parking signs and easels.*** In areas without parking pay stations or parking meters, establishing a Temporary No Parking Zone requires placement of type T-38 or T-39 easels, and completion of an online verification form in conformance with the Traffic Control Manual for In-street Work. The Permittee shall contact SDOT's Traffic Permit Counter when working in pay-to-park areas (meters or pay station controlled).
7. ***Nighttime Illumination.*** Four or more Type B warning lights of sufficient brilliance to be seen from 500 feet, must be maintained at all times during the hours of darkness at the points of obstruction or excavation of any right-of-way.

Seattle Dept of Transportation
Street Use Permits, 23rd Floor
700 Fifth Ave, Suite 2300
P O Box 34996
Seattle, WA 98124-4996

UTILITY PERMIT

Permit No.: 242324

☐ Inspector Copy ☒ Permittee Copy ☐ File Copy

Inspector: Daniel Conn
Inspection District: UNIVERSITY

LOCATION

Address: 1602 N NORTHLAKE PL

Details: AT NORTHEAST SIDE N NORHTLAKE PL, BETWEEN N NORTHLAKE WAY AND WOODLAWN AVE N; AND EAST SIDE WOODLAWN AVE N, BETWEEN N NORTHLAKE PL AND N 34TH ST. IMPACT TO CURB LANE AND SIDEWALK.

Application Date: 7/24/14 4:39 pm
Issue Date: 8/5/14 10:51 am

PARTIES (* Primary Applicant)

Role	Name	Address	Phone	From	To
*24 Hour Contact	MILES, SAM	1100 OLIVE WAY, SUITE 800,,SEATTLE,WA,98101	(206)853-7428		
Permittee	ARCADIS U.S. INC.	1100 OLIVE WAY STE 800,,SEATTLE,WA,98101-	(206)726-4732		
Contractor'S Agent	HENNECK, RORY	2300 EASTLAKE AVE E,SUITE 200,SEATTLE,WA,98102	(206)726-9504		

PERMITTED USES

Right of Way: NON-ARTERIAL **DPD #:** **To Be Restored By:** PERMITTEE

Use	Space	Start Date	Duration	Max Allowed Date	Sq. Ft.	Issued Date	Intended Vacate Date
51I	A	8/11/14	10	8/20/14	2400	8/5/14	8/20/14

Use	Space	Description	Conditions
51I	A	Prepatory or exploratory work for upcoming projects, including surveying, installing monitoring wells, and soil sampling	Soil Boring 6 locations, non arterial. At Northeast side N Norhtlake Pl, between N Northlake Way and Woodlawn Ave N; and east side Woodlawn Ave N, between N Northlake Pl and N 34th St. Impact to curb lane and sidewalk.

CONDITIONS OF USE

DESCRIPTION OF WORK :

Additional Notes: *SCOPE:/// CUST DESC: install 6 borings at or around the corner of N Northlake PL and Woodlawn Ave N. temporary lane closure. At Northeast side N Norhtlake Pl, between N Northlake Way and Woodlawn Ave N; and east side Woodlawn Ave N, between N Northlake Pl and N 34th St. Impact to curb lane and sidewalk.*

ADDITIONAL CONDITIONS :

Additional Notes: *Contact Wave Broadband for construction coordination. 206-330-6440 Seth Dwyer: 1 sidewalk to remain open at all times. 1@11' traffic lane must be available. In the event that no coordination for work at the same time then, reschedule work so only 1 contractor is on site at a time.*

E1.15 :
MULCHING AND MATTING - Apply mulch to protect exposed soils and promote plant establishment.

E1.40 :
PERMANENT SEEDING AND PLANTING - Install temporary surface runoff control measures prior to seeding or planting to protect the surface from erosion until the vegetation is established. Establish permanent vegetation (e.g., grasses, legumes, trees, and shrubs) as rapidly as possible to prevent soil erosion by wind or water.

E1.45 :
SODDING - Establish permanent turf for immediate erosion protection or to stabilize drainage pathways where concentrated overland flow will occur.

E1.50 :
TOPSOILING - Preserve and use topsoil to enhance final site stabilization with vegetation and to provide a suitable growth medium for final site stabilization with vegetation.

E3.25 :
STORM DRAIN INLET PROTECTION - Install storm drain covers on stormwater structures less than 12 inches deep during construction. Install catch basin filter socks in stormwater structures greater than 12 inches deep. Place the storm drain or catch basin grate on top of the catch basin filter sock to hold it in place.

C1.20 :
USE OF CHEMICALS DURING CONSTRUCTION - Use only the recommended amounts of chemical materials and apply them in a proper manner. Neutralize the pH of concrete wash water from concrete mixers, if necessary.

C1.35 :
SAWCUTTING AND PAVING POLLUTION PREVENTION - Vacuum slurry and cuttings during the activity to prevent migration offsite and do not leave slurry and cuttings on permanent concrete or asphalt paving overnight. Dispose of collected slurry and cuttings, waste material, and demolition debris in a manner that does not violate groundwater or surface water quality standards. Implement preventative measures such as berms, barriers, secondary containment, and vactor trucks if observations indicate that a violation of water quality standards could occur.

Seattle Dept of Transportation
Street Use Permits, 23rd Floor
700 Fifth Ave, Suite 2300
P O Box 34996
Seattle, WA 98124-4996

UTILITY PERMIT

Permit No.: 242324

C1.45 :
SOLID WASTE HANDLING AND DISPOSAL - Remove and dispose of accumulated solid waste at authorized disposal areas. Label waste containers and place them in a covered area with closed lids. Salvage and recycle any useful materials.

BMP5 :
SPILL PREVENTION AND CLEANUP-Keep a spill cleanup kit in a nearby vehicle or next to the work site so that it is easily accessible. Make sure the contents of the spill kit are appropriate for the types and quantities of materials used for this work task. Refill spill kit materials before beginning work.

BMP16 :
CONCRETE POURING, CONCRETE/ASPHALT CUTTING, AND ASPHALT APPLICATION - Sweep or shovel loose aggregate chunks and dust for recycling or proper disposal. Place storm drain covers or similarly effective containment devices over all storm drains located downslope or adjacent to the work area. Shovel or vacuum all slurry and remove from the site. Perform cleaning of concrete application and mixing equipment or concrete-delivery vehicles in a designated area where the rinse water is controlled.

BMP20 :
LANDSCAPING AND LAWN VEGETATION MANAGEMENT - Use proper fertilizer and herbicide application techniques to minimize nutrient pollution of stormwater. Implement proper landscaping and mulching techniques to prevent plant material and excess mulch from entering the separate storm drainage system. Do not dispose of collected vegetation in separate storm drainage systems, waterways, water bodies or greenbelt areas.

DAMAGED OR DESTROYED UTILITY :
SDOT makes no representation regarding the safety or integrity of the subject structure. If the structure is damaged or destroyed, SDOT will have no obligation to provide an alternative location for the permit utility.

TREE TRUNK OR ROOTS :
Contact the City Arborist Office (684-8733) a minimum of five working-days prior to digging within any landscaped areas in the street rights-of-way. The edge of all trenching must be at least five feet (5') from any street trees. When trenching near trees with trunks greater than twelve inches (12") in diameter, hand dig all trenching for a distance of ten feet (10'), measured five feet (5') radius from the tree trunk. When encountering tree roots, cut off cleanly with sharp saw (do not leave torn or ripped tree roots unattended). Do not cut roots greater than two inches (2") in diameter (contractor will have to hand tunnel underneath the roots). Do not paint ends of roots. Notify Landscape Maintenance at 684-4121 at least forty eight (48) hours in advance when working in landscaped areas or on trees.

FEES

Description	Date	Amount
ISSUANCE FEE - USE 51I	08/5/2014	$146.00
Totals:		$146.00

STREET USE INSPECTOR Daniel Conn (206) 386-4504

Permittee _____ Director Per _____

GENERAL REQUIREMENTS

1. ***Nature of permit.*** This permit is issued according to Seattle Municipal Code ("SMC"), Chapter 15.04, for the use or occupancy of the public right of way in a manner consistent with the terms and conditions in this permit. This permit is wholly of a temporary nature, vests no permanent rights, and is revocable according to SMC Section 15.04.070.
2. ***Acceptance of terms, conditions, and requirements.*** The Permittee accepts the terms, conditions, and requirements of this permit and agrees to comply with them to the satisfaction of the Seattle Department of Transportation, Street Use & Urban Forestry Division ("Street Use"), or such other agency as may be designated by the City. The Permittee further agrees to comply with all applicable City ordinances, including but not limited to SMC Title 15, and all applicable state and federal laws.
3. ***Copy of permit.*** A copy of the issued permit and current approved plans shall be on site and available at all times.
4. ***Expiration of permit.*** This permit shall remain valid until revoked according to SMC Section 15.04.070; provided that the permit shall expire automatically if the authorized work does not begin within 6 months from the date the permit is issued. The Permittee is responsible for keeping the permit up to date including submitting updated plans for approval. The Permittee shall submit requests to update a permit in writing or in person, and all requests shall be made to Street Use in a timely manner; otherwise, the Permittee may lose access to requested schedule for continued work in the right of way.
5. ***Superiority of Street Improvement Permits.*** When a Street Improvement Permit exists, rights acquired under the Street Improvement Permit supersede those acquired under any other Street Use or Utility Permits. Work not approved under the Street Improvement Permit shall require separate Street Use or Utility Permits and Permittee shall obtain these permits in advance of work.
6. ***Compliance with technical requirements and standards.*** All work within the public right of way shall be performed and completed according to the current or subsequently-amended requirements in the following technical documents published by the City: Right-of-Way Improvements Manual; Street Tree Manual; Standard Specifications for Road, Bridge and Municipal Construction; Standard Plans for Municipal Construction; Street and Sidewalk Pavement Opening and Restoration Rule; and Traffic Control Manual for In-Street Work.
7. ***Scope of work.*** The Permittee shall stage equipment or materials and construct or install the improvements and infrastructure reflected in and in accordance with this permit and the City-approved construction plans. Any revisions, omissions, or additions to the scope of work shall be reviewed and approved by the City before implementation.
8. ***Street Use notification.*** Construction work may be completed in several phases: site preparation (installing traffic control, saw-cutting, etc.); ground

breaking; restoration; or staging of equipment and materials. Before beginning any phase of work in the public right of way, the Permittee shall notify Street Use of each start date. The Permittee shall be responsible for notifying Street Use Job Start at (206) 684-5270 or SDOTJobStart@seattle.gov a minimum of 2 business days before starting work and shall provide the following information:

- Permit number;
- Job-site address;
- Start date - please specify if Job Start date is the same as the excavation or ground breaking date. If the dates are different, please provide both dates;
- Brief work description; and
- Job-site contact name and phone number.

Failure to notify Street Use Job Start shall result in a $300 penalty or other amounts according to SMC Section 15.04.074. For Street Improvement Permits and Utility Major Permits, a preconstruction meeting is required before starting construction, and the assigned inspector shall be notified a minimum of 2-business days before required inspections. Construction or utility activity occurring with, but not approved under, a Street Improvement or Utility Major Permit shall be permitted under separate Street Use permits. The Permittee shall apply for and obtain these Street Use permits in advance of work. Failure to do so may subject the Permittee to the above-described penalties, and additional permit review charges may apply.

9. ***Underground and overhead utility notification.*** The Permittee shall notify the following entities, as applicable, 2 full business days in advance:
   - Utility Underground Locate Center (811 or 1-800-424-5555) before ground disturbance; and
   - Seattle City Light (206-684-4911) if working within 10 feet of high-voltage lines.
10. ***Olympic Pipe Line Company notification.*** When work in the right of way occurs within 100 feet of an Olympic Pipe Line Company ("OPLC") pipeline, the Permittee shall coordinate the work with OPLC, which may include submitting detailed construction plans to OPLC. The Permittee shall notify OPLC's field coordinator 10-business days in advance of the work (425-235-7767) and an OPLC representative may be required to be onsite during the work.
11. ***Public notification.*** The Permittee shall notify all potentially affected residents and businesses at least 10-business days before starting work in the public right of way, including alleys. If a tree has been approved for removal, the Permittee shall post a "tree removal" public-notice placard at least 10-business days before starting work. If a SDOT public notice comment period is required prior to permitting, the Permittee shall conduct the public notice outreach prior to commencement of the SDOT public notice comment period.
12. ***Alley notification.*** Where this permit authorizes work in an alley, the Permittee shall notify all potentially impacted property owners and businesses prior to any activity occurring in the alley, including and especially those property owners and businesses with tenants using the alley to access parking or for building ingress/egress or deliveries. The Permittee shall schedule work around waste-management-collection days. If this is not possible, the Permittee shall coordinate with waste management services to either provide intermittent alley access during waste pickup or to temporarily establish waste pickup at an alternate location. If an alley is to remain open during permitted work, a minimum 11-foot clear width is required for vehicular access. If an alley is closed to through traffic, the Permittee shall notify the nearest Seattle Fire Department fire station and the Seattle Police Department at the non-emergency number prior to commencing work.
13. ***Coordination of work.*** In performing work authorized by this permit, the Permittee shall coordinate with other contractors working in the public right of way to minimize impact to the public. Documented coordination agreements may be required prior to permit issuance.
14. ***Hours of work.*** Work performed in the public right of way shall only occur during hours authorized under all applicable codes, regulations, rules, and permits.
15. ***Off-hours work.*** Work outside of normal working hours, 8:00 AM - 5:00 PM Monday through Friday, is considered "off-hours work" and requires a minimum of 3-business days advanced notice to the Street Use Inspection Supervisor before the off-hours work commences. Off-hours work may also require a separately-approved traffic control plan. A minimum of 2 hours of inspection time shall be charged for off-hours inspections at the premium rate. A Stop Work order or Citation may be issued for failing to notify Street Use at least 3-business days before the off-hours work.
16. ***Inspection fees.*** The Permittee shall pay for City inspections of work authorized under this permit according to the current fee schedule established by SMC Section 15.04.074 and all other associated costs.
17. ***Billing.*** All fees and costs billed according to this permit shall be paid to the City of Seattle within 30-calendar days from the invoice date. Past due invoices may be subject to interest charges and may be sent to collections.
18. ***Deposits, charges, and future billings.*** The Permittee, also identified as the "Financially Responsible Party" on Street Use permit applications, is responsible and liable for all permit-related charges. If a deposit was made for estimated future Street Use services, any unused portion of the deposit shall be refunded to the Permittee. Any charges in excess of the deposit shall be billed to the Permittee on a monthly basis.
19. ***Corrective work.*** The Permittee is responsible for any additional costs incurred by the City resulting from temporary or corrective measures required to bring the work area into compliance with standards that apply, including but not limited to; temporary traffic control, requirements for temporary structures, temporary stabilization, and temporary restoration when the Permittee is not on site.
20. ***Indemnification.*** The Permittee agrees to defend, indemnify, and hold harmless the City of Seattle, its officials, officers, employees, and agents against: any liability, claims, causes of action, judgments, or expenses, including reasonable attorney fees, resulting directly or indirectly from any act or omission of the Permittee, its contractors, subcontractors, anyone directly or indirectly employed by them, and anyone for whose acts or omissions they may be liable, arising out of the Permittee's use or occupancy of the public right of way; and all loss by the failure of the Permittee to fully or adequately perform, in any respect, all authorizations or obligations under this Permit.

EXISTING IMPROVEMENTS

1. ***Costs of damage to City property and improvements.*** The Permittee shall be responsible for the costs of repairing any damage to City property or improvements, including street trees, resulting from work performed by or on behalf of the Permittee within the public right of way. Damage to street trees is assessed on the value of the tree according to SMC subsection 15.90.018.B.
2. ***Utility protection.*** The Permittee shall be responsible for checking locations and providing adequate protection for all utilities in the work area.
3. ***Utility relocation.*** The Permittee shall be responsible for notifying affected utilities and requesting any necessary relocation.
4. ***Survey monuments.*** Before removing, destroying, disturbing, or covering a survey monument, such that the survey point is no longer visible or

readily accessible, the Permittee shall obtain a permit from the Department of Natural Resources according to Washington Administrative Code, Chapter 332-120.

5. ***Protecting, removing, and relocating existing improvements.*** The Permittee, at their own cost and expense, shall be responsible for coordinating the removal and relocation of existing improvements within the public right of way that their construction or permitted project may interfere with. These existing improvements include, but are not limited to trees, bike racks, newsstands, bike-share stations, signs, benches, artwork, and waste receptacles.

   For bike-share stations, the Permittee shall contact the bike-share operator at least 30-calendar days before starting work in order to coordinate the removal and relocation of the bike-share station.

   For all other existing improvements, the Permittee shall contact the improvement owner at least 10-business days before starting work to coordinate the temporary removal of the improvement.

   For newsstands, the Permittee shall coordinate temporary relocation during the construction period by posting notice of upcoming construction projects at seattlenewsstands.org at least 10-business days before starting work.

   The Permittee shall be responsible for reinstalling the improvements or coordinating the reinstallation in their original location or at a reasonable alternative location approved by the existing improvement owner and meeting all applicable City requirements. The Permittee is further responsible for protecting all trees within the construction project area and shall contact Urban Forestry to disclose and describe any construction impacts to trees.

   Failure to contact the improvement owners or Urban Forestry is cause for Street Use to revoke this permit.

6. ***Monorail system proximity requirements.*** The Permittee shall be responsible for coordinating with the Seattle Center when any work, deliveries, or loading/unloading that would occur within 14 feet of a Monorail structure, or 20 feet of a Monorail foundation or below-ground installation. The Permittee shall contact the Seattle Center at 206-905-2601 at least 10-business days before starting construction. Failure to do so is cause for permit revocation.

7. ***Monorail system proximity guidelines.*** Below grade: A restricted digging area shall include a 45-degree cone extending outward and downward from the ground level of all monorail piers. Nearby excavations shall be monitored to assure footing stability. At or above grade: The piers above ground level cannot be moved, nor can any item such as lighting or signage be attached to the piers without prior written consent from the Seattle Center Director. Piers shall not be painted. Landscaping shall not occur adjacent to piers or within 10 feet of a Monorail structure without prior written consent of the Seattle Center Director. Any construction activity in the area of the power rails shall follow OSHA guidelines for working around high voltage. Construction equipment shall be located and operated in awareness of and taking account of beam height and the trains' 14-foot-operational envelope from each side of the beam. Contractors shall string warning lines from pier to pier under the beams as a guide. Spotters shall be employed when any construction activity occurs within 25 feet of the beams.

ENVIRONMENTAL PROTECTION

1. ***Best management practices required.*** The Permittee shall be responsible for the control of surface runoff, erosion and sediment at the construction site, as required by: the Stormwater Code (SMC Title 22, Subtitle VIII); the Standard Specifications for Road, Bridge, and Municipal Construction; and Department of Planning and Development Director's Rule 16-2009, as amended. The site and the surrounding area shall generally be kept clean and free of construction debris or other material, including but not limited to mud, dust, rock, asphalt, and concrete. Waste materials shall be collected and disposed of at an appropriate disposal site. These materials shall be prevented from entering any part of the public sewer and storm drain system, and any surface waters.

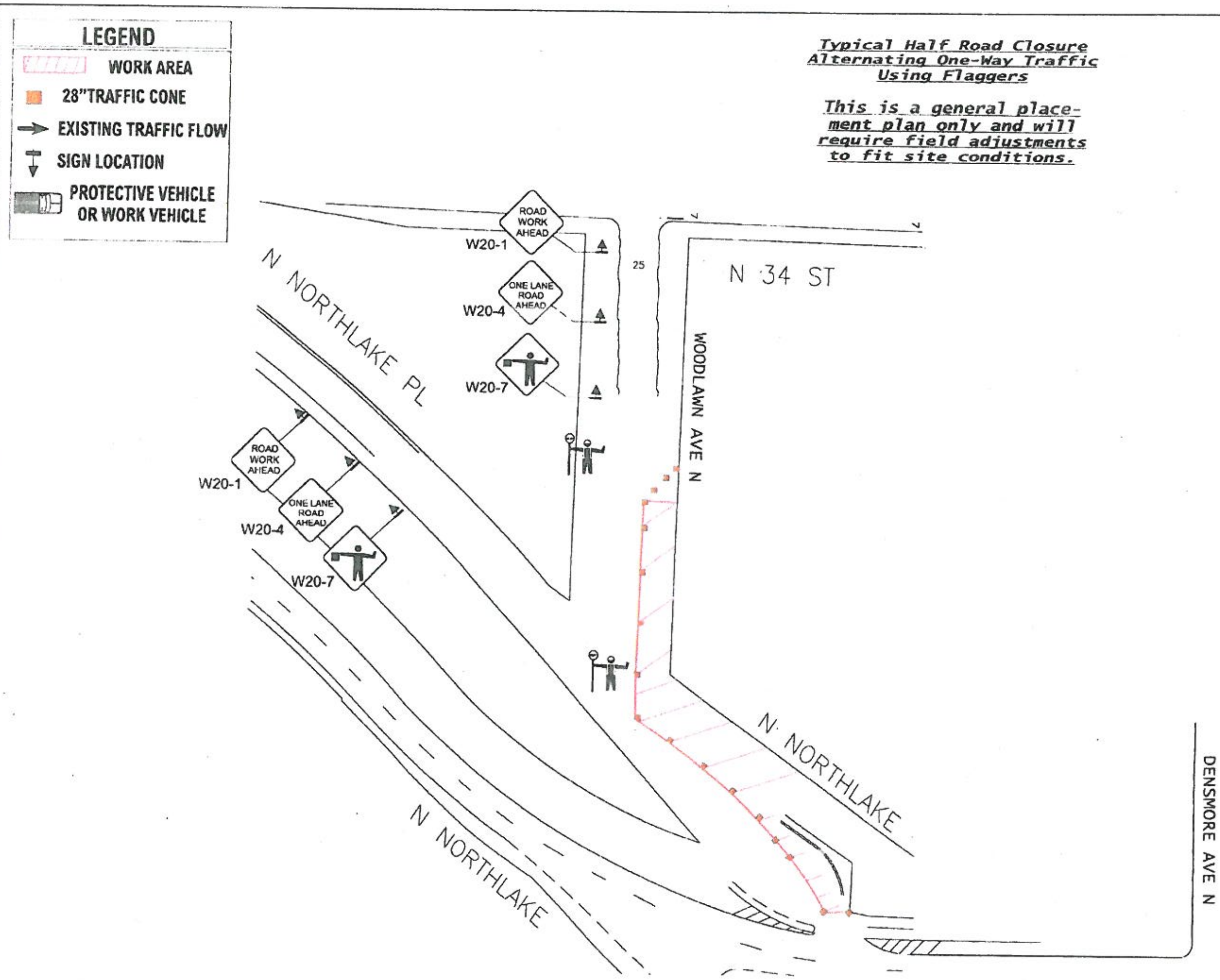
TRAFFIC CONTROL REQUIREMENTS

1. ***Compliance with the Traffic Control Manual for In-Street Work.*** In order to provide safe and effective work areas and to ward, control, protect, and expedite vehicular and pedestrian traffic; signage for all construction within the public right of way shall comply with the City of Seattle Traffic Control Manual for In-Street Work, as amended. When required, the conditions on the traffic control plan shall supersede any conflicting provisions or requirements in the City of Seattle Traffic Control Manual for In-Street Work. A copy of the current City of Seattle Traffic Control Manual for In-Street Work and the approved traffic control plan shall be on site at all times.
2. ***Lanes to remain open during peak hours.*** Traffic lanes shall not be closed during the following peak hours: 6:00 AM-9:00 AM and 3:00 PM-7:00 PM in the Central Business District, and 7:00 AM-9:00 AM and 4:00 PM-6:00 PM for arterials elsewhere in the City, unless specifically noted on the approved traffic control plan.
3. ***Maintain access.*** Access shall be maintained or accommodated during construction.
4. ***Width of temporary traffic lanes.*** Temporary traffic lanes created during the permitted work shall be a minimum of 11 feet in width unless otherwise approved on the traffic control plan.
5. ***Working within restricted curb spaces.*** When the project impacts a restricted curb space, such as meters, pay stations, specific use and load zones; the Permittee shall obtain permission from SDOT Traffic Management ("TM") and reserve the spaces with the TM Permit Counter (684-5086) before starting work.
6. ***Temporary No Parking signs and easels.*** In areas without parking pay stations or parking meters, or when Traffic Permits allow reserved parking spaces to be controlled with Temporary No Parking signs, establishing a Temporary No Parking Zone requires placing type R7-T38 (T-38) or R7-T39 (T-39) easels and completing an online verification form in conformance with the Traffic Control Manual for In-Street Work.
7. ***Nighttime illumination.*** Four or more Type B warning lights of sufficient brilliance to be seen from 500 feet shall be maintained at all times during the hours of darkness at the points of obstruction or excavation of any right-of-way.
8. ***Work in alleys.*** For work occurring in alleys that impedes vehicular access, including but not limited to egress, ingress, or through travel, Street Closed signs shall be placed at each end of the alley. Property owners adjacent to the alley shall be contacted, and their concerns shall be addressed and mitigated as possible. This may require alternative work scheduling in the case of Solid Waste collection days and hours.

TRAFFIC CONTROL PLAN

Typical Half Road Closure
Alternating One-Way Traffic
Using Flaggers

This is a general placement plan only and will require field adjustments to fit site conditions.



SEATTLE, WA

NOT TO SCALE

Permit #__________

SPEED LIMIT 30

28" CONES FOR DELINEATION SPACED @ 15'

ROAD CLASS DEFINITIONS

CLASS I - Central District, University District

CLASS II - Arterial streets

CLASS III - All partially or full controlled arterial streets

*Advance warning signs if feasible

**Vertical barricades, cones, tubular guideposts

TABLE 1

CHANNELIZING DEVICE SPACING (FEET)		
MPH	TAPER	TANGENT
50/70	40	80
35/45	30	60
25/30	20	40

Table XI-1

CLASS OF ROAD	WARNING SIGN SPACING IN FEET			TAPER LENGTH (L) IN FEET		CHANNELIZING DEVICE SPACING ON FEET (maximum)				WARNING SIGNS MIN. SIZE IN INCHES
				LANE WIDTH		VERTICAL BARRICADES & DRUMS		OTHER**		
	A	B	C	10'	12'	TAPER (ft)	TANGENT	TAPER (ft)	TANGENT	
I	*			75	90	SPEED LIMIT	SPEED LIMIT x 2	15	30	30x30
II	150	150	75	100	200	SPEED LIMIT	SPEED LIMIT x 2	20	60	30x30
III	300	300	150	400	600	SPEED LIMIT	SPEED LIMIT x 2	30	60	30x30

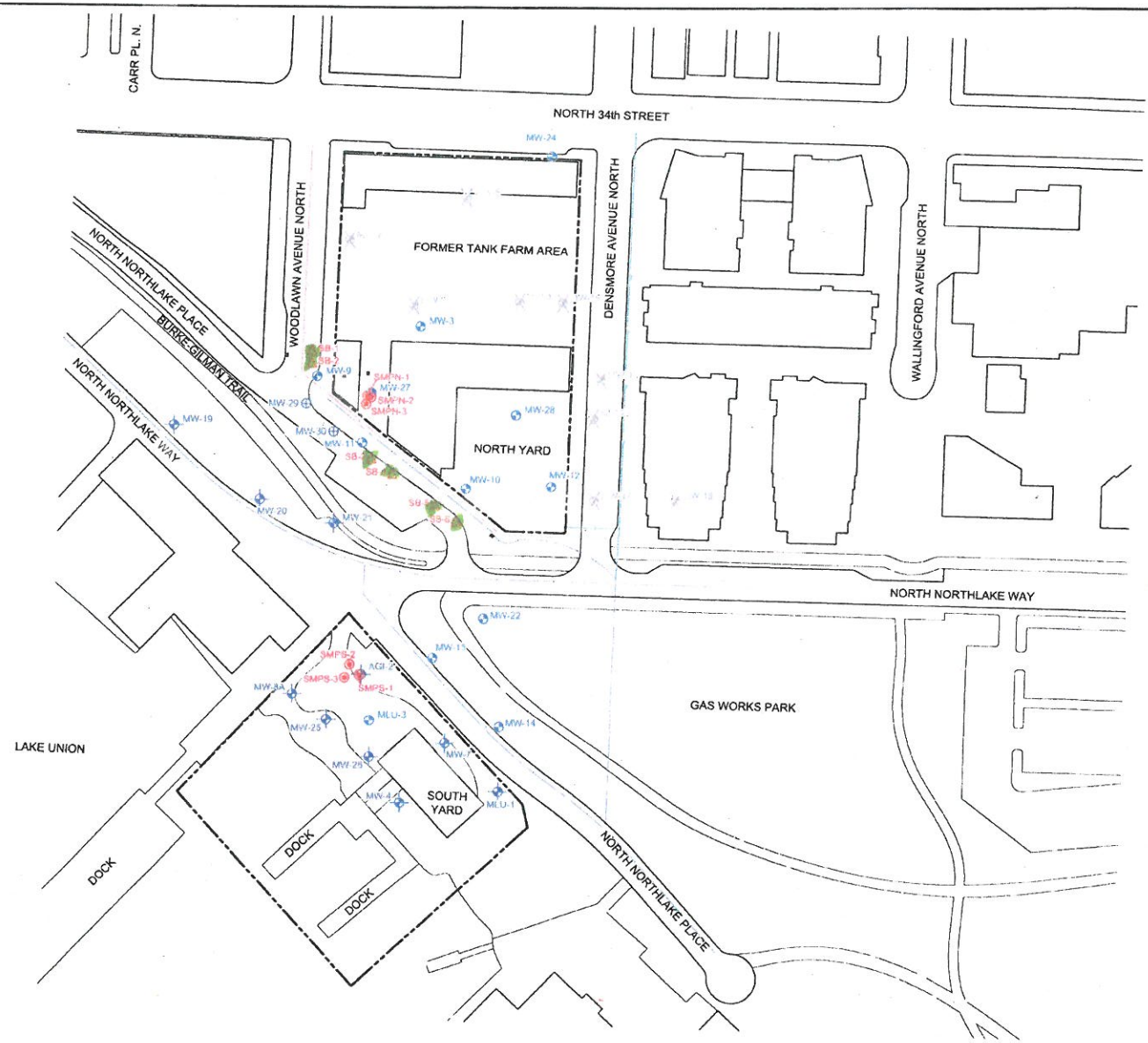
GENERAL NOTES

1. ALL SIGNS AND SPACING SHALL CONFORM TO THE MUTCD AND CITY OF SEATTLE SPECS.
2. PRIORITY PASSAGE THROUGH WORK AREA FOR EMERGENCY VEHICLES SHALL BE PROVIDED AT ALL TIMES.
3. ALERT METRO TRANSIT 5 DAYS IN ADVANCE (IF APPLICABLE).
4. PROTECTIVE VEHICLE RECOMMENDED-MAY BE A WORK VEHICLE.
5 DEVICES SHALL NOT ENCROACH INTO ADJACENT LANES.
6. ALL SIGNS 48" X 48" B/O UNLESS OTHERWISE SPECIFIED.
7. CHANNELIZATION DEVICES ARE 28 INCH REFL CONES. (see TABLE 1 for spacing distances).
8. ALL SPACING MAY BE ADJUSTED TO ACCOMMODATE AT GRADE INTERSECTIONS AND/OR DRIVEWAYS.
9. FLAGGERS WILL CONTROL ALTERNATING ONE-WAY TRAFFIC.
10. TAPERS WILL BE 50'-100' AND MUST CONTAIN A MIN OF 6 DEVICES.
11. ALERT AFFECTED RESIDENTS AND BUSINESSES

Seamas McGuire | Geologist | seamas.mcguire@arcadis-us.com

ARCADIS U.S., Inc. | 1100 Olive Way | Seattle, WA, 98102
T. 206-726-4703 | M. 339-222-9653
www.arcadis-us.com

All Signs & Spacing to conform to the MUTCD & The City of Seattle Traffic Control Manual



Borings to be installed

LEGEND:

- PROPOSED MONITORING WELL LOCATION
- PROPOSED SOIL BORING LOCATION
- GROUNDWATER MONITORING WELL
- ABANDONED MONITORING WELL
- COMPLIANCE MONITORING WELL
- SEPARATE-PHASE MONITORING POINT LOCATION
- CATCH BASIN
- NATURAL GAS LINE (APPROX.)
- UNDERGROUND ELECTRIC LINE (APPROX.)
- WATER LINE (APPROX.)
- SEWER LINE (APPROX.)

NOTES:

1. BASE MAP FROM A DRAWING BY SAIC TITLED "SITE MAP", DATED 09-14-07, @ A SCALE OF 1" = 60'. REVISED IN ACCORDANCE WITH A SURVEY DRAWING BY OTAK CONDUCTED IN APRIL & MAY, 2011.
2. ALL LOCATIONS OTHER THAN MONITORING WELLS ARE APPROXIMATE.

0 100' 200'
GRAPHIC SCALE

FORMER CHEVRON BULK PLANT No. 100-1327
FACILITIES NORTH / KING COUNTY (METRO)
SEATTLE, WASHINGTON
DUAL PHASE EXTRACTION WORK PLAN

PROPOSED MONITORING WELL / SOIL BORING LOCATIONS

ARCADIS

FIGURE 2

Appendix B

Boring Logs

Date Start/Finish: 7/15/2014
Drilling Company: Cascade Drilling
Driller's Name: Curtis A.
Drilling Method: Hollow Stem Auger
Auger Size: 8" Outer Diameter
Rig Type:
Sampling Method: Split Spoon

Northing:
Easting:
Casing Elevation: NE

Borehole Depth: 24' bgs
Surface Elevation:

Descriptions By: SLM

Well/Boring ID: **MW-9R**

Client: Chevron EMC

Location: KC Metro Terminal 100-1327, 1602 North Northlake Way, Seattle, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	0										Original well box set in 2' of concrete surrounded by soil	18" Flush-mount Monument 6" Well Cap Concrete
											Bentonite and Sand from original well construction	
5	-5											Bentonite Chiops 6" Schedule 40 PVC Riser
10	-10											

ARCADIS
Infrastructure · Water · Environment · Buildings

Remarks: bgs = below ground surface
NM = Not Measured
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

Project Number:B0045799.0000
Data File:

Date: 10/23/2014 Created/Edited by:RwL

Date Start/Finish: 7/15/2014
Drilling Company: Cascade Drilling
Driller's Name: Curtis A.
Drilling Method: Hollow Stem Auger
Auger Size: 8" Outer Diameter
Rig Type:
Sampling Method: Split Spoon

Northing:
Easting:
Casing Elevation: NE

Borehole Depth: 24' bgs
Surface Elevation:

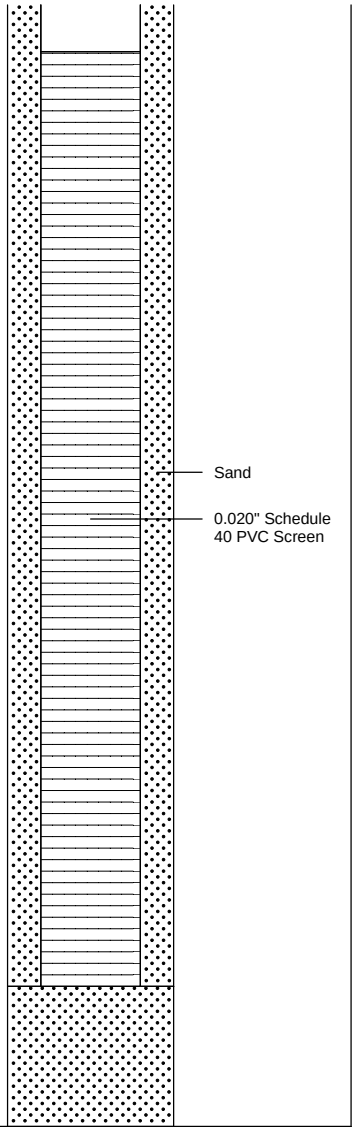
Descriptions By: SLM

Well/Boring ID: **MW-9R**

Client: Chevron EMC

Location: KC Metro Terminal 100-1327, 1602 North Northlake Way, Seattle, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
											Same as Above	
15	-15											
20	-20											
		1	22.5 -24	1.5			701.8		SW		Sand, trace silt and pebbles. Sand is coarse to fine grain, poorly sorted, pebbles are rounded, wet, dark brown, HCLO	



ARCADIS
Infrastructure · Water · Environment · Buildings

Remarks: bgs = below ground surface
NM = Not Measured
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

Date Start/Finish: 7/16/2014
Drilling Company: Cascade Drilling
Driller's Name: Curtis A.
Drilling Method: Hollow Stem Auger
Auger Size: 8" Outer Diameter
Rig Type:
Sampling Method: Split Spoon

Northing:
Easting:
Casing Elevation: NE

Borehole Depth: 24' bgs
Surface Elevation:

Descriptions By: SLM

Well/Boring ID: **EW-1**

Client: Chevron EMC

Location: KC Metro Terminal 100-1327, 1602 North Northlake Way, Seattle, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	0										Top soil	10" Flush-mount Monument; 4" Well Cap; Concrete
5	-5	HA	5-5.5	0.5			0.0		GS		Gravel, coarse grain sand, sorted, dry, light brown, no HCLO	Bentonite Chiops; 4" Schedule 40 PVC Riser
		HA	7.5-8	0.5			0.0				Coarse Sand, trace gravel, well sorted, dry, dark brown, no HCLO	
10	-10	1	10-11.5	1.5	9 12 12	24	0.0		SP		Same as Above	

Remarks:
bgs = below ground surface
NM = Not Measured
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

ARCADIS
Infrastructure · Water · Environment · Buildings

Project Number:B0045799.0000
Data File:

Date: 8/19/2014 Created/Edited by:RwL

Date Start/Finish: 7/16/2014 **Drilling Company:** Cascade Drilling **Driller's Name:** Curtis A. **Drilling Method:** Hollow Stem Auger **Auger Size:** 8" Outer Diameter **Rig Type:** **Sampling Method:** Split Spoon	**Northing:** **Easting:** **Casing Elevation:** NE **Borehole Depth:** 24' bgs **Surface Elevation:** **Descriptions By:** SLM	**Well/Boring ID: EW-1** **Client:** Chevron EMC **Location:** KC Metro Terminal 100-1327, 1602 North Northlake Way, Seattle, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
		2	12.5 -14	1.5	15 26 30	56	572				Same as Above - wet, grey, HCLO	
15	-15											Sand; 0.020" Schedule 40 PVC Screen
		3	17.5-19	1.5	26 50/6	100	235.6		SM		Silty Sand, medium grain sand, well sorted, wet, grey, HCLO	
20	-20											
		4	22.5 -24	1.5	14 50/6	100	226				Same as Above - with cobbles	

ARCADIS
Infrastructure · Water · Environment · Buildings

Remarks: bgs = below ground surface
NM = Not Measured
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

Date Start/Finish: 7/15/2014
Drilling Company: Cascade Drilling
Driller's Name: Curtis A.
Drilling Method: Hollow Stem Auger
Auger Size: 8" Outer Diameter
Rig Type:
Sampling Method: Split Spoon

Northing:
Easting:
Casing Elevation: NE

Borehole Depth: 24' bgs
Surface Elevation:

Descriptions By: SLM

Well/Boring ID: **MW-29**

Client: Chevron EMC

Location: KC Metro Terminal 100-1327, 1602 North Northlake Way, Seattle, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	0										~ 4 inches Asphalt and 6 inches concrete	10" Flush-mount Monument; 4" Well Cap; Concrete
5	-5	HA	5-5.5	0.5			0.8		GS		Sandy Gravel, medium to large rounded gravel, poorly sorted, coarse to fine grain sand, dense, orange to brown, no HCLO	Bentonite Chiops; 4" Schedule 40 PVC Riser
		HA	7.5-8	0.5			0.9				Gravelly Sand, medium to coarse grain sand, medium rounded gravel, dense, brown, no HCLO	
10	-10	1	10-11.5	1.5	15 50/6	100	38.8		SG		Sand and pebbles, medium to fine grain sand, poorly sorted, moist, brown, no HCLO	

ARCADIS
Infrastructure · Water · Environment · Buildings

Remarks:
bgs = below ground surface
NM = Not Measured
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

Date Start/Finish: 7/15/2014
Drilling Company: Cascade Drilling
Driller's Name: Curtis A.
Drilling Method: Hollow Stem Auger
Auger Size: 8" Outer Diameter
Rig Type:
Sampling Method: Split Spoon

Northing:
Easting:
Casing Elevation: NE

Borehole Depth: 24' bgs
Surface Elevation:

Descriptions By: SLM

Well/Boring ID: **MW-29**

Client: Chevron EMC

Location: KC Metro Terminal 100-1327, 1602 North Northlake Way, Seattle, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
		2	12.5 -14	1.0	21 50/6	100	34.8				Same as Above - moist to wet	
15	-15											Sand; 0.020" Schedule 40 PVC Screen
		3	17.5 -19	1.5	11 14 19	33	1.9		SW		Sand, trace pebbles, medium to fine sand, rounded, poortly sorted, wet, dark borwn, no HCLO	
20	-20											
		4	22.5 -24	1.5	31 50/6	100	0.6				Same as Above	

ARCADIS
Infrastructure · Water · Environment · Buildings

Remarks:
bgs = below ground surface
NM = Not Measured
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

Date Start/Finish: 7/16/2014
Drilling Company: Cascade Drilling
Driller's Name: Curtis A.
Drilling Method: Hollow Stem Auger
Auger Size: 8" Outer Diameter
Rig Type:
Sampling Method: Split Spoon

Northing:
Easting:
Casing Elevation: NE

Borehole Depth: 24' bgs
Surface Elevation:

Descriptions By: SLM

Well/Boring ID: **MW-30**

Client: Chevron EMC

Location: KC Metro Terminal 100-1327, 1602 North Northlake Way, Seattle, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	0										~ 4 inches Asphalt and 6 inches concrete	10" Flush-mount Monument; 4" Well Cap; Concrete
5	-5	HA	5-5.5	0.5			0.4		SG		Gravelly Sand, medium to coase sand with medium rounded gravel, brown, moist, no HCLO	Bentonite Chiops; 4" Schedule 40 PVC Riser
		HA	7.5-8	0.5			0.4				Same as Above	
10	-10	1	10-11.5	1.5	20 50/6	100	31.6				Pebbly Sand, sand fine to coarse, poorly sorted, medium rounded pebbles, light brown, moist, no HCLO	

ARCADIS
Infrastructure · Water · Environment · Buildings

Remarks: bgs = below ground surface
NM = Not Measured
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

Date Start/Finish: 7/16/2014
Drilling Company: Cascade Drilling
Driller's Name: Curtis A.
Drilling Method: Hollow Stem Auger
Auger Size: 8" Outer Diameter
Rig Type:
Sampling Method: Split Spoon

Northing:
Easting:
Casing Elevation: NE

Borehole Depth: 24' bgs
Surface Elevation:

Descriptions By: SLM

Well/Boring ID: **MW-30**

Client: Chevron EMC

Location: KC Metro Terminal 100-1327, 1602 North Northlake Way, Seattle, WA

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
								SW			
	2	12.5 -14	1.5	15 15 18	33	10.9				Same as Above - moist to wet	
15 -15	3	15- 16.5	0.7	15 15 15	30	11.3		SG		Gravelly sand, sand fine to coarse, poorly sorted, gravel small to medium size and rounded, brown, moist, no HCLO	Sand; 0.020" Schedule 40 PVC Screen
	4	17.5- 19	1.5	15 20 25	45	14.1				Same as Above - wet	
20 -20	5	22.5 -24	1.5	50/6	100	1.7		SM		Silty Sand, trace gravel, sorted, sand fine to medium grain, grey, wet, no HCLO	

ARCADIS
Infrastructure · Water · Environment · Buildings

Remarks:
bgs = below ground surface
NM = Not Measured
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

Date Start/Finish: 8/12/14 to 8/13/14
Drilling Company: Cascade Drilling
Driller's Name: Curtis A.
Drilling Method: Hollow Stem Auger
Auger Size: 8" Outer Diameter
Rig Type:
Sampling Method: Split Spoon

Northing:
Easting:
Casing Elevation: NE

Borehole Depth: 21.5' bgs
Surface Elevation:

Descriptions By: RL

Well/Boring ID: **SB-1**

Client: Chevron EMC

Location: KC Metro Terminal 100-1327, 1602 North Northlake Way, Seattle, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	0										Asphalt	Concrete
		HA	2.5-3	.5			1.1				Sand and Gravel - sand is fine to coarse grain, subangular, gravel is very small pebble to cobble, subangular to rounded, poorly sorted, loose, possibly fill, brown, no odor	
5	-5	HA	5-5.5	.5			0.5		SG		Same As Above	Bentonite Chips
		HA	7.5-8	.5			0.3				Same As Above	
10	-10	1	10-11.5	1.0	5 13 20	33	3.0				Sand and some gravel - sand is fine to coarse grain, subangular, gravel is small to large pebble, brown, no odor	

ARCADIS
Infrastructure · Water · Environment · Buildings

Remarks:
bgs = below ground surface
NM = Not Measured
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

Date Start/Finish: 8/12/14 to 8/13/14
Drilling Company: Cascade Drilling
Driller's Name: Curtis A.
Drilling Method: Hollow Stem Auger
Auger Size: 8" Outer Diameter
Rig Type:
Sampling Method: Split Spoon

Northing:
Easting:
Casing Elevation: NE

Borehole Depth: 21.5' bgs
Surface Elevation:

Descriptions By: RL

Well/Boring ID: **SB-1**

Client: Chevron EMC

Location: KC Metro Terminal 100-1327, 1602 North Northlake Way, Seattle, WA

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
								SW			
	2	12-13.5	1.5	8 14 15	29	1700				Same As Above	
										Sand - change in lithology and color right at 12.5 feet bgs, fine to medium grain, no gravel, grey, HCLO, no sheen	
								SP			
15 -15	3	15-16.5	1.0	20 50/5	100	998				Same As Above	Bentonite Chips
								SG		Sand and Gravel - change right at 16 feet bgs, sand is fine to coarse, subangular, gravel is small pebble to large pebble, anagular to subrounded, grey, HCLO, no sheen	
	4	17.5-19	1.5	20 50/6	100	262				Sand with trace gravel - sand is fine to medium grain, subangular, gravel is small to medium pebble, grey with brown streaks, no odor or sheen.	
								SW			
20 -20	5	20-21.5	1.5	18 27 30	57	6.8				Same As Above - with slight bio/sulfur odor	

ARCADIS
Infrastructure · Water · Environment · Buildings

Remarks:
bgs = below ground surface
NM = Not Measured
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

Date Start/Finish: 8/12/14 to 8/13/14
Drilling Company: Cascade Drilling
Driller's Name: Curtis A.
Drilling Method: Hollow Stem Auger
Auger Size: 8" Outer Diameter
Rig Type:
Sampling Method: Split Spoon

Northing:
Easting:
Casing Elevation: NE

Borehole Depth: 21.5' bgs
Surface Elevation:

Descriptions By: RL

Well/Boring ID: **SB-2**

Client: Chevron EMC

Location: KC Metro Terminal 100-1327, 1602 North Northlake Way, Seattle, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	0										Asphalt	Concrete
		HA	2.5-3	.5			0.9				Sand and Gravel - Sand fine to coarse grain, subangular, gravel very small pebble to small cobble, rounded, possibly fill, brown, no odor	
5	-5	HA	5-5.5	.5			1.4				Same As Above	Bentonite Chips
		HA	7.5-8	.5			0.6		SG		Same As Above	
10	-10	1	10-11.5	1.5	12 15 16	31	8.4				Same As Above - brown with no odor	

ARCADIS
Infrastructure · Water · Environment · Buildings

Remarks:
bgs = below ground surface
NM = Not Measured
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

Date Start/Finish: 8/12/14 to 8/13/14 **Drilling Company:** Cascade Drilling **Driller's Name:** Curtis A. **Drilling Method:** Hollow Stem Auger **Auger Size:** 8" Outer Diameter **Rig Type:** **Sampling Method:** Split Spoon	**Northing:** **Easting:** **Casing Elevation:** NE **Borehole Depth:** 21.5' bgs **Surface Elevation:** **Descriptions By:** RL	**Well/Boring ID:** **SB-2** **Client:** Chevron EMC **Location:** KC Metro Terminal 100-1327, 1602 North Northlake Way, Seattle, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
							625				Change in color to grey with HCLO, no sheen, lithology stayed the same	
											Same As Above	
		2	12-13.5	1.5	11 15 20	35	> 2,500				Sand - fine to medium grain, subangular, grey, HCLO, no sheen	
15	-15	3	15-16.5	1.5	17 20 30	50	529		SP		Sand - medium to coarse grain, subangular, grey, HCLO, no sheen	Bentonite Chips
		4	17.5-19	1.0	18 50/6	100	559		SW		Sand with some gravel - sand fine to medium grain, subangular, gravel small pebble to cobble, subrounded, grey HCLO, no sheen	
20	-20	5	20-21.5	1.0	18 21 30	51	157				Sand and Gravel - sand fine to medium grain, subangular, gravel small pebble to cobble, angular to subrounded, grey, slight HCLO, no sheen	

ARCADIS
Infrastructure · Water · Environment · Buildings

Remarks: bgs = below ground surface
NM = Not Measured
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

Date Start/Finish: 8/12/14 to 8/13/14
Drilling Company: Cascade Drilling
Driller's Name: Curtis A.
Drilling Method: Hollow Stem Auger
Auger Size: 8" Outer Diameter
Rig Type:
Sampling Method: Split Spoon

Northing:
Easting:
Casing Elevation: NE

Borehole Depth: 21.5' bgs
Surface Elevation:

Descriptions By: RL

Well/Boring ID: **SB-3**

Client: Chevron EMC

Location: KC Metro Terminal 100-1327, 1602 North Northlake Way, Seattle, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	0										~ 4 inches Asphalt and 8 inches concrete	Concrete
		HA	2.5-3	.5			1.7		SW		Sand with some gravel - sand is fine to medium grain, subangular, gravel is pebble to large pebble with trace cobbles, subrounded, brown, no odor	
5	-5	HA	5-5.5	.5			2.0				Same As Above - grey to brown, no odor	Bentonite Chips
		HA	7.5-8	.5			139				Same As Above - grey, HCLO, no sheen	
10	-10	1	10-11.5	1.0	50/6	100	363				Same As Above	

ARCADIS
Infrastructure · Water · Environment · Buildings

Remarks: bgs = below ground surface
NM = Not Measured
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

Date Start/Finish: 8/12/14 to 8/13/14
Drilling Company: Cascade Drilling
Driller's Name: Curtis A.
Drilling Method: Hollow Stem Auger
Auger Size: 8" Outer Diameter
Rig Type:
Sampling Method: Split Spoon

Northing:
Easting:
Casing Elevation: NE

Borehole Depth: 21.5' bgs
Surface Elevation:

Descriptions By: RL

Well/Boring ID: **SB-3**

Client: Chevron EMC

Location: KC Metro Terminal 100-1327, 1602 North Northlake Way, Seattle, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
		2	12-13.5	1.0	50/5	100	276				Same as Above - large cobble broken up in split spoon	
15	-15	3	15-16.5	1.0	50/6	100	28.3		SW		Sand with some Gravel - sand fine grain, subangular, gravel small to large pebble, subangular to subrounded, grey, no odor	Bentonite Chips
		4	17.5-19	1.0	50/6	100	387				Same As Above - with slight HCLO, no sheen	
20	-20	5	20-21.5	1.5	50/6	100	361				Same as Above	

ARCADIS
Infrastructure · Water · Environment · Buildings

Remarks: bgs = below ground surface
NM = Not Measured
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

Date Start/Finish: 8/11/14 to 8/13/14
Drilling Company: Cascade Drilling
Driller's Name: Curtis A.
Drilling Method: Hollow Stem Auger
Auger Size: 8" Outer Diameter
Rig Type:
Sampling Method: Split Spoon

Northing:
Easting:
Casing Elevation: NE

Borehole Depth: 21.5' bgs
Surface Elevation:

Descriptions By: RL

Well/Boring ID: **SB-4**

Client: Chevron EMC

Location: KC Metro Terminal 100-1327, 1602 North Northlake Way, Seattle, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	0										~ 4 inches Asphalt and 8 inches concrete	Concrete
		HA	2.5-3	.5			0.7				Sand with some Gravel - sand fine to coarse, subangular, gravel small to large pebble with trace cobbles, subangular to rounded, light brown, no odor.	
5	-5	HA	5-5.5	.5			0.1		SG		Same As Above - grey, no odor	Bentonite Chips
		HA	7.5-8	.5			0.4				Same As Above	
10	-10	1	10-11.5	1.0	10 50/6	100	284				Sand with little gravel - sand fine to medium grain, subangular, gravel small to large pebble, subrounded, grey, HCLO, no sheen	

ARCADIS
Infrastructure · Water · Environment · Buildings

Remarks: bgs = below ground surface
NM = Not Measured
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

Date Start/Finish: 8/11/14 to 8/13/14
Drilling Company: Cascade Drilling
Driller's Name: Curtis A.
Drilling Method: Hollow Stem Auger
Auger Size: 8" Outer Diameter
Rig Type:
Sampling Method: Split Spoon

Northing:
Easting:
Casing Elevation: NE

Borehole Depth: 21.5' bgs
Surface Elevation:

Descriptions By: RL

Well/Boring ID: **SB-4**

Client: Chevron EMC

Location: KC Metro Terminal 100-1327, 1602 North Northlake Way, Seattle, WA

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
	2	12-13.5	1.0	50/5	100	377		SW		Same As Above	
15 -15	3	15-16.5	1.5	27 50/6	100	128		SM		Sand with some Silt and trace gravel - sand is very fine to fine grain, silt low plasticity, gravel small to medium pebble, subrounded, grey, HCLO, no sheen	Bentonite Chips
	4	17.5-19	1.5	22 50/6	100	761		SW		Sand with some Gravel and Silt - sand fine grain, subangualr, gravel small to large pebble, rounded, silt low plasticity, grey, HCLO, no sheen	
20 -20	5	20-21.5	1.5	27 50/5	100	809				Same as Above	

ARCADIS
Infrastructure · Water · Environment · Buildings

Remarks: bgs = below ground surface
NM = Not Measured
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

Date Start/Finish: 8/11/14 to 8/14/14
Drilling Company: Cascade Drilling
Driller's Name: Curtis A.
Drilling Method: Hollow Stem Auger
Auger Size: 8" Outer Diameter
Rig Type:
Sampling Method: Split Spoon

Northing:
Easting:
Casing Elevation: NE

Borehole Depth: 21.5' bgs
Surface Elevation:

Descriptions By: RL

Well/Boring ID: **SB-5**

Client: Chevron EMC

Location: KC Metro Terminal 100-1327, 1602 North Northlake Way, Seattle, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	0										~ 2 inches Asphalt and 8 inches concrete	Concrete
		HA	2.5-3	.5			0.1				Sand with trace Gravel - sand is fine to medium grain, subangular, gravel is small to medium pebble, light brown, no odor	
5	-5	HA	5-5.5	.5			0.2				Same As Above	Bentonite Chips
		HA	7.5-8	.5			670		SW		Sand with trace Gravel - sand is fine to medium grain, subangular, gravel is small to large pebble, grey, HCLO, no sheen	
10	-10	1	9.5-11	1.5	40 50/5	100	32.6				Same As Above - slight HCLO, no sheen	

Remarks:
bgs = below ground surface
NM = Not Measured
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

ARCADIS
Infrastructure · Water · Environment · Buildings

Project Number:B0045799.0000
Data File:

Date: 8/18/2014 Created/Edited by:RwL

Date Start/Finish: 8/11/14 to 8/14/14 **Drilling Company:** Cascade Drilling **Driller's Name:** Curtis A. **Drilling Method:** Hollow Stem Auger **Auger Size:** 8" Outer Diameter **Rig Type:** **Sampling Method:** Split Spoon	**Northing:** **Easting:** **Casing Elevation:** NE **Borehole Depth:** 21.5' bgs **Surface Elevation:** **Descriptions By:** RL	**Well/Boring ID: SB-5** **Client:** Chevron EMC **Location:** KC Metro Terminal 100-1327, 1602 North Northlake Way, Seattle, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
		2	12.5 -14	1.5	50/6	100	1,552		SG		Sand with some Gravel - sand is fine to medium grain, subangular, gravel is small pebble to cobble, subrounded to angular, grey, HCLO, no sheen	
15	-15	3	15-16.5	1.0	50/5	100	113				Same As Above - slight HCLO, no sheen	Bentonite Chips
		4	17.5-19	0.5	50/5	100	213				Same as Above - no HCLO or odor	
20	-20	5	20-21.5	1.0	50/5	100	27.7				Same as Above - no odor	

ARCADIS
Infrastructure · Water · Environment · Buildings

Remarks: bgs = below ground surface
NM = Not Measured
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

Date Start/Finish: 8/11/14 to 8/14/14
Drilling Company: Cascade Drilling
Driller's Name: Curtis A.
Drilling Method: Hollow Stem Auger
Auger Size: 8" Outer Diameter
Rig Type:
Sampling Method: Split Spoon

Northing:
Easting:
Casing Elevation: NE

Borehole Depth: 21.5' bgs
Surface Elevation:

Descriptions By: RL

Well/Boring ID: **SB-6**

Client: Chevron EMC

Location: KC Metro Terminal 100-1327, 1602 North Northlake Way, Seattle, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	0										~ 2 inches Asphalt and 10 inches concrete	Concrete
		HA	2.5-3	.5			0.1		SW		Sand with trace silt and gravel - sand fine to medium grain, subangular, gravel large pebble, rounded, grey to light brown, no odor	
											Encountered a large cobble approcimately 10 to 12 inches	
5	-5	HA	5-5.5	.5			0.0		SG		Sand with Gravel - sand fine to medium grain, subangular grain, gravel (~30%) small to large pebbles, rounded to angular with trace large cobbles, grey to light brown, no odor	Bentonite Chips
		HA	7.5-8	.5			330				Same As Above - HCLO, no sheen	
		1	9.5-11	1.0	15 21 21	42	1,252		SW		Sand with little Gravel - sand fine to coarse, subangular, gravel small to medium pebble, subrounded, grey, HCLO, no sheen	
10	-10											

ARCADIS
Infrastructure · Water · Environment · Buildings

Remarks:
bgs = below ground surface
NM = Not Measured
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

Date Start/Finish: 8/11/14 to 8/14/14
Drilling Company: Cascade Drilling
Driller's Name: Curtis A.
Drilling Method: Hollow Stem Auger
Auger Size: 8" Outer Diameter
Rig Type:
Sampling Method: Split Spoon

Northing:
Easting:
Casing Elevation: NE

Borehole Depth: 21.5' bgs
Surface Elevation:

Descriptions By: RL

Well/Boring ID: **SB-6**

Client: Chevron EMC

Location: KC Metro Terminal 100-1327, 1602 North Northlake Way, Seattle, WA

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
	2	12.5 -14	1.5	11 15 12	27	396		SG		Sand with some Gravel and trace silt - sand fine to medium grain, subangular, gravel small to large pebble, subrounded, silt low plasticity, grey, slight HCLO, no sheen	Bentonite Chips
15 -15	3	15-16.5	1.0	15 10 23	33	186				Sand and Grave with trace silt - sand fine grain, subangular, gravel small to medium pebble, subrounded, silt no plasticity, grey, no odor	
	4	17.5-19	1.5	50/6	100	237				Same As Above - slight HCLO, no sheen	
20 -20	5	20-21.5	1.0	50/6	100	111				Sand and Gravel - sand medium to coarse grain, subangular, gravel small pebble to cobble, rounded to subangular, grey, no odor	

ARCADIS
Infrastructure · Water · Environment · Buildings

Remarks: bgs = below ground surface
NM = Not Measured
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

Appendix C

Drilling Field Notes

7-14-14 · KC METRO WELL INSTALL/OVERDRILL S. McGUIRE

0630 → SCM arrives onsite. Reviews SOW. Points ideal locations for MW wells and contingency wells.

0700 → Cascade Drilling arrives onsite. Site walk conducted w/ Curtis and Nalani about locations of wells and overhead clearance.

0730 → TCS arrives onsite. Discuss Traffic Control Plan and signage. National Barricade arrives. Traffic control is setup. Vehicles and trailer will be kept on level road below. HES meeting is conducted. OE tenants discussed. Site specific hazards are addressed and planned for. Cascade reviews vac truck JSA. SCM gives flesser safety glasses etc. TOMorrow they will bring more PPE, but today they are meeting all chevron specs w/ SCM glasses / long sleeves.

0830 → Setup vac truck on MW-9R overdrill. Wheel chocks in place. Begin breaking out old well box. Will setup second exclusion zone to keep out bikers and pedestrians.

0915 → Through well monument of MW-9. Starting to Vac.

1000 → Talk to Sam Miles. Will get porter John delivered for crew throughout next couple days.

1020 → Finish Vac of MW-9R down to 8'. Mob on to location of contingency North. Also in plastic per SZ recommendation.

1040 → No soil sample @ 5' bgs as it is just gravel / cobbles.

1055 → collect Sample @ 7.5' bgs. Coarse grain sand w/ trace gravel. Dark brown. NO HCCO. PID = 0.0. SOME biodebris. Well sorted.

1120 → Finish clearing contingency well N to 8'. Backfill MW-9R and CN. Mob to MW-29 location.

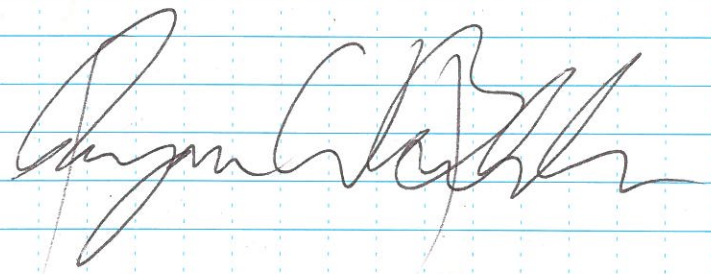
1155 → Jackhammer down to find concrete slab layer. Will need to core MW-29. Check other locations. Also have concrete slab.

1205 → Take lunch.

Scale: 1 square = _____

1235 → Back to site. Mob Concrete cutter into position on MW-29

1300 → R. Brauchla on site to relieve S. McGuire - site walkdown & H&S briefing
1330 → S. McGuire off site
1340 → Honey bucket drops off the other portable toilet
1410 → Concrete core removed from MW-29, thickness: 8"
1430 → Cascade begins air-knifing/vacuuming MW-29 - roots & woody debris visible near surface, as well as large (~3") cobbles
1500 → Collect soils from 5' bgs @ MW-29: Soil is - Sandy Gravel (SG): medium to large rounded gravel with poorly-sorted fine-to coarse-grained sand (mostly coarse) orangish-brown, dense, damp, no HCLO (PID = 0.8ppm)
1520 → Collect soils from 7.5' bgs @ MW-29: Soil is - Gravelly Sand (SP): medium to coarse-grained rounded sand with medium rounded gravel, brown, dense, damp, PID: 0.4ppm
1610 → Still coring on MW-30; call S. Miles & request guidance - Sam says, finish the well we're on but don't worry about the other contingency well.
1655 → Core on MW-30 removed (thickness: 1.3')
1715 → Collect soils from 5' bgs @ MW-30: Soil is - Gravelly Sand (SP): medium to coarse sand with medium rounded gravel, brown, loose to medium density, damp, no HCLO (PID = 0.4ppm)
1720 → Collect soils from 7.5' bgs @ MW-30: Soil is - Gravelly Sand (SP): medium to coarse, poorly-sorted sand with little medium gravel brown, loose to medium density, damp, no HCLO (PID = 0.4ppm)
1735 → Drillers backfill MW-29 & MW-30
1745 → Drillers patch MW-29 & MW-30
1750 → Drillers have one drum of soil cuttings
1900 → National Barricade offsite
1910 → ARCADIS Cascade off site



today 1 soil drum generated

Scale: 1 square = _____

S. McGUIRE KC METRO WELL INSTALL / OVERDRILL DAY 2 7-15-19

0645 → SCM arrives on site. Conducts site overview. Preps equipment.

0700 → Cascade drilling arrives onsite. stage equipment. Hold H&S meeting. Review SOW. Review Cascade drilling JSA. Talk about site specific hazards and make plan for day.

0800 → Set out traffic control.

0815 → TCS arrives onsite w/ flaggers. Fill in on health and safety and give them positions according to city approved permit.

0830 → Mob into position on ~~EW-1~~ EW-1 (CN).

0845 → Begin drilling.

0915 → Sample EW-1-12.5'.

0930 → Sample EW-1-22.5'.

0945 → Begin to construct well EW-1. Samples are put on ice. Soil is photographed to show no LNAPL present.

1000 → Maura O'Brian (DOE) arrives onsite. SCM discusses work that has been done. Continue creating well box.

1100 → Finish well box. Discuss w/ MO sample at bottom of MW-9R and how they would like to put a wood plug in the bottom to create ideal seal, but would not be able to time SS sample from bottom, but would instead need to time sample from tooth of rig. MO thinks that sounds like a good idea. SCM will discuss w/ SZ.

1130 → Mob onto MW-29 location.

1145 → Begin drilling MW-29.

1230 → Sample MW-29-12.5'. ALSO DUP-1.

1300 → LUNCH.

Scale: 1 square = _____

S. McGuire KC METRO WELL INSTALL/OVERDRILL CONTINUED... 7-15-19

1330 → Sample MW-29-22.5'

1400 → Finish drilling. Begin setting well. Call Leo (Natalie & Lucia) about sending extra bi-sulfates in case we need extra wells.

1430 → Tim N Sam Miles. Process goes well.

1500 → start placing monument / decon of augers continues

1600 → Let concrete set

1630 → Cascade / ARCADIS offsite.

James McCain

* Today 4 soil drums / 1 decon drum generated

S. MIGUEL KC METRO WELL INSTALL / OVERPRESS 7-15-19

0700 → Arrive on site. Meet Cascade / TCS and Mark O'Brien (DOT) on site.

0730 → Hold H&S tailgate meeting. Review all site specific hazards. Discuss OTS tenants of operation and Cascade drilling JSA. Primary hazards for today will be bike traffic and heat. Setup exclusion zone.

0800 → Move onto MW-30 location which will be drilled first to see if any contingency wells will be needed. Begin setting up exclusion zone

0810 → Begin drilling.

0830 → Sample MW-30-12.5'. Also DUP-2

0900 → Sample MW-30-22.5'

0915 → Finish drilling. Begin setting well etc.

0930 → Difficult time setting well to full depth because of cable. Drill slightly deeper to set well correctly.

1030 → Fines have accumulated at the bottom of MW-30 during setting. Use bailer and surge block to remove.

1100 → Fines have been removed. Will finish development.

1115 → Move drill rig into position on MW-9R.

1145 → Begin drilling MW-9R

1330 → collect sample at bottom of MW-9R. Sand, trace silt / pebbles, C-F grain sand, poorly sorted, HCL 0, wet, dark brown, rounded pebbles etc. PID = 701.8

1400 → Sample MW-9R-22.5'. Then take lunch. Mark O'Brien leaves site.

1930 → Return to site. Begin to develop / jet MW-9R.

1455 → MW-29 gauged @ 13.51.

Scale: 1 square = _____

1530 → Measure distances of wells to MW-9R.
MW-29 = 29' MW-30 = 40' EW-1 = 10'

1630 → MW-9R has been jetted and purged since. However fines are still accumulating in well. Well monuments on MW-30 completed and set. Driller Curtis says that with the monument construction of MW-9R and decon/mobbing drums they may not have time for developing EW-1 and finishing MW-9R which he thinks could use a couple more hours.

1700 → Begin to clean up. Mob to MW-9R to install well box and monument.

1800 → Pictures taken. Monument installed on MW-9R. Mob drums to South Yard. Label drums etc.

1900 → Put up directional Barricade Cones in sweep for pickup. Sign Cascade daily form. Mob porta john outside for pickup. Dummy lock set. ~~Secure~~ Cascade leaves.

1915 → SCM leaves.

James McGuire

Total drum count is 4 H_2O & 10 soil.

7-14-14 → 1 SOIL DRUM
7-15-14 4 SOIL DRUMS, 1 H_2O (DECON)
7-16-14 → 5 SOIL DRUM / 3 H_2O (1 DECON / 2 purge)

Scale: 1 square = _____

KC Metro Gauging Round 7/22/2014 S McGuire
R. Brauchla

0900 - ARCADIS on site don PPE, calibrate PID. (Weather: low 60 with scattered showers
0930 - Gauging Round. H&S tailgate form. Review hazards.

Time	Well	PID (ppm)	DTW (ft btoc)	DTP (ft btoc)	
935	MW-30	6.2	12.37	—	
940	MW-29	7.4	13.80	—	
945	EW-1	1,566	12.25	—	
955	MW-27	98.4	10.02	10.015 = DTP	(sheen
1010	MW-11	1.5	10.60	—	
1020	MW-10	118.8	8.81	—	
1025	MW-28	117.2	7.24	—	
1030	MW-12	346.4	8.48	8.44 = DTP	
1040	MW-22	0.5	14.34	—	
1045	MW-21	1.8	13.05	—	
1050	MW-20	242.5	13.35	—	
1055	MW-19	1.7	12.73	—	
1105	MW-3	624.8	10.52	9.83 = DTP	

1115 - MW-9R is secured with allen head screws - off site to get allen keys

1225	MW-9R	1,257	13.31	—

1230 - ARCADIS off site (to WA-1835)
~~- ARCADIS returns to label drums~~ (SM)
- ARCADIS out: 1230

Methodology: Wells were measured using a calibrated PID and an oil/water interface probe. The probe was decon'ed between wells.

Drum Inventory: Fourteen 55-gallon steel drums - stored in the south yard
- 10 soil drums
- 2 decon water drums
- 2 purge water drums

7/22/2014

Scale: 1 square = _____

Appendix D

Soil Laboratory Report and
Chain-of-Custody Documentation

ANALYTICAL RESULTS

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Chevron
L4310
6001 Bollinger Canyon Road
San Ramon CA 94583

July 30, 2014

Project: 1001327

Submittal Date: 07/18/2014
Group Number: 1490060
PO Number: 0015143985
Release Number: ROEHL
State of Sample Origin: WA

Client Sample Description	Lancaster Labs (LL) #
EW-1-12.5' NA Soil	7537978
EW-1-22.5' NA Soil	7537979
MW-29-12.5' NA Soil	7537980
MW-29-22.5' NA Soil	7537981
DUP-1 NA Soil	7537982
MW-30-12.5' NA Soil	7537983
MW-30-22.5' NA Soil	7537984
MW-9R-22.5' NA Soil	7537985
DUP-2 NA Soil	7537986

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

ELECTRONIC COPY TO	Arcadis	Attn: Scott Zorn
ELECTRONIC COPY TO	Arcadis	Attn: Alan Kahal

Respectfully Submitted,

Natalie R. Luciano
Senior Specialist

(717) 556-7258

Sample Description: EW-1-12.5' NA Soil
Facility# 1001327
1602 N Northlane Way - Seattle, WA

LL Sample # SW 7537978
LL Group # 1490060
Account # 11964

Project Name: 1001327

Collected: 07/15/2014 09:15 by SM

Submitted: 07/18/2014 09:45
Reported: 07/30/2014 16:04

Chevron
L4310
6001 Bollinger Canyon Road
San Ramon CA 94583

SE112

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**	**mg/kg**	
10237	Benzene	71-43-2	N.D.	0.025	46.59
	Reporting limits were raised due to interference from the sample matrix.				
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	64	9.8	224.64
GC Petroleum Hydrocarbons w/Si	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	
12006	DRO C12-C24 w/Si Gel	n.a.	N.D.	3.3	1
12006	HRO C24-C40 w/Si Gel	n.a.	N.D.	11	1
	The reverse surrogate, capric acid, is present at <1%.				
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	
00111	Moisture	n.a.	8.3	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

State of Washington Lab Certification No. C457

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs Benzene only - Soil	SW-846 8260B	1	Q142023AA	07/22/2014 03:11	Andrea E Lando	46.59
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201419935125	07/15/2014 09:15	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201419935125	07/15/2014 09:15	Client Supplied	1
02005	NWTPH-GX Soil C7-C12	ECY 97-602 NWTPH-Gx	1	14202A31A	07/22/2014 04:20	Marie D Beamenderfer	224.64
06647	GC-5g Field Preserved MeOH	SW-846 5035	1	201419935125	07/15/2014 09:15	Client Supplied	n.a.
12006	NWTPH-Dx soil w/ 10g Si Gel	ECY 97-602 NWTPH-Dx modified	1	142020004A	07/23/2014 10:42	Glorines Suarez-Rivera	1
12008	NW Dx soil w/ 10g column	ECY 97-602 NWTPH-Dx 06/97	1	142020004A	07/21/2014 14:30	Kelli M Barto	1
00111	Moisture	SM 2540 G-1997	1	14204820003B	07/23/2014 19:57	Scott W Freisher	1

Sample Description: EW-1-22.5' NA Soil
Facility# 1001327
1602 N Northlane Way - Seattle, WA

LL Sample # SW 7537979
LL Group # 1490060
Account # 11964

Project Name: 1001327

Collected: 07/15/2014 09:30 by SM

Submitted: 07/18/2014 09:45
Reported: 07/30/2014 16:04

Chevron
L4310
6001 Bollinger Canyon Road
San Ramon CA 94583

SE122

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**	**mg/kg**	
10237	Benzene	71-43-2	N.D.	0.029	51.96
	Reporting limits were raised due to interference from the sample matrix.				
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	450	42	927.75
GC Petroleum Hydrocarbons w/Si	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	
12006	DRO C12-C24 w/Si Gel	n.a.	8.5	3.4	1
12006	HRO C24-C40 w/Si Gel	n.a.	N.D.	11	1
	The reverse surrogate, capric acid, is present at <1%.				
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	
00111	Moisture	n.a.	10.8	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

State of Washington Lab Certification No. C457

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs Benzene only - Soil	SW-846 8260B	1	Q142023AA	07/22/2014 03:34	Andrea E Lando	51.96
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201419935125	07/15/2014 09:30	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201419935125	07/15/2014 09:30	Client Supplied	1
02005	NWTPH-GX Soil C7-C12	ECY 97-602 NWTPH-Gx	1	14202A31A	07/22/2014 16:33	Marie D Beamenderfer	927.75
06647	GC-5g Field Preserved MeOH	SW-846 5035	1	201419935125	07/15/2014 09:30	Client Supplied	n.a.
12006	NWTPH-Dx soil w/ 10g Si Gel	ECY 97-602 NWTPH-Dx modified	1	142020004A	07/23/2014 11:04	Glorines Suarez-Rivera	1
12008	NW Dx soil w/ 10g column	ECY 97-602 NWTPH-Dx 06/97	1	142020004A	07/21/2014 14:30	Kelli M Barto	1
00111	Moisture	SM 2540 G-1997	1	14204820003B	07/23/2014 19:57	Scott W Freisher	1

Sample Description: MW-29-12.5' NA Soil
Facility# 1001327
1602 N Northlane Way - Seattle, WA

LL Sample # SW 7537980
LL Group # 1490060
Account # 11964

Project Name: 1001327

Collected: 07/15/2014 12:30 by SM

Submitted: 07/18/2014 09:45
Reported: 07/30/2014 16:04

Chevron
L4310
6001 Bollinger Canyon Road
San Ramon CA 94583

S2912

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**	**mg/kg**	
10237	Benzene	71-43-2	N.D.	0.0004	0.81
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	4.2	1.2	28.77
GC Petroleum Hydrocarbons w/Si	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	
12006	DRO C12-C24 w/Si Gel	n.a.	110	3.2	1
12006	HRO C24-C40 w/Si Gel	n.a.	75	11	1
	The reverse surrogate, capric acid, is present at <1%.				
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	
00111	Moisture	n.a.	7.5	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

State of Washington Lab Certification No. C457

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs Benzene only - Soil	SW-846 8260B	1	A142041AA	07/23/2014 08:37	Stephanie A Selis	0.81
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201419935125	07/15/2014 12:30	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201419935125	07/15/2014 12:30	Client Supplied	1
02005	NWTPH-GX Soil C7-C12	ECY 97-602 NWTPH-Gx	1	14202A31A	07/22/2014 01:18	Marie D Beamenderfer	28.77
06647	GC-5g Field Preserved MeOH	SW-846 5035	1	201419935125	07/15/2014 12:30	Client Supplied	n.a.
12006	NWTPH-Dx soil w/ 10g Si Gel	ECY 97-602 NWTPH-Dx modified	1	142020004A	07/23/2014 13:17	Glorines Suarez-Rivera	1
12008	NW Dx soil w/ 10g column	ECY 97-602 NWTPH-Dx 06/97	1	142020004A	07/21/2014 14:30	Kelli M Barto	1
00111	Moisture	SM 2540 G-1997	1	14204820003B	07/23/2014 19:57	Scott W Freisher	1

Sample Description: MW-29-22.5' NA Soil
Facility# 1001327
1602 N Northlane Way - Seattle, WA

LL Sample # SW 7537981
LL Group # 1490060
Account # 11964

Project Name: 1001327

Collected: 07/15/2014 13:30 by SM

Submitted: 07/18/2014 09:45
Reported: 07/30/2014 16:04

Chevron
L4310
6001 Bollinger Canyon Road
San Ramon CA 94583

S2922

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**	**mg/kg**	
10237	Benzene	71-43-2	N.D.	0.0004	0.73
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	N.D.	0.9	21.02
GC Petroleum Hydrocarbons w/Si	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	
12006	DRO C12-C24 w/Si Gel	n.a.	N.D.	3.2	1
12006	HRO C24-C40 w/Si Gel	n.a.	N.D.	11	1
	The reverse surrogate, capric acid, is present at <1%.				
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	
00111	Moisture	n.a.	7.5	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

State of Washington Lab Certification No. C457

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs Benzene only - Soil	SW-846 8260B	1	A142041AA	07/23/2014 09:00	Stephanie A Selis	0.73
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201419935125	07/15/2014 13:30	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201419935125	07/15/2014 13:30	Client Supplied	1
02005	NWTPH-GX Soil C7-C12	ECY 97-602 NWTPH-Gx	1	14202A31A	07/22/2014 01:55	Marie D Beamenderfer	21.02
06647	GC-5g Field Preserved MeOH	SW-846 5035	1	201419935125	07/15/2014 13:30	Client Supplied	n.a.
12006	NWTPH-Dx soil w/ 10g Si Gel	ECY 97-602 NWTPH-Dx modified	1	142020004A	07/23/2014 11:26	Glorines Suarez-Rivera	1
12008	NW Dx soil w/ 10g column	ECY 97-602 NWTPH-Dx 06/97	1	142020004A	07/21/2014 14:30	Kelli M Barto	1
00111	Moisture	SM 2540 G-1997	1	14204820003B	07/23/2014 19:57	Scott W Freisher	1

Sample Description: DUP-1 NA Soil
Facility# 1001327
1602 N Northlane Way - Seattle, WA

LL Sample # SW 7537982
LL Group # 1490060
Account # 11964

Project Name: 1001327

Collected: 07/15/2014 by SM

Submitted: 07/18/2014 09:45
Reported: 07/30/2014 16:04

Chevron
L4310
6001 Bollinger Canyon Road
San Ramon CA 94583

NWSD1

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**	**mg/kg**	
10237	Benzene	71-43-2	N.D.	0.0005	0.89
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	1.5	1.0	23.56
GC Petroleum Hydrocarbons w/Si	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	
12006	DRO C12-C24 w/Si Gel	n.a.	26	3.2	1
12006	HRO C24-C40 w/Si Gel	n.a.	33	11	1
	The reverse surrogate, capric acid, is present at <1%.				
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	
00111	Moisture	n.a.	7.1	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

State of Washington Lab Certification No. C457

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs Benzene only - Soil	SW-846 8260B	1	A142041AA	07/23/2014 12:47	Stephanie A Selis	0.89
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201419935125	07/15/2014 00:00	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201419935125	07/15/2014 00:00	Client Supplied	1
02005	NWTPH-GX Soil C7-C12	ECY 97-602 NWTPH-Gx	1	14202A31A	07/22/2014 02:31	Marie D Beamenderfer	23.56
06647	GC-5g Field Preserved MeOH	SW-846 5035	1	201419935125	07/15/2014 00:00	Client Supplied	n.a.
12006	NWTPH-Dx soil w/ 10g Si Gel	ECY 97-602 NWTPH-Dx modified	1	142030026A	07/28/2014 15:12	Glorines Suarez-Rivera	1
12008	NW Dx soil w/ 10g column	ECY 97-602 NWTPH-Dx 06/97	1	142030026A	07/23/2014 09:40	Katheryne V Sponheimer	1
00111	Moisture	SM 2540 G-1997	1	14204820003B	07/23/2014 19:57	Scott W Freisher	1

Sample Description: MW-30-12.5' NA Soil
Facility# 1001327
1602 N Northlane Way - Seattle, WA

LL Sample # SW 7537983
LL Group # 1490060
Account # 11964

Project Name: 1001327

Collected: 07/16/2014 08:30 by SM

Submitted: 07/18/2014 09:45
Reported: 07/30/2014 16:04

Chevron
L4310
6001 Bollinger Canyon Road
San Ramon CA 94583

S3012

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**	**mg/kg**	
10237	Benzene	71-43-2	N.D.	0.028	50.96
	Reporting limits were raised due to interference from the sample matrix.				
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	46	2.8	63.69
GC Petroleum Hydrocarbons w/Si	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	
12006	DRO C12-C24 w/Si Gel	n.a.	310	6.4	2
12006	HRO C24-C40 w/Si Gel	n.a.	670	21	2
	The reverse surrogate, capric acid, is present at <1%.				
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	
00111	Moisture	n.a.	7.8	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

State of Washington Lab Certification No. C457

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs Benzene only - Soil	SW-846 8260B	1	Q142023AA	07/22/2014 03:57	Andrea E Lando	50.96
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201419935125	07/16/2014 08:30	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201419935125	07/16/2014 08:30	Client Supplied	1
02005	NWTPH-GX Soil C7-C12	ECY 97-602 NWTPH-Gx	1	14202A31A	07/22/2014 17:09	Marie D Beamenderfer	63.69
06647	GC-5g Field Preserved MeOH	SW-846 5035	1	201419935125	07/16/2014 08:30	Client Supplied	n.a.
12006	NWTPH-Dx soil w/ 10g Si Gel	ECY 97-602 NWTPH-Dx modified	1	142030026A	07/28/2014 17:03	Glorines Suarez-Rivera	2
12008	NW Dx soil w/ 10g column	ECY 97-602 NWTPH-Dx 06/97	1	142030026A	07/23/2014 09:40	Katheryne V Sponheimer	1
00111	Moisture	SM 2540 G-1997	1	14204820003B	07/23/2014 19:57	Scott W Freisher	1

Sample Description: MW-30-22.5' NA Soil
Facility# 1001327
1602 N Northlane Way - Seattle, WA

LL Sample # SW 7537984
LL Group # 1490060
Account # 11964

Project Name: 1001327

Collected: 07/16/2014 09:00 by SM

Submitted: 07/18/2014 09:45
Reported: 07/30/2014 16:04

Chevron
L4310
6001 Bollinger Canyon Road
San Ramon CA 94583

S3022

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**	**mg/kg**	
10237	Benzene	71-43-2	N.D.	0.0004	0.72
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	20	1.3	28.79
GC Petroleum Hydrocarbons w/Si	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	
12006	DRO C12-C24 w/Si Gel	n.a.	19	3.3	1
12006	HRO C24-C40 w/Si Gel	n.a.	62	11	1
	The reverse surrogate, capric acid, is present at <1%.				
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	
00111	Moisture	n.a.	9.9	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

State of Washington Lab Certification No. C457

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs Benzene only - Soil	SW-846 8260B	1	A142041AA	07/23/2014 13:09	Stephanie A Selis	0.72
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201419935125	07/16/2014 09:00	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201419935125	07/16/2014 09:00	Client Supplied	1
02005	NWTPH-GX Soil C7-C12	ECY 97-602 NWTPH-Gx	1	14202A31A	07/22/2014 03:44	Marie D Beamenderfer	28.79
06647	GC-5g Field Preserved MeOH	SW-846 5035	1	201419935125	07/16/2014 09:00	Client Supplied	n.a.
12006	NWTPH-Dx soil w/ 10g Si Gel	ECY 97-602 NWTPH-Dx modified	1	142030026A	07/28/2014 15:35	Glorines Suarez-Rivera	1
12008	NW Dx soil w/ 10g column	ECY 97-602 NWTPH-Dx 06/97	1	142030026A	07/23/2014 09:40	Katheryne V Sponheimer	1
00111	Moisture	SM 2540 G-1997	1	14204820003B	07/23/2014 19:57	Scott W Freisher	1

Sample Description: MW-9R-22.5' NA Soil
Facility# 1001327
1602 N Northlane Way - Seattle, WA

LL Sample # SW 7537985
LL Group # 1490060
Account # 11964

Project Name: 1001327

Collected: 07/16/2014 14:00 by SM

Submitted: 07/18/2014 09:45
Reported: 07/30/2014 16:04

Chevron
L4310
6001 Bollinger Canyon Road
San Ramon CA 94583

S9R22

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**	**mg/kg**	
10237	Benzene	71-43-2	N.D.	0.035	64.17
	Reporting limits were raised due to interference from the sample matrix.				
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	1,900	270	6019.53
GC Petroleum Hydrocarbons w/Si	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	
12006	DRO C12-C24 w/Si Gel	n.a.	300	6.6	2
12006	HRO C24-C40 w/Si Gel	n.a.	100	22	2
	The reverse surrogate, capric acid, is present at <1%.				
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	
00111	Moisture	n.a.	9.3	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

State of Washington Lab Certification No. C457

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs Benzene only - Soil	SW-846 8260B	1	Q142031AA	07/22/2014 13:26	Anita M Dale	64.17
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201419935125	07/16/2014 14:00	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201419935125	07/16/2014 14:00	Client Supplied	1
02005	NWTPH-GX Soil C7-C12	ECY 97-602 NWTPH-Gx	1	14202A31A	07/22/2014 17:45	Marie D Beamenderfer	6019.53
06647	GC-5g Field Preserved MeOH	SW-846 5035	1	201419935125	07/16/2014 14:00	Client Supplied	n.a.
12006	NWTPH-Dx soil w/ 10g Si Gel	ECY 97-602 NWTPH-Dx modified	1	142030026A	07/29/2014 12:57	Glorines Suarez-Rivera	2
12008	NW Dx soil w/ 10g column	ECY 97-602 NWTPH-Dx 06/97	1	142030026A	07/23/2014 09:40	Katheryne V Sponheimer	1
00111	Moisture	SM 2540 G-1997	1	14204820003B	07/23/2014 19:57	Scott W Freisher	1

Sample Description: DUP-2 NA Soil
Facility# 1001327
1602 N Northlane Way - Seattle, WA

LL Sample # SW 7537986
LL Group # 1490060
Account # 11964

Project Name: 1001327

Collected: 07/16/2014 by SM

Submitted: 07/18/2014 09:45
Reported: 07/30/2014 16:04

Chevron
L4310
6001 Bollinger Canyon Road
San Ramon CA 94583

NWSD2

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**	**mg/kg**	
10237	Benzene	71-43-2	N.D.	0.030	54.96
	Reporting limits were raised due to interference from the sample matrix.				
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	46	2.5	57.52
GC Petroleum Hydrocarbons w/Si	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	
12006	DRO C12-C24 w/Si Gel	n.a.	270	33	10
12006	HRO C24-C40 w/Si Gel	n.a.	1,000	110	10
	The reverse surrogate, capric acid, is present at <1%.				
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	
00111	Moisture	n.a.	9.1	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

State of Washington Lab Certification No. C457

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs Benzene only - Soil	SW-846 8260B	1	Q142031AA	07/22/2014 13:49	Anita M Dale	54.96
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201419935125	07/16/2014 00:00	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201419935125	07/16/2014 00:00	Client Supplied	1
02005	NWTPH-GX Soil C7-C12	ECY 97-602 NWTPH-Gx	1	14202A31A	07/22/2014 18:21	Marie D Beamenderfer	57.52
06647	GC-5g Field Preserved MeOH	SW-846 5035	1	201419935125	07/16/2014 00:00	Client Supplied	n.a.
12006	NWTPH-Dx soil w/ 10g Si Gel	ECY 97-602 NWTPH-Dx modified	1	142030026A	07/28/2014 16:41	Glorines Suarez-Rivera	10
12008	NW Dx soil w/ 10g column	ECY 97-602 NWTPH-Dx 06/97	1	142030026A	07/23/2014 09:40	Katheryne V Sponheimer	1
00111	Moisture	SM 2540 G-1997	1	14204820003B	07/23/2014 19:57	Scott W Freisher	1

Quality Control Summary

Client Name: Chevron Group Number: 1490060
Reported: 07/30/14 at 04:04 PM

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: A142041AA	Sample number(s): 7537980-7537982,7537984							
Benzene	N.D.	0.0005	mg/kg	90	87	80-120	3	30
Batch number: Q142023AA	Sample number(s): 7537978-7537979,7537983							
Benzene	N.D.	0.025	mg/kg	104	113	80-120	9	30
Batch number: Q142031AA	Sample number(s): 7537985-7537986							
Benzene	N.D.	0.025	mg/kg	96	97	80-120	1	30
Batch number: 14202A31A	Sample number(s): 7537978-7537986							
NWTPH-GX Soil C7-C12	N.D.	1.0	mg/kg	93	85	65-120	9	30
Batch number: 142020004A	Sample number(s): 7537978-7537981							
DRO C12-C24 w/Si Gel	N.D.	3.0	mg/kg	85		50-133		
HRO C24-C40 w/Si Gel	N.D.	10.	mg/kg					
Batch number: 142030026A	Sample number(s): 7537982-7537986							
DRO C12-C24 w/Si Gel	N.D.	3.0	mg/kg	79		50-133		
HRO C24-C40 w/Si Gel	N.D.	10.	mg/kg					
Batch number: 14204820003B	Sample number(s): 7537978-7537986							
Moisture				100		99-101		

Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike
Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	Dup RPD Max
Batch number: Q142023AA	Sample number(s): 7537978-7537979,7537983 UNSPK: P537092								
Benzene	44*	60	55-143	12	30				
Batch number: 142020004A	Sample number(s): 7537978-7537981 BKG: P531151								
DRO C12-C24 w/Si Gel						N.D.	N.D.	0 (1)	20
HRO C24-C40 w/Si Gel						N.D.	N.D.	0 (1)	20
Batch number: 142030026A	Sample number(s): 7537982-7537986 BKG: 7537982								
DRO C12-C24 w/Si Gel						24	N.D.	200* (1)	20
HRO C24-C40 w/Si Gel						30	N.D.	200* (1)	20

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Chevron Group Number: 1490060
Reported: 07/30/14 at 04:04 PM

Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike
Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	Dup RPD Max
Batch number: 14204820003B	Sample number(s): 7537978-7537986					BKG: P540372			
Moisture						68.6	68.9	0	5

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed
unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: VOCs- Solid by 8260B
Batch number: A142041AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
7537980	107	106	94	93
7537981	105	106	94	93
7537982	101	104	96	94
7537984	102	105	95	97
Blank	106	106	94	90
LCS	104	101	98	99
LCSD	101	99	99	98
Limits:	50-141	54-135	52-141	50-131

Analysis Name: VOCs- Solid by 8260B
Batch number: Q142023AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
7537978	78	81	87	85
7537979	80	80	82	81
7537983	90	90	83	87
Blank	105	100	89	83
LCS	96	94	88	92
LCSD	108	109	99	101
MS	66	64	66	74
MSD	65	64	65	84
Limits:	50-141	54-135	52-141	50-131

Analysis Name: VOCs- Solid by 8260B
Batch number: Q142031AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
7537985	80	80	76	79
7537986	90	87	81	90
Blank	101	100	96	94
LCS	90	92	88	89
LCSD	89	88	87	89
Limits:	50-141	54-135	52-141	50-131

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Chevron
Group Number: 1490060
Reported: 07/30/14 at 04:04 PM

Surrogate Quality Control

Analysis Name: NWTPH-GX Soil C7-C12
Batch number: 14202A31A

	Trifluorotoluene-F
7537978	80
7537979	87
7537980	72
7537981	72
7537982	85
7537983	102
7537984	92
7537985	94
7537986	97
Blank	89
LCS	92
LCSD	85
Limits:	50-142

Analysis Name: NWTPH-Dx soil w/ 10g Si Gel
Batch number: 142020004A

	Orthoterphenyl
7537978	104
7537979	104
7537980	113
7537981	102
Blank	112
DUP	118
LCS	114
Limits:	50-150

Analysis Name: NWTPH-Dx soil w/ 10g Si Gel
Batch number: 142030026A

	Orthoterphenyl
7537982	101
7537983	103
7537984	99
7537985	96
7537986	93
Blank	104
DUP	94
LCS	101
Limits:	50-150

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Chevron Northwest Region Analysis Request/Chain of Custody

eurofins | Lancaster Laboratories

For Lancaster Laboratories use only
Acct. # 11964 Group # 1490060 Sample # 7537978-86
Instructions on reverse side correspond with circled numbers.

SCR #: 157602

1 Client Information

Facility # 100-1327 WBS

Site Address: 1602 N NORTHLAKE WAY, SEATTLE, WA

Chevron PM: ERIC RUEHL Lead Consultant: SCOTT ZORN

Consultant/Office: ARCADIS / SEATTLE

Consultant Project Mgr.: SCOTT ZORN

Consultant Phone #: 206 726-1709

Sampler: SEAMAS MCGUIRE

4 Matrix

3 Grab ☐ Composite ☑

Soil ☑ Sediment ☐ Water: Potable ☐ Ground ☐ NPDES ☐ Surface ☐ Oil ☐ Air ☐

5 Analyses Requested

Sample Identification	Collected Date	Collected Time	Total Number of Containers	BTEX + MTBE 8021 ☐ 8260 ☐ Naphth ☐	8260 full scan	Oxygenates ____	NWTPH GX	NWTPH DX	Silica Gel Cleanup ☑	Lead Total ☐ Diss. ☐ Method ____	WAVPH ☐ WAEPH ☐	Benzene by 8260B	Moisture
EW-1-12.5'	7-15	0915	5				✓	✓				✓	✓
EW-1-22.5'	7-15	0930	5				✓	✓				✓	✓
MW-29-12.5'	7-15	1230	5				✓	✓				✓	✓
MW-29-22.5'	7-15	1330	5				✓	✓				✓	✓
DUP-1	7-15	—	5				✓	✓				✓	✓
MW-30-12.5'	7-16	0830	5				✓	✓				✓	✓
MW-30-22.5'	7-16	0900	5				✓	✓				✓	✓
MW-912-22.5'	7-16	1400	4				✓	✓				✓	✓

- ☐ Results in Dry Weight
- ☐ J value reporting needed
- ☐ Must meet lowest detection limits possible for 8260 compounds
- ☐ 8021 MTBE Confirmation
- ☐ Confirm MTBE + Naphthalene
- ☐ Confirm highest hit by 8260
- ☐ Confirm all hits by 8260
- ☐ Run _____ oxy's on highest hit
- ☐ Run _____ oxy's on all hits

6 Remarks

MW-912 only had enough soil for filling Dx jar and Gx and Benzene vials.

*Any questions Please call Seamas McGuire @ 339-222-1573.

7 Turnaround Time Requested (TAT) (please circle)

Standard | 5 day | 4 day | 72 hour | 48 hour | 24 hour

8 Data Package Options (please circle if required)

Type I - Full | Type VI (Raw Data)

Relinquished by	Date	Time	Received by	Date	Time
[signature]	7-19-14	1520	ARCADIS Courier	6.25-14	1200
[signature]	7/17/14	1500	[signature]	7/18/14	15:40
Relinquished by Commerical Carrier: UPS X FedEx ____ Other ____			[signature]	7.18.14	9:45

Temperature Upon Receipt 1.6 °C

Custody Seals Intact? Yes No

9

Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL	Reporting Limit	**BMQL**	Below Minimum Quantitation Level
N.D.	none detected	**MPN**	Most Probable Number
TNTC	Too Numerous To Count	**CP Units**	cobalt-chloroplatinate units
IU	International Units	**NTU**	nephelometric turbidity units
umhos/cm	micromhos/cm	**ng**	nanogram(s)
C	degrees Celsius	**F**	degrees Fahrenheit
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
µg	microgram(s)	**mg**	milligram(s)
mL	milliliter(s)	**L**	liter(s)
m3	cubic meter(s)	**µL**	microliter(s)
		pg/L	picogram/liter

< less than - The number following the sign is the limit of quantitation, the smallest amount of analyte which can be reliably determined using this specific test.

> greater than

ppm parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg), or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.

ppb parts per billion

Dry weight basis Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Data Qualifiers:

C – result confirmed by reanalysis.

J - estimated value – The result is ≥ the Method Detection Limit (MDL) and < the Limit of Quantitation (LOQ).

U.S. EPA CLP Data Qualifiers:

Organic Qualifiers

A	TIC is a possible aldol-condensation product
B	Analyte was also detected in the blank
C	Pesticide result confirmed by GC/MS
D	Compound quantitated on a diluted sample
E	Concentration exceeds the calibration range of the instrument
N	Presumptive evidence of a compound (TICs only)
P	Concentration difference between primary and confirmation columns >25%
U	Compound was not detected
X,Y,Z	Defined in case narrative

Inorganic Qualifiers

B	Value is <CRDL, but ≥IDL
E	Estimated due to interference
M	Duplicate injection precision not met
N	Spike sample not within control limits
S	Method of standard additions (MSA) used for calculation
U	Compound was not detected
W	Post digestion spike out of control limits
*****	Duplicate analysis not within control limits
+	Correlation coefficient for MSA <0.995

Analytical test results meet all requirements of NELAC unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR part 136 Table II as “analyze immediately” are not performed within 15 minutes.

ANALYTICAL RESULTS

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Chevron
L4310
6001 Bollinger Canyon Road
San Ramon CA 94583

August 27, 2014

Project: 1001327

Submittal Date: 08/15/2014
Group Number: 1496392
PO Number: 0015143985
Release Number: ROEHL
State of Sample Origin: WA

Client Sample Description	Lancaster Labs (LL) #
SB-1 12.5-13.5 Grab Soil	7566792
SB-2 12.5-13.5 Grab Soil	7566793
SB-3 12.5-13.5 Grab Soil	7566794
SB-4 12.5-13.5 Grab Soil	7566795
SB-5 10-11 Grab Soil	7566796
SB-6 10-11 Grab Soil	7566797
DUP-1 Grab Soil	7566798

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

ELECTRONIC COPY TO	Arcadis	Attn: Alan Kahal
ELECTRONIC COPY TO	Arcadis	Attn: Scott Zorn

Respectfully Submitted,

Natalie R. Luciano
Senior Specialist

(717) 556-7258

Sample Description: SB-1 12.5-13.5 Grab Soil
Facility# 1001327
1602 N. Northlake Way - Seattle, WA

LL Sample # SW 7566792
LL Group # 1496392
Account # 11964

Project Name: 1001327

Collected: 08/13/2014 09:30 by RL

Submitted: 08/15/2014 09:15
Reported: 08/27/2014 11:05

Chevron
L4310
6001 Bollinger Canyon Road
San Ramon CA 94583

NNS01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**	**mg/kg**	
10237	Benzene	71-43-2	N.D.	0.031	54.26
	Reporting limits were raised due to interference from the sample matrix.				
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	6,700	470	10522.25
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	
08272	Diesel Range Organics C12-C24	n.a.	330	3.4	1
08272	Heavy Range Organics C24-C40	n.a.	110	11	1
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	
00111	Moisture	n.a.	11.1	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

State of Washington Lab Certification No. C457

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs Benzene only - Soil	SW-846 8260B	1	R142301AA	08/18/2014 16:50	Sarah A Guill	54.26
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201422735376	08/13/2014 09:30	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201422735376	08/13/2014 09:30	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201422735376	08/13/2014 09:30	Client Supplied	1
02005	NWTPH-GX Soil C7-C12	ECY 97-602 NWTPH-Gx	1	14232A34A	08/21/2014 00:37	Marie D Beamenderfer	10522.25
06647	GC-5g Field Preserved MeOH	SW-846 5035A	1	201422735376	08/13/2014 09:30	Client Supplied	n.a.
08272	NWTPH-Dx soil	ECY 97-602 NWTPH-Dx modified	1	142320010A	08/23/2014 00:13	Glorines Suarez-Rivera	1
11234	WA DRO NW DX Soils (Non SG)	ECY 97-602 NWTPH-Dx 06/97	1	142320010A	08/20/2014 17:00	Sally L Appleyard	1
00111	Moisture	SM 2540 G-1997	1	14233820003B	08/21/2014 17:21	Scott W Freisher	1

Sample Description: SB-2 12.5-13.5 Grab Soil
Facility# 1001327
1602 N. Northlake Way - Seattle, WA

LL Sample # SW 7566793
LL Group # 1496392
Account # 11964

Project Name: 1001327

Collected: 08/13/2014 11:00 by RL

Submitted: 08/15/2014 09:15
Reported: 08/27/2014 11:05

Chevron
L4310
6001 Bollinger Canyon Road
San Ramon CA 94583

NNS02

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**	**mg/kg**	
10237	Benzene	71-43-2	N.D.	0.060	106.23
	Reporting limits were raised due to interference from the sample matrix.				
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	21,000	950	20965.13
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	
08272	Diesel Range Organics C12-C24	n.a.	1,500	17	5
08272	Heavy Range Organics C24-C40	n.a.	470	57	5
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	
00111	Moisture	n.a.	11.9	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

State of Washington Lab Certification No. C457

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs Benzene only - Soil	SW-846 8260B	1	Q142301AA	08/19/2014 03:58	Andrea E Lando	106.23
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201422735376	08/13/2014 11:00	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201422735376	08/13/2014 11:00	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201422735376	08/13/2014 11:00	Client Supplied	1
02005	NWTPH-GX Soil C7-C12	ECY 97-602 NWTPH-Gx	1	14232A34A	08/20/2014 23:26	Marie D Beamenderfer	20965.13
06647	GC-5g Field Preserved MeOH	SW-846 5035A	1	201422735376	08/13/2014 11:00	Client Supplied	n.a.
08272	NWTPH-Dx soil	ECY 97-602 NWTPH-Dx modified	1	142320010A	08/25/2014 20:19	Glorines Suarez-Rivera	5
11234	WA DRO NW DX Soils (Non SG)	ECY 97-602 NWTPH-Dx 06/97	1	142320010A	08/20/2014 17:00	Sally L Appleyard	1
00111	Moisture	SM 2540 G-1997	1	14233820003B	08/21/2014 17:21	Scott W Freisher	1

Sample Description: SB-3 12.5-13.5 Grab Soil
Facility# 1001327
1602 N. Northlake Way - Seattle, WA

LL Sample # SW 7566794
LL Group # 1496392
Account # 11964

Project Name: 1001327

Collected: 08/13/2014 13:30 by RL

Submitted: 08/15/2014 09:15
Reported: 08/27/2014 11:05

Chevron
L4310
6001 Bollinger Canyon Road
San Ramon CA 94583

NNS03

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**	**mg/kg**	
10237	Benzene	71-43-2	N.D.	0.026	49.48
	Reporting limits were raised due to interference from the sample matrix.				
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	360	20	463.99
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	
08272	Diesel Range Organics C12-C24	n.a.	1,600	16	5
08272	Heavy Range Organics C24-C40	n.a.	N.D.	53	5
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	
00111	Moisture	n.a.	5.8	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

State of Washington Lab Certification No. C457

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs Benzene only - Soil	SW-846 8260B	1	R142301AA	08/18/2014 17:12	Sarah A Guill	49.48
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201422735376	08/13/2014 13:30	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201422735376	08/13/2014 13:30	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201422735376	08/13/2014 13:30	Client Supplied	1
02005	NWTPH-GX Soil C7-C12	ECY 97-602 NWTPH-Gx	1	14232A34B	08/21/2014 17:43	Marie D Beamenderfer	463.99
06647	GC-5g Field Preserved MeOH	SW-846 5035A	1	201422735376	08/13/2014 13:30	Client Supplied	n.a.
08272	NWTPH-Dx soil	ECY 97-602 NWTPH-Dx modified	1	142320010A	08/25/2014 20:42	Glorines Suarez-Rivera	5
11234	WA DRO NW DX Soils (Non SG)	ECY 97-602 NWTPH-Dx 06/97	1	142320010A	08/20/2014 17:00	Sally L Appleyard	1
00111	Moisture	SM 2540 G-1997	1	14233820003B	08/21/2014 17:21	Scott W Freisher	1

Sample Description: SB-4 12.5-13.5 Grab Soil
Facility# 1001327
1602 N. Northlake Way - Seattle, WA

LL Sample # SW 7566795
LL Group # 1496392
Account # 11964

Project Name: 1001327

Collected: 08/13/2014 15:00 by RL

Submitted: 08/15/2014 09:15
Reported: 08/27/2014 11:05

Chevron
L4310
6001 Bollinger Canyon Road
San Ramon CA 94583

NNS04

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**	**mg/kg**	
10237	Benzene	71-43-2	N.D.	0.024	43.86
	Reporting limits were raised due to interference from the sample matrix.				
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	61	3.5	80.41
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	
08272	Diesel Range Organics C12-C24	n.a.	970	16	5
08272	Heavy Range Organics C24-C40	n.a.	N.D.	54	5
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	
00111	Moisture	n.a.	7.7	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

State of Washington Lab Certification No. C457

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs Benzene only - Soil	SW-846 8260B	1	R142301AA	08/18/2014 17:35	Sarah A Guill	43.86
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201422735376	08/13/2014 15:00	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201422735376	08/13/2014 15:00	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201422735376	08/13/2014 15:00	Client Supplied	1
02005	NWTPH-GX Soil C7-C12	ECY 97-602 NWTPH-Gx	1	14232A34B	08/21/2014 18:19	Marie D Beamenderfer	80.41
06647	GC-5g Field Preserved MeOH	SW-846 5035A	1	201422735376	08/13/2014 15:00	Client Supplied	n.a.
08272	NWTPH-Dx soil	ECY 97-602 NWTPH-Dx modified	1	142320010A	08/25/2014 21:04	Glorines Suarez-Rivera	5
11234	WA DRO NW DX Soils (Non SG)	ECY 97-602 NWTPH-Dx 06/97	1	142320010A	08/20/2014 17:00	Sally L Appleyard	1
00111	Moisture	SM 2540 G-1997	1	14233820003B	08/21/2014 17:21	Scott W Freisher	1

Sample Description: SB-5 10-11 Grab Soil
Facility# 1001327
1602 N. Northlake Way - Seattle, WA

LL Sample # SW 7566796
LL Group # 1496392
Account # 11964

Project Name: 1001327

Collected: 08/14/2014 10:00 by RL

Submitted: 08/15/2014 09:15
Reported: 08/27/2014 11:05

Chevron
L4310
6001 Bollinger Canyon Road
San Ramon CA 94583

NNS05

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**	**mg/kg**	
10237	Benzene	71-43-2	0.085	0.0004	0.75
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	1.7	1	21.98
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	
08272	Diesel Range Organics C12-C24	n.a.	N.D.	3.3	1
08272	Heavy Range Organics C24-C40	n.a.	N.D.	11	1
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	
00111	Moisture	n.a.	9.2	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

General Sample Comments

State of Washington Lab Certification No. C457

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs Benzene only - Soil	SW-846 8260B	1	X142301AA	08/19/2014 05:54	Christopher G Torres	0.75
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201422735376	08/14/2014 10:00	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201422735376	08/14/2014 10:00	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201422735376	08/14/2014 10:00	Client Supplied	1
02005	NWTPH-GX Soil C7-C12	ECY 97-602 NWTPH-Gx	1	14232A34A	08/20/2014 18:40	Marie D Beamenderfer	21.98
06647	GC-5g Field Preserved MeOH	SW-846 5035A	1	201422735376	08/14/2014 10:00	Client Supplied	n.a.
08272	NWTPH-Dx soil	ECY 97-602 NWTPH-Dx modified	1	142320010A	08/22/2014 23:06	Glorines Suarez-Rivera	1
11234	WA DRO NW DX Soils (Non SG)	ECY 97-602 NWTPH-Dx 06/97	1	142320010A	08/20/2014 17:00	Sally L Appleyard	1
00111	Moisture	SM 2540 G-1997	1	14233820003B	08/21/2014 17:21	Scott W Freisher	1

Sample Description: SB-6 10-11 Grab Soil
Facility# 1001327
1602 N. Northlake Way - Seattle, WA

LL Sample # SW 7566797
LL Group # 1496392
Account # 11964

Project Name: 1001327

Collected: 08/14/2014 09:00 by RL

Submitted: 08/15/2014 09:15
Reported: 08/27/2014 11:05

Chevron
L4310
6001 Bollinger Canyon Road
San Ramon CA 94583

NNS06

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**	**mg/kg**	
10237	Benzene	71-43-2	0.29	0.023	41.91
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	250	20	439.51
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	
08272	Diesel Range Organics C12-C24	n.a.	260	3.4	1
08272	Heavy Range Organics C24-C40	n.a.	32	11	1
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	
00111	Moisture	n.a.	10.6	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

General Sample Comments

State of Washington Lab Certification No. C457

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs Benzene only - Soil	SW-846 8260B	1	R142301AA	08/18/2014 17:58	Sarah A Guill	41.91
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201422735376	08/14/2014 09:00	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201422735376	08/14/2014 09:00	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201422735376	08/14/2014 09:00	Client Supplied	1
02005	NWTPH-GX Soil C7-C12	ECY 97-602 NWTPH-Gx	1	14232A34A	08/20/2014 21:39	Laura M Krieger	439.51
06647	GC-5g Field Preserved MeOH	SW-846 5035A	1	201422735376	08/14/2014 09:00	Client Supplied	n.a.
08272	NWTPH-Dx soil	ECY 97-602 NWTPH-Dx modified	1	142320010A	08/22/2014 23:28	Glorines Suarez-Rivera	1
11234	WA DRO NW DX Soils (Non SG)	ECY 97-602 NWTPH-Dx 06/97	1	142320010A	08/20/2014 17:00	Sally L Appleyard	1
00111	Moisture	SM 2540 G-1997	1	14233820003B	08/21/2014 17:21	Scott W Freisher	1

Sample Description: DUP-1 Grab Soil
Facility# 1001327
1602 N. Northlake Way - Seattle, WA

LL Sample # SW 7566798
LL Group # 1496392
Account # 11964

Project Name: 1001327

Collected: 08/13/2014 by RL

Submitted: 08/15/2014 09:15
Reported: 08/27/2014 11:05

Chevron
L4310
6001 Bollinger Canyon Road
San Ramon CA 94583

NNSFD

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**	**mg/kg**	
10237	Benzene	71-43-2	N.D.	0.029	51.47
	Reporting limits were raised due to interference from the sample matrix.				
GC Volatiles	**ECY 97-602 NWTPH-Gx**		**mg/kg**	**mg/kg**	
02005	NWTPH-GX Soil C7-C12	n.a.	3,000	240	5447.41
GC Petroleum Hydrocarbons	**ECY 97-602 NWTPH-Dx modified**		**mg/kg**	**mg/kg**	
08272	Diesel Range Organics C12-C24	n.a.	190	3.4	1
08272	Heavy Range Organics C24-C40	n.a.	92	11	1
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	
00111	Moisture	n.a.	10.5	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

State of Washington Lab Certification No. C457

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs Benzene only - Soil	SW-846 8260B	1	R142301AA	08/18/2014 18:20	Sarah A Guill	51.47
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201422735376	08/13/2014 00:00	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201422735376	08/13/2014 00:00	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201422735376	08/13/2014 00:00	Client Supplied	1
02005	NWTPH-GX Soil C7-C12	ECY 97-602 NWTPH-Gx	1	14232A34A	08/20/2014 22:14	Marie D Beamenderfer	5447.41
06647	GC-5g Field Preserved MeOH	SW-846 5035A	1	201422735376	08/13/2014 00:00	Client Supplied	n.a.
08272	NWTPH-Dx soil	ECY 97-602 NWTPH-Dx modified	1	142320010A	08/22/2014 23:51	Glorines Suarez-Rivera	1
11234	WA DRO NW DX Soils (Non SG)	ECY 97-602 NWTPH-Dx 06/97	1	142320010A	08/20/2014 17:00	Sally L Appleyard	1
00111	Moisture	SM 2540 G-1997	1	14233820003B	08/21/2014 17:21	Scott W Freisher	1

Quality Control Summary

Client Name: Chevron Group Number: 1496392
Reported: 08/27/14 at 11:05 AM

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: Q142301AA	Sample number(s): 7566793							
Benzene	N.D.	0.025	mg/kg	108	99	80-120	9	30
Batch number: R142301AA	Sample number(s): 7566792,7566794-7566795,7566797-7566798							
Benzene	N.D.	0.025	mg/kg	93	93	80-120	0	30
Batch number: X142301AA	Sample number(s): 7566796							
Benzene	N.D.	0.0005	mg/kg	94	91	80-120	3	30
Batch number: 14232A34A	Sample number(s): 7566792-7566793,7566796-7566798							
NWTPH-GX Soil C7-C12	N.D.	1.0	mg/kg	87	91	65-120	4	30
Batch number: 14232A34B	Sample number(s): 7566794-7566795							
NWTPH-GX Soil C7-C12	N.D.	1.0	mg/kg	87	91	65-120	4	30
Batch number: 142320010A	Sample number(s): 7566792-7566798							
Diesel Range Organics C12-C24	N.D.	3.0	mg/kg	88		60-120		
Heavy Range Organics C24-C40	N.D.	10.	mg/kg					
Batch number: 14233820003B	Sample number(s): 7566792-7566798							
Moisture				100		99-101		

Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike
Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	Dup RPD Max
Batch number: R142301AA	Sample number(s): 7566792,7566794-7566795,7566797-7566798 UNSPK: P565763								
Benzene	85	78	55-143	7	30				
Batch number: 142320010A	Sample number(s): 7566792-7566798 BKG: 7566792								
Diesel Range Organics C12-C24						290	270	8	20
Heavy Range Organics C24-C40						100	99	1 (1)	20
Batch number: 14233820003B	Sample number(s): 7566792-7566798 BKG: 7566793								
Moisture						11.9	11.7	2	5

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Chevron Group Number: 1496392
Reported: 08/27/14 at 11:05 AM

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: VOCs- Solid by 8260B
Batch number: Q142301AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
7566793	84	87	80	86
Blank	96	97	94	91
LCS	104	103	101	99
LCSD	95	93	93	93
Limits:	50-141	54-135	52-141	50-131

Analysis Name: VOCs- Solid by 8260B
Batch number: R142301AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
7566792	75	73	81	84
7566794	83	82	82	99
7566795	89	86	89	95
7566797	69	64	72	90
7566798	79	75	87	84
Blank	90	89	88	89
LCS	93	89	91	95
LCSD	94	90	94	95
MS	79	75	77	79
MSD	68	66	68	69
Limits:	50-141	54-135	52-141	50-131

Analysis Name: VOCs- Solid by 8260B
Batch number: X142301AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
7566796	110	100	96	104
Blank	112	99	95	100
LCS	112	101	97	105
LCSD	108	96	97	103
Limits:	50-141	54-135	52-141	50-131

Analysis Name: NWTPH-GX Soil C7-C12
Batch number: 14232A34A

	Trifluorotoluene-F
7566792	326*
7566793	0*
7566796	73
7566797	78
7566798	0*
Blank	83
LCS	85
LCSD	88

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Chevron Group Number: 1496392
Reported: 08/27/14 at 11:05 AM

Surrogate Quality Control

Limits: 50-142

Analysis Name: NWTPH-GX Soil C7-C12
Batch number: 14232A34B

	Trifluorotoluene-F
7566794	99
7566795	79
Blank	85
LCS	85
LCSD	88

Limits: 50-142

Analysis Name: NWTPH-Dx soil
Batch number: 142320010A

	Orthoterphenyl
7566792	129
7566793	104
7566794	118
7566795	104
7566796	112
7566797	144
7566798	127
Blank	116
DUP	128
LCS	118

Limits: 50-150

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Chevron Northwest Region Analysis Request/Chain of Custody

eurofins | Lancaster Laboratories

For Lancaster Laboratories use only
Acct. # 11964 Group # 1496392 Sample # 7566792-98
Instructions on reverse side correspond with circled numbers.

SCR #: 159455

1 Client Information

Facility # KC METRO 100-1327 WBS
Site Address 1602 N. Northlake Way, Seattle, WA
Chevron PM ERIC ROCHL Lead Consultant
Consultant/Office ARCADIS Seattle
Consultant Project Mgr. Scott Zorn
Consultant Phone # 206 726 4709
Sampler Ross LaGrandeur

4 Matrix

Soil: Sediment ☐ Soil ☒
Water: Ground ☐ Potable ☐ NPDES ☐ Surface ☐
Oil ☐ Air ☐

3 Grab / Composite

5 Analyses Requested

2 Sample Identification	Collected Date	Collected Time	Grab	Composite	Total Number of Containers	BTEX + MTBE 8021 ☐ 8260 ☒ Naphth ☒ (BENZENE ONLY)	8260 full scan	Oxygenates ____	NWTPH GX	NWTPH DX	Silica Gel Cleanup ☒	Lead Total ☐ Diss. ☐ Method ____	WAVPH ☐ WAEPH ☐	Moisture
SB-1 12.5-13.5	8-8-14	930	X			X			X	X				X
SB-2 12.5-13.5	↓	1100	↓			X			X	X				X
SB-3 12.5-13.5	↓	1330				X			X	X				X
SB-4 12.5-13.5	↓	1500				X			X	X				X
SB-5 10-11	8-14-14	1000				X			X	X				X
SB-6 10-11	↓	900				X			X	X				X
DUP-1	8-13-14	—	↓			X			X	X				X

6 Remarks

+ No SGC on DRO/HO
+ BTEX run Benzene only
+ Contact Sam Miles 206-726-4720

Results in Dry Weight ☐
J value reporting needed ☐
Must meet lowest detection limits possible for 8260 compounds ☐
8021 MTBE Confirmation ☐
Confirm MTBE + Naphthalene ☐
Confirm highest hit by 8260 ☐
Confirm all hits by 8260 ☐
Run _____ oxy's on highest hit ☐
Run _____ oxy's on all hits ☐

7 Turnaround Time Requested (TAT) (please circle)

Standard | 5 day | 4 day
72 hour | 48 hour | 24 hour

8 Data Package Options (please circle if required)

Type I - Full | Type VI (Raw Data)

Relinquished by	Date	Time	Received by	Date	Time
[signature]	8/15/14	1305			
Ross LaGrandeur	8/14/14	1500			
Relinquished by Commerical Carrier: UPS X FedEx ____ Other ____			Received by [signature]	8.15.14	915

Temperature Upon Receipt 1.2 °C
Custody Seals Intact? Yes No

9

Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL	Reporting Limit	**BMQL**	Below Minimum Quantitation Level
N.D.	none detected	**MPN**	Most Probable Number
TNTC	Too Numerous To Count	**CP Units**	cobalt-chloroplatinate units
IU	International Units	**NTU**	nephelometric turbidity units
umhos/cm	micromhos/cm	**ng**	nanogram(s)
C	degrees Celsius	**F**	degrees Fahrenheit
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
µg	microgram(s)	**mg**	milligram(s)
mL	milliliter(s)	**L**	liter(s)
m3	cubic meter(s)	**µL**	microliter(s)
		pg/L	picogram/liter

< less than - The number following the sign is the limit of quantitation, the smallest amount of analyte which can be reliably determined using this specific test.

> greater than

ppm parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg), or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.

ppb parts per billion

Dry weight basis Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Data Qualifiers:

C – result confirmed by reanalysis.

J - estimated value – The result is ≥ the Method Detection Limit (MDL) and < the Limit of Quantitation (LOQ).

U.S. EPA CLP Data Qualifiers:

Organic Qualifiers		Inorganic Qualifiers	
A	TIC is a possible aldol-condensation product	**B**	Value is <CRDL, but ≥IDL
B	Analyte was also detected in the blank	**E**	Estimated due to interference
C	Pesticide result confirmed by GC/MS	**M**	Duplicate injection precision not met
D	Compound quantitated on a diluted sample	**N**	Spike sample not within control limits
E	Concentration exceeds the calibration range of the instrument	**S**	Method of standard additions (MSA) used for calculation
N	Presumptive evidence of a compound (TICs only)	**U**	Compound was not detected
P	Concentration difference between primary and confirmation columns >25%	**W**	Post digestion spike out of control limits
U	Compound was not detected	*****	Duplicate analysis not within control limits
X,Y,Z	Defined in case narrative	**+**	Correlation coefficient for MSA <0.995

Analytical test results meet all requirements of NELAC unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR part 136 Table II as “analyze immediately” are not performed within 15 minutes.

Appendix E

DPE Pilot Test Field Notes

1-5-14 KC METRO DPE EVENT S MCGUIRE

0645 → SCM arrives onsite. Opens wooden boat lot. Fills out paperwork.

0930 → Kurtis of Clear Creek arrives onsite w/ Secondary Containment and components to level trailer. SCM conducts tailgate meeting.

0900 → Lay out Secondary Containment. Dave of Clear Creek arrives onsite w/ more parts. Setup Secondary Containment and wait for trailer.

1000 → Trailer arrives onsite (EL of AREA 45, NW of CCC). Mob into position.

1030 → Level trailer w/ jacks and cranes.

1100 → Mob generator into position. Setup fencing and complete Secondary containment.

1130 → Start to Setup System. Tom and Kurtis leave site.

1200 → SHJ arrives connects generator to system.

1330 → SCM/RL start prepping system for run. SHJ leaves site.

1450 → Gauge site wells pre startup:

	DTW	DTB
MW-9R	21.70	≠22.75
EW-1	21.70	21.90
MW-29	18.90	22.50
MW-30	18.69	20.90

*NO SHEEN IN ALL WELLS.

1500 → START SYSTEM, Water clears in first 30 seconds.

1530 → Parameters set; NO DEVIATION PID = 666

18.5" Hg Manifold Vac
18.5" Hg KO Vac
5" Hg Cyclone Vac
20" STINGER VAC
3,350 RPM
50.0° TEMP
73.03 CFM

RESPONSE WELLS

EW-1 = 9.5" H_2O VAC
MW-29 = .9" H_2O VAC
MW-30 - 0.0 H_2O VAC
*NO WATER VISIBLE IN NO TANK

Scale: 1 square = _____

1-5-14 KC METRO DPE EVENT (2) S. McGuire

1600 → Parameter Set: NO DILUTION PID = 636

RESPONSE WELLS:
EW-1 = 9.5" H_2O @ 21.75' DTW
MW-29 = .8" H_2O @ 18.80' DTW
MW-30 = 0.0" H_2O @ 18.70 DTW
NO WATER IN KO TANK.

18.5" MANIFOLD VAC
18.5" KO VAC
5" CASING VAC
20" STINGER VAC
3700 FPM
48.8°f TEMP
80 SCFM

1630 → Parameter Set: NO DILUTION PID 725 ppm

RESPONSE WELLS:
EW-1 = 9.8" H_2O
MW-29 = 1" H_2O
MW-30 = 0" H_2O
NO WATER IN KO TANK

18.5" MANIFOLD VAC
18.5" KO VAC
5" CASING VAC
20" STINGER VAC
3600 FPM
48°f TEMP
7949 CFM

1700 → Parameter set: NO DILUTION PID = 726

RESPONSE WELLS:
EW-1 = 9.8" H_2O @ 21.76' DTW
MW-29 = 0.7" H_2O @ 18.81' DTW
MW-30 = 0.0" H_2O @ 18.71' DTW
NO WATER IN KO

18.5" MANIFOLD VAC
18.5" KO VAC
5" CASING VAC
20" STINGER VAC
1000 FPM
47.7°f TEMP
87.2 CFM

1715 → Talk to Peter Campbell who advises to shut down and start up again tomorrow, see if LNAPL is present and if not focus on pulling out concentrations. SCM calls 52. Pack up site.

1730 → Site is closed up. All locus in position. OFF site.

James McGuire

Scale: 1 square = _____

1-6-11 KC METRO DPE EVENT DAY 2 S. McGUIRE

0800 → SCM arrives onsite. Conducts H&S TAILGATE Meeting. Reviews Marked up OEM JSA. Does system look over

0815 → SCM gauging round pre-System startup:

MW-9R = 21.61 DTW. NO LNAPL. 310.1 PID
EW-1 = 21.67 DTW. NO LNAPL. 370.4 PID
MW-29 = 18.76 DTW. NO LNAPL. 0.0 PID
MW-30 = 18.67 DTW. NO LNAPL. 0.0 PID

0830 → System is turned on.

0930 → System Parameters: NO DILUTION PID = 719

18.5" Hg Manifold Vac
18.5" Hg KO Vac
5" Hg Casing Vac
20" Hg stinger vac
3640 FPM
54°F TEMP
79.352 CFM

RESPONSE WELLS:
EW-1 = 9.9" H_2O VAC @ 21.69' DTW
MW-29 = 1.1" H_2O VAC @ 18.76' DTW
MW-30 = ~~18.67~~ 0.0" H_2O VAC @ 18.67

SYSTEM KO TANK HAS NO WATER

1030 → System Parameters: NO DILUTION PID = 789.4

18.5" Hg MANIFOLD VAC
14.5" Hg KO VAC
5" Hg CASING VAC
20" Hg STINGER VAC
3920 FPM
57°F TEMP
97.216 CFM

RESPONSE WELLS:
EW-1 = 9.7" H_2O VAC @ 21.70' DTW
MW-29 = 0.9" H_2O VAC @ 18.76
MW-30 = 0.0" H_2O VAC @ 18.66

SYSTEM KO TANK HAS NO WATER

1130 → System Parameter: NO DILUTION PID = 709.9

18.5" Hg MANIFOLD VAC
18.5" Hg KO VAC
5" Hg CASING VAC
20.5" Hg STINGER VAC
3820 FPM
57°F TEM

RESPONSE WELLS:
EW-1 = 9.8" H_2O VAC @ 21.70' DTW
MW-29 = 0.9" H_2O VAC @ 18.76' DTW
MW-30 = 0.0" H_2O VAC @ 18.66 DTW
SYSTEM KO TANK HAS NO WATER
SYSTEM FLOW = 83.276 CFM

Scale: 1 square = _____

1-6-14 KC METRO DPE EVENT DAY 2 (PAGE 2) S. McGUIRE

1230 → SYSTEM PARAMETERS: NO DILUTION PID = 689 PPM

18.5" Hg MANIFOLD VAC	RESPONSE WELLS:
18.5" Hg KO VAC	EW-1 = 9.7" H_2O VAC @ 21.71' DTW
5" Hg CASING VAC	MW-29 = 0.7" H_2O VAC @ 18.78 DTW
20" Hg STINGER VAC	MW-30 = 0.0" H_2O VAC @ 18.67 DTW
3900 FPM	SYSTEM KO HAS NO H_2O
58° F TEMP	SYSTEM FLOW = 85.02 CFM

1330 → SYSTEM PARAMETERS: NO DILUTION PID = 619 PPM

18.5" Hg MANIFOLD VAC	RESPONSE WELLS:
18.5" Hg KO VAC	EW-1 = 9.9" H_2O VAC @ 21.72' DTW
5" CASING VAC	MW-29 = 0.9" H_2O VAC @ 18.77 DTW
20.5" Hg STINGER VAC	MW-30 = 0.0" H_2O VAC @ 18.66 DTW
3880 FPM	SYSTEM KO HAS NO H_2O
59° F TEMP	SYSTEM FLOW = 81.58 CFM

1400 → Talk to Peter Campbell. Advises SCM to call PC at end of day to decide whether to continue running or stop. Is encouraged by concentrations getting pulled out.

1430 → SYSTEM PARAMETERS: NO DILUTION PID = 616 PPM

18.5" Hg MANIFOLD VAC	RESPONSE WELLS:
18.5" Hg KO VAC	EW-1 = 9.5" H_2O VAC @ 21.72' DTW
5" CASING VAC	MW-29 = 0.9" H_2O VAC @ 18.77 DTW
20.5" Hg STINGER VAC	MW-30 = 0.0" H_2O VAC @ 18.66 DTW
4019 FPM	SYSTEM KO HAS NO H_2O
58° F TEMP	SYSTEM FLOW = 87.61

1530 → SYSTEM PARAMETERS: NO DILUTION PID = 616 PPM

18.5" Hg MANIFOLD VAC	RESPONSE WELLS:
18.5" Hg KO VAC	EW-1 = 9.4" H_2O VAC @ 21.72' DTW
5" CASING VAC	MW-29 = 0.8" H_2O VAC @ 18.77 DTW
20.5" Hg STINGER VAC	MW-30 = 0.0" H_2O VAC @ 18.65 DTW
4008 FPM	SYSTEM KO HAS NO H_2O
57°	SYSTEM FLOW = 87.54

1-6-14 KL METRO DPE EVENT DAY 2 (PAGE 3) S. McGUIRE

1630 → SYSTEM PARAMETERS → NO DILUTION PID = 627

18.5" Hg MANIFOLD VAC	RESPONSE WELLS
18.5" KO VAC	EW-1 = 9.4" H_2O VAC @ 21.72' DTW
6" CASING VAC	MW-29 = 0.8" H_2O VAC @ 18.75' DTW
20.5" STINGER VAC	MW-30 = 0.0" H_2O VAC @ 18.65 DTW
4000 FPM	SYSTEM KO has no H_2O
56° F TEMP	SYSTEM FLOW = 87.20 CFM

1645 → Talk to Peter Campbell. Advises SCM to run system for another day while concentrations / mass removal are high. SCM calls SZ to inform of work done.

1700 → CLEAN UP AND LOCK DOWN SITE.

1730 → SCM OFF SITE TO go back to office to change equipment.

James McGuire

Scale: 1 square = _____

1-7-14 KC METRO DPE EVENT DAY 3 S. McGUIRE

0750 → SLM arrives onsite. Conducts H&S TAILGATE MEETING. Reviews Chevron OE tenants and site hazards.

0805 → unlock system compound. Prep system to run. Gauge wells:

MW-9R = 21.65 DTW NO LNAPL 297 PPM PID
EW-1 ~~MW-29~~ = 21.65 DTW NO LNAPL 314 PPM PID
MW-29 = ~~18.82~~ DTW NO LNAPL 0.0 PPM PID
MW-30 = 18.70 DTW NO LNAPL 0.0 PPM PID

0830 → Startup System. Make sure it is running well.

0930 → SYSTEM PARAMETERS: NO DILUTION PID = 712

18.5" Hg MANIFOLD VAC
18.5" Hg KO VAC
6" Hg CASING VAC
19.5" Hg STINGER VAC
1005 FPM
51° F TEMP

RESPONSE WELLS:
EW-1 = 21.69' DTW & 9.5" H_2O VAC
MW-29 = 1.1" H_2O VAC / 18.80' DTW
MW-30 = 0.0" H_2O / 18.70' DTW
SYSTEM KO has no H_2O
SYSTEM FLOW = 87 CFM

1030 → SYSTEM PARAMETERS: NO DILUTION PID = 678

18.5" Hg MANIFOLD VAC
18.5" Hg KO VAC
6" Hg CASING VAC
19.5" Hg STINGER VAC
4019 FPM
51°F TEMP

RESPONSE WELLS:
EW-1 = 21.70 DTW / 9.4" H_2O VAC
MW-29 = 18.80 DTW / 1.0" H_2O VAC
MW-30 = 18.70 DTW / 0.0" H_2O VAC
SYSTEM KO HAS NO H_2O
SYSTEM FLOW: 87 CFM

1130 → SYSTEM PARAMETERS: NO DILUTION PID = 654

18.5" Hg MANIFOLD VAC
18.5" Hg KO VAC
6" Hg CASING VAC
19.5" Hg STINGER VAC
1000 FLOW FPM
52° F TEMP

RESPONSE WELLS:
EW-1 = 21.70 DTW / 9.4" H_2O
MW-29 = 18.80 DTW / 1.0" H_2O
MW-30 = 18.70 DTW / 0.0" H_2O VAC
SYSTEM KO HAS NO H_2O
SYSTEM FLOW: 87 CFM

1-7-14 KC METRO DPE EVENT DAY 3 (PAGE 2) S.McGUIRE

1130 → Talk to Peter Campbell who wants to test vacuum on well casing as it seems slightly low. SCM replaces gauge on top of well with consistent reading of 6" Hg VAC for casing. PC also wants SCM to turn down manifold vac to see if removal is the same. SCM reduces VAC at manifold with parameter round:

15" Hg MANIFOLD VAC	SYSTEM PID = 621
15" Hg KO VAC	NO H_2O
15" CASING VAC	FLOW = 69.76
16" STINGER VAC	
3200 VELOCITY FPM	

CALL PC who advises SCM to reset system back to original configuration.

1230 → SZ arrives onsite. SCM shows him system setup. Take Parameter round: NO DILUTION PID = 651.3

18.5" Hg MANIFOLD VAC	RESPONSE WELLS:
18.5" Hg KO VAC	EW-1 = 21.70 / 9.5" H_2O VAC
6" CASING VAC	MW-29 = 18.80 DTW / 1.1" H_2O VAC
20" STINGER VAC	MW-30 = 18.70 DTW / 0.0" H_2O VAC
4021 FPM	NO H_2O IN KO
54°F TEMP	SYSTEM FLOW = 87.65

1330 → PARAMETER ROUND: NO DILUTION PID = 647

18.5" Hg MANIFOLD VAC	RESPONSE WELLS:
18.5" Hg KO VAC	EW-1 = 21.70 DTW / 9.6" H_2O VAC
6" Hg CASING VAC	MW-29 = 18.80 DTW / 1.0" H_2O VAC
20" STINGER VAC	MW-30 = 18.70 DTW / 0.0" H_2O VAC
4033 FPM	NO H_2O IN KO
55°F TEMP	SYSTEM FLOW = 87

1430 → PARAMETER ROUND: NO DILUTION PID = 645

18.5" Hg MANIFOLD VA	RESPONSE WELLS:
18.5" Hg KO VAC	EW-1 = 21.70 DTW / 9.5" H_2O VAC
6" Hg CASING VAC	MW-29 = 18.80 DTW / 1.0" H_2O VAC
20" STINGER VAC	MW-30 = 18.70 DTW / 0.0" H_2O VAC
4027 FPM	NO H_2O IN KO
56°F TEMP	SYSTEM FLOW = 87

Scale: 1 square = _____

1-7-14 UC METRO DPE EVENT DAY 3 (PAGE 3) S.MCGUIRE

1530 → PARAMETER ROUND: NO DILUTION PID = 671

18.5" Hg MANIFOLD VAC
18.5" Hg KO VAC
6" Hg CASING VAC
20" STINGER VAC
4035 FPM
57° TEMP

RESPONSE WELLS:
EW-1 = 21.70 DTW / 9.5" H_2O VAC
MW-29 = 18.80 DTW / 1.0" H_2O VAC
MW-30 = 18.70 DTW / 0.0" H_2O
NO H_2O IN KO
SYSTEM FLOW = 87

1630 → PARAMETER ROUND: NO DILUTION PID = 639

18.5 Hg MANIFOLD VAC
18.5" Hg KO VAC
6" Hg CASING VAC
20" Hg STINGER VAC
4050 FPM
55° TEMP

EW-1 = 21.70 DTW / 9.6" H_2O VAC
MW-29 = 18.80 DTW / 0.9" H_2O
MW-30 = 18.71 DTW / 0.0" H_2O
NO H_2O IN KO
SYSTEM FLOW = 88

1650 → Call PC w. the stats from day. Will continue to run tomorrow.

1725 → SLM clean up site.

1745 → JM off site to office to charge equipment

James McGuire

Scale: 1 square = _____

1-8-15 KC METRO DPE EVENT DAY 4 R. LaCrambe

715 Arrive on site - H&S tailgate - review SOW, JSAs & HASP

745 Open trailer & start generator

800 Initial gauging, sound, then start system

MW-9R = 21.50 DTW NO LNAPL PID = 127
EW-1 = 21.72 DTW NO LNAPL PID = 693
MW-29 = 15.61 DTW NO LNAPL PID = 4.3
MW-30 = 18.46 DTW NO LNAPL PID = 1.6

I was told by LEWIS that their dewatering well in SW corner is at ~ 22' bgs

900 System Parameters -0 No dilution

19.5 "Hg Manifold Vac
19.5 "Hg KO vac
5 "Hg Casing Vac
20.5 "Hg Stinger Vac
~~4000~~ FPM
56° °F temp
551 VOC

Response Wells DTW/in H_2O
EW-1 21.72/ >5
MW-29 18.61 / 0.6
MW-30 18.45 / 0

1000 System Parameters -0 No dilution

19 "Hg Manifold
19 "Hg KO
5 "Hg Casing
20.5 "Hg Stinger
~~4000~~ FPM
~~56°~~ °F Temp
5 23 VOC

Response Wells DTW/in H_2O
EW-1 21.72 / >5
MW-29 18.62 / 0.7
MW-30 18.46 / 0

1100 System Parameters -0 No Dilution

19 "Hg Manifold
19 "Hg KO
5 "Hg Casing
20.5 "Hg Stinger

Response Well DTW/in H_2O
EW-1 21.72 / >5 9.2"
MW-29 18.65 / 0.6
MW-30 18.46 / 0

Scale: 1 square = 4027 FPM
57° F TEMP

1115 → SCM arrives on site.

1-8-15 KC METRO DPE EVENT DAY 1 (PAGE 2) S. MCGUIRE

1200 → System Parameters: NO DILUTION 471 ppm PID

19" Hg MANIFOLD VAC
19" KO VAC
5" CASING VAC
20" STINGER VAC
4061 FPM
60° F TEMP

RESPONSE WELLS:
EW-1 = 21.72 DTW / 9.3" H_2O VAC
MW-29 = 18.65 DTW / 0.9" H_2O VAC
MW-30 = 18.46 DTW / 0.0" H_2O VAC
*NO H_2O in KO
SYSTEM FLOW = 88 CFM

1300 → SYSTEM PARAMETERS: NO DILUTION 440 ppm PID

19" Hg MANIFOLD VAC
19" KO Hg VAC
5" Hg CASING VAC
20" Hg STINGER VAC
59° F TEMP
4054

RESPONSE WELLS:
EW-1 = 21.72 DTW / 9.4" H_2O VAC
MW-29 = 18.65 DTW / 0.7" H_2O VAC
MW-30 = 18.47 DTW / 0.0" H_2O VAC
*NO H_2O IN KO
SYSTEM FLOW = 88 CFM

1400 → SYSTEM PARAMETERS: NO DILUTION 421 PPM PID

19" Hg MANIFOLD VAC
19" Hg KO MANIFOLD VAC
5" Hg CASING VAC
20" Hg STINGER VAC
58° F TEMP
4078 FPM

RESPONSE WELLS:
EW-1 = 21.73 DTW / 9.5" H_2O VAC
MW-29 = 18.67 DTW / 0.7" H_2O VAC
MW-30 = 18.46 DTW / 0.0" H_2O VAC
*NO H_2O IN KO
SYSTEM FLOW = 89 CFM

1430 → Talk to Peter Campbell. Plan is to demob tomorrow after full run today.

1500 → SYSTEM PARAMETERS: NO DILUTION 401 PPM PID

19" Hg MANIFOLD VAC
19" Hg KO MANIFOLD VAC
5" Hg CASING VAC
20" Hg STINGER VAC
57° F TEMP
4039 FPM

RESPONSE WELLS
EW-1 = 21.73 DTW / 9.3" H_2O VAC
MW-29 = 18.67 DTW / 0.7" H_2O VAC
MW-30 = 18.46 DTW / 0.0" H_2O VAC
*NO H_2O IN KO
SYSTEM FLOW = 88 CFM

Scale: 1 square = _____

1-8-15 KC METRO DPE EVENT DAY 4 S. MCGUIRE

~~1600~~ 1600 → SYSTEM PARAMETERS: NO DILUTION 394 PED

1'

19" Hg MANIFOLD VAC	RESPONSE WELLS:
19" Hg HO VAC	EW-1 = 21.73 / 9.4" H_2O VAC
5" Hg CASING VAC	MW-29 = 18.67 / 0.7" H_2O VAC
20" Hg STINGER VAC	MW-30 = 18.46 / 0.0" H_2O VAC
4000 FPM	FLOW = 87 CFM
56° f TEMP	* NO H_2O in HO TANK.

1615 → TALK TO SZ about shutting down.

1630 → CLEAN/ UP SYSTEM.

1700 → SLM OFF S555.

James McGuire

Scale: 1 square = _____

1-9-15 KC METRO DPE EVENT DAY 5 S.M'GUIRE

0700 → SCM/RL meet up on site. Conduct H&S tailgate meeting. Review OE tenants and SOW for day. Begin cleaning up all components of system.

0900 → CLEAR CREEK (TOM & KURTIS) arrive onsite. Review SOW. Conduct tailgate meeting.

0830 → Go over to system to prep for demob. Tongue of generator is too close to boom truck (LKL) to move.

1000 → Connect CCC truck to system. RL will go with truck to Edmonds terminal to drop off system. SCM will stay with Kurtis CCC to wait for boom truck to move to demob generator. Gauge wells.

1035 → TOM/RL leave site.

1245 → Boom truck is moved

1330 → Demob generator. Clean up site area.

1900 → SCM/Kurtis off site

James McGuire

GAUGE
MW-9R = 21.49 DTW / NO LNAPL PID = 131
EW-1 = 21.70 DTW / NO LNAPL PID = 651
MW-29 = 18.61 DTW / NO LNAPL PID = 2.0
MW-30 = 18.50 DTW / NO LNAPL PID = 0.0

Scale: 1 square = _____

Appendix F

Dual Phase Extraction Pilot Test
Field Measurements and Results

Table F-1
Dual Phase Extraction Parameters and Measurements
Former Chevron Bulk Plant #1001327
1602 North Northlake Place
Seattle, Washington

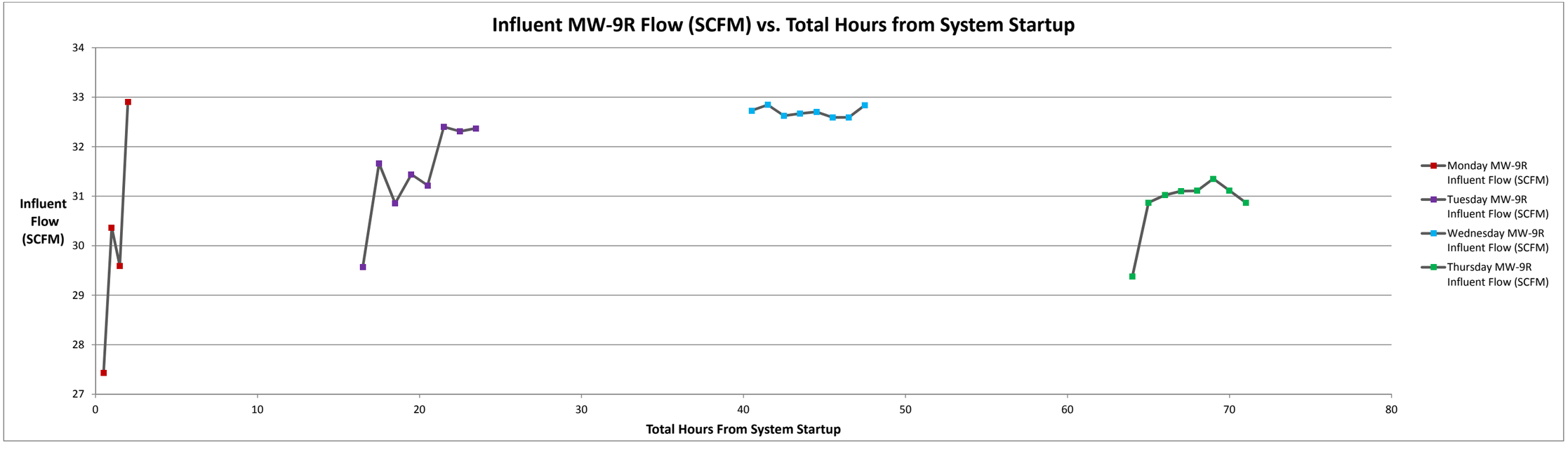
System Parameters															Response Well Parameters						
Date	Time	Time Since Startup (hours)	Runtime Since Startup (hours)	PID (ppm)	Manifold Vacuum (in. Hg)	Knockout Tank Vacuum (in. Hg)	Casing Vacuum (in. Hg)	Stinger Vacuum* (in. Hg)	Velocity (ft/min)	Flow (ACFM)	Flow (SCFM)	Influent Temp (°F)	Mass Removal Rate (lbs./day)	Cumulative Mass Removal (lbs.)	EW-1 VAC (in. H_2O)	EW-1 DTW (feet btoc)	MW-29 VAC (in. H_2O)	MW-29 DTW (feet btoc)	MW-30 VAC (in. H_2O)	MW-30 DTW (feet btoc)	MW-9R DTW (feet btoc)
1/5/2015	1450	0	0	--	--	--	--	--	--	--	--	--	--	0.00	--	21.70	--	18.80	--	18.68	21.70
1/5/2015	1530	0.5	0.5	666	18.5	18.5	5	20	3350	164.49	61.78	50	13.25	0.28	9.5	--	0.9	--	0.0	--	--
1/5/2015	1600	1	1	636	18.5	18.5	5	20	3700	181.67	68.40	48.8	14.01	0.57	9.5	21.75	0.8	18.80	0.0	18.70	--
1/5/2015	1630	1.5	1.5	725	18.5	18.5	5	20	3600	176.76	66.65	48	15.56	0.89	9.8	--	1.0	--	0.0	--	--
1/5/2015	1700	2	2	726	18.5	18.5	5	20	4000	196.40	74.10	47.7	17.32	1.25	9.8	21.76	0.7	18.81	0.0	18.71	--
1/6/2015	0815	15.25	2	--	--	--	--	--	--	--	--	--	--	1.25	--	21.67	--	18.76	--	18.67	21.61
1/6/2015	0930	16.5	3	719	18.5	18.5	5	20	3640	178.72	66.61	54	15.42	1.90	9.9	21.69	1.1	18.76	0.0	18.67	--
1/6/2015	1030	17.5	4	789.4	18.5	18.5	5	20	3920	192.47	71.32	57	18.13	2.65	9.7	21.70	0.9	18.76	0.0	18.66	--
1/6/2015	1130	18.5	5	709.9	18.5	18.5	5	20.5	3820	187.56	69.50	57	15.89	3.31	9.8	21.70	0.9	18.76	0.0	18.66	--
1/6/2015	1230	19.5	6	689	18.5	18.5	5	20	3900	191.49	70.81	58	15.71	3.97	9.7	21.71	0.7	18.78	0.0	18.67	--
1/6/2015	1330	20.5	7	619	18.5	18.5	5	20.5	3880	190.51	70.32	59	14.01	4.55	9.9	21.72	0.8	18.77	0.0	18.66	--
1/6/2015	1430	21.5	8	616	18.5	18.5	5	20.5	4019	197.33	72.98	58	14.47	5.15	9.5	21.72	0.8	18.77	0.0	18.66	--
1/6/2015	1530	22.5	9	646	18.5	18.5	5	20.5	4000	196.40	72.77	57	15.14	5.78	9.4	21.72	0.8	18.77	0.0	18.65	--
1/6/2015	1630	23.5	10	627	18.5	18.5	6	20.5	4000	196.40	72.91	56	14.72	6.40	9.4	21.72	0.8	18.75	0.0	18.65	--
1/7/2015	0805	39.1	10	--	--	--	--	--	--	--	--	--	--	6.40	--	21.65	--	18.82	--	18.70	21.65
1/7/2015	0930	40.5	11	712	18.5	18.5	6	19.5	4005	196.40	73.63	51	16.88	7.10	9.5	21.69	1.1	18.80	0.0	18.70	--
1/7/2015	1030	41.5	12	678	18.5	18.5	6	19.5	4019	196.40	73.63	51	16.07	7.77	9.4	21.70	1.0	18.80	0.0	18.70	--
1/7/2015	1130	42.5	13	654	18.5	18.5	6	19.5	4000	196.40	73.48	52	15.47	8.42	9.4	21.70	1.0	18.80	0.0	18.70	--
1/7/2015	1230	43.5	14	651.3	18.5	18.5	6	20	4021	196.40	73.20	54	15.35	9.06	9.5	21.70	1.1	18.80	0.0	18.70	--
1/7/2015	1330	44.5	15	647	18.5	18.5	6	20	4033	196.40	73.05	55	15.22	9.69	9.6	21.70	1.0	18.80	0.0	18.70	--
1/7/2015	1430	45.5	16	645	18.5	18.5	6	20	4027	196.40	72.91	56	15.14	10.32	9.5	21.70	1.0	18.80	0.0	18.70	--
1/7/2015	1530	46.5	17	671	18.5	18.5	6	20	4035	196.40	72.77	57	15.72	10.98	9.5	21.70	1.0	18.80	0.0	18.70	--
1/7/2015	1630	47.5	18	639	18.5	18.5	6	20	4050	196.40	73.05	55	15.03	11.60	9.6	21.70	0.9	18.80	0.0	18.71	--
1/8/2015	0800	63	18	--	--	--	--	--	--	--	--	--	--	11.60	--	21.72	--	18.61	--	18.46	21.5
1/8/2015	0900	64	19	551	19.5	19.5	5	20.5	4000	196.40	66.15	56	11.74	12.09	9.2	21.72	0.6	18.61	0.0	18.45	--
1/8/2015	1000	65	20	523	19	19	5	20.5	4000	196.40	69.53	56	11.71	12.58	9.2	21.72	0.7	18.62	0.0	18.46	--
1/8/2015	1100	66	21	498	19	19	5	20	4027	196.40	69.40	57	11.13	13.04	9.3	21.72	0.6	18.65	0.0	18.46	--
1/8/2015	1200	67	22	471	19	19	5	20	4061	196.40	69.00	60	10.46	13.48	9.4	21.72	0.8	18.65	0.0	18.46	--
1/8/2015	1300	68	23	440	19	19	5	20	4054	196.40	69.13	59	9.79	13.89	9.5	21.72	0.7	18.65	0.0	18.47	--
1/8/2015	1400	69	24	421	19	19	5	20	4078	196.40	69.26	58	9.39	14.28	9.3	21.73	0.7	18.67	0.0	18.46	--
1/8/2015	1500	70	25	401	19	19	5	20	4039	196.40	69.40	57	8.96	14.65	9.4	21.73	0.7	18.67	0.0	18.46	--
1/8/2015	1600	71	26	394	19	19	5	20	4000	196.40	69.53	56	8.82	15.02	9.4	21.73	0.7	18.67	0.0	18.46	--
Average Values During Pilot Test				**613**	**19**	**19**	**5.32**	**20**	**3939**	**192.59**	**70.55**	**55**	**13.95**	**--**	**9.52**	**21.71**	**0.85**	**18.74**	**<0.01**	**18.61**	**--**

LEGEND:

ppm parts per million
in. Hg inches of mercury
ft/min feet per minute
ACFM ctual cubic feet per minute
SCFM standard cubic feet per minute
°F degrees Fahrenheit
lbs. pounds
in. H_2O inches of water column
feet bgs feet below top of casing

* Difficulties were encountered when reading the stinger vacuum gauge. The gauge was changed out, but the stinger vacuum gauge still read higher than the manifold vacuum.

Chart F-1
System Flow During DPE Pilot Test
Former Chevron Bulk Plant #1001327
1602 North Northlake Place
Seattle, Washington



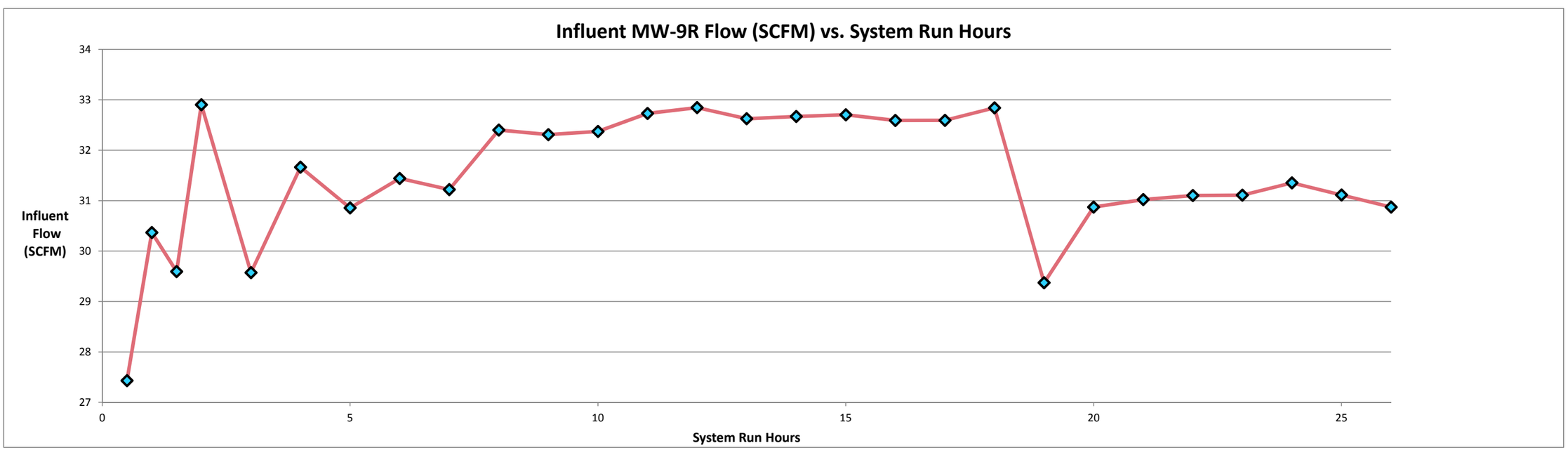
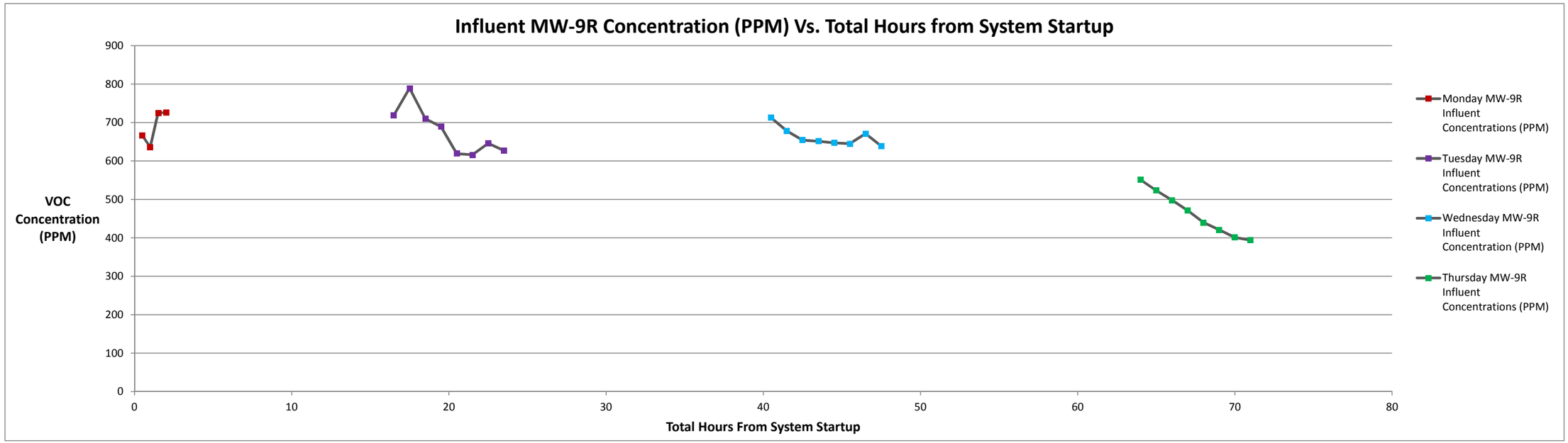


Chart F-2
PID Measurements During DPE Pilot Test
Former Chevron Bulk Plant #1001327
1602 North Northlake Place
Seattle, Washington



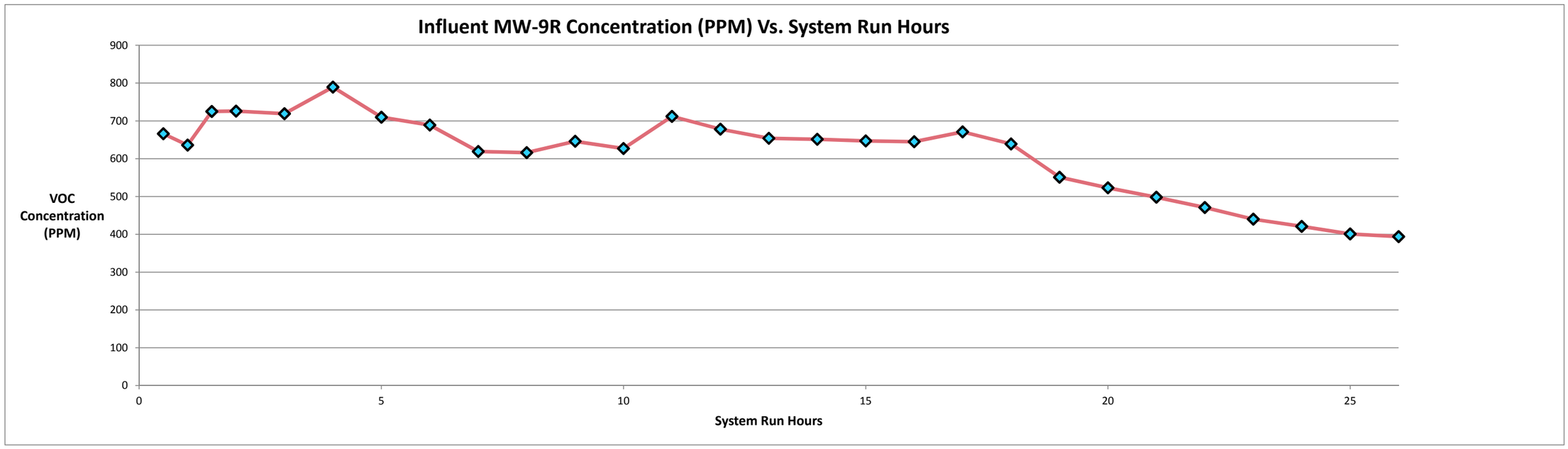
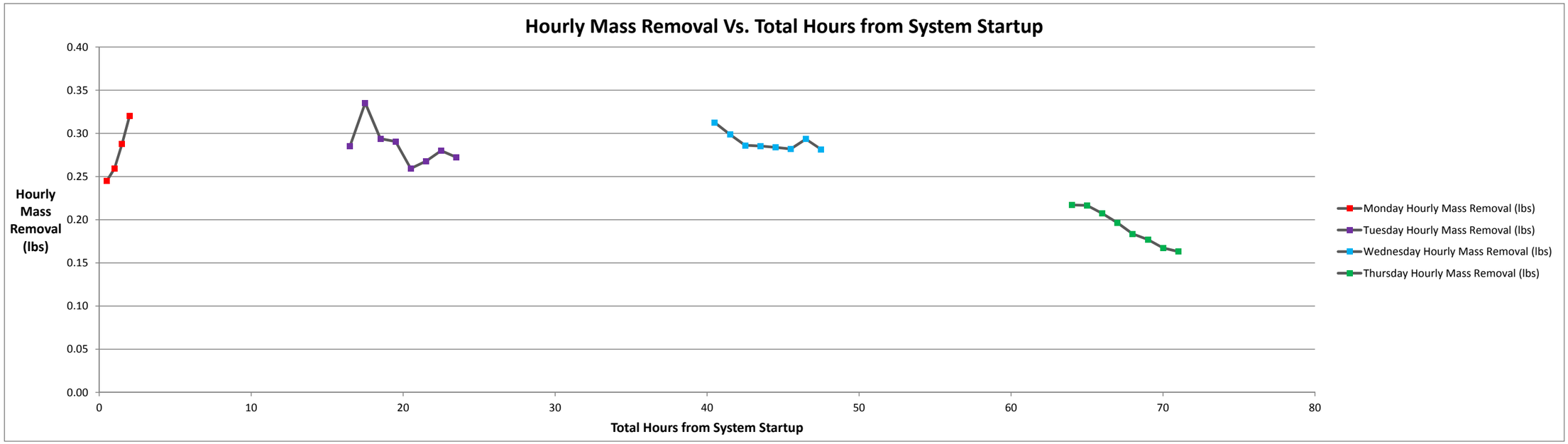


Chart F-3
Hourly Mass Removal During DPE Pilot Test
Former Chevron Bulk Plant #1001327
1602 North Northlake Place
Seattle, Washington



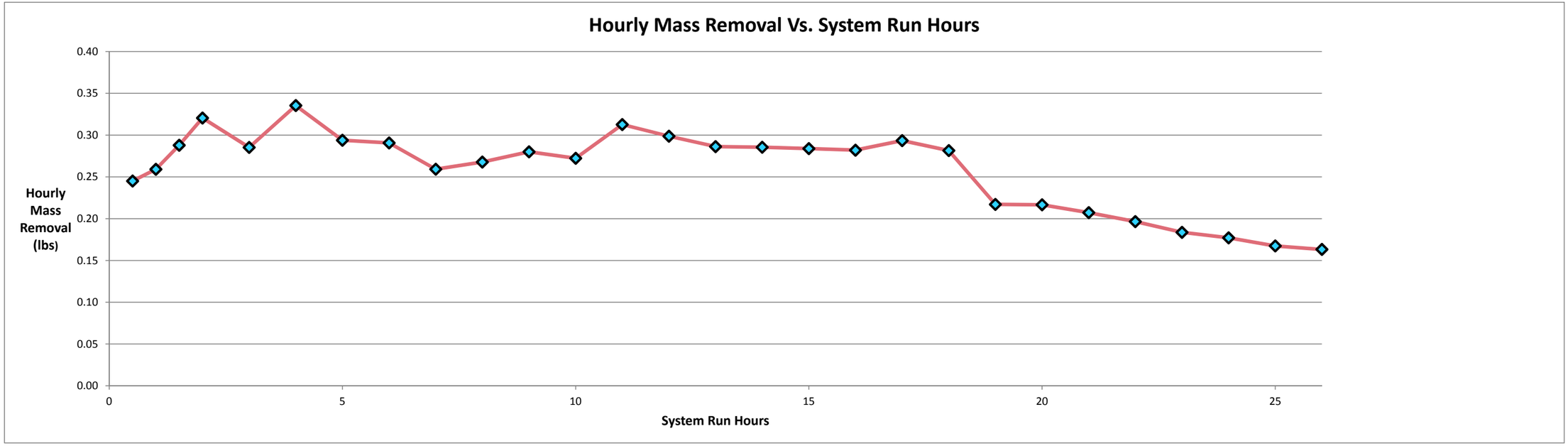
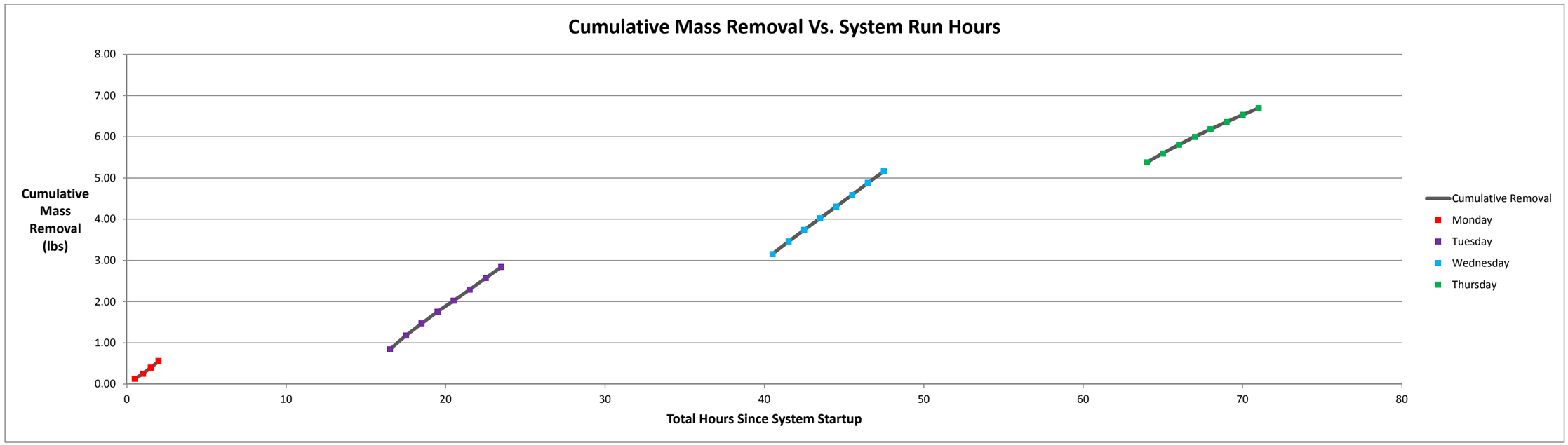


Chart F-4
Cumulative Mass Removal During DPE Pilot Test
Former Chevron Bulk Plant #1001327
1602 North Northlake Place
Seattle, Washington



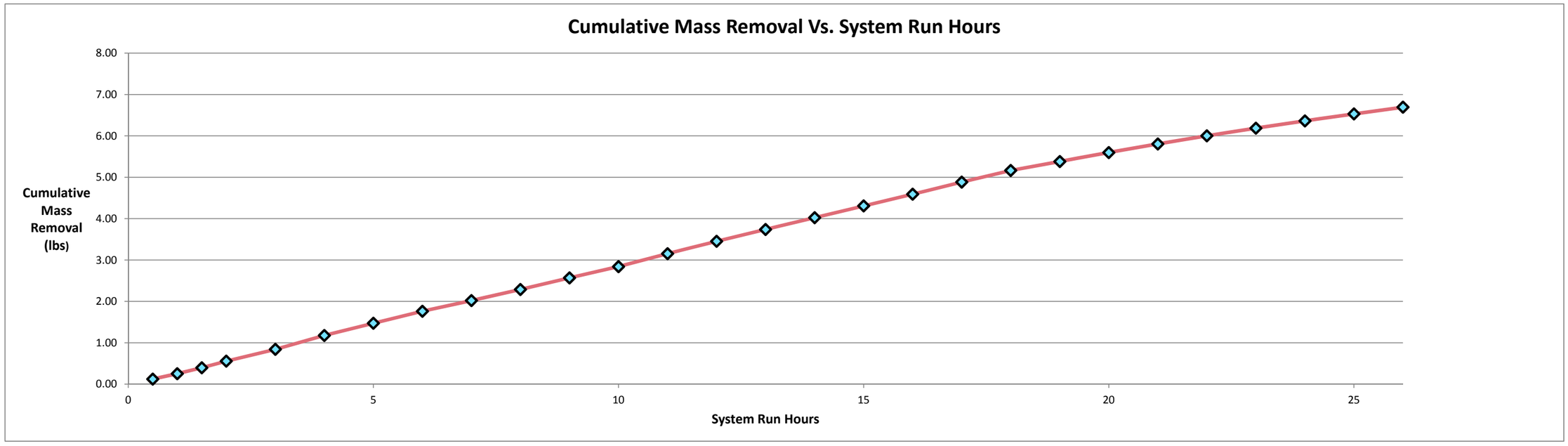
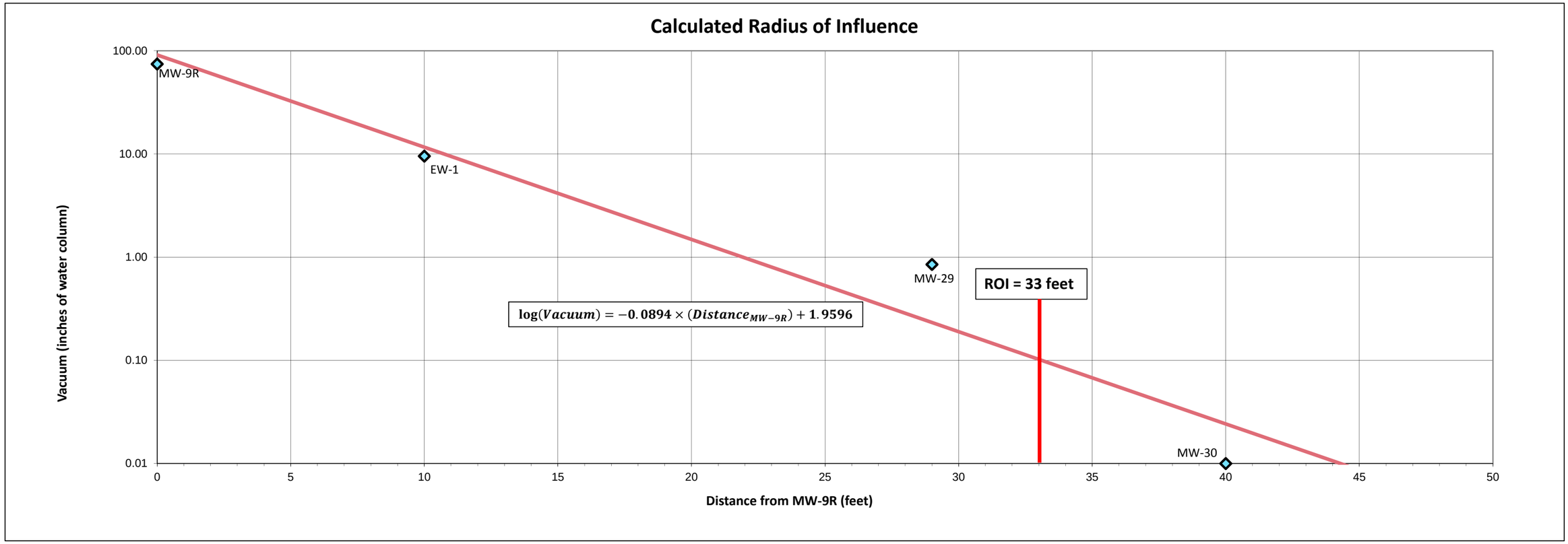


Chart F-5
ROI Calculation
Former Chevron Bulk Plant #1001327
1602 North Northlake Place
Seattle, Washington



Well	Distance from MW-9R (feet)	Measured Vacuum (inches of water column)
MW-9R	0	74.3 applied
EW-1	10	9.51 induced
MW-29	29	0.85 induced
MW-30	40	<0.01 induced

$$ROI = \frac{\log(0.1\ inches\ H_2O) + 1.9596}{-0.0894} = 33\ feet$$