April 6, 2015

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Mr. Ed Ralston
Program Manager – Remediation Management
Phillips 66 Company
76 Broadway
Sacramento, CA, 95818

**RE: Post Remedial Conditions Assessment Work Plan**
**Phillips 66 Facility No. 2603140 (AOC #1668)**
**12412 116th Avenue Northeast**
**Kirkland, WA**
**ATC Project No. 76.75118.1668**
**Washington Department of Ecology LUST Program ID #85348955**

Dear Mr. Ralston:

Cardno ATC is pleased to submit this Work Plan to Phillips 66 Company (Phillips 66) for the above referenced facility, located at 12412 116th Avenue Northeast Kirkland, Washington (Site). The objective of this work plan is to present a scope of work to assess post remedial conditions at the Site. The layout of the site is shown on Figure 1.

## SITE DESCRIPTION

The Site is a former Exon Station 72428, located on the northeast corner of the intersection of 124th street and 116th Avenue Northeast, Kirkland, Washington. The site is at an elevation of 128 feet above mean sea level. The site is currently occupied by an active 76 service gas station.

## BACKGROUND

Multiple site remediation approaches have been taken at the site since cleanup activity began in 1991, including multiple in-situ remediation systems. The most recent remediation system (a vacuum-enhanced groundwater extraction system, or VEGE) was designed and installed by Cardno ERI with startup in January 2011 and operated until it was shut down and left in place on site in March of 2012. This system treated soil and groundwater in the northern portion of the property, as well as near the former UST basin in the southern portion of the property. No extraction

occurred in the near vicinity of the current, active UST basin, located in the southwest portion of the property.

**Preliminary Site Evaluation**

Cardno ERI reviewed recent site data, primarily chemical groundwater data, and compared with historical information to evaluate if the remediation system present on site was performing appropriately, or whether modifications would be required to the system or to the overall cleanup approach to move the site to closure in the most efficient manner. Cardno ERI concluded that it appears that the existing remediation system has been successful in reducing petroleum hydrocarbons in the northern portion of the property, as well as near the former UST basin in the southern portion of the property, to levels below the MTCA Method A Cleanup levels, but additional information regarding current site conditions would be required to provide a specific recommended remedial approach.

Specifically Cardno ERI recommended the following:

- Groundwater sampling at targeted monitoring and remediation wells;
- Collection of soil samples in the vicinity of historic soil samples that had contained elevated hydrocarbon concentrations in the remediation area; and
- Further characterization in the vicinity of MW-7), including a site reconnaissance to evaluate for a possible pathway from the surface to the groundwater, and subsequent soil and groundwater sample collection.

On October 27 and 28, 2014, Cardno ATC collected groundwater samples from 16 targeted monitor and remediation wells (including MW-1, MW-3, MW-4, MW-6, MW-7, MW-8, MW-10, MW-11, MW-14, MW-15, EW-1, DPE-2, DPE-7, DPE-18, DPE-21 and DPE-24). With the exception of diesel-range hydrocarbons detected in wells DPE-2, DPE-18 and DPE-22, and benzene detected in well EW-1, none of the targeted wells exhibited concentrations of petroleum-related contaminants greater than the MTCA Method A cleanup levels. Benzene has occasionally been detected above the MTCA Method A cleanup level in the groundwater collected from well MW-7 during previous sampling events.

On October 27, 2014, Cardno ATC also completed a site reconnaissance in the vicinity of the current and former UST nest and well MW-7 to evaluate a possible pathway from the surface to the groundwater. Field observations made during the site reconnaissance indicate that the area near the current and former USTs and MW-7 is relatively flat. Based on the surface topography, the potential for the previously reported surface spill to travel southward from the current USTs toward MW-7 and/or the landscaped area along the southern perimeter of the Site could not be ruled out.

**SCOPE OF WORK**

The proposed scope of work to assess post remedial conditions is summarized in the following sections. The execution of the field work may be changed if warranted by field conditions. Cardno ATC will notify Phillips 66 of any substantial changes to the field work before proceeding. The proposed scope of work consists of 3 tasks, described below.

**Task 1 – Pre-Field Activities**

At least 72 hours prior to the beginning of subsurface soil work, Cardno ATC will physically mark the location of the proposed borings to aid in underground utility locating. Underground utilities and piping in the vicinity of the proposed borings will be identified in advance of fieldwork by requesting underground locating (One Call) by the Public Utility Notification Service and by contracting a private utility locator. Additionally, it will be necessary to notify and coordinate with the current property owners and station manager.

A site-and-project-specific health and safety plan (HASP) will be prepared identifying potential physical and chemical hazards associated with the proposed field activities, specified personal protective equipment and safety monitoring requirements. The HASP will be kept on file at Cardno ATC's Seattle, Washington office and on Phillips 66 electronic database (LiveLink) and a copy will be made available onsite during field activities.

**Task 2 – Field Activities – Collection of Soil Samples in Remediation Area**

**Proposed Boring Locations and Details**

Cardno ATC is proposing to complete as many as 10 soil borings (identified as DP-1 through DP-10) in the vicinity of historic soil samples that exhibited elevated hydrocarbon concentrations that were collected during installation of the remediation wells. Approximate boring locations in the remediation area are shown on attached **Figure 1**. The proposed locations of the borings will avoid areas with active product piping wherever possible and may change based on field conditions (such as the locations of identified underground utilities). The drilling will be conducted by a Washington State licensed driller using direct-push drilling equipment, under the direction of a Cardno ATC field representative.

As required by P66, proposed soil borings DP-1 through DP-10 will be cleared to a depth of five feet using an air knife/vacuum truck prior to drilling activities. Shallow soil samples will not be collected between the surface and 5 feet below ground surface (BGS). It is anticipated each boring in the remediation area will be advanced to depths between 10 and 15 feet BGS.

**Field Screening and Soil Sampling Activities**

Soil samples below 5 feet bgs (0-5 feet bgs will be removed during air knife operations) will be collected continuously for lithologic profiling, field screening and possible chemical analysis. Samples will be field-screened for the presence of volatile organic constituents (VOCs) using a portable photoionization detector (PID). Field screening will be conducted by placing a portion of the collected soil into a sealable plastic bag and then monitoring headspace vapor concentrations using a PID. Soil lithology will be described using the Unified Soil Classification System.

Soil samples will be collected continuously below 5-feet BGS using direct-push sampling equipment (either a 4- or 5-foot long macro-core sampler equipped with disposable acetate liners). As many as two soil samples will be selected for laboratory analysis from each soil boring. Cardno ATC field personnel will use the following criteria to aid in the selection of soil samples to be submitted for analysis; 1) from the interval exhibiting any visual evidence of free product; 2) from the interval exhibiting the highest PID

reading; 3) from the interval near the soil/water interface zone; and/or 4) from the same depth interval as that which exhibited elevated hydrocarbons during installation of historic remediation wells.

Soil sampling equipment will be cleaned with a Liquinox wash, tap water rinse, and a distilled water rinse between each sampling attempt. Soil samples will be collected from each sampling sleeve and placed in laboratory prepared voa vials with septum lids or jars with Teflon lids and immediately placed in an ice chest and kept cool until delivery to the laboratory. Soil samples from each boring will be analyzed for one or more of the following constituents of concern (COCs) using the following methods:

- BTEX, Ethylene Dibromide (EDB), Ethylene Dichloride (EDC), and Methyl Tertiary Butyl Ether (MTBE), using Environmental Protection Agency (EPA) Method 5035A/8260B;
- Gasoline-range hydrocarbons and diesel- and heavy oil-range hydrocarbons by Northwest Methods NWTPH-Gx and NWTPH-Dx (with silica gel cleanup via the "column" method), respectively;
- Total Lead using EPA Method 6000/7000.

Following the Washington Department of Ecology requirements, soil samples collected by Method 5035A will be obtained from the macro-core sampler using a hand-held plunger set to collect the appropriate volume of soil for subsequent VOC analysis by EPA Method 8260B. Soil collected in the plunger will be transferred to laboratory-prepared voa vials equipped with septum lids. Samples for remaining analysis will be transferred to laboratory-prepared jars equipped with Teflon lids. All samples will be immediately placed in an ice chest, and kept cool until delivery to the laboratory. Standard chain-of-custody procedures will be observed during transport of the samples to the laboratory.

**Task 3 – Characterization in Vicinity of MW-7**

**Proposed Boring Locations and Details**

Cardno ATC is proposing to complete as many as 4 borings (identified as DP-11 through DP-14) and three hand-augured borings (identified as HA-1 through HA-3) in the vicinity of monitor well MW-7. Approximate boring locations are shown on attached **Figure 1**. The proposed locations of the borings may change based on field conditions (such as the locations of identified underground utilities). The drilling will be conducted by a Washington State licensed driller using direct-push drilling equipment, under the direction of a Cardno ATC field representative. The hand augers will be completed by Cardno ATC staff.

As described in Task 1 and as required by P66, proposed borings DP-11 through DP-14 will be cleared to a depth of five feet using an air knife/vacuum truck prior to drilling activities. Shallow soil samples will not be collected between the surface and 5 feet BGS. It is anticipated borings DP-11 through DP-14 will be advanced to depths between 10 and 15 feet BGS, assumed sufficient to characterize the soil conditions and collect grab-groundwater samples. Each hand augured boring will be advanced to depths between 12- and 18-inches bgs, a depth assumed sufficient to evaluate shallow soil conditions. The hand-augured boring locations will not be cleared using an air knife/vacuum truck.

**Field Screening and Soil Sampling Activities**

One shallow soil sample exhibiting the highest field screening evidence of petroleum contamination will be collected from each hand-augured boring. If field screening evidence of petroleum contamination is not observed in the shallow hand-auger borings, then the sample collected from the base of the borings (approximately 12- to 18-incheds BGS) will be submitted for analysis.

Soil samples below 5 feet BGS from borings DP-11 through DP-14 (0-5 feet bgs will be removed during air knife operations) will be collected continuously for lithologic profiling, field screening and possible chemical analysis. Samples will be field-screened for the presence of volatile organic constituents (VOCs) using a portable photoionization detector (PID). Field screening will be conducted by placing a portion of the collected soil into a sealable plastic bag and then monitoring headspace vapor concentrations using a PID. Soil lithology will be described using the Unified Soil Classification System.

Soil samples will be collected continuously from 5-feet BGS using direct-push sampling equipment (either a 4- or 5-foot long macro-core sampler equipped with disposable acetate liners). As many as three soil samples will be selected for laboratory analysis from each soil boring including; 1) from the interval exhibiting any visual evidence of free product; 2) from the interval exhibiting the highest PID reading, and/or 3) from the interval near the soil/water interface zone.

Soil sampling equipment will be cleaned with a Liquinox wash, tap water rinse, and a distilled water rinse between each sampling attempt. Soil samples will be collected from each sampling sleeve and placed in laboratory prepared voa vials with septum lids or jars with Teflon lids and immediately placed in an ice chest and kept cool until delivery to the laboratory. Soil samples from each boring (including the hand augured borings) will be analyzed for one or more of the following COCs using the following methods:

- BTEX, EDB, EDC, and MTBE using EPA Method 5035A/8260B;
- Gasoline-range hydrocarbons and diesel- and heavy oil-range hydrocarbons by Northwest Methods NWTPH-Gx and NWTPH-Dx (with silica gel cleanup via the “column” method), respectively;
- Total Lead using EPA Method 6000/7000.

Following the Washington Department of Ecology requirements, soil samples collected by Method 5035A will be obtained from the macro-core sampler or hand augur using a hand-held plunger set to collect the appropriate volume of soil for subsequent VOC analysis by EPA Method 8260B. Soil collected in the plunger will be transferred to laboratory-prepared voa vials equipped with septum lids. Samples for remaining analysis will be transferred to laboratory-prepared jars equipped with Teflon lids. All samples will be immediately placed in an ice chest, and kept cool until delivery to the laboratory. Standard chain-of-custody procedures will be observed during transport of the samples to the laboratory.

One-time grab groundwater samples will also be collected from borings DP-11 and DP-14, if possible. The grab-groundwater samples will be collected using a decontaminated, extendable, stainless steel screen; new polyethylene and silicone tubing; check-valve; and a peristaltic pump. The 5-foot-long, direct-push screen assembly will be advanced to the desired sample depth, at which point the screen will be exposed by pulling back on the outer drill rod. Groundwater present in the borehole will be pumped

through the screen and into the tubing using a peristaltic pump. Prior to collecting the groundwater sample, Cardno ATC will purge each borehole using low flow techniques with disposable polyethylene tubing and a peristaltic pump. During the low flow purge, Cardno ATC will monitor and document water quality parameters including pH, temperature, conductivity, turbidity, dissolved oxygen, and oxidation reduction potential (ORP). Purging will continue until a maximum of 10 borehole volumes of water are removed, or until these parameters stabilize for two consecutive readings as indicated:

- pH +/-0.1 standard units
- temperature +/- 0.1 degree Celcius
- specific conductance +/- 10.0 ohm-cm
- dissolved oxygen +/- 0.2 mg/L
- ORP +/-10 millivolts

Groundwater samples obtained during sampling activities will be transferred to laboratory-supplied containers, labeled, and placed in an iced cooler until received by the analytical laboratory. The grab-groundwater samples from borings DP-11 and DP-14 will be analyzed for one or more of the following COCs using the following methods:

- BTEX by EPA Method 8260B;
- Gasoline-range hydrocarbons and diesel- and heavy oil-range hydrocarbons by Northwest Method NWTPH-Gx and NWTPH-Dx (with silica gel cleanup via the “column” method), respectively;
- Total and dissolved lead using EPA Method 6000/7000.

**REPORTING**

Cardno ATC personnel will observe and document all characterization activities at the project site. After receipt of final analytical results and data validation, all results will be summarized in a draft assessment report that will be submitted to Phillips 66 for review. The assessment report will document soil/groundwater impacts encountered during the investigation. Conclusions regarding the results of the field activities will be included in the report. The report will include tables, maps, figures, field notes, where appropriate, and appendices pertinent to the data collected during the field activities. The report will be prepared and signed by a Washington licensed professional geologist or engineer.

**WORK SCHEDULE**

Cardno ATC anticipates completing the field work for this assessment within 30 days of Ecology’s approval of the work plan (if granted access by the current facility owner/operator). The field work will be completed in two days. Soil and grab-groundwater samples will be submitted on a standard turn-around time. The draft report will be provided within six (6) weeks of completing the field work.

Cardno ATC
Shaping the Future

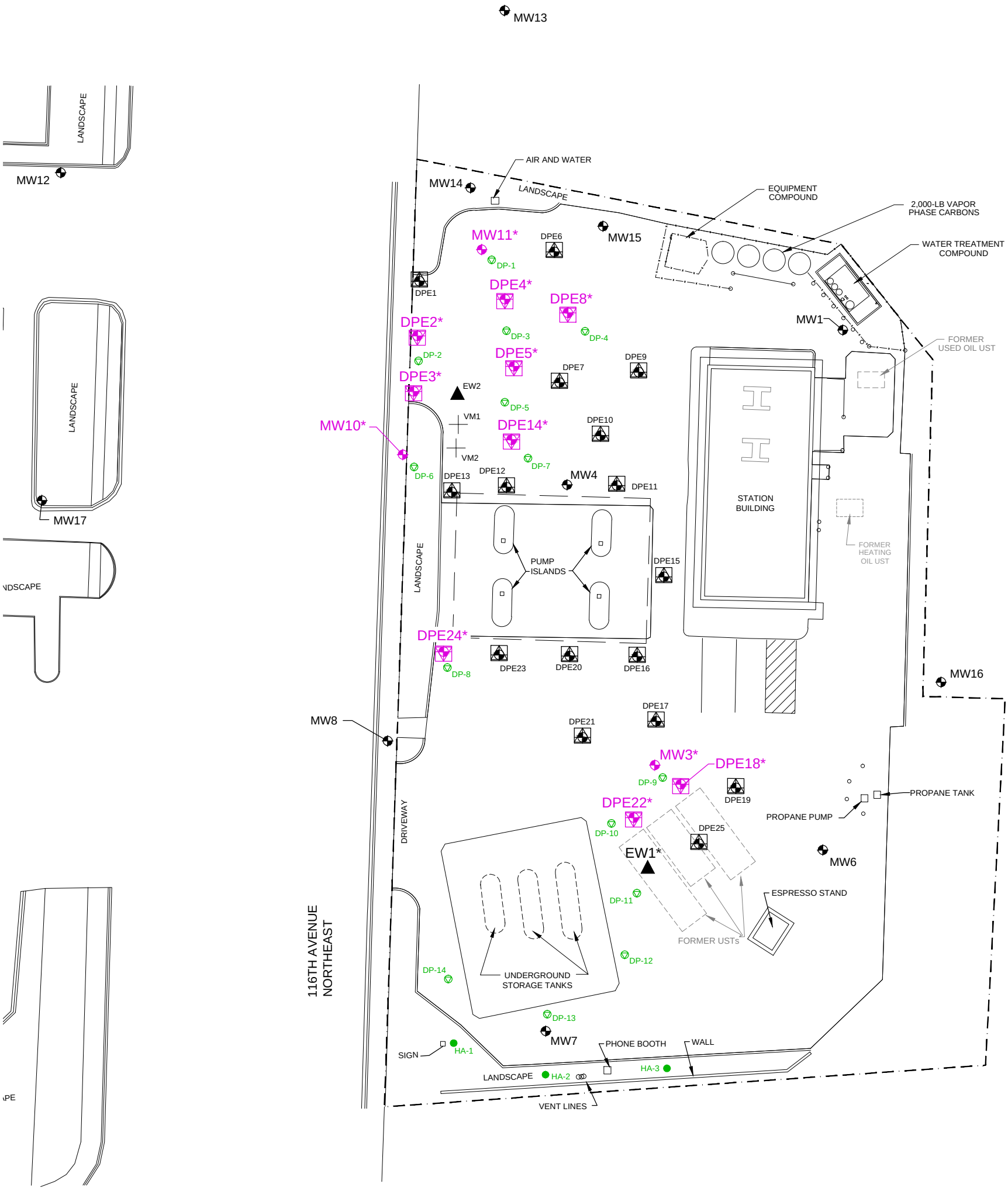
We appreciate the opportunity to be of service in this matter. If you have questions regarding this Post Remedial Conditions Work Plan, please contact Kyle Sattler at (503) 419-2500.

Sincerely,

**Cardno ATC**

Kyle Sattler, L.G.
Senior Project Manager

Enc: Figure 1 – Site Plan




NOTE: ALL LOCATIONS ARE APPROXIMATE

# SITE PLAN

PHILLIPS 66 FACILITY NO. 2603130 (AOC #1668)
12412 116TH AVENUE NORTHEAST
KIRKLAND, WA

| | | | |
|---|---|---|---|
| PROJECT NUMBER: Z076000069 | | DATE: 4/6/15 | FIGURE 2 |
| APPROVED BY: KS | | DRAWN BY: BK | |

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