

# ENVIRONMENTAL ASSESSMENT WORK PLAN

Former Standard Oil Service Station No. 30-5192  
9816 271<sup>st</sup> Street NW  
Stanwood, Washington

November 18, 2005

*Prepared for:*



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**ENVIRONMENTAL ASSESSMENT WORK PLAN**  
**FORMER STANDARD OIL SERVICE STATION NO. 30-5192**  
**9816 271<sup>ST</sup> STREET NW**  
**STANWOOD, WASHINGTON**

## 1.0 INTRODUCTION

This work plan proposes tasks designed to further define the nature and extent of petroleum hydrocarbon impacts observed in soil and potentially groundwater at the former Standard Oil Service Station #30-5192, located in Stanwood, Washington. This work plan has been produced by Science Applications International Corporation (SAIC) on behalf of Chevron Products Company (Chevron).

## 2.0 BACKGROUND

### 2.1 Site Setting and History

The property (9816 271<sup>st</sup> Street NW Stanwood, Washington) is located in the SE quarter of Section 24, Range 03, in Township 32 within an area of primarily residential/commercial land uses. Surrounding the property is Pearson Street to the north, the intersection of 271<sup>st</sup> Street NW, Pearson Street and Main Street to the east, Main Street to the southeast, an alleyway to the south and a vacant residential building to the west. A Vicinity map is presented as **Figure 1**.

A Standard Oil service station was operated at the site from approximately 1958 to at least 1970. The first known title record for the subject property begins in 1924 with a sale from the Lien family to J. Norin Hafstad, who in 1939 sold the property to Mr. Ed Peterson and his wife, who in 1958 leased the property to Standard Oil Company of California (now Chevron Corporation). Standard Oil's lease expired in 1970, after which ownership of the parcel traversed several more parties. In 1984, the portion of the property within the alleyway south of the lot was sold to the City of Stanwood, and in 1998 the remaining portion of the parcel became the property of the current owners.

SAIC reviewed the 1941 Sanborn Map for the site. The site had been developed by 1941 as a one-story filling station, the map indicates the presence of two underground storage tanks located in the northeast portion of the property, a greasing facility in the eastern portion of the former station structure and a store in the western portion. Apparently, the property had been operated as a service station prior to Standard Oil's 1958 lease.

Very little information regarding the features and layout for the former Standard station could be located either by Chevron or SAIC through public information domains. Given the location and age of the structure, general layout of the former station building, information collected during the recent UST removal activities and a physical inspection of the immediate area surrounding the property, it appears that there are two additional USTs located in the alleyway south of the property and that these tanks may have been connected to the former dispenser island located in the northeast corner of the property. It is also possible that there are USTs located in the southwest corner of the property and possible hydraulic hoist components beneath the former station building floor (See **Figure 2 –Site Map**-for the location of known and suspected station improvements).

In Late December 2004, a limited site investigation was performed which included the decommissioning and removal of three Underground Storage Tanks (UST'S). The USTs were removed by Glacier Environmental Services, Inc. and soil samples from the bottom and side-walls of the UST excavation were collected by Pinnacle GeoSciences. Soil samples were also collected at the same time from areas beneath the former product piping and dispenser island and from several soil stockpiles. Results from this investigation indicated that samples collected from the bottom and side-walls of the UST excavation, from beneath the product lines and from the soil stockpiles contained gasoline and heavy oil range petroleum hydrocarbon impacts along with benzene, toluene, ethyl

benzene and xylene (BTEX Compounds) at concentrations exceeding the Washington State Department of Ecology (WDOE) Model Toxics Control Act (MTCA) 173-340 WAC Method A cleanup standards. One of the 14 soil samples collected during this investigation also contained lead at a concentration exceeding the MTCA Method A cleanup criteria. One other sample collected from one of the three stock-piles contained diesel range petroleum hydrocarbons at a concentration exceeding MTCA Method A standards.

Future development at this site is expected to include construction of a single or two-story commercial office building with construction beginning in the fall of 2006.

### **3.0 OBJECTIVES**

The objective of this investigation is to further assess and document the nature and extent of petroleum hydrocarbon impacts to soil and groundwater. Through this investigation and subsequent groundwater monitoring, site conditions will be better understood and remedial options can be evaluated. To accomplish these objectives, SAIC proposes to perform an electromagnetic (EM)/Ground Penetrating Radar (GPR) survey to identify potential USTs and other sub-surface structures existing onsite.

SAIC proposes to install up to sixteen soil borings. The borings will be used to investigate and delineate the extents of gasoline, diesel and oil range petroleum hydrocarbons, BTEX, and total lead contamination in soil, assess if contamination has migrated offsite, and to determine depth to groundwater. The soil borings will be located in areas where fuel transfer and dispensing had historically been performed, where fuel tanks had been located and where other sub-surface structures with the potential to produce environmental impacts to soil (i.e. hydraulic hoists) may have been located. SAIC also proposes to complete four of the soil borings as groundwater monitoring wells with locations determined based on soil sampling results. These monitoring wells are anticipated to be installed 1) in the northwest corner, 2) along the eastern end and 3) in the southwest corner of the Raplee property. The fourth well will likely be installed in the alleyway south-southwest of the USTs presumed to be located in this area. One additional monitoring well may be installed based on soil sampling results and the presence of other subsurface structures identified during the EM/GPR survey. **Figure 3** depicts the currently proposed soil boring and groundwater monitoring well locations.

### **4.0 SCOPE OF WORK**

The scope of work for this investigation will include the following tasks:

- Use EM and GPR to search the site for undocumented USTs and other sub-surface structures;
- Locate underground utilities, if present, at the proposed soil boring locations;
- Obtain all appropriate well-installation permits required to complete this investigation;
- Clear each soil boring location to a minimum depth of 8 feet bgs, using a hand auger or air knife;
- Advance up to sixteen exploratory soil borings using Geoprobe direct-push soil sampling equipment. Each soil boring will be completed to a depth where field observations indicate that groundwater is present or contamination is no longer present (whichever is deeper). Some boring locations may vary depending on site conditions and field observations;
- Complete up to five of the exploratory soil borings as 1.5-inch inside diameter groundwater monitoring wells using the Geoprobe equipment. The exact placement of some of these wells will be determined based on the soil sampling and magnetic/GPR results;
- Collect soil samples from the upper 8-feet in each boring using a hand auger. Soil samples from below 8-feet will be collected continuously using a Geoprobe soil sampler;
- Field screen each soil sample collected for the presence of organic vapors and sheen;

- Submit selected soil samples (based on the field screening results and visual observation made by the field geologist at the time of sampling) to an analytical laboratory under direct contract to Chevron for analysis of gasoline-range petroleum hydrocarbons (TPH-gas), diesel and oil-range petroleum hydrocarbons (TPH-diesel-extended), BTEX constituents, and lead;
- Submit samples from the locations with the greatest level of petroleum impact (based on the field screening results and visual observations made at the time of sampling) to the laboratory so that soil MTCA Method B soil cleanup levels for gasoline and diesel can be derived. Sample analysis will include NWTPH-Gx, NWTPH-Dx, BTEX, n-hexane, 1-2 dibromoethane (EDB), 1-2 dichloroethane (EDC), total lead, carcinogenic polycyclic aromatic hydrocarbons, (cPAHs), naphthalenes, volatile petroleum hydrocarbon (WA-VPH) analytes and extractable petroleum hydrocarbon (WA-EPH) fractions;
- Survey the relative location of each soil boring and monitoring well and the elevation of each newly installed monitoring well;
- Develop each of the newly installed wells by pumping and surging;
- Return to the site once groundwater conditions have stabilized (usually within seven days of well installation) to collect groundwater samples from each newly installed well;
- Submit groundwater samples to an analytical laboratory under direct contract to Chevron for analysis of gasoline-range petroleum hydrocarbons (TPH-gas), diesel and oil-range petroleum hydrocarbons (TPH-diesel-extended), BTEX constituents, and lead;
- Dispose of all investigation derived waste materials in accordance with local, state and federal regulations;
- Complete a Site Investigation Report.

## **5.0 PROCEDURES**

### **5.1 Underground Utility and Buried Structure Locating**

Prior to subsurface investigation activities, SAIC will arrange for the location of underground utilities by: (1) contacting the Utilities Underground Location Center; (2) contracting a private utilities locating service; and (3) through EM and GPR surveys.

The typical process utilized for an underground Storage Tank (UST) survey is to employ both EM and GPR. The area in question is initially traversed with a EM instrument on 3~5 foot line spacings to pinpoint target locations, GPR is then used to better define the targets in these locations and determine if those targets are USTs. The GPR survey should establish a relative depth, size, and ground projection of potential USTs. The principle focus is to locate any undocumented UST's as well as hoists, leach field structures, and piping beneath both the former standard service station and the adjacent alleyway.

### **5.2 Obtain Permits**

The drilling subcontractor will procure the appropriate start card permits prior to drilling. Permission to drill on-site will be obtained from the property owner.

### **5.3 Soil Borings**

SAIC will subcontract Geotech Explorations of Kent, Washington to perform up to sixteen soil borings using Geoprobe direct-push equipment. Each soil boring location will first be cleared by hand or with an air knife to approximately 8 feet below ground surface (bgs) prior to use of the Geoprobe equipment. Soil samples from each boring will be collected from the upper 8-feet using a hand auger and from below 8-feet using the Geoprobe soil sampling equipment. Each soil boring will be completed to a depth where field observations indicate that groundwater is present or contamination is no longer present (whichever is deeper). Some boring locations may

vary depending on site conditions and field observations. Each soil boring will be logged by an SAIC environmental scientist/geologist in accordance with the Unified Soil Classification System ("USCS") Visual-Manual Procedure (American Society for Testing and Materials Method D2488). Following completion, each boring will be backfilled with bentonite pellets to within one-foot of the surface and then brought flush with the surrounding surface with native soil/fill materials.

Soil samples from each boring will undergo headspace vapor screening for the presence of hydrocarbons using a photo-ionization detector (PID) with a 10.2-electron volt (eV) lamp (see Section 5.4). The results of the headspace vapor screening will be recorded on the soil boring logs. Soil samples will be selected by SAIC for laboratory analysis based on headspace screening concentrations, sheen, odor, depth to groundwater, and other field observations. In most cases, soil samples collected from the groundwater interface in each boring will be submitted for laboratory analysis. Additional samples may be submitted for laboratory analysis from any soil samples collected near or above the groundwater interface that exhibit headspace vapor concentrations greater than approximately 100 parts per million, sheen, odor, discoloration or other evidence of petroleum impact. The project manager will decide if any additional samples will be analyzed. Soil samples collected for gasoline and volatiles analysis will be retained in one-time use samplers conforming to U.S. EPA Method 5035 specifications, samples retained for semi-volatile hydrocarbon and metals analyses will be retained in laboratory-supplied glass jars with Teflon-lined lids. All samples will be placed in a pre-chilled ice-chest while at the site and during transport to the analytical laboratory. Samples collected for laboratory analysis will be submitted to Lancaster Laboratories in Lancaster, Pennsylvania.

#### **5.4 Soil Headspace Vapor Screening**

Headspace vapor screening consists of measuring the organic vapor content of a volume of air in the headspace surrounding a sealed sample of soil. Soil from each boring will be screened in the field using a portable gas analyzer equipped with a photoionization detector (PID).

The screening procedure involves first placing the soil in a re-sealable (Ziploc) bag, leaving a small amount of open headspace in the bag for organic vapors, if present, to collect. The bag is then sealed and the headspace allowed to equilibrate with the soil sample for several minutes at ambient air temperature prior to PID measurement. The bag is punctured or slightly unsealed, and the PID intake probe is inserted through the opening into the headspace. The concentration of organic vapor in the headspace of the bag is then measured and recorded.

#### **5.5 Monitoring Well Installation**

Five of the soil borings will be completed as monitoring wells by installing a 1.5-inch inside diameter, schedule 40 PVC casing with 0.010-inch factory slotted screen and a pre-packed filter screen. Well screens of approximately ten foot length will be placed near the bottom of each boring and will extend to above the groundwater surface at the time of installation. The remaining annular space above the slotted screen and pre-pack will then be fillet with 10/20 silica sand and sealed with hydrated bentonite chips or pellets to approximately three feet bgs. Two feet of concrete will then be poured into the remaining annular space to provide a surface-seal at the wellhead. The remaining blank well casing will then be cut at approximately 0.5-feet bgs and a locking well plug installed. A traffic-rated waterproof well monument set in concrete will be installed at each well location flush with the surrounding surface.

#### **5.6 Monitoring Well Development**

Each new monitoring well will be developed by first surging with a weighted surge block, then over pumping with a peristaltic pump. The development procedure consists of lowering the surge block into the bottom of the well. The surge block is raised and lowered repeatedly to surge the groundwater within the well. Surging the well by raising and lowering the surge block produces an outward surge of water that is forced from the borehole through the well screen and into the formation. This tends to break up any bridging that has developed within the formation. As the surge block is repeatedly raised and lowered through the well, the surging action created in the borehole causes the particulate matter outside the well to flow into the well. The surge block is then removed

from the well and tubing connected to the peristaltic pump is lowered to the well bottom. Water containing this particulate material is then removed from the well by the pump. After approximately three well volumes of water have been removed, or the water begins to clear of particulate matter, the pump tubing is removed from the well, and the entire process is repeated by surging with the surge block. This alternating of surging with a surge block, then pumping is continued until approximately ten casing volumes of water have been removed.

Purged groundwater produced during well development will be contained in 55-gallon DOT-approved drums and temporarily stored at the site to allow fines and sediments to settle. The purge water will later be treated on-site by granular activated carbon filtration and then discharged to the ground surface.

### **5.7 Monitoring Well Sampling**

Groundwater samples will be collected from each of the new monitoring wells. Prior to sampling, each new well will be allowed to stabilize for at least seven days following development. Prior to purging water from each monitoring well, depth to water will be measured with respect to the well TOC to the nearest 0.01-foot using an electronic water-level indicator.

Each monitoring well will be purged with a peristaltic pump until a minimum of three bore volumes of groundwater has been removed from each well. In the event a monitoring well runs dry during purging, the groundwater level in the well will be allowed to recover to approximately 75 percent of its original static level and purging will continue. If the well is again purged dry, it will be allowed to recover to 75 percent of its original static water level (if possible), at which point it will be considered sufficiently purged.

After purging is complete, groundwater samples will be collected directly from the discharge side of the peristaltic pump. Groundwater samples collected for laboratory analysis will be collected in laboratory-supplied sample containers and immediately placed in a pre-cooled ice chest for storage prior to transport to the analytical laboratory under standard chain-of-custody procedures.

Purged groundwater will be contained in 55-gallon DOT approved drums and temporarily stored to allow fines and sediments to settle. The purge water will later be treated on-site by granular activated carbon filtration and then discharged to the ground surface.

### **5.8 Monitoring Well Survey**

The TOC elevation of each new monitoring well will be surveyed to the nearest 0.01-foot with respect to the TOC of the existing monitoring wells on the site. A survey reference mark will be scribed on the lip of the new well casings for future groundwater elevation measurements. The location of each monitoring well installed will be determined with respect to other site features. Well locations will be measured to the nearest 0.1-foot using a survey tape or rolling-wheel measuring device.

## **6.0 DATA QUALITY ASSURANCE**

The following quality assurance and quality control procedures will be utilized during this investigation to ensure accurate and reproducible data reflective of actual subsurface conditions.

### **6.1 Monitoring Equipment Calibration**

The portable PID used for screening soil vapor headspace will be calibrated at the beginning of each day according to the manufacturer's recommended procedure using a laboratory-certified isobutylene gas standard. The PID may also need to be re-calibrated during the course of the day.

## 6.2 Decontamination Procedures

Equipment that is not directly used for sampling (i.e. drilling steel) will be cleaned between each sampling location using a high-pressure water wash. Soil sampling equipment (i.e. hand augers, spoons and scoops) will be cleaned by washing with non-phosphate detergent (e.g. Alconox, Liquinox) and water, rinsing with clean tap water, and rinsing with deionized or distilled water. The water level indicator and surge block will be washed with detergent and water and then rinsed with tap water and distilled water before use, between each sampling or measurement location and prior to storage.

Disposable nitrile gloves, pump tubing, Geoprobe sample liners and any other form of disposable sampling equipment will be discarded after use at each sampling location.

## 6.3 Sample Storage, Packing, and Shipment

All soil and groundwater samples will be stored in a pre-cooled ice chest while at the site and during transportation to the laboratory. Samples will be sub-packed by sample location in new Ziploc plastic bags and stored in the dark at approximately 4°C. A temperature compliance vial (provided by the laboratory) will accompany each cooler to verify that proper holding temperatures were maintained during transport.

## 6.4 Chain-of-Custody Procedures

Chain-of-custody (COC) protocols will be followed throughout the duration of this project. Each sample cooler (or batch of coolers) containing laboratory samples will contain a fully completed COC form. The field personnel will retain a copy of the COC form, and the original will be sent with the samples to the laboratory.

# 7.0 LABORATORY ANALYSES

Each soil sample and the QA/QC samples will be submitted to Lancaster Laboratories in Lancaster, PA and analyzed for gasoline range petroleum hydrocarbons, diesel/oil range petroleum hydrocarbons, BTEX compounds and lead using the following Washington State and EPA approved methods:

- Total petroleum hydrocarbons as gasoline (TPH-G) by NWTPH-G;
- Total petroleum hydrocarbons as diesel and oil (TPH-Dx) by NWTPH-Dx with Silica gel cleanup;
- BTEX compounds by EPA Method 8021b;
- Total lead by EPA Method 6010/6020.

Soil samples from the locations with the greatest level of petroleum impact (based on the field screening results and visual observations made at the time of sampling) will also be submitted for the following Washington State and EPA approved methods:

- n-hexane, naphthalene, EDB and EDC by EPA Method 8260b;
- cPAHs by EPA Method 8270c;
- Volatile Petroleum Hydrocarbons (VPH) and Extractable Petroleum Hydrocarbons (EPH) by the Washington State Department of Ecology – VPH and EPH methods.

Each groundwater sample and the QA/QC samples will be submitted to Lancaster Laboratories in Lancaster, PA and analyzed for gasoline range petroleum hydrocarbons, diesel/oil range petroleum hydrocarbons, BTEX compounds and lead using the following Washington State and EPA approved methods:

- Total petroleum hydrocarbons as gasoline (TPH-G) by NWTPH-G;
- Total petroleum hydrocarbons as diesel and oil (TPH-Dx) by NWTPH-Dx with Silica gel cleanup;
- BTEX compounds by EPA Method 8021b;
- Total lead by EPA Method 6010/6020.

## **8.0 STORAGE AND DISPOSAL OF RESIDUALS**

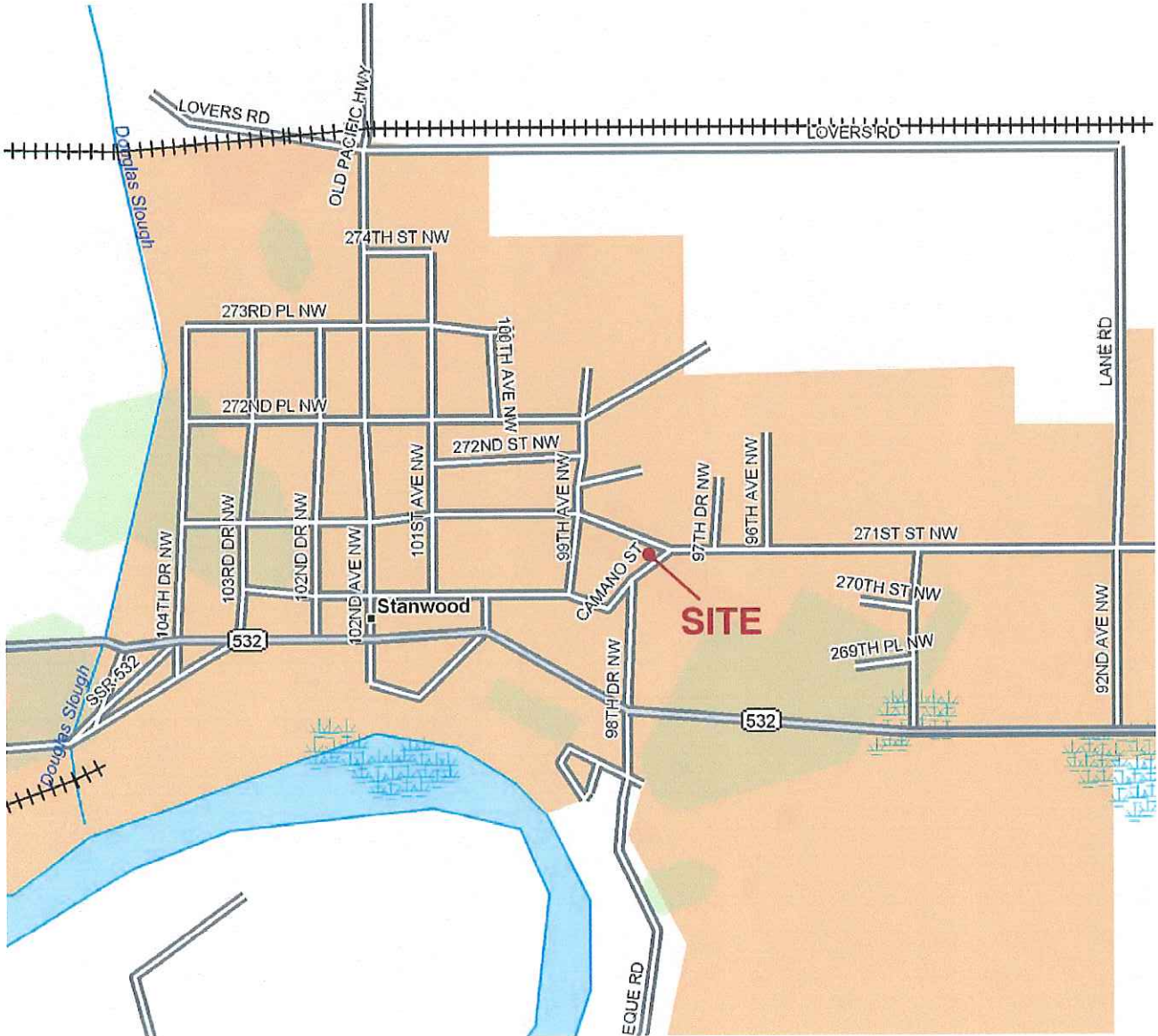
Residual soil from this investigation will be contained in 55-gallon DOT approved drums and stored (temporarily) on-site while awaiting laboratory results. Following receipt of laboratory analytical data, arrangements will be made for transport of all sampling residuals to Rinker Materials in Everett, Washington for eventual treatment and disposal.

All decontamination and purge water will be stored in 55-gallon DOT approved waste drums. These drums will be temporarily stored on-site to until analytical results from the groundwater sampling are obtained. If the contaminants in the groundwater are limited to petroleum constituents, the drummed water will be treated on-site by activated carbon filtration and then discharged. If the groundwater contains lead or chlorinated compounds, the drummed water will be disposed of off-site at an appropriate disposal facility.

## **9.0 SCHEDULE**

SAIC will finalize the fieldwork schedule following a review of this work plan by Chevron Corporation, Mr. Eldon Raplee and the City of Stanwood. The anticipated schedule for implementation of this investigation is as follows:

- Preparation for fieldwork – two weeks (contingent on approval of this work plan and driller/field staff availability).
- Perform the utilities locates – Week of December 12th
- Perform the EM/GPR survey – Week of December 19th
- Perform soil boring/sampling – 3 days, December 20-22, 2005.
- Installation of groundwater monitoring wells – 1 day, December 22, 2005.
- Completion of a Site Investigation Report – January/February 2006.



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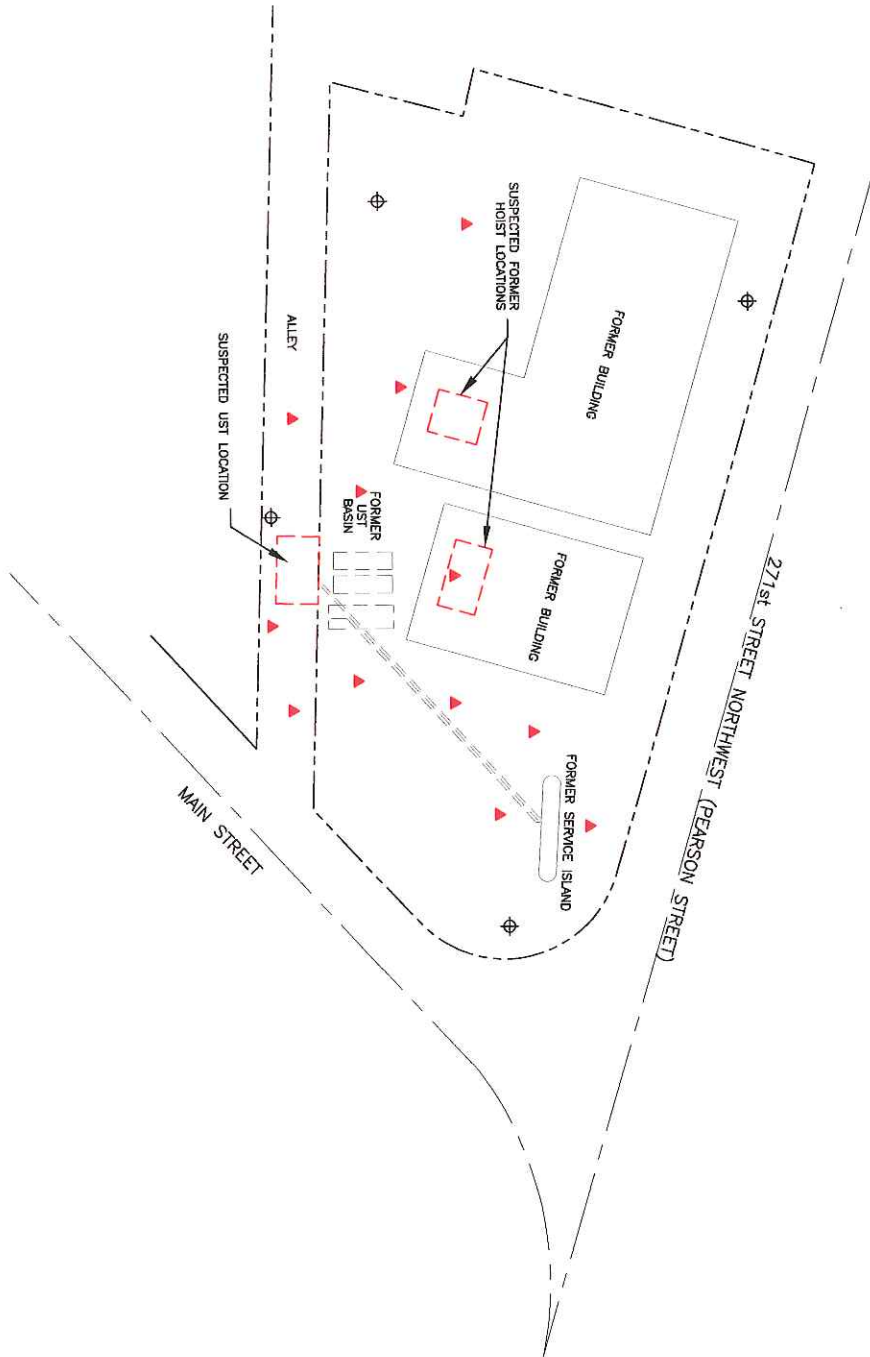


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NO. 30-5192  
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STANWOOD, WASHINGTON

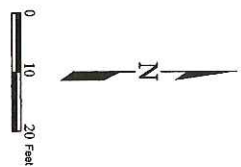
**FIGURE 1**  
**VICINITY MAP**

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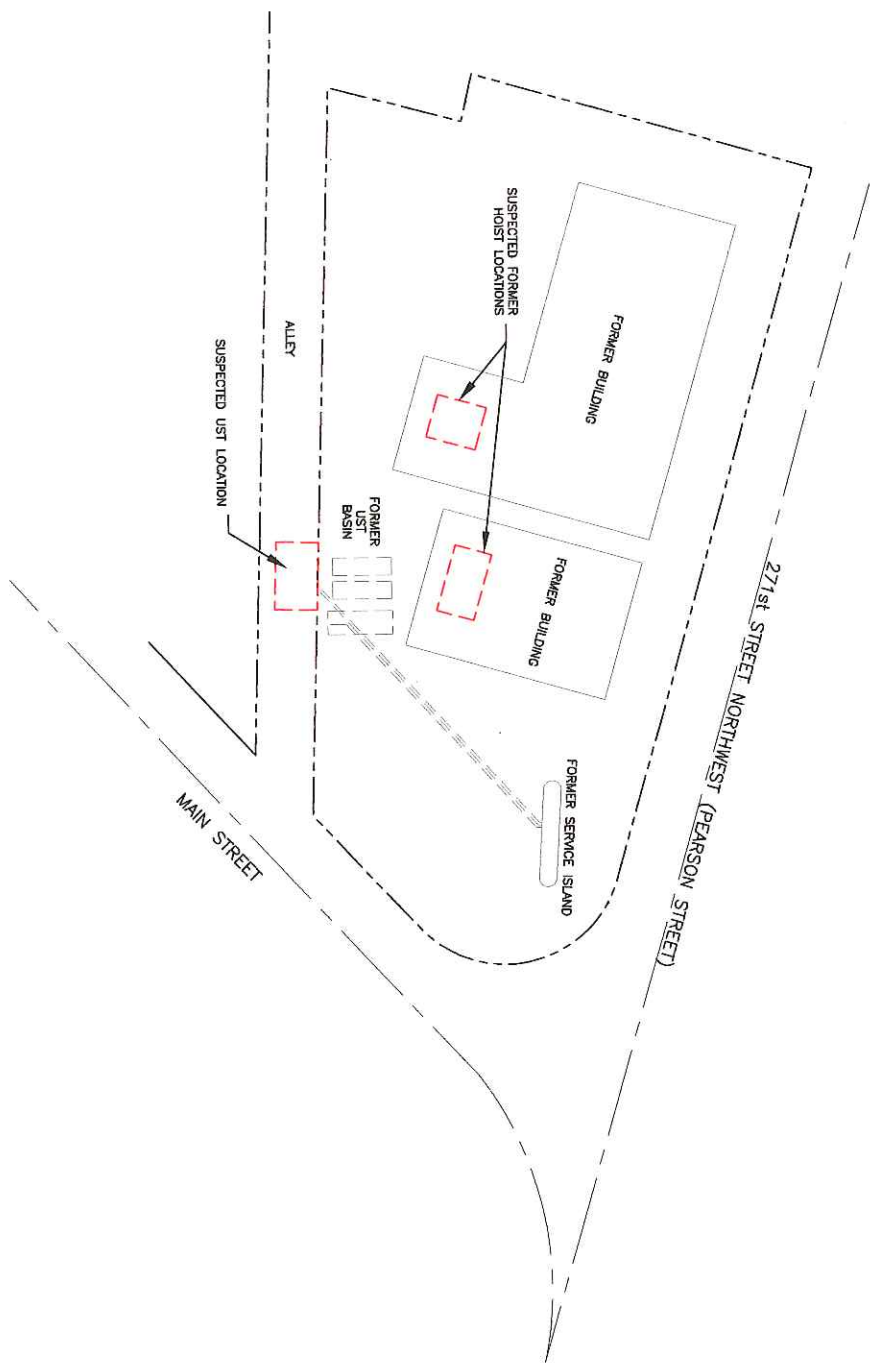
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- LEGEND
- PROPERTY LINE
  - ▲ PROPOSED SOIL BORING LOCATION
  - ⊕ PROPOSED MONITORING WELL LOCATION



	FORMER CHEVRON SERVICE STATION 9915 271ST NORTHWEST STANWOOD, WASHINGTON	<b>FIGURE 3</b> PROPOSED SOIL BORING AND MONITORING WELL LOCATIONS	PREPARED BY: [Name] DATE: 11/15/05
	NO. 20-05192 STANWOOD NORTHWEST		DATE: 11/15/05



FORMER CHEVRON SERVICE STATION  
 NO. 26-5192  
 9818 271ST STREET NORTHWEST  
 STANWOOD, WASHINGTON

DATE: 08/01/2005  
 FILE: 30-5192\_Base.mxd

**FIGURE 2**  
 SITE MAP