January 24, 2019 2015-007-01

Mr. Aaren Fiedler
VCP Site Manager
Toxics Cleanup Program
Southwest Regional Office

Subject: **Response to Ecology Request for Additional Information on Cleanup under the VCP for the John's Shell Site**
John's Shell – VCP Project ID: SW1623
1410 Ocean Beach Highway
Longview, Washington

Dear Mr. Fiedler:

HydroCon Environmental, LLC (HydroCon) is pleased to submit this response to Ecology's Request for Additional Information on Cleanup under the VCP for the John's Shell, dated May 7, 2018. HydroCon has prepared this response letter on behalf of Wilcox & Flegel. This response letter addresses Ecology's comments included in the Remedial Investigation Checklist. HydroCon also requests comments and approval of the attached Work Plan for the site.

REMEDIAL INVESTIGATION REPORT BODY

I. Introduction.

a. General Site Information. *No specific Ecology comment (Section indicated as Adequate).*

b. Site History. *No specific Ecology comment (Section indicated as Adequate).*

c. Site Use. *No specific Ecology comment (Section indicated as Adequate).*

II. Field Investigations.

a. Previous Environmental Investigations. Discuss prior work performed, samples obtained, why sampling locations were chosen, etc. Cite any previous environmental reports. *Ecology comment (Section indicated as Incomplete): I realize you can't speak to why previous consultants did what they did, but previous data collected from past consultants should be interpreted.*

HydroCon Response: Discussion regarding the results of previous data collected, by other consultants, is included in Sections 2.2 and 2.3 in the attached Environmental Site Assessment Work Plan (Work Plan).

b. Site Characterization. Discuss current site characterization activities for each site media (surface water/sediments, soils, groundwater systems, air, and cultural history/archeology, if applicable). Name site contaminants of concern (COCs) and discuss why they were chosen for analysis. Describe how prior and current work efforts contribute to the understanding of the nature and extent of contamination. *Ecology comment (Section indicated as Incomplete): It has not been demonstrated that the Site has been fully characterized.*

HydroCon Response: Discussion regarding the current understanding of the nature and extent of contamination at the Site, for each media, and the identification of COCs at the Site are included in Section 4 in the attached Work Plan.

III. Sampling/Analytical Results. Discussion of sampling/analytical results should include contaminants analyzed for in samples from each applicable site media (soil, groundwater, vapor, surface water). Include comparison of the results to the applicable Method (A, B, or C) cleanup level, sampling method, laboratory method, and any special sampling or analytical protocols (silica gel, filtration, etc.). Evaluate the quality of the data. *No specific Ecology comment (Section indicated as Incomplete)*.

HydroCon Response: Discussions regarding the historical sampling/analytical results for contaminants analyzed at the Site for each applicable media and a comparison of the results to the applicable Cleanup Method are included in Sections 2.2 and 2.3, respectively in the attached Work Plan. In addition, the proposed cleanup standards for the site are discussed in Section 5 in the attached Work Plan.

IV. Conceptual Site Model (CSM). Discuss contaminant release, fate and transport, exposure pathways (surface water, groundwater wells, air, direct contact, etc.), and potential receptors (human, aquatic, terrestrial). Describe typical concerns for this type of environmental contamination, and include a discussion of site specific concerns (hydro-geologic setting, receptors, current or future site zoning/land use, etc.). *No specific Ecology comment (Section indicated as Missing)*.

HydroCon Response: A CSM is included as Section 4.0 in the attached Work Plan.

V. Proposed Cleanup Standards.

a. General. *No specific Ecology comment (Section indicated as Adequate).*

b. Terrestrial Ecological Evaluation (TEE). A TEE should be performed, if required, as part of cleanup level selection. Reference WAC 173-340-7491 to see if the site qualifies for an exclusion. *Ecology comment (Section indicated as Missing): A TEE was not included as part of your report, and could not be located in the Site file.*

HydroCon Response: A TEE has been completed for the Site and was submitted under separate cover. For completeness and continuity, the TEE will be included in the next site assessment report deliverable.

VI. Summary, Conclusions, and Recommendations.

a. Summary and Conclusions. *No specific Ecology comment (Section indicated as Adequate).*

b. Recommendations. Outline possible interim/remedial actions if appropriate. *No specific Ecology comment (Section indicated as N/A).*

REMEDIAL INVESTIGATION FIGURES

General. *No specific Ecology comment (Section indicated as Adequate).*

I. Vicinity Map(s)

a. *No specific Ecology comment (Section indicated as Adequate).*

b. Show other applicable items including (but not limited to): surface topography, natural areas, surrounding land uses, location of groundwater supply and monitoring wells within a one mile radius. *No specific Ecology comment (Section indicated as N/A).*

II. Site Map(s)

a. Show overall site layout with site features and existing well, boring, and sampling locations labeled consistently with current and historical site data and sample names used in the report. If multiple names exist for a sampling location or area of the site indicate this. *Ecology comment (Section indicated as Missing): Report focused on groundwater and did not show or discuss soil results.*

HydroCon Response: Site maps have been revised to include the location and designation of historical soil samples collected at the Site. In addition, discussion regarding historical soil sampling is included in Sections 2.2 and 2.3 in the attached Work Plan.

b. Include COC locations, concentrations, and estimate vertical and horizontal extent of contamination for site media, as applicable. Include waste materials present on site as well as hazardous substance treatment, storage, or disposal areas (show current and historical features). *No specific Ecology comment (Section indicated as Missing).*

HydroCon Response: Additional site maps have been generated to include COC locations, concentrations and estimates of the vertical and horizontal extent of contamination and included as appendices to the attached Work Plan.

c. *No specific Ecology comment (Section indicated as Adequate).*

d. Show other relevant information including (but not limited to): site and property boundaries, buildings/facilities on site, historical site features, underground storage tanks (USTs), previous excavation/interim action activity, etc. *Ecology comment (Section indicated as Incomplete): There was mention in earlier reports of a waste oil tank located near the observed TPH-O contamination. Its location and status should be included.*

HydroCon Response: The attached Work Plan describes the extent previous investigations have characterized the site in Sections 2.3 and 2.4 and proposes a scope of work to complete the lateral and vertical delineation of the soil and groundwater contamination, in Section 6.0.

III. Conceptual Site Model

a. Provide figures showing contaminant release(s), fate and transport, exposure pathways, and potential and/or actual receptors. The lateral and vertical extent of contamination, as currently understood, should be clearly conveyed. *Ecology comment (Section indicated as Missing): Specifically, it does not appear that the extent of contamination in soil has been defined. Soils have not been sampled for all substances indicated in MTCA Table 830-1, and groundwater has been inadequately sampled. It has not been demonstrated that the Site has been fully defined, or that contamination has not migrated off Property.*

HydroCon Response: A CSM is included as Section 4.0 in the attached Work Plan. In addition, a schematic conceptual site model is included in the appendices of the Work Plan.

REMEDIAL INVESTIGATION TABLES

General. *No specific Ecology comment (Section indicated as Adequate).*

a. *No specific Ecology comment (Section indicated as Adequate).*

b. *No specific Ecology comment (Section indicated as Adequate).*

c. *No specific Ecology comment (Section indicated as Adequate).*

REMEDIAL INVESTIGATION APPENDICES

a. *No specific Ecology comment (Section indicated as Adequate).*

b. *No specific Ecology comment (Section indicated as Adequate).*

c. *No specific Ecology comment (Section indicated as Adequate).*

d. *No specific Ecology comment (Section indicated as Adequate).*

MISCELLANEOUS ITEMS

Environmental Information Management (EIM). All sampling data must be uploaded into Ecology's EIM database. This allows Ecology to access data, check results, and/or perform additional analyses. For information, reference:

www.ecy.wa.gov/programs/tcp/data_submittal/Data_Requirements.htm

Ecology comment (Section indicated as Missing): To avoid delays in Site reviews, please be sure to follow Ecology's submittal requirements.

HydroCon Response: Site data has been successfully uploaded to the EIM database. HydroCon received an email from the EIM Data Coordinator, Erica Fot, on April 13, 2018 indicating the submitted data files had been successfully loaded into EIM for the Site. Data generated during sampling, as detailed in the attached Work Plan, will be uploaded to EIM.

Certification (Licensed Professional Stamp). *No specific Ecology comment (Section indicated as Adequate).*

a. **Additional information may be requested by Ecology as required to fully define the site.** *No specific Ecology comment (Section indicated as N/A).*

b. **Submittal Requirements:** Ecology requests three copies of reports submitted per WAC 173-340-850. Please contact the cleanup project manager for specific submittal requirements. *Ecology comment (Section indicated as Incomplete): To avoid delays in Site reviews, please be sure to follow Ecology's submittal requirements.*

HydroCon Response: HydroCon will submit reports per WAC 173-340-850 requirements or as otherwise directed by the cleanup project manager.

CLOSING

We appreciate the care in which Ecology has reviewed the submitted report and your assistance in moving the site toward closure. Please contact the undersigned at (360) 703-6079 if you have any questions regarding the information provided in this letter.

Sincerely,

Brian Pletcher,
Senior Project Manager

Attachments
Attachment A – Environmental Site Assessment Work Plan

ATTACHMENT A
ENVIRONMENTAL SITE ASSESSMENT WORK PLAN

Environmental Site Assessment Work Plan

Handy Mart – 1410 Ocean Beach Highway, Longview, Washington
HydroCon Project Number 2015-007.01
Ecology Cleanup No: 11294
VCP Project ID: SW1623

Prepared for:

Wilcox & Flegel
98 Panel Way
Longview, Washington 98632

January 24, 2019

Prepared by:

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1.0 INTRODUCTION

HydroCon Environmental, LLC (HydroCon) is pleased to present this Environmental Site Assessment Work Plan to further characterize the nature and extent of gasoline contaminated soil and groundwater associated with the July 1991 gasoline release from the underground storage tank (UST) system. The work plan also includes a summary of cleanup and assessment activities performed at the Handy Mart located in Longview Washington. The site location is shown on Figure 1. This work plan provides a summary of past cleanup activities, site assessments and groundwater monitoring results to identify data gaps to be address by this work plan. The purpose of the proposed Environmental Site Assessment collect additional soil and groundwater data to further characterize and delineate soil and groundwater contamination to obtain a no further action (NFA) determination for the 1991 unleaded gasoline release at the site.

2.0 SITE BACKGROUND

2.1 Site Description

The subject property is located at 1410 Ocean Beach Highway in Longview, Washington. The Cowlitz County Assessor's Office identifies the subject site as Parcel 1029901 within Section 28 of Township 8 North and Range 2 West of the Willamette Meridian (Figure 1). The Columbia River is located approximately 2.8 mile southwest of the site. The Cowlitz River is approximately 0.8 miles east of the site.

The site is located in a mixed residential and commercial area. Residential properties are located west and southwest of the site. Commercial properties are located to the north, east and south of the site. The property located to the east and adjacent to the subject site is a former Time Oil leaking underground storage tank (LUST) cleanup site (Cleanup Site ID 10877). This site received a NFA from Ecology in August 2012.

The current site layout includes a convenience store building, carwash and underground storage tank (UST) system. The site only dispensed gasoline until 2005. In June 2005 the mid grade gasoline UST was converted to diesel fuel. The convenience store building is located in the northern portion of the site, the UST system is located on the central portion of the site and the carwash is located on the east portion of the site (Figure 2).

According to the Ecology UST Site/Tank Data Summary data base, the USTs at the site were installed in 1969 and continue to operate to date. The data base reports that the USTs are single wall steel tanks with interior linings. The current product piping is double wall, corrosion resistant flexible piping.

2.1.1 Site Geology

The soils that underlie the site are Quaternary age alluvial sediments. Based on a review of the site boring logs, the soils beneath the site consist of silts and silty sand to a depth of 15 feet below ground surface (bgs). Based on the current groundwater monitoring at the site, the depth to groundwater varies seasonally between 5 and 10 feet bgs.

2.2 1991 Release

In July 1991, soil and groundwater impacted with gasoline was discovered in borings advanced south of the USTs during an environmental site assessment conducted by Sweet Edwards/Emcon Inc. (EMCON). The EMCON soil and groundwater report was not available for review. The site assessment was conducted to facilitate the sale of the property from John Szkodyn to Wilson Oil. The source of the release was determined to be two loose bolts on the leak detector located in the unleaded turbine sump. This allowed for small releases of gasoline to occur when under pressure. The leak detector was repaired and additional soil borings were advanced to determine the extent of the release south of the USTs.

On October 18, 1991, Environmental Inspection Services (EIS) supervised the excavation of approximately 140 cubic yards of soil from the southern end of the USTs. Four confirmation soil samples and one water sample were collected from the remedial excavation. The soil and the groundwater samples were analyzed for gasoline range petroleum hydrocarbons (GRPH) and benzene, toluene, ethylbenzene, and total xylenes (BTEX). The detected concentrations of GRPH in soil were all below the Model Toxics Control Act (MTCA) Method A Cleanup Level (CUL) (100 milligrams per kilogram [mg/kg]) and benzene was not detected in the samples submitted. The soil sample collected from the north wall of the excavation was analyzed for lead. Lead was not detected above the Method Reporting Limit (MRL) of 3 mg/kg. The water sample collected from the excavation pit had detections of GRPH and benzene with the resulting concentrations of 12,800 micrograms per liter (µg/L) and 22 µg/L, respectively. The soil sample locations and analytical results are shown on Figure 3 and Table 1. A copy of the EIS report[1] is included in Appendix A.

While the water sample collected from excavation pit had concentrations that exceeded the MTCA Method A Cleanup Levels for GRPH and benzene, the soil had been successfully remediated and Ecology issued a NFA determination for the site on March 19, 1992. Although water samples collected from excavations can be utilized to confirm a release has occurred, it should be noted that samples collected from an excavation are not representative of actual groundwater conditions.

[1] Analytical Test Results, November 6, 1991, Environmental Inspection Services

2.3 2005 Phase I and Phase 2

A Phase I and Limited Phase 2 Environmental Site Assessment (ESA)[2] was conducted by 3 Kings Environmental, Inc (3 Kings) in February 2005 to facilitate a potential property sale. A copy of the Phase I and Limited 2 ESA report is included in Appendix A. Ten soil borings (B1 through B10) were advanced at the site to assess soil and groundwater quality in the vicinity of the site UST system and assess the potential of off-site impacts from the former Time Oil cleanup property located east of the site.

The results of the ESA indicated that heavy oil (weathered motor oil) was detected in borings (B2, B4 and B5) located on the west side of the site, at concentrations below the MTCA Method A CUL. Based on review of the boring logs, the subsurface soils have a relatively high organic content. It's possible that the organic material may have contributed to the heavy oil detections in the samples. The 3 Kings ESA reported that a waste oil tank had been removed from the site in the past; however the location of waste oil tank is unknown. HydroCon reviewed the Phase I prepared by 3 Kings and found no reference to a waste oil tank at the site.

GRPH was detected at the soil water interface in a boring (B5) located adjacent to the south side of the USTs. The GRPH concentration in soil was 90 mg/kg, below the MTCA Method A CUL of 100 mg/kg; benzene was not detected above the laboratory MRL. The soil sample locations and analytical results are included on Figure 3. A groundwater sample was collected from boring B5 and contained 4,410 µg/L of GRPH, however benzene was not detected above the laboratory MRL of 0.04 µg/L. The laboratory report notes that the soil and groundwater sample collected from B5 as weathered gasoline. The concentration of GRPH exceeded the MTCA Method A CUL for groundwater. This concentration GRPH in the B5 sample was significantly less than the sample collected from the pit water inside the remedial excavation in 1991 (12,800 µg/L). The historical groundwater sample locations and analytical results are presented on Figure 4 and Table 2.

Ecology was provided the results of the February 2005 ESA and the site was reopened as a new release.

In May 2005, 3 Kings installed three 1-inch diameter groundwater monitoring wells (MW1, MW2, and MW3) in the vicinity of the USTs. Soil samples were collected from soil/water interface (10.5 feet bgs) in borings MW2 and MW3 located south of the UST basin. The soil sample collected from the MW3 boring had a detection of GRPH at 90 mg/kg. BTEX analysis was not conducted at that time due to the absence of benzene detections during the February

[2] Phase I-II Environmental Site Assessment Report July 26, 2005, 3 Kings Environmental Inc.

2005 Phase II. The monitoring wells were purged, sampled, and analyzed for GRPH and BTEX; 1,2-dibromoethane (EDB); 1,2-dichloroethane (EDC); isopropylbenzene; methyl-tert butyl ether (MTBE); naphthalene; n-propylbenzene; 1,2,4-trimethylbenzene; and 1,3,5-trimethylbenzene. GRPH and BTEX were not detected above their respective MRLs in the groundwater samples collected from MW1 and MW2. GRPH was detected in MW3; however, the concentrations were below the MTCA Method A CUL. Benzene was detected in MW3 at a concentration of 14 µg/L, n-propylbenzene at 2 µg/L, toluene at 3 µg/L and total xylenes at 8 µg/L. Only benzene exceeded the MTCA Method A CUL for groundwater (5 µg/L).

Based on the groundwater monitoring results 3 Kings concluded that the detections in the soil and groundwater were from the 1991 documented release. Historical groundwater data collected during the 1991 remediation activities and the 2005 site assessment are summarized on Figure 4 and in Table 2.

3.0 GROUNDWATER MONITORING

Groundwater monitoring was conducted by 3 Kings on a bi-annual basis, beginning in December 2010 and ending in March 2012. HydroCon subsequently began quarterly groundwater sampling in September 2015 through June 2017. The sections below describe the sampling methodology utilized by HydroCon for the last five consecutive quarterly groundwater monitoring events. Included in the discussion are the calculated groundwater gradients and flow direction during those events.

3.1 Groundwater Sampling

Prior to sample collection, the well cap on each well was removed and the water level was allowed to equilibrate prior to measuring the depth-to-water (DTW). The DTW in each well was measured using a clean electronic water level indicator. Water levels were measured at the scribed reference mark (north end of the top of the PVC casing) at each well. The wells were purged with a peristaltic pump, using low-flow techniques, equipped with new length of low-density polyethylene (LDPE) tubing attached to a new length of silicone tubing. Field parameters (pH, temperature, oxygen reduction potential [ORP], and specific conductivity) were measured and recorded on a Groundwater Sample Collection field form along with the DTW measurements. Purging was completed when the field parameters had stabilized. Groundwater levels and groundwater parameters were not able to be measured simultaneously, due to the well size (1-inch in diameter).

Samples were collected immediately after purging and placed in labeled laboratory-prepared sample bottles. The samples were shipped in an iced cooler along with chain-of-custody documentation to Apex Laboratory in Tigard, Oregon for analysis.

Each groundwater sample was analyzed for the following set of parameters:

- GRPH by Northwest Method NWTPH-Gx
- BTEX by EPA Method 8021B.

3.2 Groundwater Conditions and Groundwater Flow Direction

The water produced from the wells during the last five groundwater sampling events was clear with no noticeable odor or sheen.

Static water levels in the three wells seasonally range from 5.13 to 10.67 feet below the top of the PVC well casing. The elevation of the groundwater in the wells was calculated using the elevation of the top of the casing (at the scribed reference mark) and subtracting the DTW measurement (Table 3). HydroCon prepared a groundwater elevation contour map from each data set to illustrate the direction of groundwater flow at the site. These figures are included as Figures 5.1 through Figure 5.5. Groundwater flowed in a northeast direction during the April 2016, August 2016 and March 2017 sampling events. During the November 2016 sampling event the groundwater flowed to the east and to the west during the June 2017 sampling event. The gradient at the site ranged from 0.004 foot per foot during the November 2016 event to 0.01 foot per foot during the June 2017 sampling event.

3.3 Groundwater Analytical Results

The groundwater analytical results are reported as parts per billion (µg/L) and are summarized on Table 4 and shown on Figure 6. The analytical results are summarized below.

GRPH has been historically detected in all wells; however the detected concentrations have never exceeded the MTCA Method A CUL of 800 µg/L. The highest GRPH concentration detected at the site, was in MW3 at a concentrations of 499 µg/L, in 2005. GRPH has not been detected above the laboratory MRLs in monitoring wells MW-1 and MW-2 for the past five quarters and has been below the laboratory MRL for the past two quarters at MW-3.

The maximum concentration of benzene detected during the past five quarterly events was 3.7 µg/L in MW-1 during the April 2016 groundwater monitoring event. All detections of benzene during the last five quarterly monitoring events have been below the MTCA Method A CUL of 5 µg/L.

4.0 CONCEPTUAL SITE MODEL

A conceptual site model (CSM) is a site-specific evaluation of potential contaminant sources, exposure pathways, and receptors available to the site based on the distribution of contaminants, and current and reasonably likely future land and water uses. Exposure

pathways were assessed for the site utilizing soil and groundwater analytical data, hydrogeologic data, and current and potential future land and water uses. A graphic display of the conceptual site model (CSM) is included on Figure 7.

The site and the east, north and south adjacent properties are zoned as Central Business District (CBD) which is a commercial area intended for major retail, service, financial, professional, and cultural uses. The west adjacent property is zoned as Traditional Neighborhood Residential (TNR) and is characterized by predominately residential uses, by a grid pattern of streets with sidewalks. A review of the City of Longview's December 2006 Comprehensive Plan Future Land Use Map, the zoning of the site and surrounding properties is not anticipated to change. Based on historical soil and groundwater sampling analytical results, impacted media(s) are not located within 100 feet of a residential buildings and do not appear to be migrating offsite.

4.1 Contaminants and Media of Concern

Laboratory analysis was performed at the site for contaminants of potential concern (COPCs) including GRPH, DRPH, ORPH, BTEX, EDB, EDC, MTBE, naphthalene and total lead. A contaminate of concern (COC) is defined as a COPC which was ever detected at a concentration exceeding the MTCA Method A CUL. Five soil samples were analyzed for BTEX during past investigations. Benzene was not detected above the MRLs for these samples however the MRL is above the current MTCA Method A CUL of 0.03 mg/kg. Due to the lack of benzene detections in soil samples it was proposed that the GRPH CUL for the site is 100 mg/kg but is above the CUL of 30 mg/kg if benzene is detected. Based on a CUL of 100 mg/kg there are no COC for soil at the site. The maximum detections of GRPH at the site were 90 mg/kg collected from borings B5 and MW3 located south of the UST excavation.

Ecology recently provided comments to HydroCons *Environmental Summary Report* [3] in a letter dated May 7, 2018 and indicated that due to the elevated MRLs and limited number of soil samples analyzed for benzene, additional characterization would be needed to establish COC and CUL for GRPH. Based on Ecology's comments GRPH and benzene are considered COCs for soil at the site.

Based on past MTCA Method A CUL exceedances in groundwater GRPH and benzene are considered COCs for the site.

4.2 Confirmed and Suspected Source Areas

The historical investigations confirmed elevated concentrations of COCs were present in groundwater in the vicinity of the UST excavation as a result of a release of unleaded gasoline. (Figure 2).

4.2.1 Distribution of Contaminants in Soil

Petroleum-contaminated soil is generally detected south and west of the UST excavation and remedial excavation between 10 and 15 feet bgs. The distribution of the contaminated soil is shown on Figure 3.

4.2.2 Distribution of Contaminants in Groundwater

The area of petroleum-contaminated groundwater that resulted from the release of unleaded gasoline in the UST excavation generally coincides with the area of soil contamination. Recent groundwater analytical results indicate that the concentration of COCs in all site monitoring wells have remained below their respective MTCA Method A cleanup levels since at least April 2016 (minimum 5 consecutive quarterly groundwater sampling events). (Figure 8).

4.3 Contaminant Fate and Transport

4.3.1 Transport Mechanisms Affecting Distribution of Petroleum Hydrocarbons

The environmental transport mechanisms of TPH are related to its separate phases in the subsurface. The four phases of petroleum contamination in the subsurface are vapor (in soil gas), residual (sorbed contamination on soil particles), aqueous phase (contaminants dissolved in groundwater), and light non-aqueous phase liquids (LNAPL). At steady state conditions, each phase is in equilibrium with the other phases in the subsurface, and the relative ratio of total subsurface contamination by TPH between the four phases is controlled by dissolution, volatilization, and sorption.

TPH observed in soil and groundwater beneath the site have been transported from source areas and distributed throughout the Site primarily by dispersive transport mechanisms within the saturated zone and by soil vapor transport. As with other chemicals, petroleum hydrocarbons tend to spread out as groundwater flows away from the source area. The extent of the hydrocarbon plume depends on the volume of the release, soil density, particle size, and seepage velocity.

4.3.2 Environmental Fate

The significant processes controlling the fate of petroleum hydrocarbons in the environment are dissolution, volatilization, sorption, and bioattenuation. Petroleum hydrocarbons are comprised of hundreds of organic compounds that exhibit a wide range of physical and chemical properties. These compounds range from low molecular weight, low-boiling point compounds with high vapor pressure (i.e. highly volatile) exhibiting moderate aqueous solubility to those that exhibit a high molecular weight, high-boiling point, low vapor pressure, and extremely low aqueous solubility. Gasoline represents the lower molecular weight compounds that exhibit a higher relative capacity for dissolution, volatilization, and bioattenuation. These compounds are therefore more mobile in the environment and less persistent over time. The moderate molecular weight compounds representative of diesel fuel exhibit a lower relative capacity for dissolution, volatilization, and bioattenuation compared to gasoline.

4.4 Preliminary Exposure Assessment

The following is a summary of the potential migration pathways identified for the site and potential targets for COCs observed on the Property.

4.4.1 Soil-to-Groundwater Pathway

Based on the presence of residual soil petroleum hydrocarbons in soil at the site, the leaching to groundwater pathway is considered complete.

4.4.2 Direct Contact Pathway

Direct contact with COCs in soil and groundwater is limited to human receptors that come into close contact with the media via direct exposure, including dermal contact or ingestion of excavated soil or groundwater. The standard point of compliance for soil contamination beneath a site is approximately 15 feet bgs, which represents a reasonable estimate of the depth that could be accessed during normal site redevelopment activities (WAC §173-340-740[6][d]). Direct contact exposure to soil and groundwater unlikely with the exception of potential construction and excavation workers.

4.4.3 Vapor Pathway

Volatile COCs (benzene) have been identified in groundwater in the vicinity of the UST excavation. Recent groundwater monitoring data are presently below the Ecology's screening level of 2.4 µg/L. Based on recent groundwater data and the lack of benzene detected in soil the vapor intrusion exposure pathway is considered not to be complete at the Site.

4.4.4 Surface Water

Migration of contaminants via surface water infiltration and leaching to the subsurface is mitigated by the asphalt and concrete that covers the site. Therefore, this pathway is considered incomplete.

4.4.5 Groundwater/Drinking Water

Shallow groundwater in the vicinity of the Site is not developed as a significant drinking water resource and is not likely to be developed in the future due to presence of the City of Longview water system. The City of Longview obtains its drinking water from a deep well field located 2.25 miles southwest of the site (Mint Farm Industrial Park). HydroCon search the Department of Ecology Well Report Viewer database for wells within 0.5 mile radius from the site. One domestic well was identified located approximately 2,800 feet southwest of the site at 2222 Ocean Beach Highway, Longview Washington. The total depth of the well is 38 feet bgs and is screened from 31 to 33 feet bgs. A copy of the well report is included in Appendix B. While adverse impacts to shallow groundwater at the Site have been confirmed, the potential for adverse impacts to the municipal water supply or private wells from contaminants migrating from the Site is very low.

5.0 PROPOSED CLEANUP STANDARDS

5.1 Contaminants and Media of Concern

The COCs for the site are those compounds that were detected at concentrations exceeding their respective CULs. The COCs identified in soil and groundwater at the site includes GRPH and benzene.

5.2 Cleanup Standards

The selected cleanup alternative must comply with the MTCA cleanup regulations specified in WAC §173-340 and with applicable state and federal laws. Although the site is zoned as CBD, which discourages residential use, the west adjacent property is zoned a TNR. As a result, the CULs selected for the site are the MTCA Method A CULs for Unrestricted Land Use.

The proposed CULs for soil and groundwater beneath the Site are generally the MTCA Method A CULs for Unrestricted Land Use for COCs that have a Method A CUL.

The CULs for the media and COCs are presented in the tables below, including the source of the CUL.

Proposed CULs for Soil

Chemicals of Concern	Cleanup Level (milligrams per kilogram)	Source
GRPH[1]	100	MTCA Method A, Unrestricted; WAC §173-340-740(2)(b)(i)
Benzene	0.03	
Toluene	7	
Ethylbenzene	6	
Total xylenes	9	

[1] Weather gasoline without benzene

Proposed CULs for Groundwater

Chemicals of Concern	Cleanup Level (micrograms per liter)	Source
GRPH[1]	800	MTCA Method A, Table Value; WAC §173-340-720(3)(b)(i)
Benzene	5	
Toluene	1,000	
Ethylbenzene	700	
Total xylenes	1,000	

[1]When benzene is present in groundwater

5.3 Points of Compliance

The point of compliance is the location where the enforcement limits that are set in accordance with WAC §173-200-050 will be measured and cannot be exceeded (WAC §173-200-060 and Ecology, 2005). Once the CULs have been attained at the defined points of compliance, the impacts present beneath the Site will no longer be considered a risk to human health or the environment.

5.3.1 Points of Compliance for Soil

In accordance with Ecology 2005, the points of compliance for soil depend on the CULs proposed for cleanup and the exposure pathways. Since Method A CULs are proposed for the Site and are considered protective of all potential soil exposure pathways, the standard point of compliance applies to cleanup actions at this Site. The standard point of compliance is defined as “throughout the site from ground surface to fifteen feet below the ground surface”.

5.3.2 Points of Compliance for Groundwater

In accordance with WAC §173-340-720(8)(a)(b), the point of compliance for groundwater is defined as the uppermost level of the saturated zone extending vertically to the lowest depth that potentially could be impacted by the COCs throughout the Site.

Existing monitoring wells (MW-1 through MW-3) will be used to evaluate whether compliance at the Site has been achieved.

6.0 FIELDWORK

The following fieldwork tasks will be performed at the site:

6.1 Update Health and Safety Plan

HydroCon will update the site specific Health and Safety Plan to guide field safety protocols, in accordance with rules established by the Occupational Safety and Health Administration (OSHA) and Washington Industrial Safety and Health Act (WISHA).

6.2 Utility Locates

The Washington Utility Notification Center (WUNC) will be contacted prior to conducting work at the site. HydroCon will paint white paint marks and/or place white flagging on the ground, as is required by law, prior to contacting the WUNC. A private underground utility contractor will be hired to clear proposed boring locations prior to initiating drilling.

6.3 Temporary Borings

HydroCon will contract with a direct-push drilling contractor to advance 5 borings to a maximum depth of 20 feet bgs each for the purpose of sample collection at potential source areas, and areas requiring additional characterization (Figure 8).

Rationale for Selected Boring Locations

BORING NUMBER	RATIONALE FOR BORING
HC01	North of MW01 to delineate soil north of the USTs
HC02	West of the UST excavation
HC03	West of MW03
HC04	Near boring B5 to evaluate natural attenuation of soil in remedial excavation area.
HC05	Assess soil and groundwater quality south of UST and remedial soil excavation

Each boring will be drilled using the direct-push drilling method. Soil samples will be collected on a continuous basis using the macro core samplers equipped with 5-foot length of PVC liners. Soil samples will be observed by the field geologist and field screened using visual and olfactory observations as wells as a photoionization detector (PID) which measures relative organic vapor concentrations. The soil will be logged by a geologist using the Unified Soil Classification System. All soil types, sampling information, field screening results, drilling information, and other pertinent data will be recorded on a field boring log. A well log will be produced for each boring and included in the report.

7.0 SAMPLING AND ANALYSIS PLAN

Soil and groundwater sampling is proposed to assess soil and groundwater conditions at the site. All field operations will be supervised by personnel experienced in Site assessment and sampling activities. Field operations will be performed in accordance with the Site's Health and Safety Plan.

Any necessary permits for the proposed Site investigation activities will be obtained from city, county and state jurisdictions.

7.1 Field Screening

Field screening will consist of volatile organic vapor measurements using a photoionization detector (PID), sheen testing, visual observations (staining, etc.), and olfactory observations. The PID will be calibrated before use at the site to a test gas standard consisting of 100 ppm isobutylene. A portion of each soil sample will be placed in a sealable plastic baggie. The tip of the PID will be inserted into the plastic bag in the airspace above the soil sample and the PID measurement will be recorded on boring logs. Sheen testing will consist of placing a small portion of soil in clear water and observing the water for the presence of hydrocarbon sheen.

7.2 Soil Sampling

Up to three soil samples per boring will be submitted to the laboratory based on field screening results, lithologic composition, and depth. The selected soil samples will be removed from the polyethylene tubing using a new pair of disposable gloves and placed directly into labeled laboratory prepared jars and sealed with Teflon-lined lids. Soil samples will be placed into laboratory supplied containers (4 ounce jars (TPH-Dx) and VOAs utilizing 5035A field preservation for TPH-Gx and BTEX) and immediately placed in an ice filled cooler along with chain-of-custody documentation for shipment to APEX Laboratory in Tigard, Oregon.

7.3 Groundwater Sampling – Temporary Borings

Groundwater samples will be collected from a temporary well constructed using new 1-inch diameter PVC blank riser pipe attached to a 5-foot length of slotted well screen. The well screen will be across the vadose and water bearing zone. A new length of low density polyethylene (LDPE) tubing will be placed down the temporary well and attached to a peristaltic pump. Water will be purged from each respective boring until no further improvement in water clarity is observed. Samples will be placed directly into the laboratory-prepared sample jars and stored in a chilled cooler along with chain-of-custody documentation.

7.4 Analytical Methods

HydroCon will collect three soil samples per boring and groundwater samples for potential chemical analysis. At a minimum one soil sample will be submitted for analysis from the soil/groundwater interface. If field screening of soil samples identify potential impacts to the vadose soils, the soil sample with the highest PID reading will be submitted from the boring location. One soil sample will be collected in the saturated zone from a depth of 15 feet but will only be analyzed if petroleum hydrocarbons are detected in the groundwater sample collected from the corresponding boring. The soil and groundwater samples will be submitted to Apex laboratory (Tigard, Oregon) to be analyzed for the established COCs at the site.

- GRPH will be analyzed using Northwest Method NWTPH-Gx
- DRPH and ORPH will be analyzed using Northwest Method NWTPH-Dx with and without silica gel cleanup for soil samples only.
- BTEX will be analyzed using EPA Method 8260B

8.0 REPORTING

Upon the completion of field work and receipt of the analytical results, HydroCon will prepare a report documenting field activities and methodologies, the analytical results, and recommendations for additional investigation (if necessary) or site closure. Results will be compared to applicable MTCA Method A CULs. HydroCon will also evaluate using MTCA Model Remedies for site closure, if warranted.

9.0 PROJECT SCHEDULE

HydroCon will initiate the site characterization activities within two weeks of Ecology's approval of this plan. Field work is anticipated to take on day to complete. A report presenting the findings will be submitted to Ecology within two weeks of receiving final laboratory analytical results.

If you have any questions regarding this work plan please call at 360-719-0682 or email bpletcher@hydroconllc.net.

Signature:

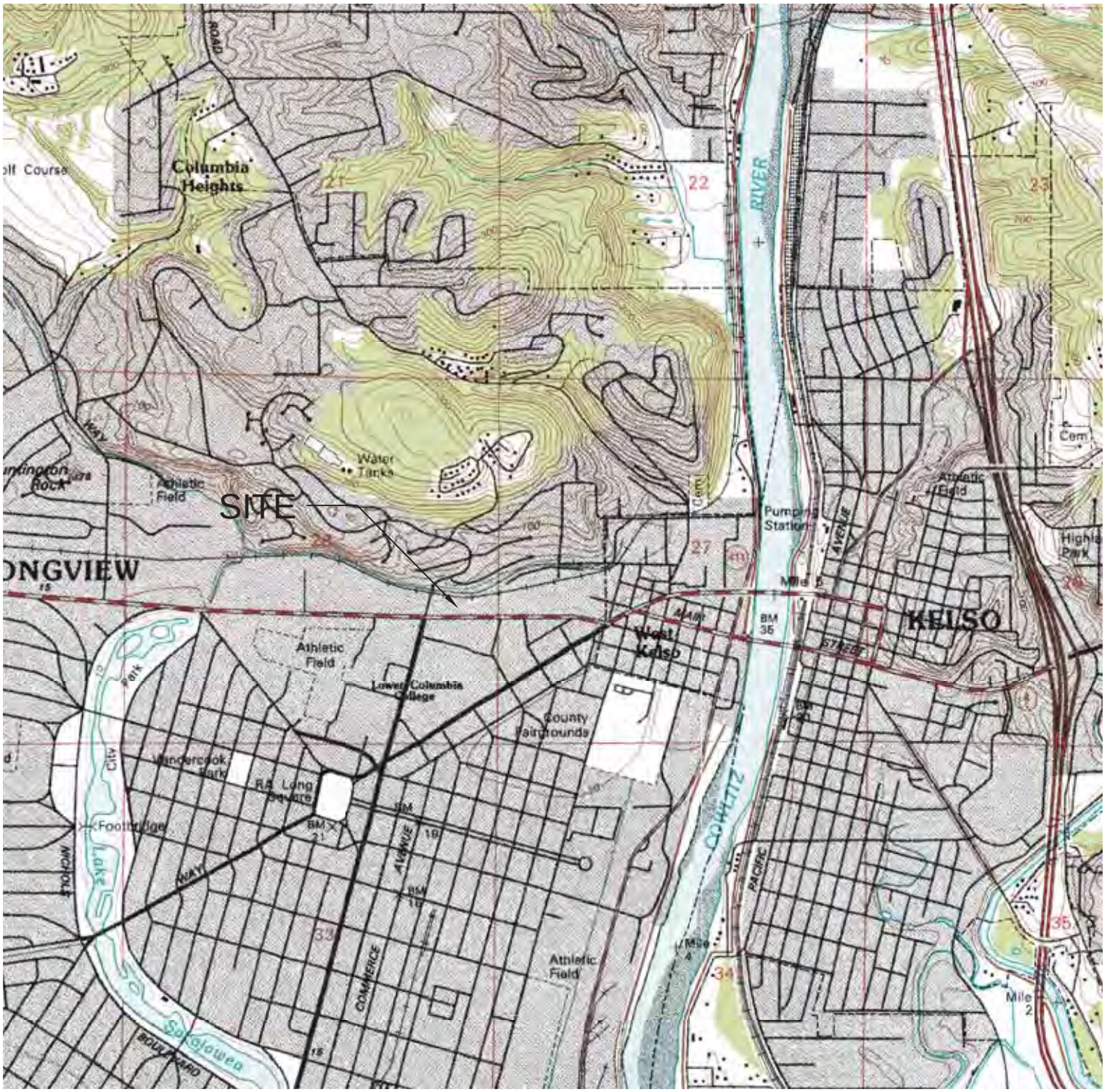
Report Prepared By:

Brian J Pletcher
Project Manager

Report Reviewed By:

Craig Hultgren, LHG
Principal Geologist

State of Washington
Hydrogeologist
1809
Licensed Geologist
CRAIG HULTGREN



NOTE(S):

1. USGS, KELSO QUADRANGLE
   WASHINGTON
   7.5 MINUTE SERIES (TOPOGRAPHIC)

N
W E
S

0 2000 4000
SCALE IN FEET
1" = 2000'

HydroCon
501 Allen St Suite B, Kelso WA Ph: (360) 706-6079

DATE: 03-20-17
DWN: JH
CHK: JH
APPROVED:
PRJ. MGR: DB
PROJECT NO: 2015-007-01

FIGURE 1
SITE LOCATION
HANDY MART
WILCOX & FLEGEL
1410 OCEAN BEACH HWY
LONGVIEW, WA

CONVENIENCE STORE

CAR WASH

DISPENSER ISLAND

B1
B2
B3
B4
B5
B6
B7
B8
B9
B10
MW-1
MW-2
MW-3
#1
#2
#3
#4

LEGEND

- PROPERTY BOUNDARY
- BUILDING
- APPROXIMATE EXTENT OF 1991 REMEDIAL EXCAVATION
- MW-1 — MONITORING WELL LOCATION
- B1 — BORING LOCATION
- #1 — EXCAVATION SAMPLE LOCATION

N W E S

0 30 60

SCALE IN FEET
1" = 30'

HydroCon
510 Allen St. Suite B Kelso, WA 98626, Ph (360) 703-6079

DATE: 05-23-18
DWN: JH
CHK: BP
APPROVED: BP
PRJ. MGR: DB
PROJECT NO: 2015-007-01

FIGURE 2
SITE FEATURES
HANDY MART
WILCOX & FLEGEL
1410 OCEAN BEACH HWY
LONGVIEW, WA

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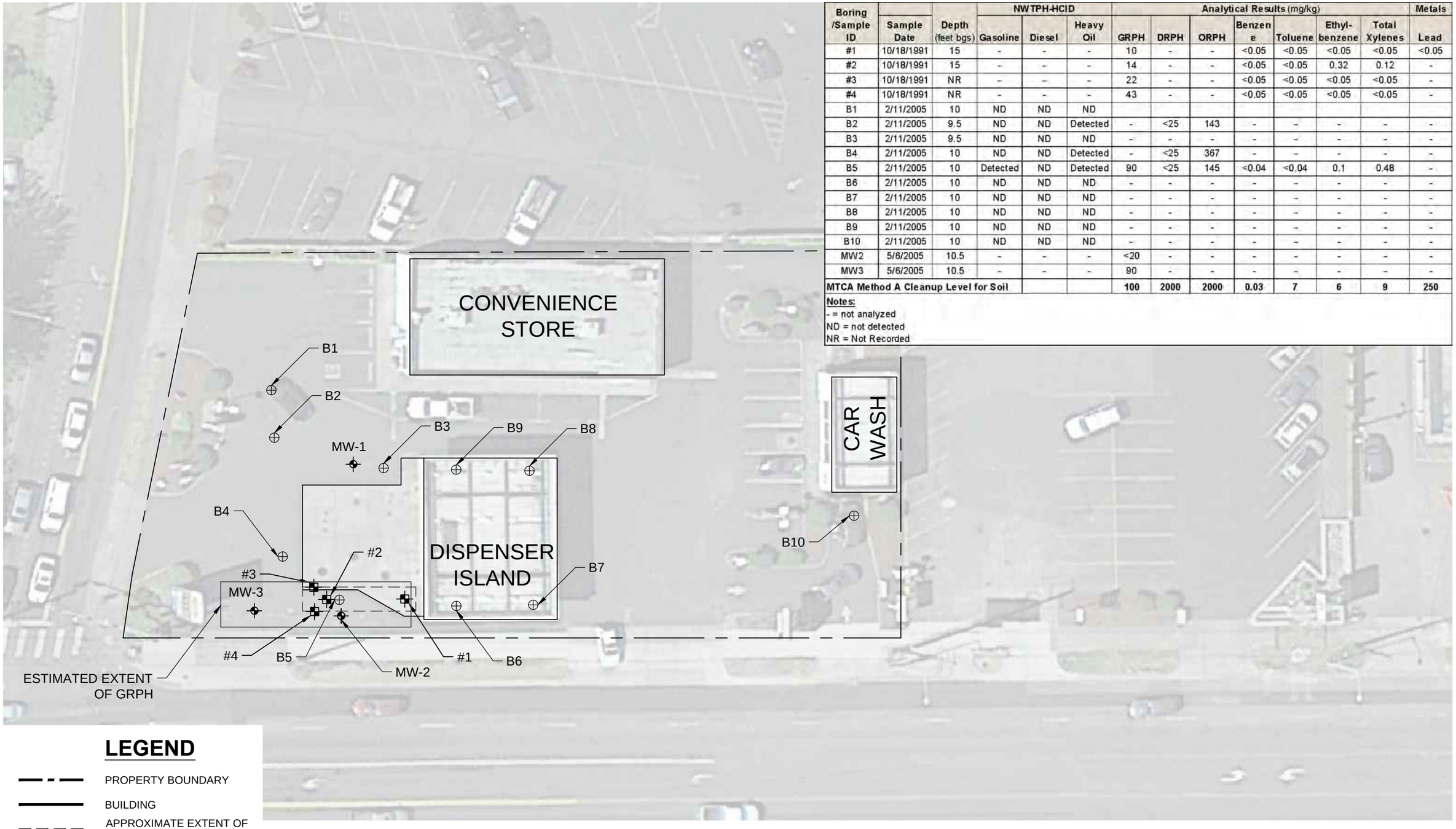
Boring /Sample ID	Sample Date	Depth (feet bgs)	NWTPH-HCID			Analytical Results (mg/kg)							Metals
			Gasoline	Diesel	Heavy Oil	GRPH	DRPH	ORPH	Benzene	Toluene	Ethyl-benzene	Total Xylenes	Lead
#1	10/18/1991	15	-	-	-	10	-	-	<0.05	<0.05	<0.05	<0.05	<0.05
#2	10/18/1991	15	-	-	-	14	-	-	<0.05	<0.05	0.32	0.12	-
#3	10/18/1991	NR	-	-	-	22	-	-	<0.05	<0.05	<0.05	<0.05	-
#4	10/18/1991	NR	-	-	-	43	-	-	<0.05	<0.05	<0.05	<0.05	-
B1	2/11/2005	10	ND	ND	ND								
B2	2/11/2005	9.5	ND	ND	Detected	-	<25	143	-	-	-	-	-
B3	2/11/2005	9.5	ND	ND	ND	-	-	-	-	-	-	-	-
B4	2/11/2005	10	ND	ND	Detected	-	<25	367	-	-	-	-	-
B5	2/11/2005	10	Detected	ND	Detected	90	<25	145	<0.04	<0.04	0.1	0.48	-
B6	2/11/2005	10	ND	ND	ND	-	-	-	-	-	-	-	-
B7	2/11/2005	10	ND	ND	ND	-	-	-	-	-	-	-	-
B8	2/11/2005	10	ND	ND	ND	-	-	-	-	-	-	-	-
B9	2/11/2005	10	ND	ND	ND	-	-	-	-	-	-	-	-
B10	2/11/2005	10	ND	ND	ND	-	-	-	-	-	-	-	-
MW2	5/6/2005	10.5	-	-	-	<20	-	-	-	-	-	-	-
MW3	5/6/2005	10.5	-	-	-	90	-	-	-	-	-	-	-
MTCA Method A Cleanup Level for Soil						**100**	**2000**	**2000**	**0.03**	**7**	**6**	**9**	**250**

Notes:
- = not analyzed
ND = not detected
NR = Not Recorded



LEGEND

- PROPERTY BOUNDARY
- BUILDING
- APPROXIMATE EXTENT OF 1991 REMEDIAL EXCAVATION
- MW-01 — MONITORING WELL LOCATION
- B1 — BORING LOCATION
- #1 — EXCAVATION SAMPLE LOCATION

N W E S

0 30 60
SCALE IN FEET
1" = 30'

HydroCon
510 Allen St. Suite B Kelso, WA 98626, Ph (360) 703-6079

DATE: 05-22-18
DWN: JH
CHK: BP
APPROVED: BP
PRJ. MGR: DB
PROJECT NO: 2015-007-01

FIGURE 3
SUMMARY OF HISTORICAL SOIL ANALYTICAL RESULTS
HANDY MART
WILCOX & FLEGEL
1410 OCEAN BEACH HWY
LONGVIEW, WA

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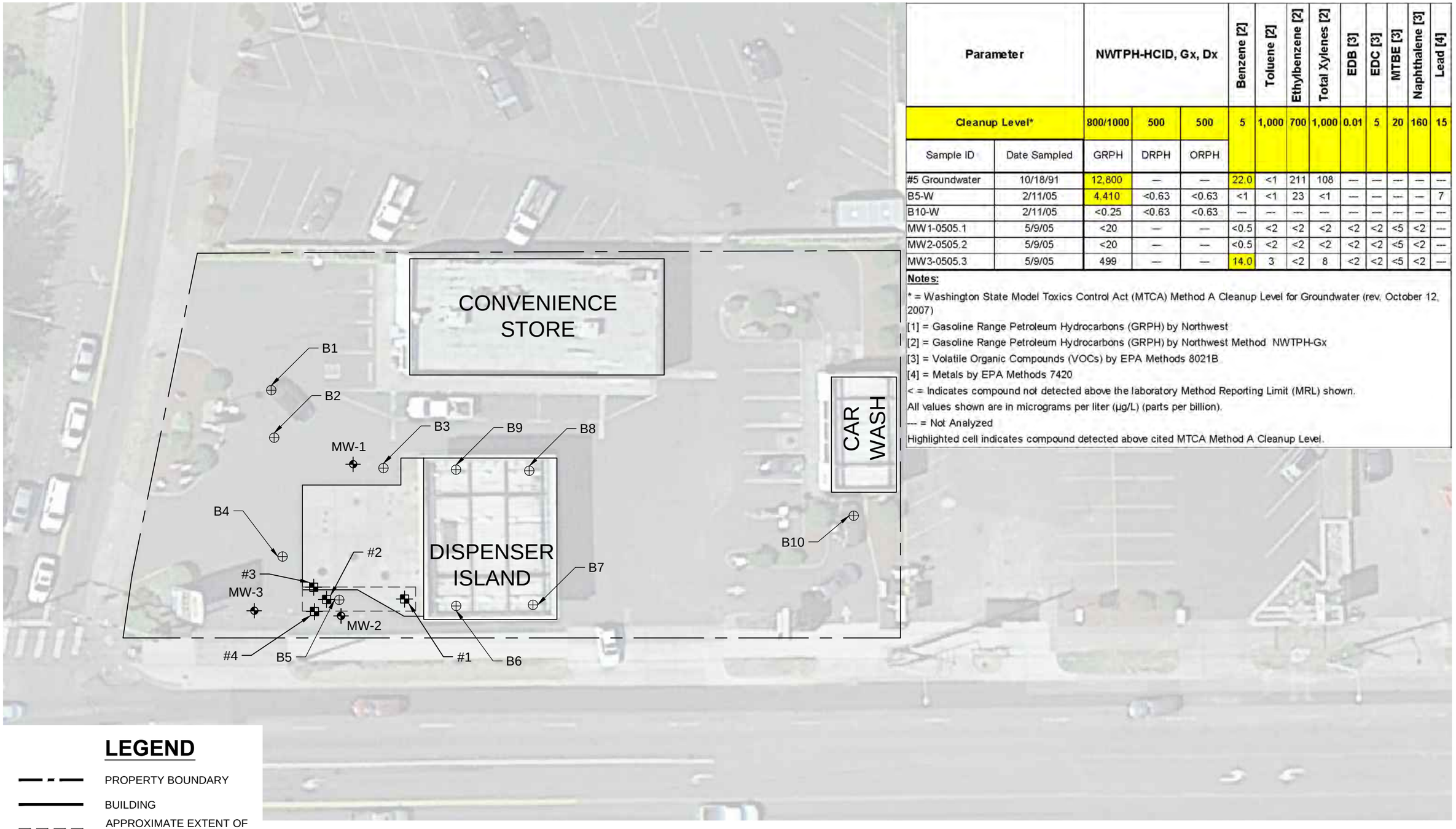

Parameter		NWTPH-HCID, Gx, Dx			Benzene [2]	Toluene [2]	Ethylbenzene [2]	Total Xylenes [2]	EDB [3]	EDC [3]	MTBE [3]	Naphthalene [3]	Lead [4]
Cleanup Level*		800/1000	500	500	5	1,000	700	1,000	0.01	5	20	160	15
Sample ID	Date Sampled	GRPH	DRPH	ORPH									
#5 Groundwater	10/18/91	12,800	—	—	22.0	<1	211	108	—	—	—	—	—
B5-W	2/11/05	4,410	<0.63	<0.63	<1	<1	23	<1	—	—	—	—	7
B10-W	2/11/05	<0.25	<0.63	<0.63	—	—	—	—	—	—	—	—	—
MW1-0505.1	5/9/05	<20	—	—	<0.5	<2	<2	<2	<2	<2	<5	<2	—
MW2-0505.2	5/9/05	<20	—	—	<0.5	<2	<2	<2	<2	<2	<5	<2	—
MW3-0505.3	5/9/05	499	—	—	14.0	3	<2	8	<2	<2	<5	<2	—

Notes:

* = Washington State Model Toxics Control Act (MTCA) Method A Cleanup Level for Groundwater (rev. October 12, 2007)

[1] = Gasoline Range Petroleum Hydrocarbons (GRPH) by Northwest

[2] = Gasoline Range Petroleum Hydrocarbons (GRPH) by Northwest Method NWTPH-Gx

[3] = Volatile Organic Compounds (VOCs) by EPA Methods 8021B

[4] = Metals by EPA Methods 7420

< = Indicates compound not detected above the laboratory Method Reporting Limit (MRL) shown.

All values shown are in micrograms per liter (µg/L) (parts per billion).

--- = Not Analyzed

Highlighted cell indicates compound detected above cited MTCA Method A Cleanup Level.

LEGEND

- PROPERTY BOUNDARY
- BUILDING
- APPROXIMATE EXTENT OF 1991 REMEDIAL EXCAVATION
- MW-01 — MONITORING WELL LOCATION
- B1 — BORING LOCATION
- #1 — EXCAVATION SAMPLE LOCATION

N W E S

0 30 60

SCALE IN FEET
1" = 30'

HydroCon
510 Allen St. Suite B Kelso, WA 98626, Ph (360) 703-6079

DATE: 05-22-18
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CHK: BP
APPROVED: BP
PRJ. MGR: DB
PROJECT NO: 2015-007-01

FIGURE 4
SUMMARY OF HISTORICAL GROUNDWATER ANALYTICAL RESULTS
HANDY MART - WILCOX & FLEGEL
1410 OCEAN BEACH HWY
LONGVIEW, WA

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CONVENIENCE STORE

CAR WASH

MW-1
(13.09)

13.15

13.10

DISPENSER ISLAND

MW-3
(13.22)

MW-2
(13.19)

13.2

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LEGEND

- PROPERTY BOUNDARY
- BUILDING
- MW-01 (XX.XX) — MONITORING WELL (GROUNDWATER ELEV.)
- APPROXIMATE DIRECTION OF GROUNDWATER FLOW
- GROUNDWATER ELEVATION CONTOUR

N
W E
S

0 30 60
SCALE IN FEET
1" = 30'

Hydro Con
510 Allen St. Suite B Kelso, WA 98626, Ph(360) 703-6079

DATE: 05-21-17
DWN: JH
CHK: CD
APPROVED: BP
PRJ. MGR: DB
PROJECT NO: 2015-007-01

FIGURE 5.1
GROUNDWATER ELEVATION & CONTOUR MAP (APRIL 2016)
HANDY MART
WILCOX & FLEGEL
1410 OCEAN BEACH HWY
LONGVIEW, WA

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CONVENIENCE STORE

CAR WASH

MW-1
(10.67)

11.2

10.8

UST PIT

DISPENSER ISLAND

MW-3
(11.61)

MW-2
(11.57)

11.6

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LEGEND

- PROPERTY BOUNDARY
- BUILDING
- MW-01 (XX.XX) — MONITORING WELL (GROUNDWATER ELEV.)
- APPROXIMATE DIRECTION OF GROUNDWATER FLOW
- GROUNDWATER ELEVATION CONTOUR

N
W E
S

0 30 60
SCALE IN FEET
1" = 30'

Hydro Con
510 Allen St. Suite B Kelso, WA 98626, Ph(360) 703-6079

DATE: 05-21-17
DWN: JH
CHK: CD
APPROVED: BP
PRJ. MGR: DB
PROJECT NO: 2015-007-01

FIGURE 5.2
GROUNDWATER ELEVATION & CONTOUR MAP (AUGUST 2016)
HANDY MART
WILCOX & FLEGEL
1410 OCEAN BEACH HWY
LONGVIEW, WA

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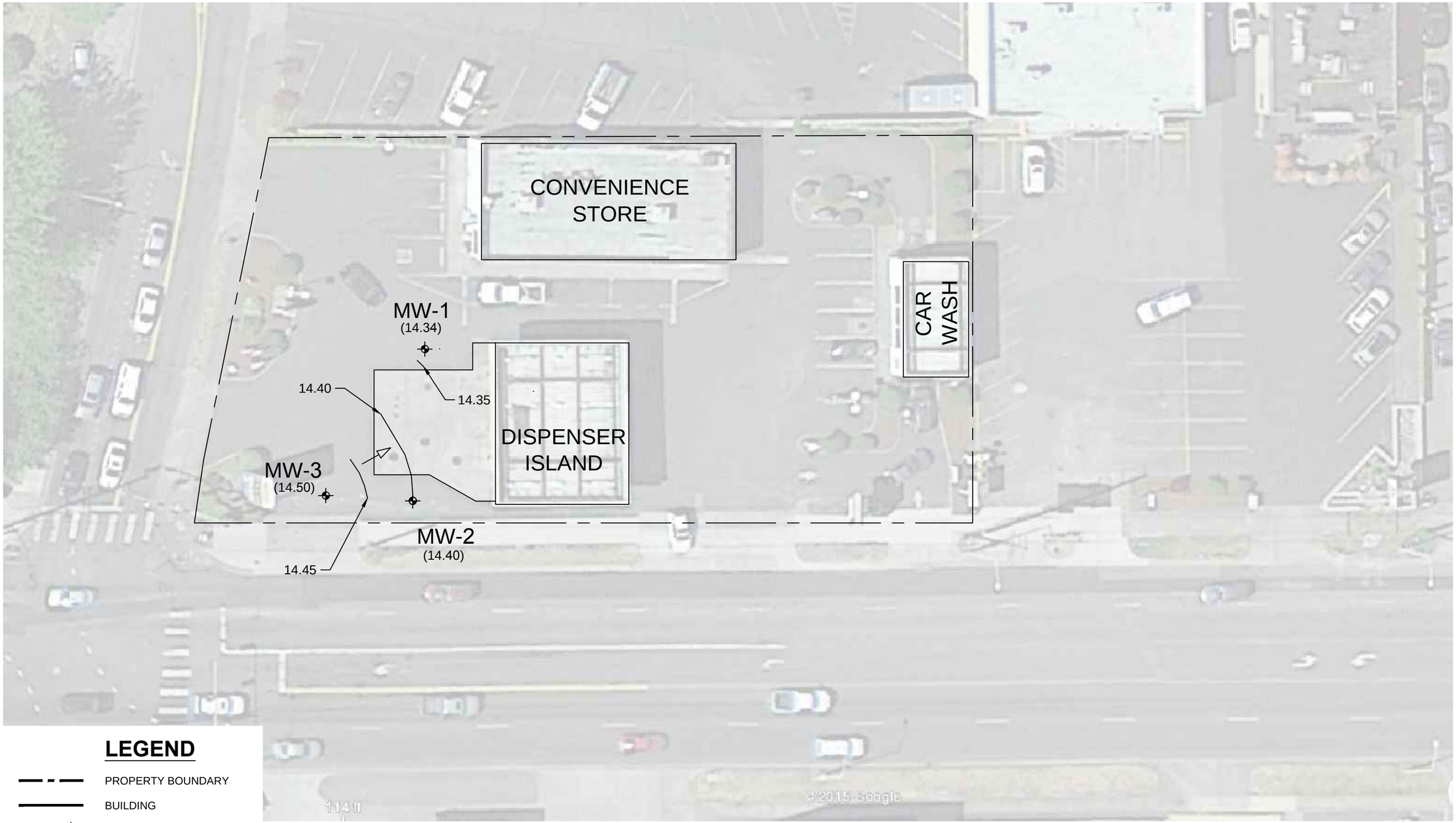

LEGEND

- PROPERTY BOUNDARY
- BUILDING
- MW-01 (XX.XX) — MONITORING WELL (GROUNDWATER ELEV.)
- APPROXIMATE DIRECTION OF GROUNDWATER FLOW
- GROUNDWATER ELEVATION CONTOUR

N / W / E / S

0 30 60

SCALE IN FEET
1" = 30'

Hydro Con
510 Allen St. Suite B Kelso, WA 98626, Ph(360) 703-6079

DATE: 05-21-17
DWN: JH
CHK: CD
APPROVED: BP
PRJ. MGR: DB
PROJECT NO: 2015-007-01

FIGURE 5.4
GROUNDWATER ELEVATION & CONTOUR MAP (MARCH 2017)
HANDY MART
WILCOX & FLEGEL
1410 OCEAN BEACH HWY
LONGVIEW, WA

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LEGEND

- PROPERTY BOUNDARY
- BUILDING
- MW-01 (XX.XX) — MONITORING WELL (GROUNDWATER ELEV.)
- APPROXIMATE DIRECTION OF GROUNDWATER FLOW
- GROUNDWATER ELEVATION CONTOUR

N W E S

0 30 60

SCALE IN FEET
1" = 30'

Hydro Con
510 Allen St. Suite B Kelso, WA 98626, Ph(360) 703-6079

DATE: 05-21-17
DWN: JH
CHK: CD
APPROVED: BP
PRJ. MGR: DB
PROJECT NO: 2015-007-01

FIGURE 5.3
GROUNDWATER ELEVATION & CONTOUR MAP
NOVEMBER 2016
WILCOX & FLEGEL - HANDY MART
1410 OCEAN BEACH HWY
LONGVIEW, WA

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LEGEND

- PROPERTY BOUNDARY
- BUILDING
- MW-01 (xx.xx) — MONITORING WELL (GROUNDWATER ELEVATION)
- GROUNDWATER FLOW DIRECTION
- GROUNDWATER CONTOUR ELEVATION

N W E S

0 30 60

SCALE IN FEET
1" = 30'

Hydro Con
510 Allen St. Suite B Kelso, WA 98626, Ph (360) 703-6079

DATE: 07-12-17
DWN: JH
CHK: CD
APPROVED: BP
PRJ. MGR: DB
PROJECT NO: 2015-007-01

FIGURE 5.5
GROUNDWATER ELEVATIONS AND CONTOUR MAP
JUNE 2017
WILCOX & FLEGEL - HANDY MART
1410 OCEAN BEACH HWY
LONGVIEW, WA

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Parameter		GRPH	Benzene	Toluene	Ethylbenzene	Total Xylenes
MTCA Method A Cleanup Level*		800/1,000	5	1,000	700	1,000
Well Identification	Date Sampled	Results in µg/L				
MW-1	9/24/15	<100	**6.1**	<1	<1	<3
	2/2/16	<100	**6.6**	<1	<1	<3
	4/14/16	<100	3.7	<1	<0.5	<1.5
	8/10/16	<100	2.2	<1	<0.5	<1.5
	11/17/16	<100	0.314	<1	<0.5	<1.5
	3/15/17	<100	<0.2	<1	<0.5	<1.5
	6/30/17	<100	<0.2	<1	<0.5	<1.5
MW-2	9/24/15	460	<1	4.4	<1	3.5
	2/2/16	<100	2.7	<1	<1	<3
	4/14/16	<100	1.41	<1	<0.5	<1.5
	8/10/16	<100	<0.2	<1	<0.5	<1.5
	11/17/16	<100	<0.2	<1	<0.5	<1.5
	3/15/17	<100	<0.2	<1	<0.5	<1.5
	6/30/17	<100	<0.2	<1	<0.5	<1.5
MW-3	9/24/15	<100	<1	<1	<1	<3
	2/2/16	210	<1	3.7	<1	<3
	4/14/16	310	<0.2	<1	<0.5	<1.5
	8/10/16	326	<0.2	<1	<0.5	<1.5
	11/17/16	329	<0.2	<1	<0.5	<1.5
	3/15/17	<100	<0.2	<1	<0.5	<1.5
	6/30/17	<100	<0.2	<1	<0.5	<1.5

Notes:
Highlighted cell indicates compound detected above referenced MTCA Method A Cleanup Level.

LEGEND

- PROPERTY BOUNDARY
- BUILDING
- APPROXIMATE EXTENT OF 1991 REMEDIAL EXCAVATION
- MW-01 MONITORING WELL LOCATION

N W E S

0 30 60
SCALE IN FEET
1" = 30'

Hydro Con
510 Allen St. Suite B Kelso, WA 98626, Ph (360) 703-6079

DATE: 06-04-18
DWN: JH
CHK: CD
APPROVED: BP
PRJ. MGR: DB
PROJECT NO: 2015-007-01

FIGURE 6
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
JUNE 2017
WILCOX & FLEGEL - HANDY MART
1410 OCEAN BEACH HWY
LONGVIEW, WA

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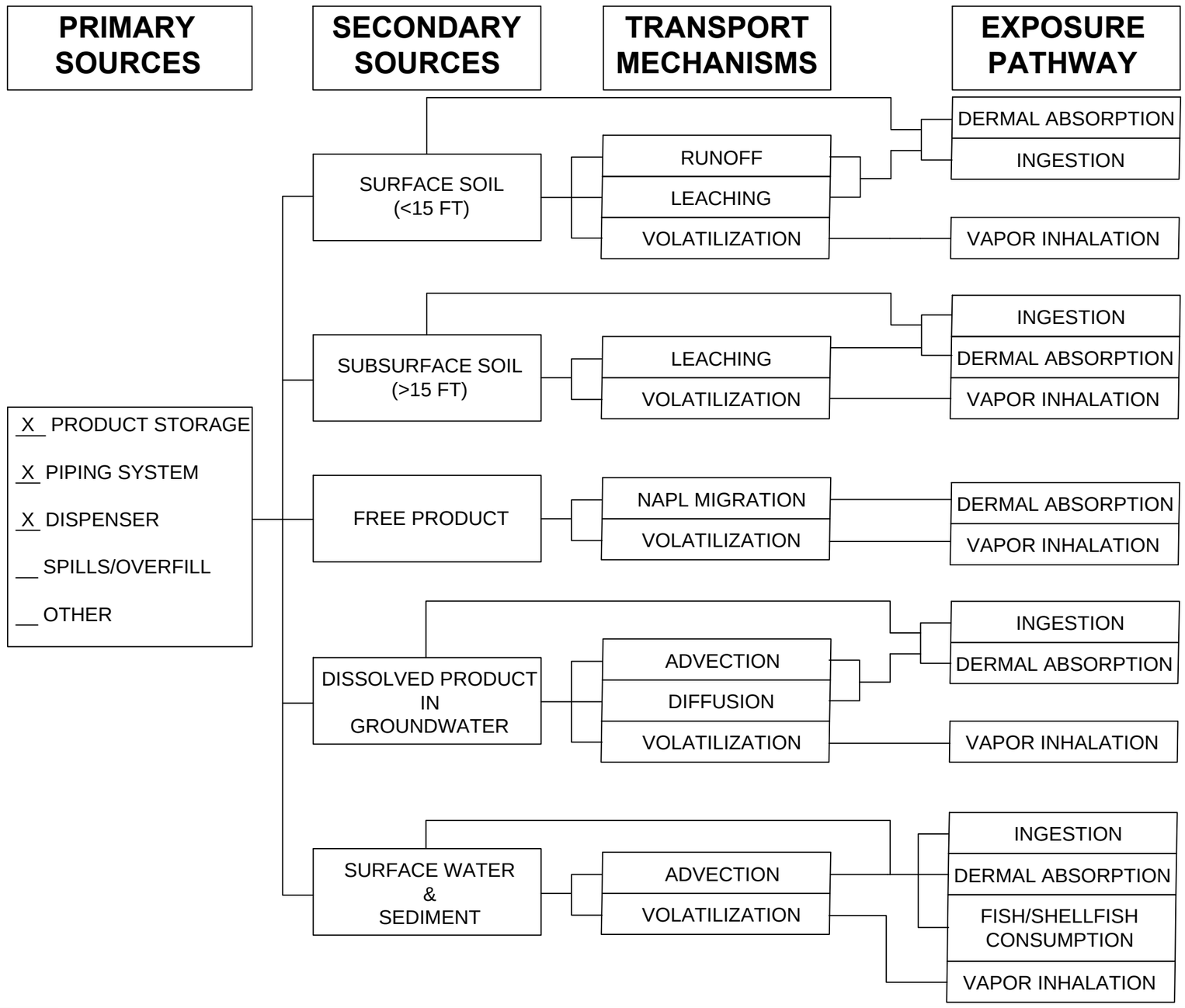

POTENTIAL RECEPTORS

N RESIDENTS/CHILDREN
N COMMERCIAL WORKERS
N INDUSTRIAL WORKERS
Y CONSTRUCTION WORKERS
Y SOIL BIOTA
N PLANTS
N ANIMALS

NA RESIDENTS/CHILDREN
NA COMMERCIAL WORKERS
NA INDUSTRIAL WORKERS
NA CONSTRUCTION WORKERS

NA RESIDENTS/CHILDREN
NA COMMERCIAL WORKERS
NA INDUSTRIAL WORKERS
NA CONSTRUCTION WORKERS
NA SOIL BIOTA
NA PLANTS
NA ANIMALS

N RESIDENTS/CHILDREN
N COMMERCIAL WORKERS
N INDUSTRIAL WORKERS
Y CONSTRUCTION WORKERS
Y SOIL BIOTA
N PLANTS
N ANIMALS

N RESIDENTS/CHILDREN
N RECREATIONAL USERS
N BENTHIC ORGANISMS
N FISH

HydroCon
510 Allen St. Suite B Kelso, WA 98626, Ph(360) 703-6079

DATE: 05-23-18
DWN: JH
CHK: BP
APPROVED: DB
PRJ. MGR: DB
PROJECT NO: 2015-007-01

FIGURE 7
CONCEPTUAL SITE MODEL
HANDY MART
WILCOX & FLEGEL
1410 OCEAN BEACH HIGHWAY
LONGVIEW, WA

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CONVENIENCE STORE

CAR WASH

DISPENSER ISLAND

B1
B2
HC01
B3
B9
B8
HC02
MW-1
B4
B10
#2
B5
B7
ESTIMATED EXTENT OF GRPH
#3
MW-3
#4
#1
B6
HC03
HC04
MW-2
HC05

LEGEND

- PROPERTY BOUNDARY
- BUILDING
- APPROXIMATE EXTENT OF 1991 REMEDIAL EXCAVATION
- MW-1 — MONITORING WELL LOCATION
- B1 — BORING LOCATION
- #1 — EXCAVATION SAMPLE LOCATION
- HC01 — PROPOSED BORING LOCATION

N
W E
S

0 30 60
SCALE IN FEET
1" = 30'

Hydro Con
510 Allen St. Suite B Kelso, WA 98626, Ph (360) 703-6079

DATE: 06-04-18
DWN: JH
CHK: BP
APPROVED: BP
PRJ. MGR: DB
PROJECT NO: 2015-007-01

FIGURE 8
PROPOSED BORING LOCATIONS
HANDY MART
WILCOX & FLEGEL
1410 OCEAN BEACH HWY
LONGVIEW, WA

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Table 1
Summary of Historic Soil Sample Results
Handy Mart, Longview Washington

		Fuels			BTEX				Metals
		GRPH	DRPH	ORPH	Benzene	Toluene	Ethylbenzene	Total Xylenes	Lead
MTCA Method A Cleanup Level*		**30/100**	**2,000**	**2,000**	**0.03**	**7**	**6**	**9**	**250**
Sample ID	Date Sampled								
#1 - Riser 1 Bottom	10/18/91	10	---	---	<0.05 ec	<0.05	<0.05	<0.05	---
#2 - Riser 2 Bottom	10/18/91	14	---	---	<0.05 ec	<0.05	0.3	0.1	---
#3 - North Sidewall	10/18/91	22	---	---	<0.05 ec	<0.05	<0.05	<0.05	<3
#4 - South Sidewall	10/18/91	43	---	---	<0.05 ec	<0.05	<0.05	<0.05	---
Soil Pile #1	1/18/92	---	---	---	<0.05 ec	<0.05	0.08	0.19	---
B1-10'	2/11/05	<20	<50	<100	---	---	---	---	---
B2-9.5'	2/11/05	<20	<25	143	---	---	---	---	---
B3-9.5'	2/11/05	<20	<50	<100	---	---	---	---	---
B4-10'	2/11/05	<20	<25	367	---	---	---	---	---
B5-10'	2/11/05	90	<25	145	<0.04 ec	<0.04	0.10	0.48	NA
B6-10'	2/11/05	<20	<50	<100	---	---	---	---	---
B7-10'	2/11/05	<20	<50	<100	---	---	---	---	---
B8-10'	2/11/05	<20	<50	<100	---	---	---	---	---
B9-10'	2/11/05	<20	<50	<100	---	---	---	---	---
B10-10'	2/11/05	<20	<50	<100	---	---	---	---	---
MW2-10.5'	5/6/05	<20	<50	<100	---	---	---	---	---
MW-3-10.5'	5/6/05	90	<50	<100	---	---	---	---	---

Notes:

* = Washington State Model Toxics Control Act (MTCA) Method A Cleanup Level for Soil (rev. October 12, 2007)

< = Indicates compound not detected above the laboratory Method Reporting Limit (MRL) shown.

ec = The MRL exceeds the applicable cleanup level

Gasoline Range Petroleum Hydrocarbons (GRPH) by Northwest Method NWTPH-Gx

Diesel Range Petroleum Hydrocarbons (DRPH) and Oil Range Petroleum Hydrocarbons by Northwest Method NWTPH-Dx

BTEX by EPA Methods 8021B and 8260

Metals by EPA Methods 7420

All values shown are in micrograms per kilogram (mg/kg) (parts per million).

--- = Not Analyzed

Table 2
Summary of Historical Groundwater Analytical Results
Handy Mart, Washington

		Fuels			BTEX				VOCs				Metals
		GRPH	DRPH	ORPH	Benzene	Toluene	Ethylbenzene	Total Xylenes	EDB	EDC	MTBE	Naphthalene	Lead
MTCA Method A Cleanup Lev		**800/1000**	**500**	**500**	**5**	**1,000**	**700**	**1,000**	**0.01**	**5**	**20**	**160**	**15**
Sample ID	Date Sampled												
#5 Groundwater	10/18/91	**12,800**	---	---	**22.0**	<1	211	108	---	---	---	---	---
B5-W	2/11/05	**4,410**	<0.63	<0.63	<1	<1	23	<1	---	---	---	---	7
B10-W	2/11/05	<0.25	<0.63	<0.63	---	---	---	---	---	---	---	---	---
MW1-0505.1	5/9/05	<20	---	---	<0.5	<2	<2	<2	<2	<2	<5	<2	---
MW2-0505.2	5/9/05	<20	---	---	<0.5	<2	<2	<2	<2	<2	<5	<2	---
MW3-0505.3	5/9/05	499	---	---	**14.0**	3	<2	8	<2	<2	<5	<2	---

Notes:

* = Washington State Model Toxics Control Act (MTCA) Method A Cleanup Level for Groundwater (rev. October 12, 2007)
Gasoline Range Petroleum Hydrocarbons (GRPH) by Northwest Method NWTPH-Gx
Diesel and Oil Range Petroleum Hydrocarbons (DRPH and ORPH) by Northwest Method NWTPH-Dx and NWTPH-HCID
Volatile Organic Compounds (VOCs) by EPA Methods 8021B and 8260
Metals by EPA Methods 7420
< = Indicates compound not detected above the laboratory Method Reporting Limit (MRL) shown.
All values shown are in micrograms per liter (µg/L) (parts per billion).
--- = Not Analyzed
Highlighted cell indicates results exceeds referenced MTCA Method A Cleanup Level

Table 3

HydroCon

Summary of Historic Groundwater Elevations
Handy Mart
Longview, Washington

Monitoring Well ID	Date	TOC Elevation	Depth to Water	Groundwater Elevation
MW-1	4/14/16	21.12	8.03	13.09
	8/10/16		10.45	10.67
	11/17/16		7.93	13.19
	3/15/17		6.78	14.34
	6/30/17		8.01	13.11
MW-2	4/14/16	19.98	6.79	13.19
	8/10/16		8.41	11.57
	11/17/16		6.83	13.15
	3/15/17		5.58	14.40
	6/30/17		6.77	13.21
MW-3	4/14/16	19.63	6.41	13.22
	8/10/16		8.02	11.61
	11/17/16		6.37	13.26
	3/15/17		5.13	14.50
	6/30/17		6.73	12.90

Notes:
TOC = Top of well casing

Table 4

Summary of Groundwater Analytical Results
Handy Mart
Longview, Washington

		Fuels	BTEX			
		GRPH	Benzene	Toluene	Ethylbenzene	Total Xylenes
MTCA Method A Cleanup Level*		**800/1,000**	**5**	**1,000**	**700**	**1,000**
Well Identification	**Date Sampled**					
MW-1	5/6/05	<250	<0.5	<2	<2	<2
	12/10/10	<50	<5.0	<5.0	<5.0	<10.0
	3/25/11	<50	<5.0	<5.0	<5.0	<10.0
	9/22/11	92.8	<5.0	<5.0	<5.0	16.8
	3/9/12	104	<5.0	<5.0	<5.0	<10.0
	9/24/15	<100	**6.1**	<1	<1	<3
	2/2/16	<100	**6.6**	<1	<1	<3
	4/14/16	<100	3.7	<1	<0.5	<1.5
	8/10/16	<100	2.2	<1	<0.5	<1.5
	11/17/16	<100	0.314	<1	<0.5	<1.5
	3/15/17	<100	<0.2	<1	<0.5	<1.5
	6/30/17	<100	<0.2	<1	<0.5	<1.5
MW-2	5/6/05	<250	<0.5	<2	<2	<2
	12/10/10	<50	<5.0	<5.0	<5.0	<10.0
	3/25/11	73	<5.0	<5.0	<5.0	<10.0
	9/22/11	76.5	<5.0	5.7	<5.0	<10.0
	3/9/12	513	**15.5**	26.0	5.13	7.6
	9/24/15	460	<1	4.4	<1	3.5
	2/2/16	<100	2.7	<1	<1	<3
	4/14/16	<100	1.41	<1	<0.5	<1.5
	8/10/16	<100	<0.2	<1	<0.5	<1.5
	11/17/16	<100	<0.2	<1	<0.5	<1.5
	3/15/17	<100	<0.2	<1	<0.5	<1.5
	6/30/17	<100	<0.2	<1	<0.5	<1.5
MW-3	5/6/05	499	**14**	3.0	<2	8
	12/10/10	230	<5.0	<5.0	<5.0	<10.0
	3/25/11	180	<5.0	<5.0	<5.0	<10.0
	9/22/11	242	<5.0	<5.0	<5.0	<10.0
	3/9/12	95.8	<5.0	<5.0	<5.0	<10.0
	9/24/15	<100	<1	<1	<1	<3
	2/2/16	210	<1	3.7	<1	<3
	4/14/16	310	<0.2	<1	<0.5	<1.5
	8/10/16	326	<0.2	<1	<0.5	<1.5
	11/17/16	329	<0.2	<1	<0.5	<1.5
	3/15/17	<100	<0.2	<1	<0.5	<1.5
	6/30/17	<100	<0.2	<1	<0.5	<1.5

Notes:

* = Washington Model Toxics Control Act (MTCA) Method A Cleanup Level for Groundwater (rev. October 12, 2007)
Gasoline Range Petroleum Hydrocarbons (GRPH) by Northwest Method NWTPH-Gx
Volatile Organic Compounds (VOCs) by EPA Methods 8021B or 8260B
< = Indicates compound not detected above the laboratory Method Reporting Limit (MRL) shown.
All values shown are in micrograms per liter (µg/L) (parts per billion).
Highlighted cell indicates compound detected above referenced MTCA Method A Cleanup Level.

APPENDIX A
HISTORIC REPORTS

Environmental Inspection Services

November 6, 1991

Steve Wilcox, President
Wilcox & Flegel Oil Company
110 Panel Way
Longview, WA 98632

Reference: Analytical test results from samples taken from an excavation at the site of "Johns Shell Service Station located at 1410 Ocean Beach Highway in Longview, Washington

Dear Steve,

A field representative from Environmental Inspection Services, Charles Spear, supervised limited excavation activities performed by Jay Brookhart Excavating. The representative also collected four representative soil samples and one water sample (sample No.s 1 thru 5) from the excavation at the aforementioned property on Friday, October 18, 1991. The four soil samples were collected from representative cavity areas as depicted on the Generalized Site Plan Plate P-1. The soil samples were collected in a manner consistent with proper sampling procedures, presentation, and chain of custody documentation as stated in a prepared sampling plan.

The sampling plan was developed to ensure that sample collection, sample location, sample handling, and data analysis were sufficient to evaluate the effectiveness of limited excavations performed on-site. The four soil samples and one water sample were subsequently analyzed by Columbia Analytical Services, Inc. a Longview based certified laboratory, in a manner consistent with the analytical procedures outlined in the EPA test methods document SW-846. Each of the soil samples and the water sample were analyzed for the presence of Total Petroleum Hydrocarbons (TPH) and benzene, toluene, ethylbenzene, and xylene (BTEX) in manner consistent with Test Methods 5030/8020 and Modified 8015.

Based on the analytical test results from samples taken at representative locations in the subject excavation, the excavation episode was successful with regards to removing contaminated petroleum-contaminated soils within the subject excavation.

4200 SW 107th #2501 • Beaverton, OR 97005 • Bus. (503) 644-8526 • (503) 646-5744

The excavation project was briefly described as follows:

Soil was excavated from the 9 foot wide by 28 foot long by 15 foot deep excavation by an excavation contractor and it was loaded and transported to an off-site Wilcox & Flegel location for either thermal treatment or temporary storage. Representative and confirmation soil samples were subsequently collected from locations at the bottom and sides of the excavation. Four soil samples and one water sample were collected by Charles A. Spear by taking representative soil samples from the backhoe bucket. The soil samples were immediately transferred to a clean 8-ounce glass sample jar by using a clean sampling trowel, packed into the sample container until no headspace was present, and a teflon-lined lid was applied to the sample container. The container was labeled and placed into a plastic vapor-tight bag and preserved on ice until the soil and water samples were analyzed by the laboratory.

The soil sample test results for volatile gasoline constituents (BTEX) and total petroleum hydrocarbons, sample No.s 1 thru 4, were reported in parts per million (ppm). The results are outlined below:

SAMPLE #	SAMPLE LOCATION	BTEX	GAS TPH
1.0	Riser-1 Bottom	ND	10 ppm
2.0	Riser-2 Bottom	Benzene - ND Toluene - ND Ethylbenzene - 0.3 Total xylenes- 0.1	14 ppm
3.0	Riser -2 northwall	BTEX - ND	22 ppm
4.0	Riser - 2 southwall	BTEX - ND	43 ppm
5.0	Water	Benzene - .022 Toluene - ND Ethylbenzene - .211 Total xylenes - .108	12.8 ppm

A single soil sample, sample No. 3, was also analyzed for the presence of total lead and the analytical test result was negative for lead. This soil sample was taken from an area of soil where leaded gasoline may have been present. Since the total lead contaminant level was determined to be less than 100 parts per million it was not necessary to analyze the soil sample for extractable lead by Total Characteristic Leaching procedure (TCLP).

Based on the analytical test results the analytical findings indicate that the most-contaminated soil has been removed from the subject excavation. Soil samples collected from the bottom and sides of the subject excavation indicate that both the vertical and horizontal extents of the contamination have been delineated according to established acceptable clean-up levels for TPH.

The elevated TPH test results from water collected in the bottom of the excavation indicated a collection of contaminants that have leached from adjoining soils into the water that was present in small quantities at the bottom of the excavation. This water sample, sample No. 5, was not a representative sample of groundwater in the excavation.

In our opinion, based on the analytical test results, the limited excavation episode was effective and soils contaminated with TPH or BTEX in levels exceeding clean-up levels were removed from the excavation. If there are any questions feel free to call me at 1-503-644-8526.

Respectfully,

Charles Arthur Spear

Charles Arthur Spear
Director of Professional Services

Environmental Inspection Services

Columbia Analytical Services inc.

1317 South 13th Ave. • Kelso, WA 98626 • (206) 577-7222, FAX (206) 636-1068

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

DATE 10/21/91 PAGE _____ OF _____

PROJECT NAME Crown Way SLP # _____

PROJECT MNGR. Charles Speer

COMPANY/ADDRESS WILCOX & FLEEL

c/o. Environmental Inspection Services

C. Speer

PHONE 503 644-8526

SAMPLERS SIGNATURE Charles C. Speer

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX	NUMBER OF CONTAINERS	Base/Neu/Acid Organics GCMS 625/8270	Volatile Organics GCMS 624/8240	Halogenated or Aromatic Volatiles 601/8010 ☐	Pesticides/PCBs 608/8080 ☐	Total Petroleum Hydrocarbons EPA 418.1 ☐	TPH/Gas/BTEX 5000/8015/8020 Oregon 418.1 ☐ Gas ☑ BTEX ☑	TPH/8015 Modified Diesel ☐	Hydrocarbon Scan ☐ TPH - HCID	TCLP Metals ☐	Semi Pest/ VOA ☐ VOA ☐ Herb ☐ Metals (total or dissolved) List Below	Cyanide	pH, Cond, Cl, SO4, PO4, F, Br NO2, NO3 (circle)	NH3-N, COD, Total-P, TKN, TOC (circle)	Total Organic Halides (TOX) 9020	TCLP Lead	REMARKS
#1 - Riser 1 Bottom	10/18	1000		Soil	1						✓										
#2 - Riser 2 Bottom	10/18	2130		Soil	1						✓										
#3 - North wall Riser 2	10/18	3:00		Soil	1						✓								✓		
#4 - South wall Riser 2	10/18	5:00		Soil	1						✓										
#5 - Groundwater	10/19	5:00		Water	1						✓										

RELINQUISHED BY:
Charles C. Speer
Signature
Charles A. Speer
Printed Name
Environmental Inspection Services
Firm
10/21/91 - 11:30 am
Date/Time

RECEIVED BY:
Signature
Printed Name
Firm
Date/Time

RELINQUISHED BY:
Colin Elliott
Signature
Colin Elliott
Printed Name
CAS
Firm
10/21/91 11:45 am
Date/Time

RECEIVED BY:
Signature
Printed Name
Firm
Date/Time

TURNAROUND REQUIREMENTS:
___ 24 hr ___ 48 hr ___ 5 day
✓ Standard (~ 10-15 working days)
✓ Provide Verbal Preliminary Results
___ Provide FAX Preliminary Results
Requested Report Date _____

REPORT REQUIREMENTS
___ I. Routine Report
___ II. Report (includes DUP, MS, MSD, as required, may be charged as samples)
___ III. Data Validation Report (includes All Raw Data)
___ IV. CLP Deliverable Report

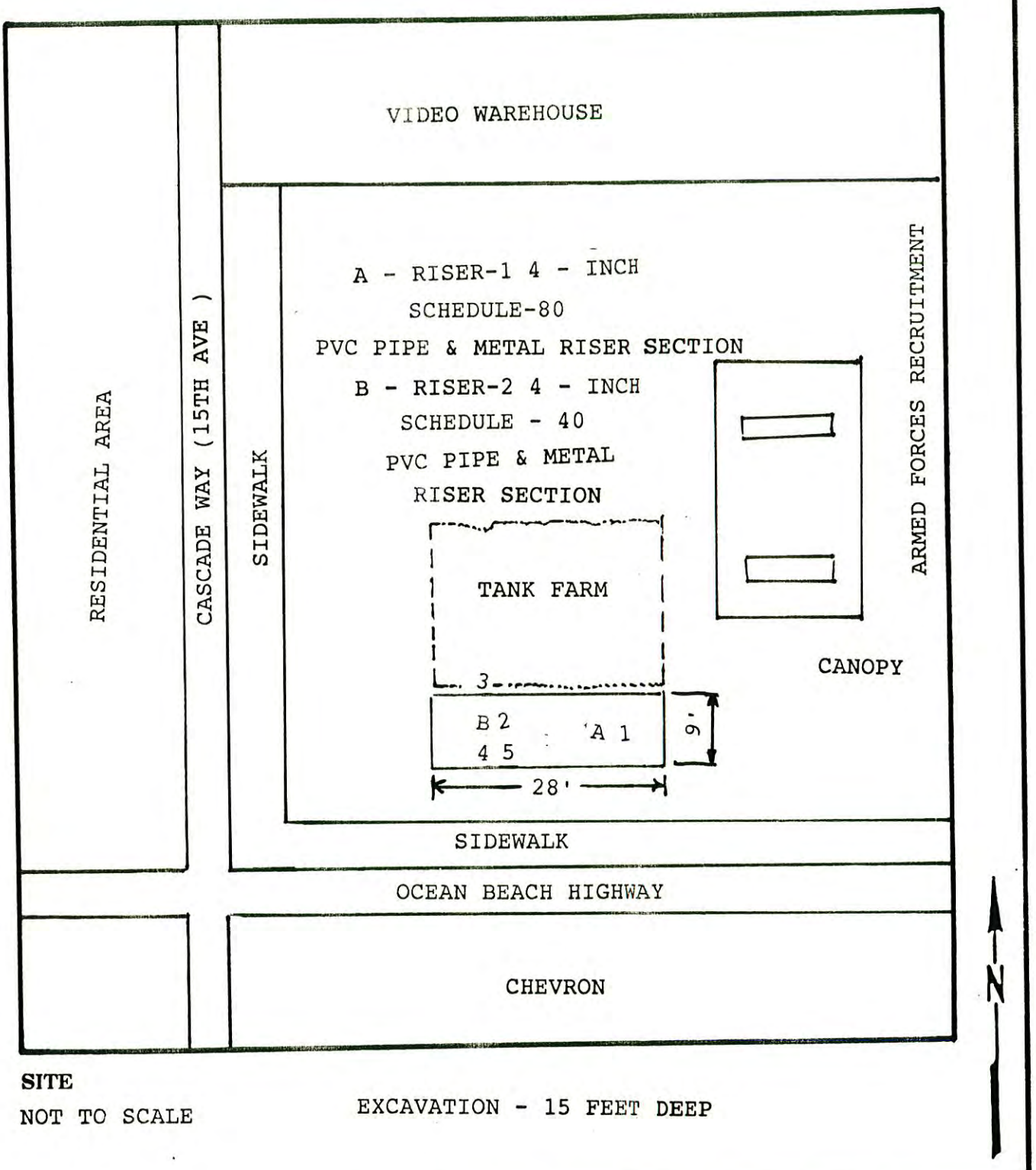
INVOICE INFORMATION:
P.O. # _____
Bill to: _____

SAMPLE RECEIPT:
Shipping VIA: _____
Shipping #: _____
Condition: _____
Lab No.: _____

SPECIAL INSTRUCTIONS/COMMENTS:

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator

400-05



SITE

NOT TO SCALE

EXCAVATION - 15 FEET DEEP

ENVIRONMENTAL INSPECTION SERVICES	GENERALIZED SITE PLAN 1410 OCEAN BEACH HIGHWAY LONGVIEW, WASHINGTON	**PLATE** P-1
PROJECT NO. 91016		

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:

Project:

Sample Matrix: SOIL

Date Received:

Date Analyzed: 10/25/91

Work Order #: 916104

TOTAL LEAD
(Method Title)

EPA METHOD 7420
(Method No.)

mg/kg
(Units)

DRY wt Basis

Sample Name	Lab Code	MRL	Result
#3 RISER 2 NORTH WALL	6104-3	3	ND
METHOD BLANK	MB	6	ND

MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by _____ Date 10/25/91 Filename: GEN1.B/05-10-91

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Alaska:
Use VPH
Others:
Use TPH

Client:

Project:

Sample Matrix: Soil

Date Received:

Date Extracted: 10/22/91

Work Order #: K91-6104

PRELIMINARY
These results have not gone through final QA review.

BTEX and TPH/VPH as Gasoline
EPA Methods 5030/8020/Modified 8015
mg/Kg (ppm)

Dry Wt. Basis

Sample Name:	#1-Riser 1 Bottom	#2-Riser 2 Bottom	#3 Riser 2 Northwall
Lab Code:	K6104-1	→2	→3
Date Analyzed:	10-23-91	10-23-91	10-23-91

Analyte	MRL			
Benzene	0.05	ND	ND	ND
Toluene	0.05	ND	ND	ND
Ethylbenzene	0.05	ND	ND 0.3	ND
Total Xylenes	0.05	ND	ND 0.1	ND
TPH/VPH as Gasoline	1	ND 10	ND 14	ND 2

TPH Total Petroleum Hydrocarbons
VPH Volatile Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by_____ Date_____ Filename: 8020A.S/08-16-91

Alaska:
Use VPH
Others:
Use TPH

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:

Project:

Sample Matrix: Soil

Date Received: / /

Date Extracted: 10/22/91

Work Order #: K91-6104

PRELIMINARY
These results have not gone through final QA review.

BTEX and TPH/VPH as Gasoline
EPA Methods 5030/8020/~~Modified 8015~~ o.k
mg/Kg (ppm)
Dry Wt Basis

Sample Name:		#4 Riser 2 Southeast	Method Blank	
Lab Code:		K6104-4	→MB	
Date Analyzed:		10-23-91	10-22-91	
Analyte	**MRL**			
Benzene	0.05	ND	ND	ND
Toluene	0.05	ND	ND	ND
Ethylbenzene	0.05	ND	ND	ND
Total Xylenes	0.05	ND	ND	ND
TPH/VPH as Gasoline	1	ND & 3	ND	ND

TPH Total Petroleum Hydrocarbons
VPH Volatile Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by _____ Date _____ Filename: 8020A.S/08-16-91

jls

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Alaska:
Use VPH
Others:
Use TPH

Client:

Project:

Date Received: / /

Work Order #: K91-6104

Sample Matrix: Water

PRELIMINARY

These results have not gone through final QA review.

BTEX and TPH/~~VPH~~ as Gasoline
EPA Methods 5030/8020/Modified 8015/~~California OHS UST Method~~
µg/L (ppb)

Sample Name:		#5 Groundwater	Method Blank	
Lab Code:		K6104-5	MB	
Date Analyzed:		10-23-91	10-23-91	
Analyte	MRL			
Benzene	0.5	~~ND~~ 2.2	ND	ND
Toluene	1	ND	ND	ND
Ethylbenzene	1	~~ND~~ 2.1	ND	ND
Total Xylenes	1	~~ND~~ 10.6	ND	ND
TPH/~~VPH~~ as Gasoline	50	~~ND~~ 12,800	ND	ND

TPH Total Petroleum Hydrocarbons
~~VPH Volatile Petroleum Hydrocarbons~~
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by_____ Date_____ Filename: 8020D.W/08-16-91

MS

LIMITED PHASE II ENVIRONMENTAL SITE ASSESSMENT and GROUNDWATER INVESTIGATION REPORT

For:
76 Gasoline Station
1410 Ocean Beach Highway
Longview, Washington 98632

July 26, 2005

Prepared for:

Wilson Oil Company
Attn: Gary Mellema
PO Box 69
Longview, Washington 98632

Prepared By:

William R. CullochDasson
Environmental Specialist

3 Kings Environmental, Inc.
1311 SE Grace Avenue
Battleground, Washington 98604
(360) 666-5464

On February 11, 2005, ten (10) soil borings were established by push probe on the site (see Figure 1). The borings were advanced to a depth of 15 feet below ground surface (bgs). Soil was inspected continuously in each boring for evidence of petroleum contamination and groundwater. Apparent groundwater was detected in each boring at 9.5 to 10 feet bgs, and soil samples were collected at the apparent soil/water interface.

No petroleum odor was detected in soil or water in the borings with the exception of Boring 5, which was apparently located in the former contaminated soil excavation on the south side of the UST nest. Petroleum odor was detected in this boring at the apparent soil/water interface, at 10 feet bgs.

All soil samples were placed into 4-ounce glass jars with tight-fitting Teflon-lined lids and stored in a cooler with ice for transport to Wy'East Environmental Services, Inc. (Wy'East) of Portland for analysis. Soil samples were analyzed for Total Petroleum Hydrocarbon Identification (TPH-HCID). Results indicated that heavy oil and gasoline were detected as summarized in Table 6.3.1.

Table 1
Soil Sample Results

Sample	Location	Depth (ft bgs)	NWTPH-HCID; NWTPH-GX; NWTPH-Dx (ppm)		
			Gasoline	Diesel	Heavy Oil
B1-10'	NW Area	10	ND	ND	ND
B2-9.5'	NW Area	9.5	ND	ND	**143**
B3-9.5'	N Side USTs	9.5	ND	ND	ND
B4-10'	W Side USTs	10	ND	ND	**367**
B5-10'	S Side USTs	10	**90**	ND	**145**
B6-10'	SW Dispenser	10	ND	ND	ND
B7-10'	SE Dispenser	10	ND	ND	ND
B8-10'	NE Dispenser	10	ND	ND	ND
B9-10'	NW Dispenser	10	ND	ND	ND
B10-10'	East Side	10	ND	ND	ND

NWTPH-HCID = Northwest Total Petroleum Hydrocarbon – Hydrocarbon Identification
NWTPH-Gx = Quantification Method for Gasoline Range TPH
NWTPH-Dx = Quantification Method for Diesel Range TPH
bgs = below ground surface
ND = Below Method Reporting Limit

As indicated in the table, gasoline was detected at the apparent soil/water interface in Boring 5. Heavy oil was detected in Boring 2, Boring 4, and Boring 5 at the apparent soil/water interface. Although a waste oil tank was reported to have been removed from the site in the past, the location of heavy oil detected in the borings is in the southwestern portion of the site, not in the area suspected of containing the former tank. Samples from other borings on the site did not contain heavy oil. The laboratory report indicates that the oil resembles weathered (old) motor oil.

The soil sample collected from Boring 5 was also analyzed for BTEX by Method 8021B. No benzene was detected in the sample. Thus, the gasoline cleanup level under the Model Toxics Cleanup Act (MTCA) Method A for unrestricted land use is 100 ppm. Since the sample also contained heavy oil, the analytical results also indicate a heavy oil cleanup level of 2,000 ppm. The concentrations of gasoline and heavy oil detected on the site are below the MTCA Method A cleanup levels for unrestricted land use.

Groundwater samples were collected from Boring 5 and Boring 10 on the subject site. Water was collected from the probe casing in each boring with a peristaltic pump. The water was pumped out until it ran relatively clear of fines, then a sample was collected in appropriate containers, placed in a cooler with ice and transported to Wy'East for analysis by Method NWTPH-HCID for hydrocarbon identification. No petroleum hydrocarbons were detected in Boring 10, on the east side of the site. Gasoline was detected in Boring B5, and the sample was analyzed for gasoline quantification by Method NWTPH-Gx, and BTEX

by EPA Method 8021B. No heavy oil was detected in the sample. Gasoline was detected at a concentration of 4,410 parts per billion (ppb), and benzene was not detected.

The concentration of gasoline in the groundwater sample is above the MTCA Method A cleanup level for unrestricted land use of 1,000 ppb.

On May 6, 2005, three monitoring wells were installed on the subject site (see Figure 2). MW 1 was installed in the suspected upgradient direction from the location of contaminated groundwater identified during the Phase II ESA. MW2 was installed in the approximate location of Boring 5, south of the tank nest and area of contaminated groundwater. MW3 was installed southwest of the tank nest. Soil samples were collected from the soil/water interface in MW2 and MW3. A soil sample was not collected from the MW1 boring since it was located adjacent to Boring 3. The soil samples were analyzed by Method NWTPH-Gx. Since no benzene was detected in earlier soil samples collected for the Phase II ESA on the site, these samples were not analyzed for BTEX. Analytical results are summarized in Table 2 and shown on Figure 2.

Table 2
Soil Sample Results

Sample	Location	Depth (ft bgs)	TPH (ppm)		
			Gasoline	**Diesel**	**Heavy Oil**
MW2-10.5'	MW2	10.5	ND	NA	NA
MW3-10.5'	MW3	10.5	**90**	NA	NA

bgs = below ground surface
ND = Below Method Reporting Limit

As indicated in Table 1, gasoline contamination was not detected in soil collected from the boring for MW2. Gasoline contamination was detected in soil collected at the apparent soil/water interface in the boring for MW3. The concentration of gasoline in the sample is below the MTCA Method A cleanup level for unrestricted land use for soil without detected benzene.

Pre-packed 1-inch monitoring wells were installed in the borings to a depth of 20 feet bgs. The wells were constructed of 15 feet of 0.010 screen and 5 feet of blank with locking caps. The wells were developed and allowed to recharge. Casing elevations were determined with a laser level. Groundwater elevations were determined and the gradient was calculated by the EPA "On-Line Tools for Site Assessment Calculation: Gradient and Direction from Three Points." The gradient was calculated to be 0.003 with a direction of flow S2.7W (177.3 degrees from north).

Each well was purged with a peristaltic sampling pump of approximately 2.5 gallons, or over 10 volumes of water in each well. Water samples were collected with disposable tubing by the peristaltic pump and placed into 40 ml glass vials with no headspace. The samples were transported to Wy'East for analysis by Method NWTPH-Gx and EPA Method 8021B for BTEX. Analytical results are summarized in Table 3 and shown on Figure 2.

Table 3

Sample	Gasoline	Benzene	Toluene	Ethylbenzene	Xylenes
MW1-0505.1	ND	ND	ND	ND	ND
MW2-0505.2	ND	ND	ND	ND	ND
MW3-0505.3	**499**	**14**	**3**	ND	**8**

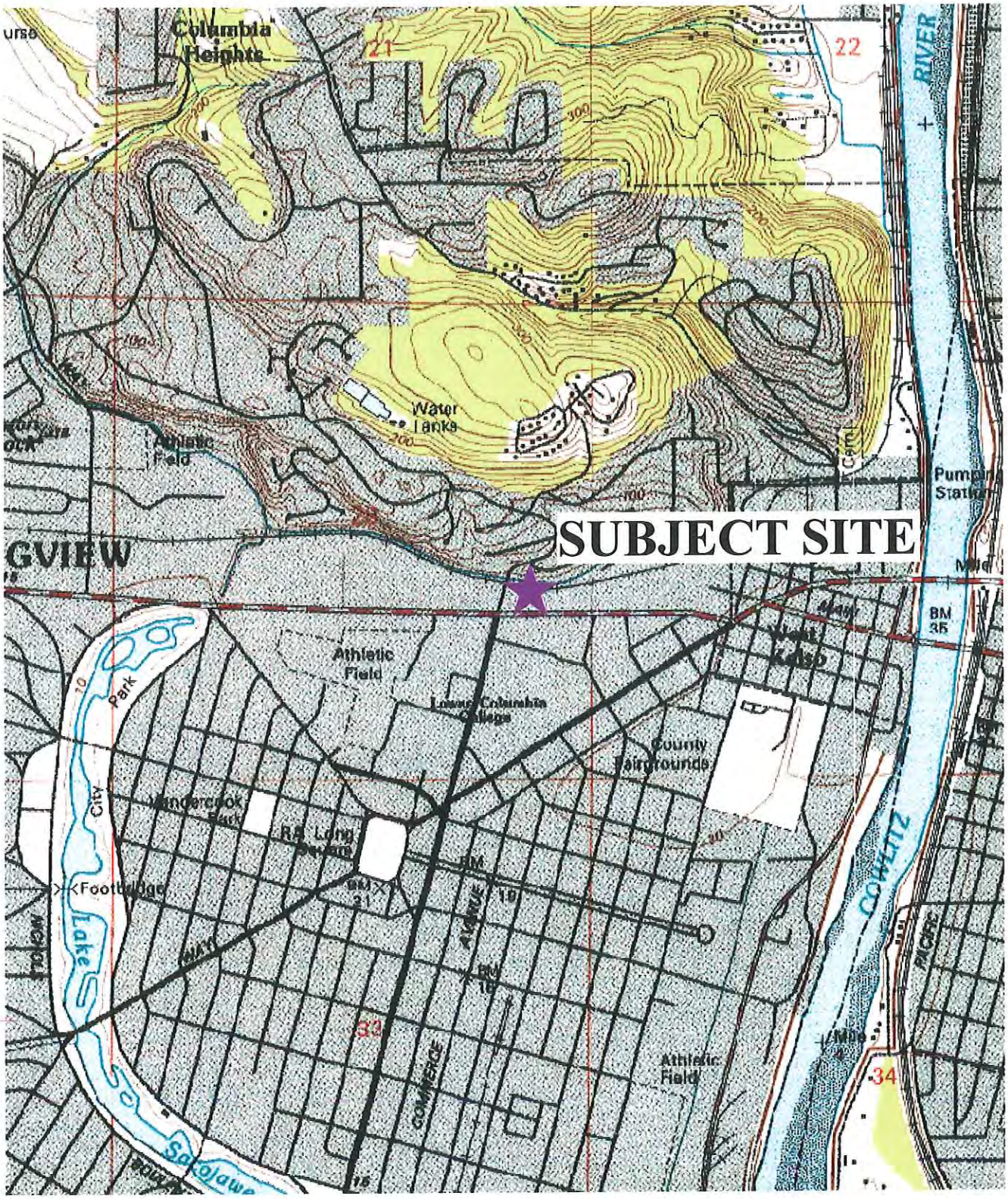
As indicated in Table 3, gasoline and volatile organic compounds were detected in groundwater in Monitoring Well MW3, but not in MW1 or MW2. The concentration of gasoline in the well is below the MTCA Method A cleanup concentration for unrestricted land use. However, benzene is above the Method A cleanup concentration of 8 ppb.

If you have any questions, please call me at 360-666-5464.

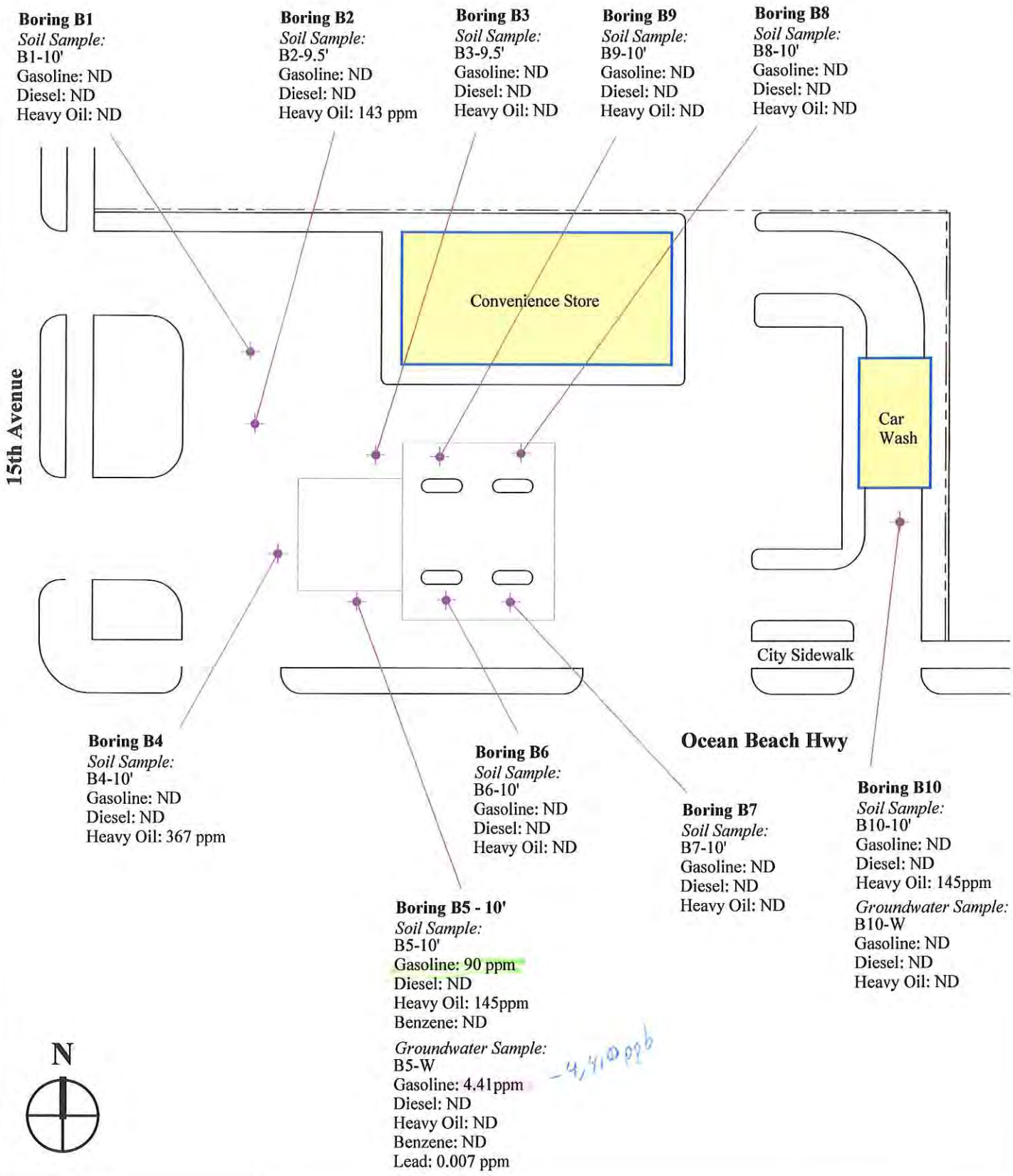
Sincerely,
3 KINGS ENVIRONMENTAL, INC

William R. CullochDasson

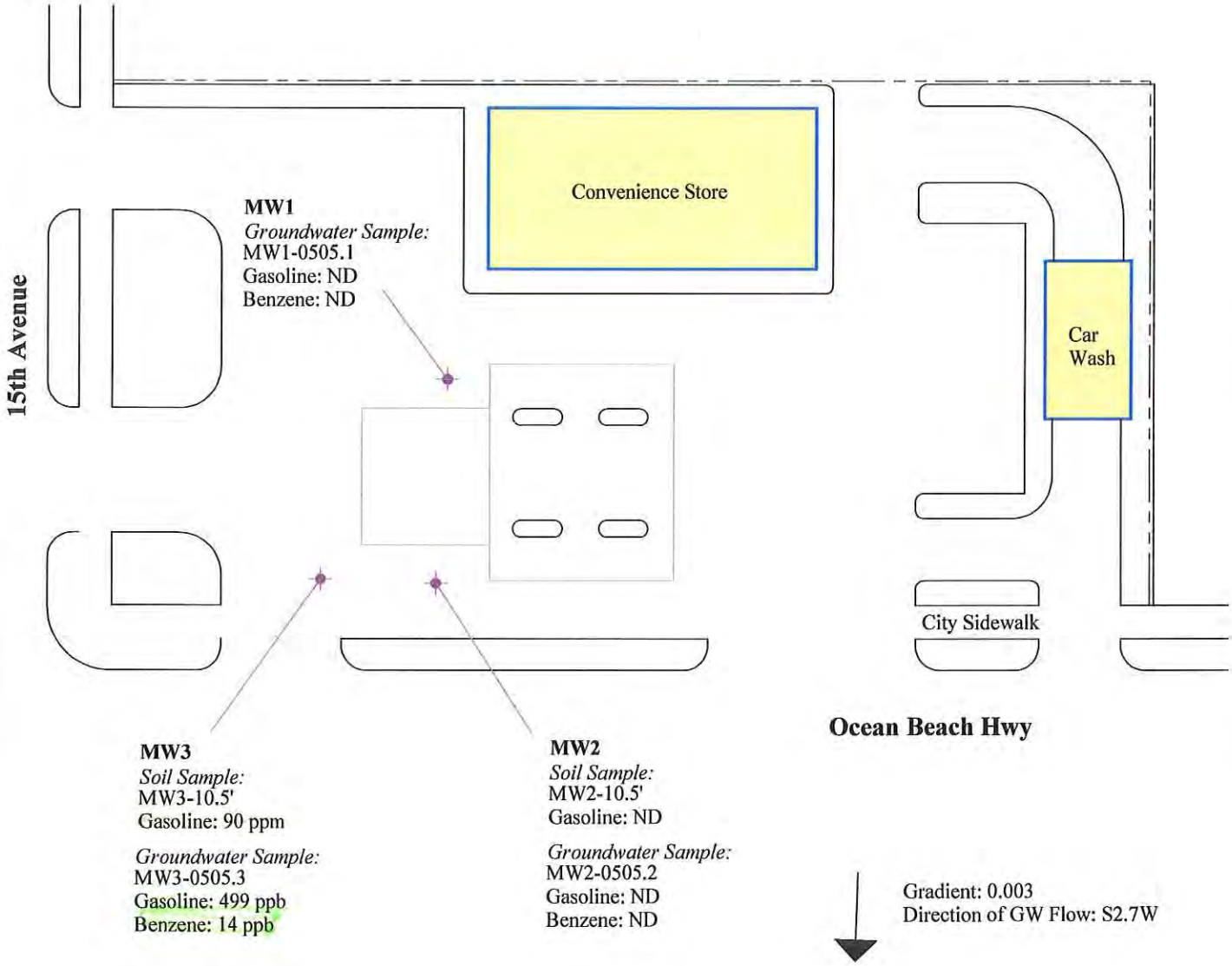
William R. CullochDasson, RG
Environmental Specialist



3 Kings Environmental, Inc. P.O. Box 280 Battle Ground, Washington 98604	**Site Location Map** 1410 Ocean Beach Highway Longview, Washington	Project: 25032 Date: 4/28/05 | Drawn by: wrc



3 Kings Environmental, Inc. P.O. Box 280 Battle Ground, Washington 98604	**FIGURE 1** **Boring Location Plan** Wilson Oil Property 1410 Ocean Beach Highway Longview, Washington 98632	Project: 25032 Date: 4/4/05 | Drawn by: wrc Scale: 1" = 40'



3 Kings Environmental, Inc. P.O. Box 280 Battle Ground, Washington 98604	**FIGURE 2** **Monitoring Well Location Plan** Wilson Oil Property 1410 Ocean Beach Highway Longview, Washington 98632	Project: 25032 Date: 7/26/05 | Drawn by: wrc Scale: 1" = 40'

LABORATORY REPORT

FEB 2 4 2005

3 Kings Environmental
Attn: Bill CullochDasson
P.O. Box 280
Battle Ground, WA 98604

PROJECT NAME/SITE:	1410 Ocean Beach Hwy	**REPORT NUMBER:**	54813
PROJECT NUMBER:	25032	**REPORT DATE:**	2-18-05
EXTRACTION DATE:	2-11-05 to 2-14-05	**PAGE:**	1 of 2

NW TPH-HCID
Analyte: Petroleum Hydrocarbon Identification (Gasoline, Petroleum, Heavy Oil) for soil (dry weight basis)

Field ID	Lab ID	Identification			Surrogate Recovery (%)
		Gasoline	Diesel	Heavy Oil	
B1-10'	N1107	**ND**	**ND**	**ND**	97
B2-9.5'	N1108	**ND**	**ND**	**Detected ‡**	106
B3-9.5'	N1109	**ND**	**ND**	**ND**	96
B4-10'	N1110	**ND**	**ND**	**Detected ‡**	106
B5-10'	N1111	**Detected †**	**ND**	**Detected ‡**	110
B6-10'	N1112	**ND**	**ND**	**ND**	90
B7-10'	N1113	**ND**	**ND**	**ND**	94
B8-10'	N1114	**ND**	**ND**	**ND**	95
B9-10'	N1115	**ND**	**ND**	**ND**	92
B10-10'	N1116	**ND**	**ND**	**ND**	95
BLANK	-	ND	ND	ND	-
Reporting Limits (mg/Kg)	-	20	50	100	-

Surrogate is Chlorooctane
ND = Not Detected (below reporting limit or detection limit)

‡ Weathered motor oil

† Weathered gas or mineral spirits

NW TPH-HCID
Analyte: Petroleum Hydrocarbon Identification (Gasoline, Petroleum, Heavy Oil) for water

Field ID	Lab ID	Identification			Surrogate Recovery (%)
		Gasoline	Diesel	Heavy Oil	
B5-W	N1117	**Detected ****	**ND**	**ND**	*
B10-W	N1118	**ND**	**ND**	**ND**	*
BLANK	-	ND	ND	ND	-
Reporting Limits (mg/L)	-	0.25	0.63	0.63	-

Surrogate is Chlorooctane
ND = Not Detected (below reporting limit or detection limit)

* Surrogate peak is not discernible on chromatogram from analyte peak.

** Weathered gas

LABORATORY REPORT

FEB 2 4 2005

3 Kings Environmental
Attn: Bill CullochDasson
P.O. Box 280
Battle Ground, WA 98604

PROJECT NAME/SITE:	1410 Ocean Beach Hwy	**REPORT NUMBER:**	54813
PROJECT NUMBER:	25032	**REPORT DATE:**	2-18-05
EXTRACTION DATE:	2-11-05 to 2-14-05	**PAGE:**	2 of 2

NWTPH-Dx
Analyte: Total Petroleum Hydrocarbon Quantification for soil (dry weight basis)

Field ID	Lab ID	Diesel mg/Kg (ppm)	Heavy Oil mg/Kg (ppm)	Surrogate Recovery (%)
B2-9.5'	N1108	**ND**	**143**	106
B4-10'	N1110	**ND**	**367**	119
B5-10'	N1111	**ND**	**145**	118
BLANK	-	ND	ND	-
Reporting Limit	-	25	100	-

Surrogate is o-Terphenyl
ND = Not Detected (below reporting limit or detection limit)

NWTPH-Gx
Analyte: Total Petroleum Hydrocarbon Quantification for soil (dry weight basis)

Field ID	Lab ID	Matrix	mg/Kg (ppm)	Surrogate Recovery (%)
B5-10'	N1111	SOIL	**90**	79
BLANK	-	-	ND	-
Reporting Limit	-	-	20	-

Surrogate is p-Bromofluorobenzene
ND = Not Detected (below reporting limit or detection limit)

NWTPH-Gx
Analyte: Total Petroleum Hydrocarbon Quantification for water

Field ID	Lab ID	µg/L (ppb)	Surrogate Recovery (%)
B5-W	N1117	**4,410**	119
BLANK	-	ND	-
Reporting Limit	-	250	-

Surrogate is p-Bromofluorobenzene
ND = Not Detected (below reporting limit or detection limit)

Wy'East Environmental Sciences, Inc.

LABORATORY REPORT

3 Kings Environmental
Attn: Bill CullochDasson
P.O. Box 280
Battle Ground, WA 98604

PROJECT NAME/SITE:	1410 Ocean Beach Hwy	**REPORT NUMBER:**	54813A
PROJECT NUMBER:	25032	**REPORT DATE:**	2-24-05
EXTRACTION DATE:	2-14-05 to 2-24-05	**PAGE:**	1 of 1

EPA 8021B

Analyte: BTEX for soil (Benzene, Toluene, Ethylbenzene, Xylenes)

Field ID	Lab ID	Identification & Quantification mg/Kg (ppm)				Surrogate Recovery (%)
		Benzene	Toluene	Ethyl-Benzene	Xylenes	
B5-10'	N1111	**ND**	**ND**	**0.10**	**0.48**	79
BLANK	-	ND	ND	ND	ND	-
Quantitation Limits	-	0.04	0.04	0.04	0.04	-

Surrogate is p-Bromofluorobenzene
ND = Not Detected (below reporting limit or detection limit)

EPA 8021B

Analyte: BTEX for water (Benzene, Toluene, Ethylbenzene, Xylenes)

Field ID	Lab ID	Identification & Quantification µg/L (ppb)				Surrogate Recovery (%)
		Benzene	Toluene	Ethyl-Benzene	Xylenes	
B5-W	N1117	**ND**	**ND**	**23**	**ND**	119
BLANK	-	ND	ND	ND	ND	-
Quantitation Limits	-	1	1	1	1	-

Surrogate is p-Bromofluorobenzene
ND = Not Detected (below reporting limit or detection limit)

EPA 3020/7421

Analyte: Total Lead (Pb) in water Quantification

Field ID	Lab ID	Quantification µg/L (ppb)
B5-W	N1117	**7**
BLANK	-	ND
Detection Limit	-	5

ND = Not Detected (below reporting limit or detection limit)

FEB 2 4 2005

Report Number: L-54813

WyEast
Environmental Sciences, Inc.

Research & Laboratory Services

CHAIN OF CUSTODY

2415 SE 11th Ave. • Portland, Oregon 97214 • (503) 231-9320 • FAX (503) 231-9344

PROJECT #	PROJECT NAME / SITE	STATE	PURCHASE ORDER #
25032	1410 Ocean Beach Hwy	WA	3881
COMPANY	**REPORT ATTENTION**	**PHONE NUMBER**	**FAX NUMBER**
3 Kings	Bill CullockDasson		
SAMPLES COLLECTED BY	**DATE(S) COLLECTED**	**TIME(S) COLLECTED**	**SAMPLES CHILLED TO 4° C?**
CullockDasson	2/11/05	9:30 - 1:45	Yes
PRESERVATIVE USED? (HCl, etc.)			Regular ☒ 3-5 Days ☐
None in Soil; HCl in 40ml Water Vials			

FIELD ID	MEDIA	CONTAINER	VOLUME ETC	ANALYSIS REQUIRED	LAB ID
B1-10'	Soil	JAR	4oz	NWTPH-HCID+	N1107
B2-9.5'	↓	↓	↓	↓	N1108
B3-9.5'					N1109
B4-10'					N1110
B5-10'					N1111
B6-10'					N1112
B7-10'					N1113
B8-10'					N1114
B9-10'					N1115
B10-10'	↓	↓	↓	↓	N1116
B5-W	Water	Bottles	(1) 1L; (2) 40ml	NWTPH-HCID+	N1117
B10-W	↓	↓	↓	↓	N1118

RELINQUISHED BY	DATE / TIME	RECEIVED BY	DATE / TIME
William R. CullockDasson	2/11/05 4:00		
RELINQUISHED BY	**DATE / TIME**	**RECEIVED BY LAB**	**DATE / TIME**
			2/11/5

Submission of samples with testing requirements to WyEast Environmental Sciences will be understood to be an agreement for services in accordance with the conditions listed on the back of the client copy

Wilson Oil

LABORATORY REPORT

3 Kings Environmental
Attn: Bill CullochDasson
P.O. Box 280
Battle Ground, WA 98604

PROJECT NAME/SITE:	Wilson Oil	**REPORT NUMBER:**	56026
PROJECT NUMBER:	25032	**REPORT DATE:**	5-12-05
EXTRACTION DATE:	5-9-05	**PAGE:**	1 of 1

NWTPH-Gx
Analyte: Total Petroleum Hydrocarbon Quantification for soil (dry weight basis)

Field ID	Lab ID	Matrix	mg/Kg (ppm)	Surrogate Recovery (%)
MW2-10.5'	N4588	SOIL	**ND**	104
MW3-10.5'	N4589	SOIL	**90**	90
BLANK	-	-	ND	-
Reporting Limit	-	-	20	-

Surrogate is p-Bromofluorobenzene
ND = Not Detected (below reporting limit or detection limit)

NWTPH-Gx
Analyte: Total Petroleum Hydrocarbon Quantification for water

Field ID	Lab ID	µg/L (ppb)	Surrogate Recovery (%)
MW1-0505.1	N4585	**ND**	99
MW2-0505.2	N4586	**ND**	97
MW3-0505.3	N4587	**499**	85
BLANK	-	ND	-
Reporting Limit	-	250	-

Surrogate is p-Bromofluorobenzene
ND = Not Detected (below reporting limit or detection limit)

Wy'East Environmental Sciences, Inc.

EPA Method 8260
Analyte: Volatile Organics in water

Field ID:	**MW1-0505.1**	Site Name:	**Wilson Oil**
Lab ID:	N4585.D	Site Number:	25032
Analysis date:	5-9-05	Report Number:	56026

CAS#	Compound	Sample (µg/L)	Blank (µg/L)	Quantitation Limit
71-43-2	Benzene	ND	ND	0.50
106-93-4	1,2-Dibromoethane	ND	ND	2
107-06-2	1,2-Dichloroethane	ND	ND	2
100-41-4	Ethylbenzene	ND	ND	2
98-82-8	Isopropylbenzene	ND	ND	2
1634-04-4	Methyl-tertbutylether (MTBE)	ND	ND	5
91-20-3	Naphthalene	ND	ND	2
103-65-1	n-Propylbenzene	ND	ND	2
108-88-3	Toluene	ND	ND	2
95-63-6	1,2,4-Trimethylbenzene	ND	ND	2
108-67-8	1,3,5-Trimethylbenzene	ND	ND	2
1330-20-7	Total Xylenes	ND	ND	2

	Surrogates:	Percent Recovery:
460-00-4	4-Bromofluorobenzene	98
107-06-2	1,2-Dichloroethane-d4	93
108-88-3	Toluene-d8	97

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Wy'East Environmental Sciences, Inc.

EPA Method 8260
Analyte: Volatile Organics in water

Field ID:	**MW2-0505.2**	Site Name:	**Wilson Oil**
Lab ID:	N4586.D	Site Number:	25032
Analysis date:	5-9-05	Report Number:	56026

CAS#	Compound	Sample (µg/L)	Blank (µg/L)	Quantitation Limit
71-43-2	Benzene	ND	ND	0.50
106-93-4	1,2-Dibromoethane	ND	ND	2
107-06-2	1,2-Dichloroethane	ND	ND	2
100-41-4	Ethylbenzene	ND	ND	2
98-82-8	Isopropylbenzene	ND	ND	2
1634-04-4	Methyl-tertbutylether (MTBE)	ND	ND	5
91-20-3	Naphthalene	ND	ND	2
103-65-1	n-Propylbenzene	ND	ND	2
108-88-3	Toluene	ND	ND	2
95-63-6	1,2,4-Trimethylbenzene	ND	ND	2
108-67-8	1,3,5-Trimethylbenzene	ND	ND	2
1330-20-7	Total Xylenes	ND	ND	2

	Surrogates:	Percent Recovery:
460-00-4	4-Bromofluorobenzene	98
107-06-2	1,2-Dichloroethane-d4	92
108-88-3	Toluene-d8	99

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Wy'East Environmental Sciences, Inc.

EPA Method 8260
Analyte: Volatile Organics in water

Field ID:	**MW3-0505.3**	Site Name:	**Wilson Oil**
Lab ID:	N4587.D	Site Number:	25032
Analysis date:	5-9-05	Report Number:	56026

CAS#	Compound	Sample (µg/L)	Blank (µg/L)	Quantitation Limit
71-43-2	Benzene	14	ND	0.50
106-93-4	1,2-Dibromoethane	ND	ND	2
107-06-2	1,2-Dichloroethane	ND	ND	2
100-41-4	Ethylbenzene	ND	ND	2
98-82-8	Isopropylbenzene	ND	ND	2
1634-04-4	Methyl-tertbutylether (MTBE)	ND	ND	5
91-20-3	Naphthalene	ND	ND	2
103-65-1	n-Propylbenzene	2	ND	2
108-88-3	Toluene	3	ND	2
95-63-6	1,2,4-Trimethylbenzene	ND	ND	2
108-67-8	1,3,5-Trimethylbenzene	ND	ND	2
1330-20-7	Total Xylenes	8	ND	2

	Surrogates:	Percent Recovery:
460-00-4	4-Bromofluorobenzene	96
107-06-2	1,2-Dichloroethane-d4	87
108-88-3	Toluene-d8	101

Report Number: 56028

WyEast
Environmental Sciences, Inc.

Research & Laboratory Services

CHAIN OF CUSTODY

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PROJECT # 25032	PROJECT NAME / SITE Wilson Oil	STATE WA	PURCHASE ORDER # 4130
COMPANY 3 Kings	REPORT ATTENTION Bill CullochDasson	PHONE NUMBER	FAX NUMBER
SAMPLES COLLECTED BY CullochDasson	DATE(S) COLLECTED 5/6/05 & 5/9/05	TIME(S) COLLECTED 5/9/05 5/6/05 : 11:35/12:37; 10:45-11:30	SAMPLES CHILLED TO 4° C? Yes
PRESERVATIVE USED? (HCl, etc.) None for Soil; HCl for water			Regular ☒ 3-5 Days ☐

FIELD ID	MEDIA	CONTAINER	VOLUME ETC	ANALYSIS REQUIRED	LAB ID
MW1-0505.1	Water	Vials	(3) 40ml	NWTPH-Gx; EPA 8.260 for BTEX, EDC, EDB & MTBE	N45585
MW2-0505.2	↓	↓	↓	↓ ↓	N45586
MW3-0505.3	↓	↓	↓	↓ ↓	N45587
MW2-10.5'	Soil	JAR	4oz	NWTPH-Gx	N45588
MW3-10.5'	↓	↓	↓	↓	N45589

RECEIVED
MAY 17 2005

RELINQUISHED BY William R. CullochDasson	DATE / TIME 5/3/05 3:05	RECEIVED BY	DATE / TIME
RELINQUISHED BY	DATE / TIME	RECEIVED BY LAB	DATE / TIME 5/9/5

Submission of samples with testing requirements to WyEast Environmental Sciences will be understood to be an agreement for services in accordance with the conditions listed on the back of the client copy

Boring #: 1	**BORING LOG**	Date: 2/11/05
MW #:		Start: 0915 Finish: 0936

Project: 76 Station 1410 Ocean Beach Hwy Longview, Washington	Boring Location: Northwest Portion
Project #: 25032 / Client: Wilson Oil	Logged By: William R.CullochDasson
Driller: GeoTech Explorations	Sect: 28 | T: 8N | R: 2W | Q: NE/SE
	Boring Dia: 1.5 | Depth: 15 ft
Drilling Method: Push Probe	Surface Elev: Approx: 20 ft amsl
	TOC Elev:
Sampling Method: Macro Sampler	Start Card #:
	SWL: 10 ft bgs Date: 2/11/05

Sample	B.C.	Depth	Sample Interval	GW Level	Strata	Lithology
						Asphalt surface with 4" gravel base Dark greenish brown silty to sandy clay with organic odor, grades to dark gray silty to sandy clay at 7 ft, becomes moist at 7.5 ft, grades to dark gray clayey silt at 10ft, wet at 10 ft, soil/water interface. Dark gray clayey silt to 15 ft.
		5'				
B1-10'		10'		▽ GW		Organic odor throughout. No petroleum detected by odor or sheen testing.
		15'			Bottom	

NOTES:

Boring #: 2 MW #:	**BORING LOG**	Date: 2/11/05 Start: 0941 Finish: 0950
Project: 76 Station 1410 Ocean Beach Hwy Longview, Washington		Boring Location: Northwest Portion
Project #: 25032	Client: Wilson Oil	Logged By: William R.CullochDasson
Driller: GeoTech Explorations		Sect: 28 | T: 8N | R: 2W | Q: NE/SE Boring Dia: 1.5 | Depth: 15 ft
Drilling Method: Push Probe		Surface Elev: Approx: 20 ft amsl TOC Elev:
Sampling Method: Macro Sampler		Start Card #: SWL: 9.5 ft bgs Date: 2/11/05

Sample	B.C.	Depth	Sample Interval	GW Level	Strata	Lithology
						Asphalt surface with 4" gravel base Dark greenish brown silty to sandy clay with some organic odor, grades to dark gray to grayish brown clayey silt at 6 ft, becomes moist at 7.5 ft, wet at 9.5 ft, soil/water interface. Dark gray clayey silt to 15 ft. Some organic odor throughout. No petroleum detected by odor or sheen testing.
		5'				
B2-9.5'		10'		GW		
		15'			Bottom	

NOTES:

Boring #: 3	**BORING LOG**	Date: 2/11/05
MW #:		Start: 1000 Finish: 1012

Project: 76 Station 1410 Ocean Beach Hwy Longview, Washington	Boring Location: North side of Tank Nest
Project #: 25032 / Client: Wilson Oil	Logged By: William R.CullochDasson
Driller: GeoTech Explorations	Sect: 28 | T: 8N | R: 2W | Q: NE/SE
	Boring Dia: 1.5 | Depth: 15 ft
Drilling Method: Push Probe	Surface Elev: Approx: 20 ft amsl
	TOC Elev:
Sampling Method: Macro Sampler	Start Card #:
	SWL: 9.5 ft bgs Date: 2/11/05

Sample	B.C.	Depth	Sample Interval	GW Level	Strata	Lithology
						Asphalt surface with 4" gravel base Brown sand, with some pebbles to 7ft; piece of wood at 7ft;
		5'				Dark gray clayey silt with some organic odor at 7ft to 11ft, wet at 9.5 ft, soil/water interface.
B3-9.5'		10'		▽ GW	No Recovery	Some organic odor 7ft to 11ft. No petroleum detected by odor or sheen testing.
		15'			Bottom	

NOTES:

Boring #: 4 MW #:	**BORING LOG**	Date: 2/11/05 Start: 1015 Finish: 1030
Project: 76 Station 1410 Ocean Beach Hwy Longview, Washington		Boring Location: West side of Tank Nest
Project #: 25032	Client: Wilson Oil	Logged By: William R.CullochDasson
Driller: GeoTech Explorations		Sect: 28 | T: 8N | R: 2W | Q: NE/SE Boring Dia: 1.5 | Depth: 15 ft
Drilling Method: Push Probe		Surface Elev: Approx: 20 ft amsl TOC Elev:
Sampling Method: Macro Sampler		Start Card #: SWL: 10 ft bgs Date: 2/11/05

Sample	B.C.	Depth	Sample Interval	GW Level	Strata	Lithology
						Asphalt surface with 4" gravel base Brown sand, with some pebbles to 4ft; Dark greenish gray clayey sand grading to clay at 5 ft Brownish gray clayey silt, grades to gray clayey silt with some organic odor at 7.5 ft, moist at 8'; wet at 10 ft, soil/water interface. Some organic odor 7.5 ft to 12ft. No petroleum detected by odor or sheen testing.
		5'				
B4-10'		10'				
		15'			Bottom	

NOTES:

Boring #: 5 MW #:	**BORING LOG**	Date: 2/11/05 Start: 1035 Finish: 1105
Project: 76 Station 1410 Ocean Beach Hwy Longview, Washington		Boring Location: South side of Tank Nest
Project #: 25032	Client: Wilson Oil	Logged By: William R.CullochDasson
Driller: GeoTech Explorations		Sect: 28 | T: 8N | R: 2W | Q: NE/SE Boring Dia: 1.5 | Depth: 15 ft
Drilling Method: Push Probe		Surface Elev: Approx: 20 ft amsl TOC Elev:
Sampling Method: Macro Sampler		Start Card #: SWL: 10 ft bgs Date: 2/11/05

Sample	B.C.	Depth	Sample Interval	GW Level	Strata	Lithology
						Asphalt surface with 4" gravel base Brown sand, with some pebbles to 4ft;
						Brown silty clay 4 ft to 9.5 ft
		5'				
B5-10'		10'		GW		Gray clayey silt at 9.5 with some organic odor at 7.5 ft, moist; wet at 10 ft, soil/water interface, with organic odor and minor petroleum odor. Some sheen observed on water.
		15'			Bottom	Groundwater sample collected from probe casing.

NOTES:

Boring #: 6	**BORING LOG**	Date: 2/11/05
MW #:		Start: 1110 Finish: 1130

Project: 76 Station 1410 Ocean Beach Hwy Longview, Washington	Boring Location: SW Dispenser
Project #: 25032 / Client: Wilson Oil	Logged By: William R.CullochDasson
Driller: GeoTech Explorations	Sect: 28 | T: 8N | R: 2W | Q: NE/SE Boring Dia: 1.5 | Depth: 15 ft
Drilling Method: Push Probe	Surface Elev: Approx: 20 ft amsl TOC Elev:
Sampling Method: Macro Sampler	Start Card #: SWL: 10 ft bgs Date: 2/11/05

Sample	B.C.	Depth	Sample Interval	GW Level	Strata	Lithology
						Concrete surface with 4" gravel base Dark greenish brown to gray clay to 4.5ft
		5'				Brown to gray clayey silt at 4.5 ft, becomes moist at 8 ft,
B6-10'		10'		▽ GW		Gray clayey silt at 10'; wet at 10 ft, soil/water interface. Gray clayey silt to 15 ft.
		15'			Bottom	Some organic odor throughout. No petroleum detected by odor or sheen testing.

NOTES:

Boring #: 7	**BORING LOG**	Date: 2/11/05
MW #:		Start: 1135 Finish: 1150

Project: 76 Station 1410 Ocean Beach Hwy Longview, Washington	Boring Location: SE Dispenser
Project #: 25032 / Client: Wilson Oil	Logged By: William R.CullochDasson
Driller: GeoTech Explorations	Sect: 28 | T: 8N | R: 2W | Q: NE/SE
	Boring Dia: 1.5 | Depth: 15 ft
Drilling Method: Push Probe	Surface Elev: Approx: 20 ft amsl
	TOC Elev:
Sampling Method: Macro Sampler	Start Card #:
	SWL: 10 ft bgs Date: 2/11/05

Sample	B.C.	Depth	Sample Interval	GW Level	Strata	Lithology
						Concrete surface with 4" gravel base Dark greenish brown to gray clay to 4 ft, with gray layer at 3 ft Brown clayey silt to 5 ft
		5'				Brown to gray clayey silt at 5 ft
B7-10'		10'		▽ @ 10		Gray clayey silt at 8', moist; wet at 10 ft, soil/water interface. Gray clayey silt to 15 ft. Minor organic odor throughout. No petroleum detected by odor or sheen testing.
		15'			Bottom	

NOTES:

Boring #: 8 MW #:	**BORING LOG**	Date: 2/11/05 Start: 1245 Finish: 1255
Project: 76 Station 1410 Ocean Beach Hwy Longview, Washington		Boring Location: NE Dispenser
Project #: 25032	Client: Wilson Oil	Logged By: William R.CullochDasson
Driller: GeoTech Explorations		Sect: 28 | T: 8N | R: 2W | Q: NE/SE Boring Dia: 1.5 | Depth: 15 ft
Drilling Method: Push Probe		Surface Elev: Approx: 20 ft amsl TOC Elev:
Sampling Method: Macro Sampler		Start Card #: SWL: 10 ft bgs Date: 2/11/05

Sample	B.C.	Depth	Sample Interval	GW Level	Strata	Lithology
						Concrete surface with 4" gravel base Brown to gray silty sand to 5 ft,
		5'				Brown silty sand to 8.5 ft
B8-10'		10'				Gray medium coarse sand layer at 8.5 to 9 ft, becomes moist at 9 ft Brownish gray to gray clayey silt, wet at 10 ft, soil/water interface. Gray clayey silt to 15 ft.
		15'			Bottom	Minor organic odor throughout. No petroleum detected by odor or sheen testing.

NOTES:

Boring #: 9 MW #:	**BORING LOG**	Date: 2/11/05 Start: 1300 Finish: 1315
Project: 76 Station 1410 Ocean Beach Hwy Longview, Washington		Boring Location: NW Dispenser
Project #: 25032	Client: Wilson Oil	Logged By: William R.CullochDasson

Driller: GeoTech Explorations	Sect: 28	T: 8N	R: 2W Q: NE/SE
	Boring Dia: 1.5		Depth: 15 ft
Drilling Method: Push Probe	Surface Elev: Approx: 20 ft amsl		
	TOC Elev:		
Sampling Method: Macro Sampler	Start Card #:		
	SWL: 10 ft bgs		Date: 2/11/05

Sample	B.C.	Depth	Sample Interval	GW Level	Strata	Lithology
						Concrete surface with 4" gravel base
						Brown fine sand with some clay, grades to brown silty sand to 5 ft,
		5'				
						Brown to gray silty sand to 7.5 ft,
						Gray clayey silt, moist at 7.5 ft, wet at 10 ft, soil/water interface. Gray clayey silt to 15 ft.
B9-10'		10'		▽ GW		
						Minor organic odor throughout. No petroleum detected by odor or sheen testing.
		15'			Bottom	

NOTES:

Boring #: 10 MW #:	**BORING LOG**	Date: 2/11/05 Start: 1320 Finish: 1410

Project: 76 Station 1410 Ocean Beach Hwy Longview, Washington	Boring Location: East side of site
Project #: 25032 / Client: Wilson Oil	Logged By: William R.CullochDasson
Driller: GeoTech Explorations	Sect: 28 | T: 8N | R: 2W | Q: NE/SE
	Boring Dia: 1.5 | Depth: 15 ft
Drilling Method: Push Probe	Surface Elev: Approx: 20 ft amsl
	TOC Elev:
Sampling Method: Macro Sampler	Start Card #:
	SWL: 10 ft bgs Date: 2/11/05

Sample	B.C.	Depth	Sample Interval	GW Level	Strata	Lithology
						Concrete surface with 4" gravel base Brown silty sand to 5 ft,
		5'				Brown clayey silt to 9 ft,
B10-10'		10'		GW ▽		Gray clayey silt, moist at 9 ft, wet at 10 ft, soil/water interface. Gray clayey silt to 15 ft.
		15'			No Sample ↓ Bottom	Minor organic odor throughout. No petroleum detected by odor or sheen testing. Groundwater sample collected. Required boring to 20 feet to collect sample.

NOTES:

APPENDIX B
WATER WELL REPORT

WATER WELL REPORT

DEPARTMENT OF ECOLOGY

Original & 1st copy - Ecology, 2nd copy - owner, 3rd copy - driller

RECEIVED
DEC 12 2016
WA State Department of Ecology (SWRO)

Construction/Decommission *("x" in circle)*
☒ Construction
☐ Decommission *ORIGINAL INSTALLATION*
Notice of Intent Number _____

PROPOSED USE: ☒ Domestic ☐ Industrial ☐ Municipal ☐ DeWater ☐ Irrigation ☐ Test Well ☐ Other _____

TYPE OF WORK: Owner's number of well (if more than one) _____
☒ New well ☐ Reconditioned *Method:* ☐ Dug ☐ Bored ☐ Driven ☐ Deepened ☐ Cable ☒ Rotary ☐ Jetted

DIMENSIONS: Diameter of well 6 inches, drilled 38'4" ft.
Depth of completed well 38'4" ft.

CONSTRUCTION DETAILS
Casing Installed: ☒ Welded 6 " Diam. from +1'5" ft. to 33'8" ft.
☐ Liner installed _____ " Diam. from _____ ft. to _____ ft.
☐ Threaded _____ " Diam. From _____ ft. to _____ ft.

Perforations: ☐ Yes ☒ No
Type of perforator used _____
SIZE of perfs _____ in. by _____ in. and no. of perfs _____ from _____ ft. to _____ ft.

Screens: ☒ Yes ☐ No ☒ K-Pac Location 31'2" TO 33'2"
Manufacturer's Name JOHNSON
Type TELESCOPING Model No. STAINLESS STEEL
Diam. 6 Slot size 12 from 33'2 ft. to 38'4" ft.
Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel/Filter packed: ☐ Yes ☒ No Size of gravel/sand _____
Materials placed from _____ ft. to _____ ft.

Surface Seal: ☒ Yes ☐ No To what depth? 18'9" ft.
Material used in seal BENTONITE
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

PUMP: Manufacturer's Name _____
Type: _____ H.P. _____

WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
Static level 15.2 ft. below top of well Date 12-01-2016
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☒ No If yes, by whom? _____
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test 12-01-2016
Bailer Test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airtest 50+ gal./min. with stem set at 38'4" ft. for 1 hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water _____ Was a chemical analysis made? ☐ Yes ☒ No

CURRENT
Notice of Intent No. WE26024
Unique Ecology Well ID Tag No. BJN370
Water Right Permit No. _____
Property Owner Name KARL SALZSIEDER
Well Street Address 2222 OCEAN BEACH HWY
City LONGVIEW County COWLITZ
Location NE 1/4-1/4 SW 1/4 Sec 28 Twn 8N R 2W EWM ☐ Check Or WWM ☐ One
(s, t, r Still REQUIRED)

Lat/Long Lat Deg _____ Lat Min/Sec _____
Long Deg _____ Long Min/Sec _____
Tax Parcel No. (Required) 10261

CONSTRUCTION OR DECOMMISSION PROCEDURE
Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
TOP SOIL	0	1
SILTY SAND GRAY	1	6
SAND MEDIUM-FINE BROWN	6	18
SILTY SAND GRAY	18	29
SAND BLUE-GRAY WATER-BEARING	29	38'4"

Start Date 12-01-2016 Completed Date 12-01-2016

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☒ Driller ☐ Engineer ☐ Trainee Name (Print) CHRISTOPHER MCGHEE
Driller/Engineer/Trainee Signature _____
Driller or trainee License No. 2115
IF TRAINEE: Driller's License No: _____
Driller's Signature: _____

Drilling Company Dale McGhee & Sons Well Drilling, Inc.
Address 4409 Pleasant Hill Road
City, State, Zip Kelso , WA , 98626
Contractor's Registration No. DALEMI*212MC Date 12-05-2016

ECY 050-1-20 (Rev 06/08) If you need this document in an alternate format, please call the Water Resources Program at 360-407-6600. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.