Cleanup Action Plan

TOC Holdings Co. Facility No. 01-323
301 Central Avenue North
Kent, Washington 98032

Prepared for:

TOC Holdings Co.
2737 W. Commodore Way
Seattle, WA 98199

April 29, 2016

Prepared by:

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2737 West Commodore Way
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TOC Holdings Co. Facility No. 01-323
301 Central Avenue North
Kent, Washington 98033

Washington State Department of Ecology
Voluntary Cleanup Program Site No.

HydroCon Project No: 01-323

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ACRONYMS

Aerotech	Aerotech Environmental Consulting
ARAR	Applicable or Relevant and Appropriate Requirement
AS	air sparge or sparging
ASI	Additional Subsurface Investigation
BTEX	benzene, toluene, ethylbenzene, and total xylenes
CAA	Cleanup Action Alternative
CAP	Cleanup Action Plan
CFR	Code of Federal Regulations
COC	Chemical of Concern
CSM	Conceptual Site Model
CUL	cleanup Level(s)
CVOC	chlorinated volatile organic compound(s)
DO	dissolved oxygen
DPE	dual-phase extraction
DRPH	diesel-range petroleum hydrocarbons
Ecology	Washington State Department of Ecology
EDB	ethylene dibromide or 1,2 dibromoethane
EDC	ethylene dichloride or 1,2 dichloroethane
EDD	Engineering Design Document
ESA	environmental site assessment
ESN	Environmental Services Network
FS	Feasibility Study
GRPH	Gasoline-range petroleum hydrocarbons
HASP	Health and Safety Plan
HydroCon	HydroCon Environmental LLC
LDPE	low-density polyethylene
LNAPL	light, nonaqueous phase liquid
LSI	Limited Site Investigation
MNA	monitored natural attenuation
MPE	multi-phase extraction
MRL	method reporting limit
MTBE	methyl tertiary butyl ether
MTCA	Model Toxics Control Act
NCP	National Contingency Plan
NFA	No Further Action
NOC	Notice of Construction (for air emissions from PSCAA)
O&M	operations and maintenance
OMB	Office of Management and Budget

ACRONYMS (Continued)

ORPH	oil-range petroleum hydrocarbons
OSHA	Occupational Safety and Health Administration
PAHs	polynuclear aromatic hydrocarbons
PCBs	polychlorinated biphenyls
PID	photoionization detector
PLP	Potentially Liable Party
POTW	publicly-owned treatment works
PSCAA	Puget Sound Clean Air Agency
PVC	polyvinyl chloride
RAOs	remedial action objectives
RCW	Revised Code of Washington
REC	recognized environmental condition
ROW	right-of-way
SI	Subsurface Investigation
SVE	soil vapor extraction
SVOCs	semi-volatile organic compounds
TCP	traffic control plan
TEE	Terrestrial Ecological Evaluation
Terracon	Terracon Consultants, Inc.
TOC	TOC Holdings Co.
TPH	total petroleum hydrocarbons
USC	United States Code
UST	underground storage tank
VIA	Vapor Intrusion Assessment
VI	vapor intrusion
VOCs	volatile organic compounds
VPH/EPH	volatile and extractable petroleum hydrocarbons
WAC	Washington Administrative Code

EXECUTIVE SUMMARY

HydroCon Environmental, LLC prepared this Cleanup Action Plan on behalf of TOC Holdings Co. for Facility No. 01-323, located at 301 Central Avenue North in Kent, Washington. This document was prepared in general accordance with the Washington State Model Toxics Control Act requirements for a Cleanup Action Plan promulgated in the Washington Administrative Code at Chapter 173-340-380.

The Property is a 0.31-acre square lot located at 301 Central Avenue North, Kent, Washington 97032. The Property address also includes 305 Central Avenue North and 215 East Smith Street. A 1,656-square foot restaurant, Taqueria El Rinconsito, is located in the southeastern portion of the Site. A paved parking lot and a drive-thru lane south of the restaurant comprise the remainder of the Property.

A retail gasoline service station was historically located in the eastern portion of the Property from at least 1935 to 1953. The facilities included two 500-gallon underground storage tanks (USTs), a fuel pump island and canopy, and a service bay with a “grease shed” and hoist. The 1953 gas station was demolished and replaced by Wagner’s Sav-Way gas station. The new service building was reportedly built in the western central portion of the Site. The gas station was demolished in approximately 1972 and replaced by the current restaurant structure. The former Time Oil Co. (now TOC Holdings Co.) was identified as the owner of a car wash building built in 1963 in the south central portion of the Site.

An ASTM Phase I Environmental Site Assessment conducted in 2010 listed some Recognized Environmental Conditions that were further investigated between 2010 and the present. Subsurface investigations conducted between 2010 and the present confirm that releases from former underground fuel storage tank systems (USTs) resulted in adverse environmental impacts to soil, groundwater, and soil gas. Laboratory analytical data indicate that concentrations of gasoline-, diesel- and heavy oil-range petroleum hydrocarbons, as well as benzene, toluene, ethylbenzene, total xylenes (BTEX) and naphthalene exceed the Washington State Model Toxics Control Act Method A cleanup levels in either soil or groundwater beneath the Property. Soil gas samples collected outside of, but adjacent to the perimeter of the restaurant building revealed concentrations of several volatile hydrocarbons above the Washington State Department of Ecology’s sub-slab vapor screening levels.

The boundary of environmental impacts exceeding the Washington State Department of Ecology’s Method A cleanup levels has been compiled from the results of historic and recent subsurface investigations. The Site boundary is defined as the area where contaminant concentrations exceed the respective medium-specific cleanup or screening level. This area is located in the southeastern portion of the Property extending approximately 10 feet to the south into the City of Kent’s E. Smith Street right-of-way.

Using the Site boundary definition described above, a feasibility study was conducted to develop and evaluate cleanup action alternatives that would facilitate selection of a final cleanup action at the Site in accordance with Chapter 173-340-350(8) of the Washington Administrative Code. Based on the results

of the feasibility study, Cleanup Alternative 1, which entails air-sparging with soil vapor extraction is the preferred alternative for the Property. This Cleanup Action Plan has been prepared based on the results of the Remedial Investigation/Feasibility Study prepared by HydroCon (dated March 23, 2016), and presents the methods proposed to remediate the contaminated soil and groundwater beneath the Site.

This executive summary is presented solely for introductory purposes. The information contained in this section should be used only in conjunction with the full text of this report.

1 INTRODUCTION

HydroCon Environmental, LLC (HydroCon) prepared this Cleanup Action Plan (CAP) for TOC Holdings Co. (TOC) Facility No. 01-323, located at 301 Central Avenue North in Kent, Washington (hereinafter referred to as the Property) on behalf of TOC. The location of the Property is shown in Figure 1. This report was prepared for submittal to the Washington State Department of Ecology (Ecology) and developed to meet the general requirements for a CAP defined by the Washington State Model Toxics Control Act (MTCA) Regulation in the Washington Administrative Code (WAC) §173-340-380.

As established in WAC §173-340-200, the "Site" is defined by the full lateral and vertical extent of contamination that has resulted from the former operation of a retail gasoline service station on the Property. Based on the information gathered to date, the Site occupies the southeast portion of the Property and slightly off-Property to the south as described more fully in the Remedial Investigation/Feasibility Study (RI/FS; HydroCon 2016a). Figure 2 illustrates the location of the Property and the historical features that resulted in the releases of fuel hydrocarbons to soil and groundwater.

1.1 DOCUMENT PURPOSE AND OBJECTIVES

This document is supplemental to the RI/FS to satisfy the requirements of MTCA at WAC §173-340-380, -400, and -410 The CAP presents historical information regarding the source and extent of impacts beneath the Site and outlines the proposed plan to mitigate the risks posed by the existing contaminants that remain beneath the Property.

1.2 DOCUMENT ORGANIZATION

This CAP has been organized into the following sections:

- **Section 1.0, Introduction.** This section describes the purpose and organization of the CAP.
- **Section 2.0, Background.** This section discusses the Site location and description and history, surrounding parcel descriptions, future land use of the Property, geological and hydrogeological setting of the Site, previous investigations, chemicals of concern (COCs), media of concern, and the Site definition.
- **Section 3.0, Technical Elements.** This section presents the remedial action objectives (RAOs), applicable or relevant and appropriate requirements (ARARs), and the development of cleanup standards.
- **Section 4.0, Selected Cleanup Alternative**. This section describes the selected cleanup action for the Site.
- **Section 5.0, Cleanup Action Implementation Plan.** This section presents the components of the cleanup action, including preparation of the cleanup action implementation documents, and the installation and operation of the remedy.

- **Section 6.0, Compliance Monitoring.** This section describes the protection, performance and confirmation monitoring that will be conducted as part of the CAP.
- **Section 7.0, Documentation Requirements.** This section describes the documentation to be provided as part of the cleanup action, and it includes a discussion of document management and compliance reports.
- **Section 8.0, References.** This section lists references used to create this document.
- **Section 9.0, Limitations.** This section discusses document limitations.

Appendices include a Sampling and Analysis Plan (SAP), Quality Assurance Project Plan (QAPP); and Site-Specific Health and Safety Plan (HASP) in Appendices A, B, and C, respectively.

2 BACKGROUND

This section provides a description of the Property features and location; a summary of current and historical land use practices on the Property and adjoining parcels, a description of potential future Property uses, and a description of the environmental, geological, and hydrogeological settings at the Site. This section also provides a summary of site characterization subsurface investigations (SIs) and interim remedial actions conducted at the Site. The details on the historical SI work are provided in the RI/FS (HydroCon 2016a).

2.1 PROPERTY LOCATION AND DESCRIPTION

The Property is a 0.31-acre square lot located at 301 Central Avenue North, Kent, Washington 97032 (Figure 1). The Property addresses also include 305 Central Avenue North and 215 East Smith Street. The Property is comprised of two tax lots (King County tax parcel Nos. 917960-1735 and 917960-1745) in Kent, King County, Washington. The Site is currently owned by the Vivolo Family Trust LLC.

A 1,656-square foot restaurant, Taqueria El Rinconsito, is located in the southeastern portion of the Site. A paved parking lot and a drive-thru lane south of the restaurant comprise the remainder of the Property.

2.2 PROPERTY LAND USE HISTORY

Previous work by Aerotech and Terracon Consultants, Inc. (Aerotech 2010 reported in Terracon 2013) reported that a gas station was historically located in the eastern portion of the Property from at least 1935 to 1953 and the facilities included two 500-gallon underground storage tanks (USTs), a fuel pump island and canopy, and a service bay with a “grease shed” and hoist. The 1953 gas station was demolished and replaced by Wagner’s Sav-Way gas station. The new service building was reportedly built in the western central portion of the Site. The gas station was demolished in approximately 1972 and replaced by the current restaurant structure.

Site reconnaissance conducted by Aerotech identified a concrete patch with two apparent UST fill ports north of the restaurant, which Aerotech interpreted as evidence of the presence of possible USTs left in place. Aerotech identified the on-Site USTs, the historical Site use as gas stations, potential additional USTs, and the subsurface components of the hoist, as Recognized Environmental Conditions (RECs). Site features are shown on Figure 2.

According to historical assessor records obtained by Terracon, Time Oil Co. was identified as the owner of a car wash building built in 1963 in the south central portion of the Site.

Terracon (2013) reviewed historical aerial photographs to obtain information on the history of development of the Property and nearby areas. The property was developed as a gas station as early as 1936 and all gas station structures had been removed by 1988. The current building

was present in 1990. Two adjoining properties were reviewed: Strains Cascade Facility/Jack in the Box and Burdic Feed. Terracon concluded that on the basis of releases, the relative position of the properties, and groundwater flow direction, there is potential for an off-site release from the former Strains Cascade Facility to impact the Property.

2.3 FUTURE PROPERTY LAND USE

HydroCon is not aware of future plans for development or redevelopment of the Property. The Property is within the City of Kent's general commercial – mixed use zoning overlay (City of Kent Website, 2016). As such, future development can include commercial and residential uses developed in conjunction with each other, with up to 2 structures. A minimum of 25 percent of the gross floor space must be permitted as commercial use and residential use cannot be permitted before the commercial use (City of Kent, 2016).

2.4 ENVIRONMENTAL SETTING

The marine climate of the Kent area is generally mild and experiences moderate seasonal fluctuations in temperature. Average temperatures (in degrees Fahrenheit) range from 60s in the summer to 40s in the winter. The warmest month of the year is August, which has an average maximum temperature of 78 degrees Fahrenheit. The coldest month of the year is January, which has an average minimum daily temperature of 46 degrees Fahrenheit. The average annual precipitation reported for the Kent area is 39.1 inches and generally occurs in the form of rain. The wettest month of the year is December, during which the area receives an average precipitation total of 5.99 inches. The driest month of the year is July, during which the area receives an average precipitation total of 0.83 inches (Western Regional Climate Center 2016).

2.5 GEOLOGIC AND HYDROGEOLOGIC SETTING

This section summarizes the regional and local topography, geology, hydrogeology, and groundwater use.

2.5.1 Topography

The topography of the area is generally flat at an elevation of 40 feet (Figure 1). The East Hill area begins rising approximately 100 feet to the east. Mill Creek is the nearest water body, lying approximately 1,500 feet to the east. The Green River is 4,700 feet to the southwest at its nearest point, which flows to the northwest to its discharge to the Puget Sound.

2.5.2 Regional Geology

The Site lies within the Duwamish Valley, located between the Cascades and Puget Sound. The Duwamish Valley is a former extension of the Puget Sound waterway that became partly filled to above sea level with lacustrine and alluvial deposits. The alluvium, primarily from the Green and White rivers, forms a thick deposit that fills the deep glacial trough that is now the Duwamish Valley. Postglacial sediments have accumulated continuously in Duwamish Valley since retreat

of the Vashon glacier. Shallow soils typically consist of channel gravels and sands that occur in present and abandoned channels of the main rivers or silt, clay and peat of overbank deposits (Mullineaux, 1970).

Soils in the Duwamish Valley typically consist of the Oridia-Seattle-Woodinville association. These soils are generally poorly drained silt loams. The alluvium in much of the lower Duwamish Valley is characterized by medium- to medium to fine-grained sand and silt that was deposited in a delta complex when the valley was a submerged marine embayment; these sediments generally do not yield appreciable volumes of water to wells (Woodward et. al., 1995).

2.5.3 Regional Hydrogeology

The main aquifer in the area is the recent alluvial aquifer (Qal) that occurs with the Pacific/Algona/Auburn area, and the Renton area. The Qal aquifer generally occurs at depths of less than 100 feet, is unconfined, and is in hydraulic connection with multiple surface water systems (White, Green and Cedar rivers). Aquifer recharge is from direct infiltration of the ground surface, and lateral groundwater inflow from deeper aquifers in adjacent uplands. Natural aquifer discharge is to the rivers. Other alluvial aquifers, mapped as Qvr, Qva, Qc_2, Qc_3 and Qc_3 are also present in the area and contribute to the Kent water supply system (Pace 2011).

2.5.4 Groundwater Use

The City of Kent is served by multiple groundwater sources located throughout its water system service area. These include Clark Springs, Kent Springs, East Hill Wells, Garrison Well, Armstrong Springs Wells, Seven Oaks Well, Summit Well, O'Brian Well, 208th Street Well, and 212th Street Wells. These sources of supply are served by aquifers that underlie the Green and Cedar River basins. These sources are responsible for meeting all of Kent's existing and projected water supply demand (Pace 2011). It appears that additional water supply wells are also in use. According to Ecology's online well log database (Ecology 2015a), the City of Kent owns 17 water supply wells within a 1-mile radius of the Site, with well depths ranging from 23 to 598 feet with well casings ranging up to 36 inches.

2.5.5 Site Geology and Hydrogeology

The locations of borings and wells advanced at the Site are shown in Figure 2. Based on the results of the investigations summarized in HydroCon 2016a, subsurface soil beneath the Property, to depth of 15 feet, consists primarily of sand with varying amounts of silt. Silt is present at the bottom of Boring HC07. Gravel and gravel fill are present in some borings to a depth of approximately 3 feet. Groundwater was present in monitoring wells at a depth of approximately 7 to 8 feet bgs and flows towards the west with a very low gradient.

2.6 SUMMARY OF PREVIOUS INVESTIGATIONS & RESPONSE ACTIONS

The following provides a summary of the methods and findings of prior SIs at the Site, including the discovery of soil and groundwater contamination. Summaries of analytical results for soil, water, and soil gas sampled in 2015 are provided in Figures 3 through 6 of this CAP and Tables 1 through 9 in the RI/FS report (HydroCon 2016a).

This section includes references to cleanup levels (CULs); unless otherwise specified, these refer to MTCA Method A CULs for Unrestricted Land Use for soil and groundwater. Only MTCA Method B CULs are published for soil gas.

2.6.1 Aerotech Phase I Environmental Site Assessment (2010)

As noted in Section 2.2, Aerotech conducted a Phase I Environmental Site Assessment (ESA) and determined that a gasoline service station that previously occupied the Property operated six USTs and associated product piping and pumps. Service station operations were present at the Site between 1936 and 1988.

2.6.2 Terracon Limited Phase II ESA (2013)

Terracon (2013) conducted a Limited Phase II SI (LSI) to investigate the recognized environmental conditions (RECs) identified in the prior Phase I ESA completed by Aerotech. The scope of work for the LSI included reviewing historical reports, investigating known and suspected UST locations by geophysical survey, and conducting exploratory excavations with concurrent assessment of potential impacts to soil and groundwater from releases from existing or previously undocumented USTs. The LSI confirmed the presence of a minimum of four USTs in the northeast portion of the Site and up to three possible USTs south of the restaurant.

Soil and groundwater samples were collected from seven borings, five near the USTs located on the northeast portion of the Site and two near suspected USTs located south of the restaurant (Figure 2). Fourteen soil samples were analyzed for gasoline-range petroleum hydrocarbons (GRPH) diesel- range hydrocarbons (DRPH), oil-range hydrocarbons (ORPH) and volatile organic compounds (VOCs). Seven groundwater samples were analyzed for GRPH, DRPH, ORPH, BTEX, n-propylbenzene, n-butylbenzene, sec-butylbenzene, 1,3-dichlorobenzene, isopropylbenzene, p-isopropylbenzene, 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, 1,2,3-trimethylbenzene, and naphthalenes.

GRPH, ethylbenzene, and naphthalene were detected in soil above their respective CULs from one boring (B-06) south of the restaurant. Groundwater collected from this same boring had exceedances of GRPH, DRPH, and some volatile organic compounds (VOCs).

2.6.3 Terracon Interim Remedial Action (June 2014)

Terracon completed an interim remedial action to permanently close five of the USTs by removal and off-Site disposal, and one of the USTs by closure-in-place in June 2014 (Terracon

2014). In the northeast portion of the Site, one 6,000-gallon UST and one 5,000-gallon UST used to store gasoline (based on odors) were removed. In the area south of the restaurant, four USTs with capacities ranging from 500 to 800 gallons used to store gasoline (based on field observations and soil analytical results) were encountered. Three of the USTs were removed and one close to the East Smith Street ROW was decommissioned in place (Figure 2).

Soil sampling conducted by Terracon during the interim remedial action included 6 confirmation samples and 4 soil stockpile composite samples from the UST excavation in the northeast area; 15 confirmation samples and 5 soil stockpile composite samples from the UST excavation south of the building; and 11 confirmation samples and 2 soil stockpile composite samples collected in an exploratory excavation in the drive-through east of the south UST excavation. HydroCon (2014) also collected duplicate samples at most locations.

GRPH and BTEX were either not detected or detected well below CULs in the confirmation and stockpile samples collected in the northeast area. One sample NSS-04 was also analyzed for polynuclear aromatic hydrocarbons (PAHs) using EPA Method 8270 with no results detected above the laboratory's method reporting limit (MRL). Based on these results, the stockpiled soil was returned to the excavation.

In the area south of the restaurant, 8 of the 15 soil samples collected from the excavation sidewalls and 2 of the 5 stockpile soil samples exhibited GRPH and BTEX concentrations in excess of the CULs. Results from samples collected in the western portions of the excavation were generally below CULs. The excavation was backfilled using clean stockpiled soil and clean imported fill.

In the drive-through area, 7 of 11 confirmation samples and one of the stockpile samples contained GRPH and BTEX concentrations above CULs. Results from the northern part of the excavation were generally below CULs. The excavation was backfilled using clean stockpiled soil and clean imported fill.

2.6.4 HydroCon Subsurface Investigation (June & July 2015)

HydroCon conducted a SI to collect data to define the Site in accordance with WAC §173-340-350. The investigation (HydroCon 2015) consisted of sampling soil from 17 direct-push borings and installing 6 groundwater monitoring wells.

2.6.4.1 Soil Conditions Revealed During the SI

Based on the results of field screening and laboratory analysis, DRPH, GRPH, and/or BTEX constituents were observed above CULs in soil samples from the southeast corner of the Site but did not result in defining the extent of soil contamination above the CULs. Additional borings to define the eastern bounds of contamination were considered necessary to fully constrain the extent of impacted soil.

2.6.4.2 Groundwater Conditions Revealed During the SI

Similarly, groundwater sampling results indicated that the southeast portion of the Site exhibits groundwater impacted with GRPH, DRPH, ORPH, benzene, and possibly lead. Impacts to the east of the property boundary were not constrained. Further investigation was considered necessary to determine the full extent of the groundwater plume.

2.6.5 HydroCon Additional Subsurface Investigation (December 2015)

An additional subsurface investigation (ASI) was conducted to address the nature and extent of data gaps identified by the SI. The ASI consisted of sampling soil from 11 direct-push borings, collecting borehole groundwater from 4 of the borings, collecting groundwater samples from monitoring wells, and collecting soil gas from 3 soil borings located outside and near the Site building. The results of the ASI are summarized in the following paragraphs.

2.6.5.1 Soil Conditions Revealed During the ASI

Soil sampling results from additional borings revealed that none of the samples exhibited concentrations of DRPH, ORPH, GRPH, or BTEX above laboratory method detection limits (MRLs) or CULs. Based on these results, the extent of impacts in soil above CULs were defined.

2.6.5.2 Groundwater Conditions Revealed During the ASI

Results from four borehole groundwater samples collected from borings HC24 through HC27 confirmed that the eastern extent of impacts to groundwater do not extend under Central Avenue North.

2.6.5.3 Soil Gas Conditions Revealed During the ASI

Soil gas samples SG01, SG02, and SG03 were located south of the building: near the center, near the southwest corner of the building, and near the northwest corner of the building, respectively (Figure 6). The samples were submitted for analyses of constituents listed in Ecology's Tier I Vapor Intrusion Assessment (VIA) sub-slab soil gas screening guidance (Ecology 2015b). Each of the samples exceeded one or more of the sub-slab screening levels, indicating that soil gas abatement is a necessary component of remedial actions for the Site.

Based on the results of the Tier I VIA, HydroCon has planned additional soil gas, indoor- and ambient-air sampling to determine the full areal extent of soil gas contamination as well as to evaluate indoor air quality (HydroCon 2016b, c).

3 TECHNICAL ELEMENTS

This section recapitulates the technical elements presented in the RI/FS with respect to Site definition, remedial action objectives (RAOs), applicable or relevant and appropriate requirements (ARARs), and the development of cleanup standards.

3.1 SITE DEFINITION

Based on the findings from the investigations conducted by HydroCon and others since 2010, the Site is defined as petroleum-contaminated soil, soil gas, or groundwater exceeding the MTCA Method A CULs or screening levels (soil gas) in the southeastern portion of the Property and approximately 10 feet to the south of the Property in the City of Kent's E. Smith Street ROW as shown in Figure 7, titled "Site Boundary Definition".

3.2 CHEMICALS AND MEDIA OF CONCERN

Based on the findings of the investigations conducted on and adjacent to the Property, the primary COCs for the Site in soil and groundwater are DRPH; ORPH; GRPH; BTEX; and naphthalene.

A Tier I VIA conducted by HydroCon during their ASI in December 2015 revealed concentrations in soil gas of benzene; EDC; ethylbenzene; n-hexane; naphthalene; ortho- and meta-xylenes; C5 to C8 aliphatic airborne petroleum hydrocarbons (APH); C9 to C12 aliphatic APH; and C9 to C10 aromatic APH exceeding Ecology's sub-slab screening levels (Ecology 2015b). Based on these Tier I findings, HydroCon has planned a Tier II VIA (HydroCon, 2016b, c) involving soil gas, ambient air, and indoor air sampling to further evaluate the vapor intrusion pathway in accordance with Ecology's guidance. It is anticipated that the list of COCs in soil gas and indoor air will be finalized after the completion of the Tier II VIA.

3.3 CONFIRMED AND SUSPECTED SOURCE AREAS

The historical investigations confirmed elevated concentrations of COCs present in soil and groundwater beneath the Property as a result of a release of petroleum hydrocarbons from the former USTs and fuel-dispensing pump islands that formerly occupied the Property (Figure 2).

3.4 REMEDIAL ACTION OBJECTIVES

RAOs are statements of the goals for a cleanup action. RAOs are defined to:

- Implement administrative principles for cleanup (WAC §173-340-130).
- Meet the requirements, procedures, and expectations for conducting an FS and developing cleanup action alternatives as discussed in WAC §173-340-350 through §173-340-370.

- Develop CULs (WAC §173-340-700 through §173-340-760) and remedial alternatives that are protective of human health and the environment.

In particular, RAOs must address the following threshold requirements from WAC §173-340:

- Protect human health and the environment.
- Comply with CULs.
- Comply with applicable state and federal laws.
- Provide for compliance monitoring.

The overall RAO for this Site is to reduce the existing human health and environmental risks to a level sufficient to achieve an unrestricted "No Further Action" (NFA) determination from Ecology.

3.5 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

Under WAC §173-340-350 and §173-340-710, applicable requirements include regulatory cleanup standards, standards of control, and other environmental requirements, criteria, or limitations established under state or federal law that specifically address a contaminant, remedial action, location, or other circumstances at a site. MTCA defines relevant and appropriate requirements as:

> those cleanup action standards, standards of control, and other human health and environmental requirements, criteria or limitations established under state and federal law that, while not legally applicable to the hazardous substance, cleanup action, location, or other circumstances at a site, the department determines address problems or situations sufficiently similar to those encountered at the site that their use is well suited to the particular site. The criteria specified in WAC §173-340-710(3) shall be used to determine if a requirement is relevant and appropriate.

Remedial actions conducted under MTCA must comply with the substantive requirements of the ARARs but are exempt from their procedural requirements (WAC §173-340-710[9]). Specifically, this exemption applies to state and local permitting requirements under the Washington State Water Pollution Control Act, Solid Waste Management Act, Hazardous Waste Management Act, Clean Air Act, State Fisheries Code, and Shoreline Management Act.

ARARs were screened to assess their applicability to the cleanup action. Table 1 summarizes these ARARs.

3.6 CHEMICALS AND MEDIA OF CONCERN

The COCs for the Site are those compounds that were detected at concentrations exceeding their respective CULs. The COCs and the media where the COCs were detected above the respective CULs are listed below:

- GRPH, DRPH, ORPH; BTEX, and naphthalene in soil and groundwater
- Benzene, ethylbenzene, xylenes, EDC, n-hexane, naphthalene, and airborne petroleum hydrocarbons (APH) in soil gas and indoor air

3.7 CLEANUP STANDARDS

The selected cleanup action alternative must comply with the MTCA cleanup regulations specified in WAC §173-340 and with applicable state and federal laws. The CULs selected for those portions of the Site located within the Property boundary and for the greater Site are consistent with the RAOs, which state that the overall objective is to reduce concentrations of COCs in soil, groundwater, and soil gas beneath the Site to below their applicable CULs. In addition to mitigating risks to human health and the environment, achieving the RAOs will allow Ecology to issue Property- and/or Site-specific determinations of NFA. The associated media-specific CULs for the identified COCs are summarized in the following sections

3.7.1 Cleanup Levels

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. If there is no promulgated Method A CUL for a particular COC for a given chemical or medium, the proposed CUL is the MTCA Method B Standard Formula Value for carcinogenic or noncarcinogenic compounds, depending upon the carcinogenic properties of the compound.

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]	30	MTCA Method A, Unrestricted; WAC §173-340-740(2)(b)(i)
DRPH	2,000	
ORPH	2,000	
benzene	0.03	
toluene	7	
ethylbenzene	6	
xylenes[2]	9	
naphthalene[3]	5	

[1]For all gasoline mixtures with benzene included
[2]For total xylenes: ortho-, meta-, and para-isomers
[3]Value is for total of naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene

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)
DRPH	500	
ORPH	500	
benzene	5	
toluene	1,000	
ethylbenzene	700	
xylenes[2]	1,000	
naphthalene[3]	160	
1,3,5-trimethylbenzene	80	MTCA Method B, Non-Carcinogen, Standard Formula Value

[1]When benzene is present in groundwater
[2]For total xylenes: ortho-, meta-, and para-isomers
[3]Value is for total of naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene

Screening Levels for Sub-Slab Soil Gas

Chemicals of Concern	Cleanup Level[1] (micrograms per cubic meter)	Source
APH[2]	4,700	*Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action*, Review DRAFT, Publication No. 09-09-047; Appendix B, Method B, October 2009, Revised April 2015,
benzene	10.7	
toluene	76,200	
ethylbenzene	15,200	
xylenes[3]	1,520	
1,2 dichloroethane (EDC)	3.2	
1,2 dibromoethane (EDB)	0.139	
n-hexane	10,700	
methyl tertiary butyl ether	321	
naphthalene	2.45	
1,2,4 trimethylbenzene	107	

[1]The value is the screening level for sub slab measurements of soil gas.
[2]This is the most stringent of the three screening level values for air-phase petroleum hydrocarbon fractions.
[3]Value is for individual ortho- and meta-isomers. No value is published for para-isomer.

Proposed CULs for Indoor Air

Chemicals of Concern	Cleanup Level (micrograms per cubic meter)	Source
APH[1]	140	*Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action*, Review DRAFT, Publication No. 09-09-047; Appendix B, Method B, October 2009, Revised April 2015,
benzene	0.321	
toluene	2,290	
ethylbenzene	457	
xylenes[3]	45.7	
1,2 dichloroethane (EDC)	0.0962	
1,2 dibromoethane (EDB)	0.00417	
n-hexane	320	
methyl tertiary butyl ether (MTBE)	9.62	
naphthalene	0.0735	
1,2,4 trimethylbenzene	3.2	

[1]Value is for aliphatic petroleum hydrocarbon fraction (EC9-12).
[2]Value is for individual ortho- and meta- isomers. No value is published for para- isomer.

3.7.2 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, 2005a). 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.

3.7.2.1 Points of Compliance for Soil

In accordance with Ecology 2005a, 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".

3.7.2.2 Point 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 that are not removed as a result of the selected remedy; together with newly installed monitoring or remediation wells will be used to evaluate whether compliance at the Property has been achieved.

3.7.2.3 Point of Compliance for Soil Gas

Cleanup standards and points of compliance for soil gas have not been promulgated as of the date of this document, although soil gas screening levels have been published as draft guidance by Ecology (Ecology 2015b) and are included as ARARs for this cleanup action. The points of compliance for soil gas are identified in the referenced guidance for both sub-slab (soil gas encountered just beneath a building) and deeper soil gas (defined as equal to, or greater than, 15 feet bgs). Because the depth to groundwater at the Site is much less than 15 feet bgs, the deeper soil gas exposure pathway, point of compliance, and cleanup guidance levels are not applicable to this cleanup action.

3.7.2.4 Point of Compliance for Ambient (Outdoor) and Indoor Air

The points of compliance for ambient air will be the standard point of compliance in accordance with WAC §173-340-750(6), which is ambient air throughout the Property, although ambient air is not currently considered a medium of concern for this Site. CULs and points of compliance for indoor air have not been promulgated as of the date of this document, although indoor air CULs have been published as draft guidance (Ecology

2015b) and are included as ARARs for this document. As with ambient air, indoor air is not currently considered a medium of concern for this Site.

4 RECOMMENDED CLEANUP ACTION

HydroCon prepared a RI/FS report (HydroCon 2016a) to document the rationale for recommending a specific cleanup action alternative for the Site in accordance with the requirements of MTCA found at WAC 173-340-350(8). Depending on the complexity of the Site, an RI/FS could involve the development and evaluation of numerous remedial alternatives. However, because Property-specific conditions preclude many remedial components from being applied at the Site, the evaluation focused on a limited number of feasible components and alternatives that are both implementable and capable of achieving the RAOs. Two cleanup alternatives were developed in the FS for comparative analysis based on the technologies retained from screening. These cleanup alternatives are described as follows:

- **Cleanup Alternative 1—Air Sparge with Soil Vapor Extraction**. This alternative employs air sparging of contaminated groundwater to remediate volatile contaminants of concern by phase transfer, while remediating other nonvolatile target compounds by insitu aerobic biodegradation. Contaminants transferred to the vapor phase from groundwater by air sparging, and those present in soil gas that potentially threaten the nearby building indoor air would be recovered by soil vapor extraction. Recovered soil vapor would be treated prior to atmospheric discharge. Air emissions would be controlled and monitored on a monthly basis in accordance with requirements of the Puget Sound Clean Air Agency.
- **Cleanup Alternative 2—Dual-Phase Extraction.** This alternative would recover contaminants in the groundwater via pipe drains located within the Property boundary while simultaneously extracting contaminated soil vapor. The system would lower the water table around the drains and expose more of the petroleum-contaminated soil in the vadose zone, thus providing more area for recovery of contaminants by soil vapor extraction. The system would also supply and sustain oxygen to the unsaturated zone to promote aerobic bioremediation of the petroleum hydrocarbons adsorbed to the soil. Extracted groundwater and vapor would be collected, treated and monitored monthly for disposal under permits with the City of Kent municipal sewer system and the Puget Sound Clean Air Agency, respectively.

After performing the comparative analysis and ranking of alternatives in accordance with the MTCA evaluation criteria, Cleanup Action Alternative 1 (CAA 1) is the recommended alternative. CAA 1 meets the threshold requirements for cleanup actions set forth in WAC §173-340-360(3) and WAC §173-340-370. CAA 1 is protective of human health and the environment, is more easily implemented than the competing alternative, and provides a permanent solution for reducing concentrations of COCs at the Property. In addition, the cost to implement CAA 1 is lower than CAA 2 in achieving a corresponding benefit.

Details concerning the implementation of the recommended cleanup alternative are provided below.

5 CLEANUP ACTION IMPLEMENTATION

This section provides a description of the installation of cleanup action components and their maintenance and monitoring.

5.1 CLEANUP ACTION COMPONENTS

The recommended cleanup action involves air sparging of the groundwater in the areas exhibiting COC concentrations above cleanup goals simultaneously with SVE. A conceptual site plan illustrating how this cleanup action would be constructed is shown in Figure 8. This cleanup action will be effective in achieving the cleanup goals for the media of concern because it relies on proven technologies to remediate COCs in the affected media. It will also be effective in controlling the vapor intrusion to indoor air exposure pathway by preventing the further migration of contaminated soil gas, and capturing the soil gas for permanent treatment by adsorption to vapor phase GAC or by catalytic oxidation. The vapor control technology will be determined as part of the engineering design process, which will be documented in the upcoming Engineering Design Document (EDD, refer to Section 5.2.2).

A field scale pilot test is recommended as part of remedial design to determine the number of and effective spacing for AS wells and SVE trenches to ensure treatment of the contaminated zones and capture of soil vapors. Because it is anticipated that the AS process would increase the COC concentrations in the soil gas above those measured during the Tier I VIA, it is of utmost importance that the system adequately capture soil gas under and surrounding the building to protect restaurant workers and visitors from exposure to contaminants in indoor air. As such, fail-safe measures and alarm systems will be incorporated into the design of the remedial system.

For the purpose of estimating the cost to install and operate this cleanup action, AS well installation was assumed to be in a triangular grid pattern at a spacing of 12 feet over the area identified as the Site boundary. AS wells would be installed to a depth of approximately 20 feet bgs. It is important to install the AS wells at a depth that does not place the well screen below an aquitard, which would prevent the injected air from treating shallower zones. The absence of fine-grained material that would act as an aquitard would be confirmed during the AS well installation process. Clean compressed air would be conveyed by buried pipeline in a utility trench from an AS blower located in a remediation compound situated in an existing landscaped area as shown on Figure 8. SVE would be implemented by excavating one or more shallow trenches to a depth of approximately 4 to 5 feet bgs. A four-inch diameter slotted polyvinyl chloride (PVC) pipe would be installed in each trench at a depth of approximately 3.5 feet bgs and backfilled with crushed rock or pea gravel. The top of the trench would be sealed with polyethylene sheeting to minimize the collection of atmospheric air and to maximize the horizontal distance of vacuum induced by the SVE blower. The SVE blower would be located in the remediation compound. Recovered soil gas would be subjected to moisture separation and then through the appropriate vapor control technology before being discharged to the

atmosphere. A Notice of Construction (NOC) for approval to discharge treated vapor would be required from the Puget Sound Clean Air Agency (PSCAA) prior to system installation.

During the operation of the remediation system, recovered vapors from the system would be monitored monthly to assess the effectiveness and progress of the system. Groundwater quality would be monitored on a quarterly basis throughout the operational time frame and for at least four quarters following the operation of the system to confirm compliance with CULs. Confirmation soil and groundwater samples would be used to demonstrate that the RAOs were attained at the presumed conclusion of remediation. A compliance monitoring plan is provided in the SAP in Appendix A.

5.2 IMPLEMENTATION PLANS

Cleanup action implementation involves planning the sampling and analysis, quality assurance and health and safety requirements to be implemented during installation of the remedy and to monitor the operation of the remedy. In addition, design calculations, construction drawings and specifications are needed to design, bid, and install the remedy.

5.2.1 Plans Appended to CAP

To facilitate safe and quality remedial construction as well as operation and maintenance of the recommended cleanup action, HydroCon prepared Sampling & Analysis (SAP), Quality Assurance Project (QAPP), and Health and Safety Plans (HASP), which are appended to this CAP (Appendices A, B, and C, respectively).

5.2.2 Engineering Design Document

Upon approval of the CAP by stakeholders, HydroCon will prepare the EDD, which will include the following:

- **Design Basis Memorandum** summarizing the results of any pilot testing needed to provide design data and the basis for the design documented in the Construction Drawings and Specifications.
- **Construction Drawings and Specifications** prepared by a Washington State licensed Professional Engineer. Drawings and specifications will l be used to obtain qualified contractors to install the remedy.

5.2.3 Cleanup Action Schedule

The proposed cleanup action implementation schedule is presented in the following table.

Estimated Cleanup Action Implementation Schedule

Task	Task Description	Duration (calendar days)	Predecessor	Completion
1	Final CAP			May 1, 2016
2	Prepare Draft EDD	45	Task 1	June 17, 2016
3	Finalize EDD	14	Task 2	June 30, 2016
4	Bid and Award Installation of Systems	21	Task 3	July 15, 2016
5	Procure Equipment; Secure Permits	60	Task 4	September 9, 2016
6	Construction	14	Task 5	September 23, 2016
7	System Startup	7	Task 6	October 30, 2016
8	First Quarterly Cleanup Action Progress Reports (with As Built) (See Section 7.2)	Milestone	Task 7	Submitted First Quarter 2017
9	Quarterly Compliance Reports	Milestone	Task 8	Submitted quarterly thereafter until closure

6 COMPLIANCE MONITORING

There are three types of compliance monitoring identified for cleanup actions performed under MTCA (WAC 173-340-410): protection, performance, and confirmational monitoring. A paraphrased definition for each is presented below (WAC 173-340-410[1]). Additional details regarding procedures for sample collection, handling, quality assurance, and site safety procedures are provided collectively in Appendices A through C.

- **Protection Monitoring.** To evaluate whether human health and the environment are adequately protected during construction and the operation and maintenance period of an interim action or cleanup action.
- **Performance Monitoring.** To document that the cleanup action has attained cleanup standards.
- **Confirmational Monitoring.** To evaluate the long-term effectiveness of the interim action or cleanup action once cleanup standards or other performance standards have been attained.

6.1 PROTECTION MONITORING

A HASP has been prepared for the cleanup action that meets the minimum requirements for such a plan identified in federal (Title 29 CFR, Parts 1910.120, and 1926) and state regulations (WAC Title 296). The HASP identifies the known physical, chemical, and biological hazards; hazard monitoring protocols; and administrative and engineering controls required to mitigate the identified hazards (Appendix C).

6.2 PERFORMANCE AND CONFIRMATIONAL MONITORING

The following sections discuss the performance and confirmational monitoring to be implemented during the cleanup action at the Site as well as providing an estimate of restoration time frame. The scope of the monitoring and sampling, including sample frequency, is discussed in detail in the SAP (Appendix A).

6.2.1 Vapor Performance and Confirmational Monitoring

To evaluate the effectiveness of the cleanup action, vapor performance monitoring will be conducted on a monthly basis during operation of the remediation system using vapor samples taken from the remediation system's vapor discharge stack prior to and after any emissions control equipment. Concentrations of COCs in the performance vapor samples will be plotted as a function of time to determine mass removal rate. When the mass removal rate reaches an asymptotic level and concentrations of COCs in the samples drop to below laboratory reporting limits, the vapor samples are considered confirmational and the PSCAA would be petitioned to allow the removal of emissions control equipment.

6.2.2 Groundwater Performance and Confirmational Monitoring

Groundwater performance monitoring will continue on a quarterly basis to monitor the effectiveness of the remediation system at the Site. It is anticipated that groundwater quality beneath the Site will be substantially restored by virtue of removing the petroleum contamination in soil, groundwater, and soil vapor, as implemented under the cleanup action. Groundwater confirmational monitoring will be initiated once performance monitoring results indicate that the RAOs described in the CAP have been achieved at the points of compliance for groundwater at the Site and the remediation system has been shut down. These analytical results will be used to confirm that the RAOs have been met. Four consecutive quarters of post-remediation groundwater analytical data indicating COC concentrations below the respective CULs will be considered adequate to demonstrate that CULs have been achieved.

6.2.3 Soil Confirmational Monitoring

Confirmation soil samples will also be collected after the cleanup action is considered complete to demonstrate the long-term effectiveness of the cleanup action. These samples would be collected during a subsurface investigation to assess the concentrations of COCs present in subsurface soil beneath the Site. If concentrations of COCs in soil exceed applicable cleanup levels, remediation may continue or an alternative remedial strategy and/or institutional controls may be implemented to mitigate, manage, or contain residual contamination in soil.

6.2.4 Restoration Time Frame

One of the minimum requirements for cleanup actions under the MTCA Cleanup Regulation is that the action provides for a reasonable restoration time frame [WAC §173-340-360 (2)(b)(ii)]. In addition to the regulation, Ecology also published guidance for evaluating what constitutes a reasonable restoration time frame for petroleum hydrocarbon contaminated sites when relying only on natural attenuation and also when relying on natural attenuation after more active remedial actions have been employed (Ecology 2005b). This guidance declares that source control actions are almost needed in conjunction with natural attenuation in order to achieve site cleanup goals within a reasonable time frame.

Since this cleanup action relies on source control in conjunction with natural attenuation during the implementation of source control to achieve site cleanup goals, the estimated restoration time frame of 2 to 5 years is reasonable when compared to a cleanup action relying solely on natural attenuation (5 to 10 years or more). These estimated remediation time frames for cleanup actions with and without source control are based on HydroCon's experience with other similar sites.

7 DOCUMENTATION REQUIREMENTS

Documentation of the cleanup action is necessary to meet MTCA requirements. The applicable and relevant documentation generated for the cleanup action will be submitted to Ecology for review and approval. Copies of the documents will be retained for a minimum of 10 years after completion of the cleanup action.

7.1 DOCUMENT MANAGEMENT

An established document control system to be implemented during the cleanup action includes the following elements, as appropriate: Field Report Forms, Groundwater Purge and Sample Forms, Sample Identification Labels, and Sample Chain-Of-Custody Forms. An example of each of these documents is provided in the SAP (Appendix A). Disposal manifests for the waste generated on the Property will be maintained and submitted with the project documentation.

7.2 COMPLIANCE REPORTS

Cleanup Action Progress Reports will be prepared quarterly while the Site is undergoing cleanup activities to document the progress of remediation. The first quarterly report after completion of the system installation and startup will include a Construction Completion Report, which will document the as-built construction of the remedial system. A description of the content of subsequent Cleanup Action Progress Reports is provided below.

Groundwater monitoring reports will be prepared quarterly to document the groundwater compliance monitoring. The quarterly groundwater reports will include the following:

- Description of the Site and Site background summary.
- Figure depicting the well network, groundwater elevation contours, and groundwater flow direction.
- Description of the quarterly groundwater monitoring activities.
- Summary of the compliance sampling analytical results for groundwater for samples collected during quarterly groundwater monitoring, including summary tables.

O&M reports will be prepared to document the operation of the remediation system and system compliance monitoring. The O&M reports will include the following:

- Summary of operating parameters.
- The percent of time the system was operational over the monitoring period.
- Summary of maintenance and/or modification activities performed on the remediation system.

- Summary of the compliance sampling analytical results for vapor and water for samples collected during monthly O&M activities, including summary tables.

When the conditions for a Site NFA under MTCA have been achieved, a formal NFA request will be submitted to Ecology for their review and concurrence. This request will consist of the following items, as applicable and requested by the Ecology Project Manager:

- Historic compliance monitoring data for the groundwater medium confirming that CULs have been achieved.
- Compliance/confirmational monitoring data for the soil medium confirming that CULs have been achieved.
- Compliance confirmational monitoring data for other media of concern as requested by Ecology to review the NFA petition.

Upon receipt of the Site NFA from Ecology, HydroCon will perform site closure and restoration. The scope of work required to accomplish site closure and restoration will be:

- Permanently disconnect all utilities, mechanical, and electrical connections from the remedial equipment.
- Permanently close out utility services by contacting service providers and complying with their closure requirements. Requesting closure inspection and closure approval from an authorized representative of the service provider.
- To the extent practical, salvage or recycle the above-ground mechanical and electrical piping and equipment and properly disposing of the remaining unsalvageable material.
- Demolish the remediation compound and haul offsite for recycle or disposal. Restore the compound area by landscaping to try and match the original condition.
- Abandon monitoring wells and decommission remedial systems in accordance with State of Washington well closure requirements.

A Site Closure Report will be prepared following completion of the well abandonment and system decommissioning activities to document closure activities.

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9 LIMITATIONS

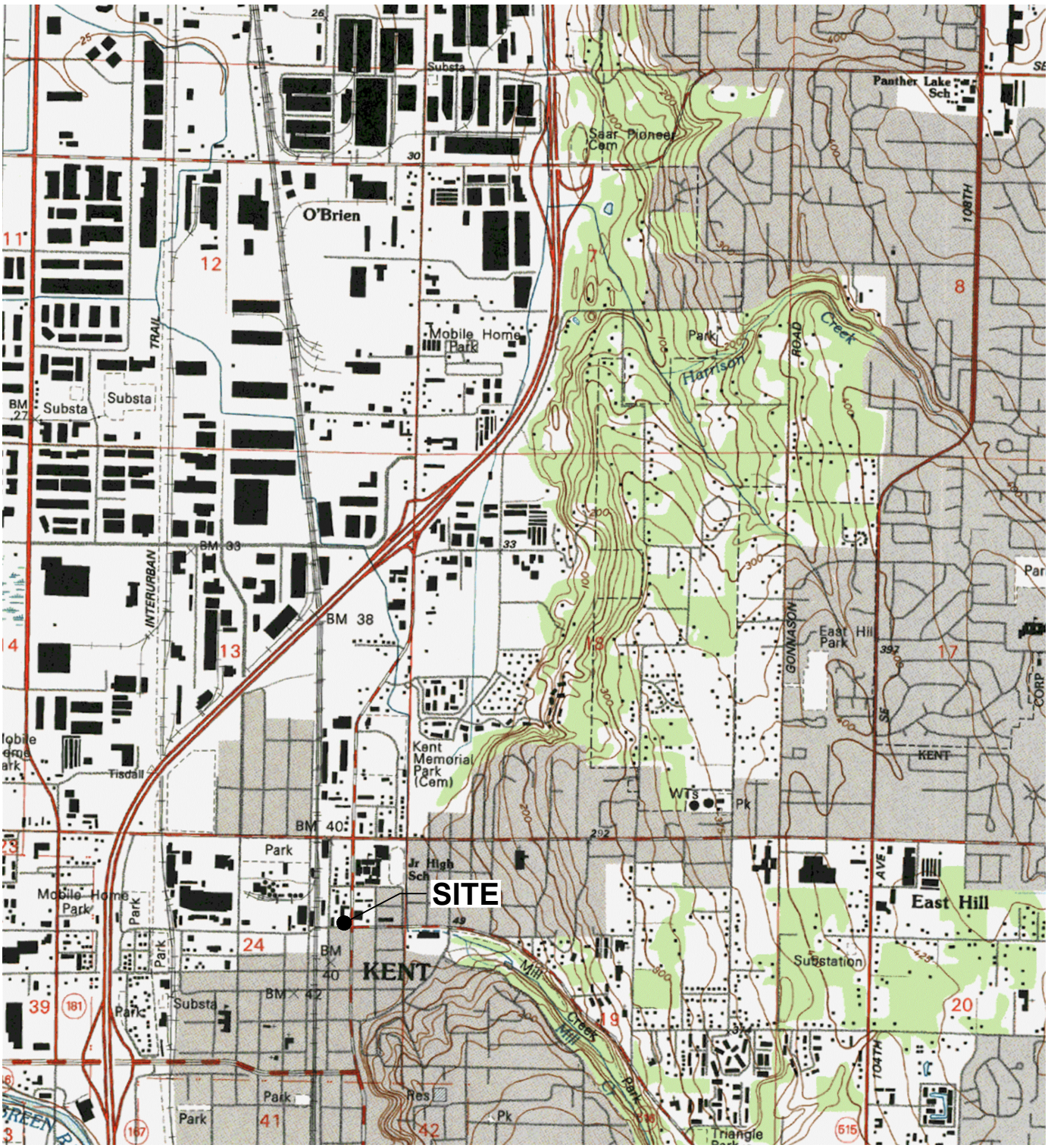
HydroCon's services were performed in a manner consistent with generally accepted practices of the profession undertaken in similar studies in the same geographical area during the same time period. HydroCon makes no warranties, either expressed or implied, regarding the findings, conclusions or recommendations. Please note that HydroCon does not warrant the work of laboratories, regulatory agencies, or other third parties supplying information used in the preparation of the report.

Findings and conclusions resulting from these services are based upon information derived from the on-Site activities and other services performed under this scope of work; such information is subject to change over time. Certain indicators of the presence of hazardous substances, petroleum products, or other constituents may have been latent, inaccessible, unobservable, non-detectable or not present during these services, and we cannot represent that the Site contains no hazardous substances, toxic materials, petroleum products, or other latent conditions beyond those identified during this monitoring. Subsurface conditions may vary from those encountered at specific sampling locations or during other surveys, tests, assessments, investigations, or exploratory services; the data, interpretations and findings are based solely upon data obtained at the time and within the scope of these services.

This report is intended for the use of TOC Holdings Co. This report may not be used or relied upon by any other party without the written consent of HydroCon. The scope of services performed in execution of this evaluation may not be appropriate to satisfy the needs of other users, and use or re-use of this document or the findings, conclusions, or recommendations is at the risk of said user.

The conclusions presented in this report are, in part, based upon subsurface sampling performed at selected locations and depths. There may be conditions between borings or samples that differ significantly from those presented in this report and which cannot be predicted by this study.

FIGURES



NOTE(S):

USGS, RENTON QUADRANGLE
WASHINGTON-KING CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

0 2000 4000

SCALE IN FEET
1" = 2000'

N
W E
S

HydroCon

DATE: 2-11-16
DWN: JJT
CHK: NV
APPROVED: CH
PRJ. MGR: RH
PROJECT NO: 01-323

FIGURE 1
SITE LOCATION MAP

TOC HOLDING CO. FACILITY NO. 01-323
301 N CENTRAL AVE
KENT, WA.

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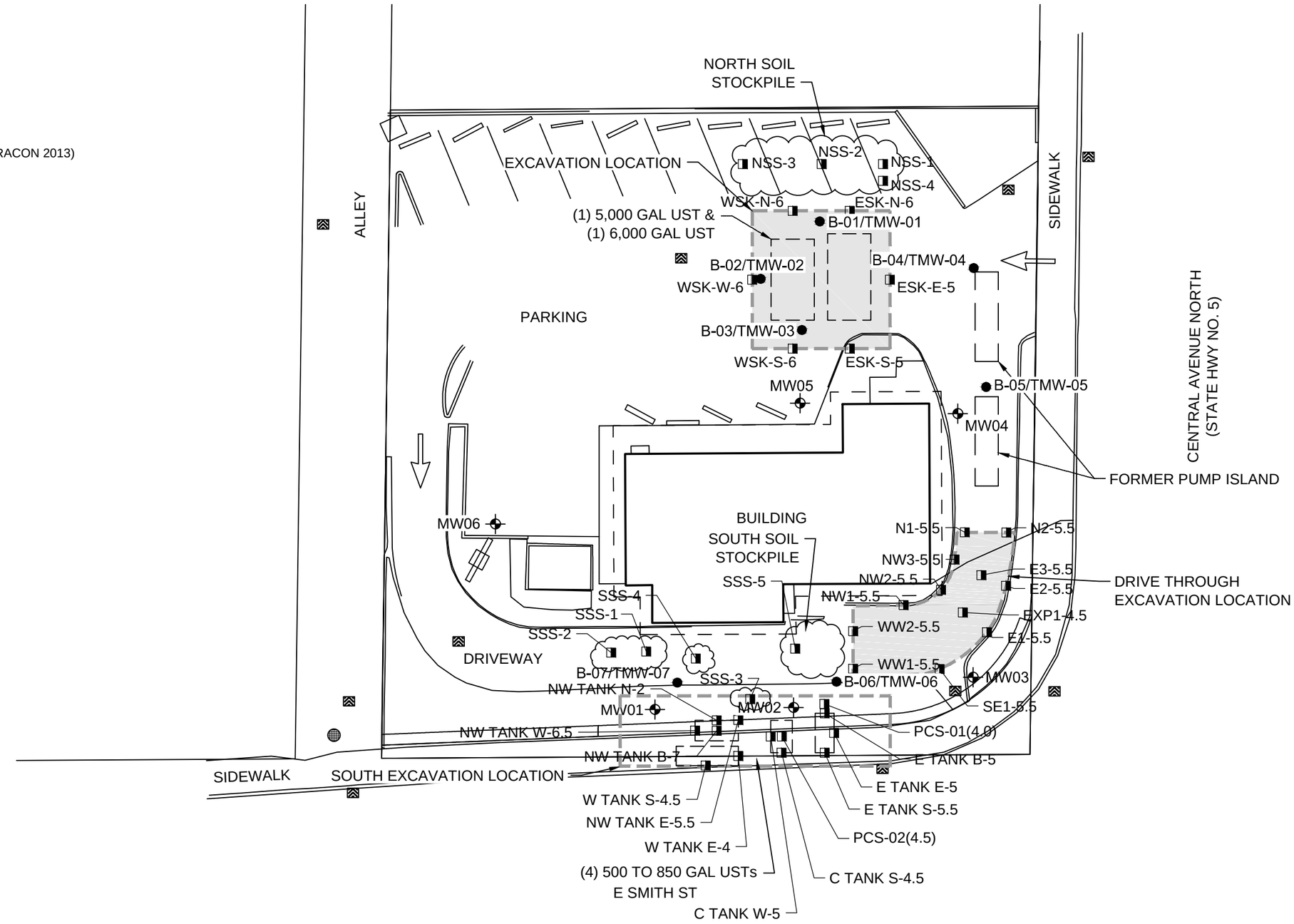
LEGEND

- BUILDING
- MW01 — MONITORING WELL
- CATCH BASIN
- BORING LOCATIONS (TERRACON 2013)
- EXCAVATION LOCATIONS



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0 20 40

SCALE IN FEET
1" = 20'

HydroCon

510 Allen St. Suite B Kelso, Wa 98626, Ph(360)-703-6086

DATE: 2-11-16
DWN: JJT
CHK: NV
APPROVED: CH
PRJ. MGR: CH
PROJECT NO: 01-323

FIGURE 2
SITE FEATURES AND UTILITIES
2013 - 2014 SAMPLE LOCATIONS
TOC HOLDING CO. FACILITY NO. 01-323
301 N CENTRAL AVE
KENT, WA.

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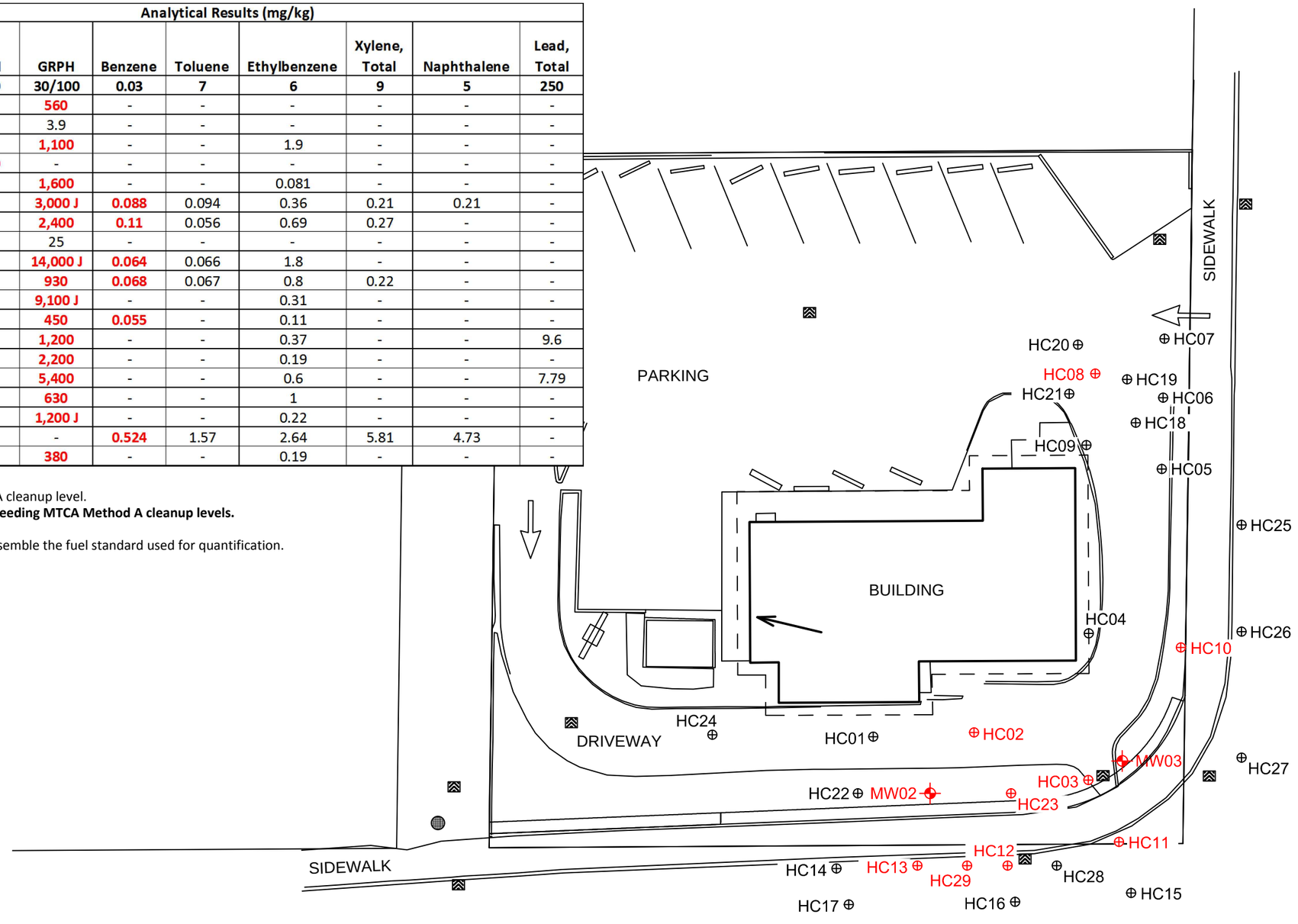
Field ID	Date Sampled	Analytical Results (mg/kg)								
		DRPH	ORPH	GRPH	Benzene	Toluene	Ethylbenzene	Xylene, Total	Naphthalene	Lead, Total
WA Method A		2,000	2,000	30/100	0.03	7	6	9	5	250
HC02-07	6/29/2015	400 x	-	**560**	-	-	-	-	-	-
HC02-15	6/29/2015	-	-	3.9	-	-	-	-	-	-
HC03-08	6/29/2015	1,200 x	-	**1,100**	-	-	1.9	-	-	-
HC08-05	6/29/2015	250 x	**2,800**	-	-	-	-	-	-	-
HC10-07	7/7/2015	**4,600 x**	-	**1,600**	-	-	0.081	-	-	-
HC11-05	7/21/2015	**2,200 x**	-	**3,000 J**	**0.088**	0.094	0.36	0.21	0.21	-
HC11-07	7/21/2015	**3,500 x**	-	**2,400**	**0.11**	0.056	0.69	0.27	-	-
HC11-10	7/21/2015	-	-	25	-	-	-	-	-	-
HC12-05	7/21/2015	**6,700 x**	-	**14,000 J**	**0.064**	0.066	1.8	-	-	-
HC12-07	7/21/2015	1,700 x	-	**930**	**0.068**	0.067	0.8	0.22	-	-
HC13-05	7/21/2015	**5,700 x**	-	**9,100 J**	-	-	0.31	-	-	-
HC13-11	7/21/2015	-	-	**450**	**0.055**	-	0.11	-	-	-
HC23-12	12/28/2015	550 x	-	**1,200**	-	-	0.37	-	-	9.6
HC23-15	12/28/2015	670 x	-	**2,200**	-	-	0.19	-	-	-
HC29-05	12/29/2015	**4,300 x**	-	**5,400**	-	-	0.6	-	-	7.79
MW02-07	6/30/2015	400 x	-	**630**	-	-	1	-	-	-
MW03-05	6/30/2015	1,500 x	-	**1,200 J**	-	-	0.22	-	-	-
MW03-07	6/30/2015	-	-	-	**0.524**	1.57	2.64	5.81	4.73	-
MW03-12	6/30/2015	640 x	-	**380**	-	-	0.19	-	-	-

Notes:
Red denotes concentration exceeds MTCA Method A cleanup level.
Results shown only for samples with detections exceeding MTCA Method A cleanup levels.
Lab Qualifiers:
x - The sample chromatographic pattern does not resemble the fuel standard used for quantification.



LEGEND

- BUILDING
- MW01 — MONITORING WELL
- HC01 — BORING LOCATIONS (HYDROCON 2015)
- CATCH BASIN
- APPROXIMATE GROUNDWATER FLOW DIRECTION
- *RED INDICATES IMPACTED SOIL

N W E S

0 20 40
SCALE IN FEET
1" = 20'

HydroCon
510 Allen St. Suite B Kelso, Wa 98626, Ph(360)-703-6086

DATE: 4-27-16
DWN: JJT
CHK: NV
APPROVED: CH
PRJ. MGR: CH
PROJECT NO: 01-323

FIGURE 3
SOIL ANALYTICAL RESULTS
FOR JULY 2015
TOC HOLDING CO. FACILITY NO. 01-323
301 N CENTRAL AVE
KENT, WA.

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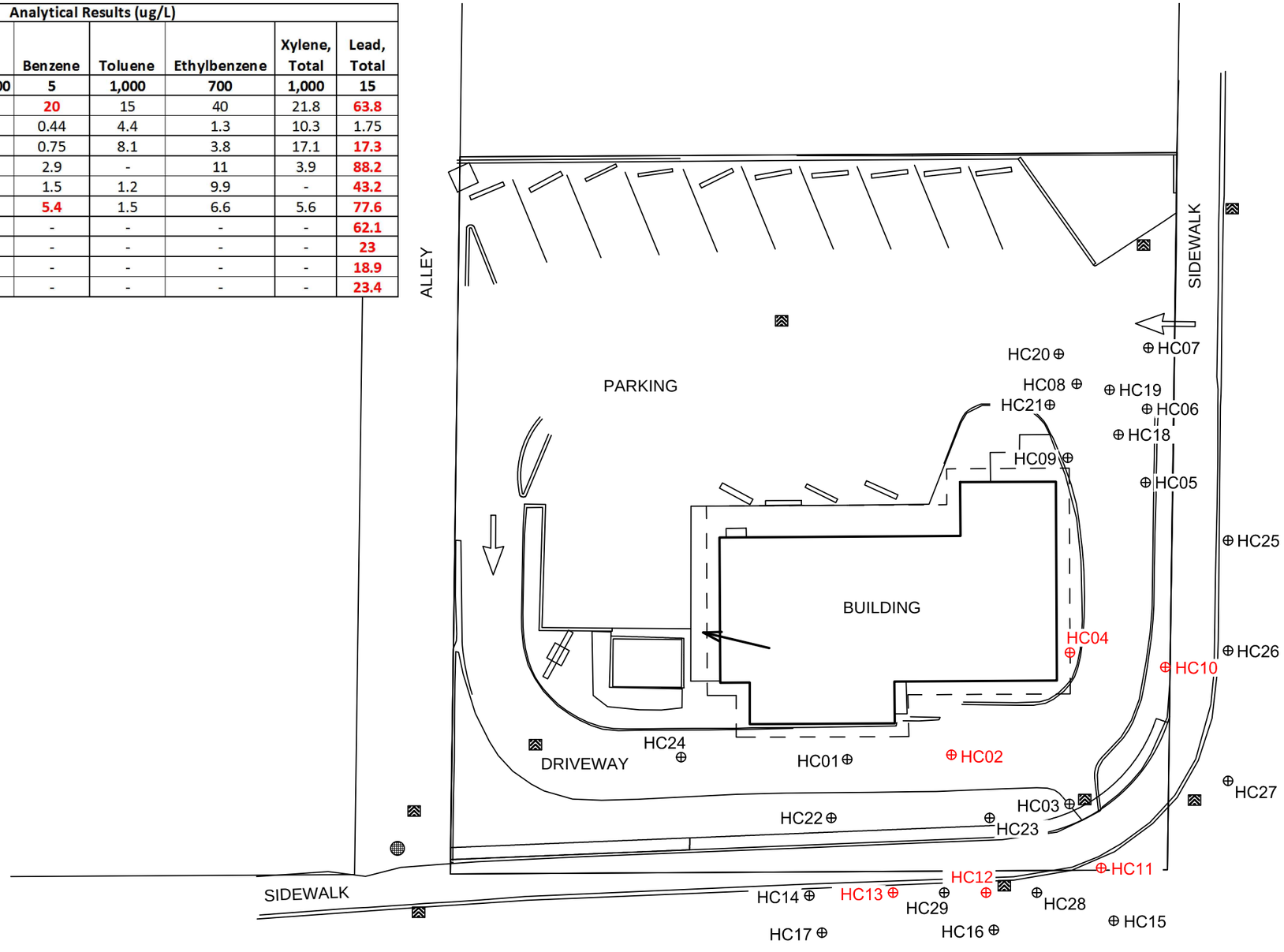
Field ID	Date Sampled	Analytical Results (ug/L)							
		DRPH	ORPH	GRPH	Benzene	Toluene	Ethylbenzene	Xylene, Total	Lead, Total
WA Method A		500	500	800/1,000	5	1,000	700	1,000	15
HC02	7/7/2015	19,000 x	510 x	6,900	20	15	40	21.8	63.8
HC04	7/7/2015	740 x	-	1,200	0.44	4.4	1.3	10.3	1.75
HC10	7/7/2015	1,800 x	-	1,900	0.75	8.1	3.8	17.1	17.3
HC11	7/7/2015	7,500 x	290 x	5,000	2.9	-	11	3.9	88.2
HC12	7/7/2015	1,900 x	-	5,100	1.5	1.2	9.9	-	43.2
HC13	7/7/2015	13,000 x	1,100 x	5,800	5.4	1.5	6.6	5.6	77.6
HC14	7/7/2015	170 x	-	-	-	-	-	-	62.1
HC15	7/7/2015	150 x	-	290	-	-	-	-	23
HC16	7/7/2015	180 x	-	190	-	-	-	-	18.9
HC17	7/7/2015	100 x	-	-	-	-	-	-	23.4



LEGEND

- BUILDING
- HC01 ⊕ BORING LOCATIONS (HYDROCON 2015)
- CATCH BASIN
- APPROXIMATE GROUNDWATER FLOW DIRECTION

*RED INDICATES IMPACTED SOIL OR GROUNDWATER

N E S W

0 20 40

SCALE IN FEET
1" = 20'

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PRJ. MGR: CH
PROJECT NO: 01-323

FIGURE 4
2015 BOREHOLE GROUNDWATER ANALYTICAL RESULTS
TOC HOLDING CO. FACILITY NO. 01-323
301 N CENTRAL AVE
KENT, WA.

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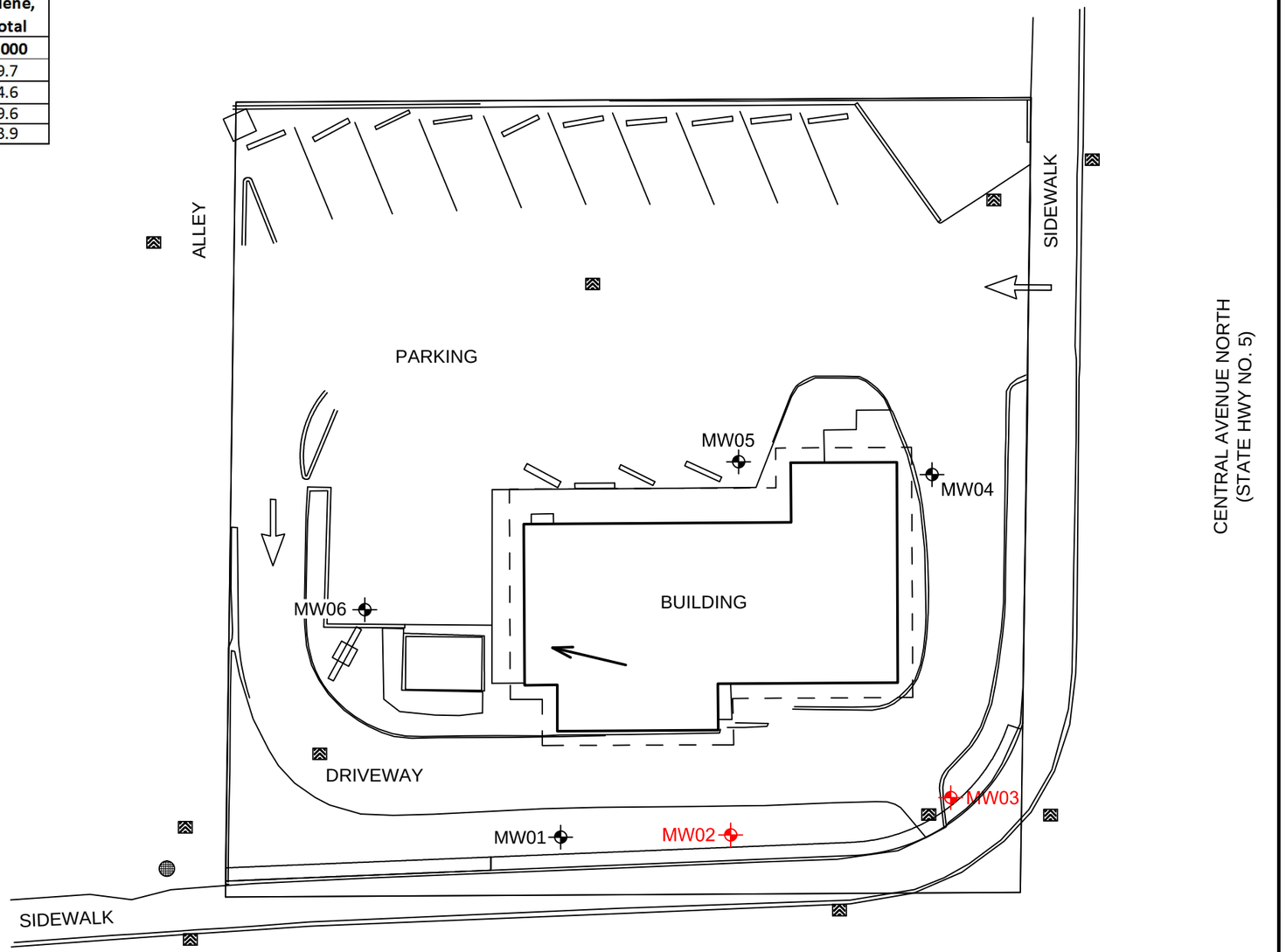
Well ID	Date Sampled	Analytical Results (ug/L)						
		DRPH	ORPH	GRPH	Benzene	Toluene	Ethylbenzene	Xylene, Total
WA Method A		500	500	500/1,000	5	1,000	700	1,000
MW02	7/29/2015	4,600 x	<250	4,100	8.1	4.8	36	9.7
MW03	7/29/2015	4,400 x	<250	3,900	0.76	1.4	26	4.6
MW02	10/21/2015	4,300 x	<280	4,300 J	4	4.6	32	9.6
MW03	10/21/2015	2,400 x	<280	3,300	0.59	1.3	19	3.9

Notes:
Red denotes concentration exceeds MTCA Cleanup Level for Groundwater.
Lab Qualifiers:
x - The sample chromatographic pattern does not resemble the fuel standard used for quantification.
J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.



LEGEND

- BUILDING
- MW01 — MONITORING WELL
- CATCH BASIN
- APPROXIMATE GROUNDWATER FLOW DIRECTION

*RED INDICATES IMPACTED GROUNDWATER

N E S W

0 20 40
SCALE IN FEET
1" = 20'

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PRJ. MGR: CH
PROJECT NO: 01-323

FIGURE 5
GROUNDWATER ANALYTICAL RESULTS
FOR JULY - DECEMBER 2015
TOC HOLDING CO. FACILITY NO. 01-323
301 N CENTRAL AVE
KENT, WA.

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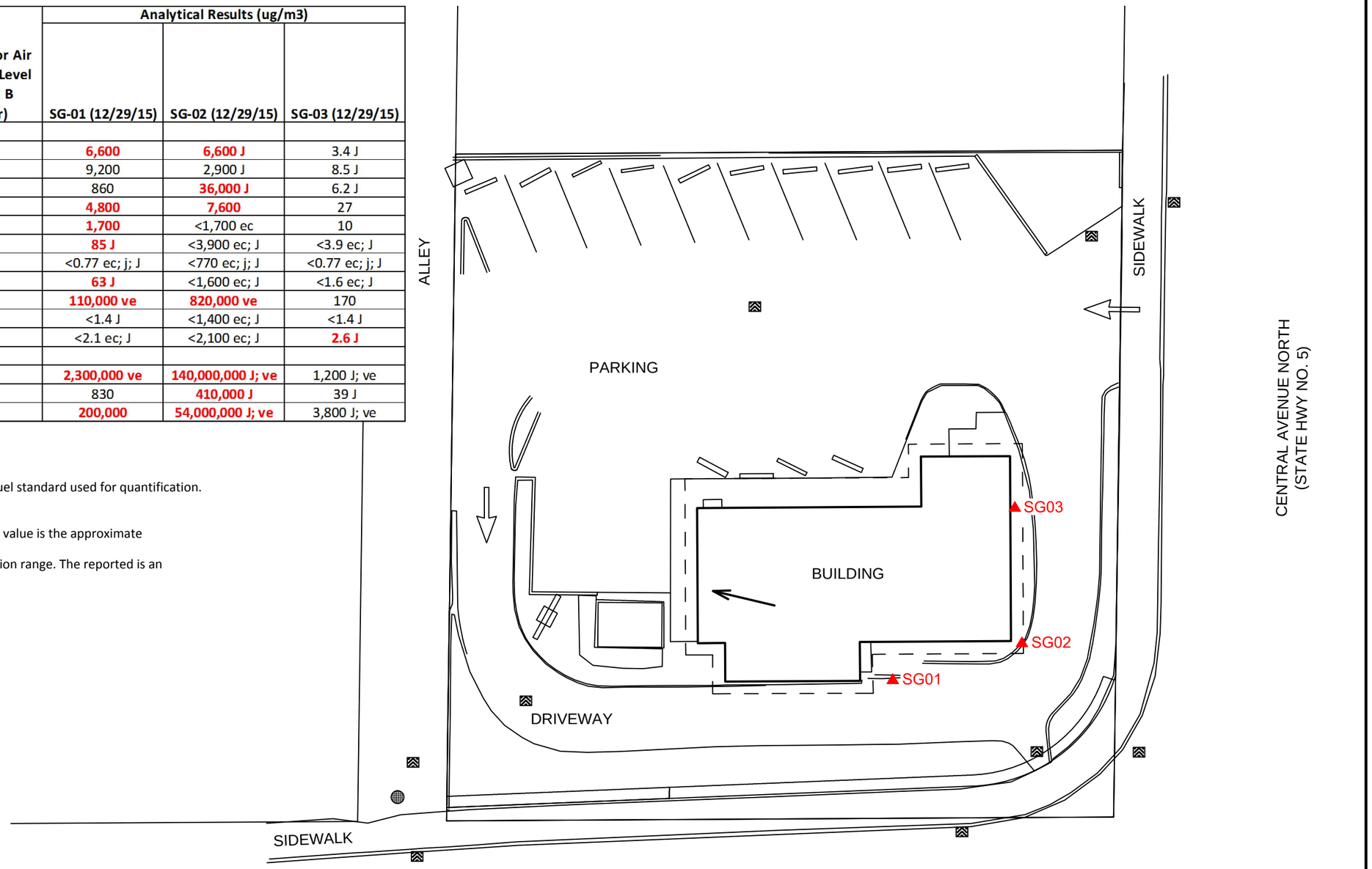
	2015 Indoor Air Screening Level Method B (Noncancer)	2015 Indoor Air Screening Level Method B (Cancer)	Analytical Results (ug/m3) SG-01 (12/29/15)	SG-02 (12/29/15)	SG-03 (12/29/15)
Volatiles-TO15					
Benzene	457	10.7	**6,600**	**6,600 J**	3.4 J
Toluene	76,200		9,200	2,900 J	8.5 J
Ethylbenzene	15,200		860	**36,000 J**	6.2 J
m,p-Xylene	1,520		**4,800**	**7,600**	27
o-Xylene	1,520		**1,700**	<1,700 ec	10
1,2,4-trimethylbenzene	107		**85 J**	<3,900 ec; J	<3.9 ec; J
EDB	137	0.139	<0.77 ec; j; J	<770 ec; j; J	<0.77 ec; j; J
EDC	107	3.21	**63 J**	<1,600 ec; J	<1.6 ec; J
Hexane	10,700		**110,000 ve**	**820,000 ve**	170
MTBE	45,700	321	<1.4 J	<1,400 ec; J	<1.4 J
Naphthalene	45.7	2.5	<2.1 ec; J	<2,100 ec; J	**2.6 J**
Volatiles-APH					
APH EC5-8 aliphatics	90,000		**2,300,000 ve**	**140,000,000 J; ve**	1,200 J; ve
APH EC9-10 aromatics	4,700		830	**410,000 J**	39 J
APH EC9-12 aliphatics	6,000		**200,000**	**54,000,000 J; ve**	3,800 J; ve

Notes:
Red denotes concentration exceeds sub-slab screening level.
Lab Qualifiers:
x - The sample chromatographic pattern does not resemble the fuel standard used for quantification.
ec - Method reporting limit exceeds Clean Up Level shown.
j - Estimated value; result is less than normal reporting limits.
J - The analyte was positively identified; the associated numerical value is the approximate concentration.
ve - The analyte response exceeded the valid instrument calibration range. The reported is an estimate.



LEGEND

- BUILDING
- SG01 ▲ SOIL GAS LOCATIONS (HYDROCON 2015)
- CATCH BASIN
- APPROXIMATE GROUNDWATER FLOW DIRECTION

*RED INDICATES IMPACTED SOIL OR GROUNDWATER

N W E S

0 20 40
SCALE IN FEET
1" = 20'

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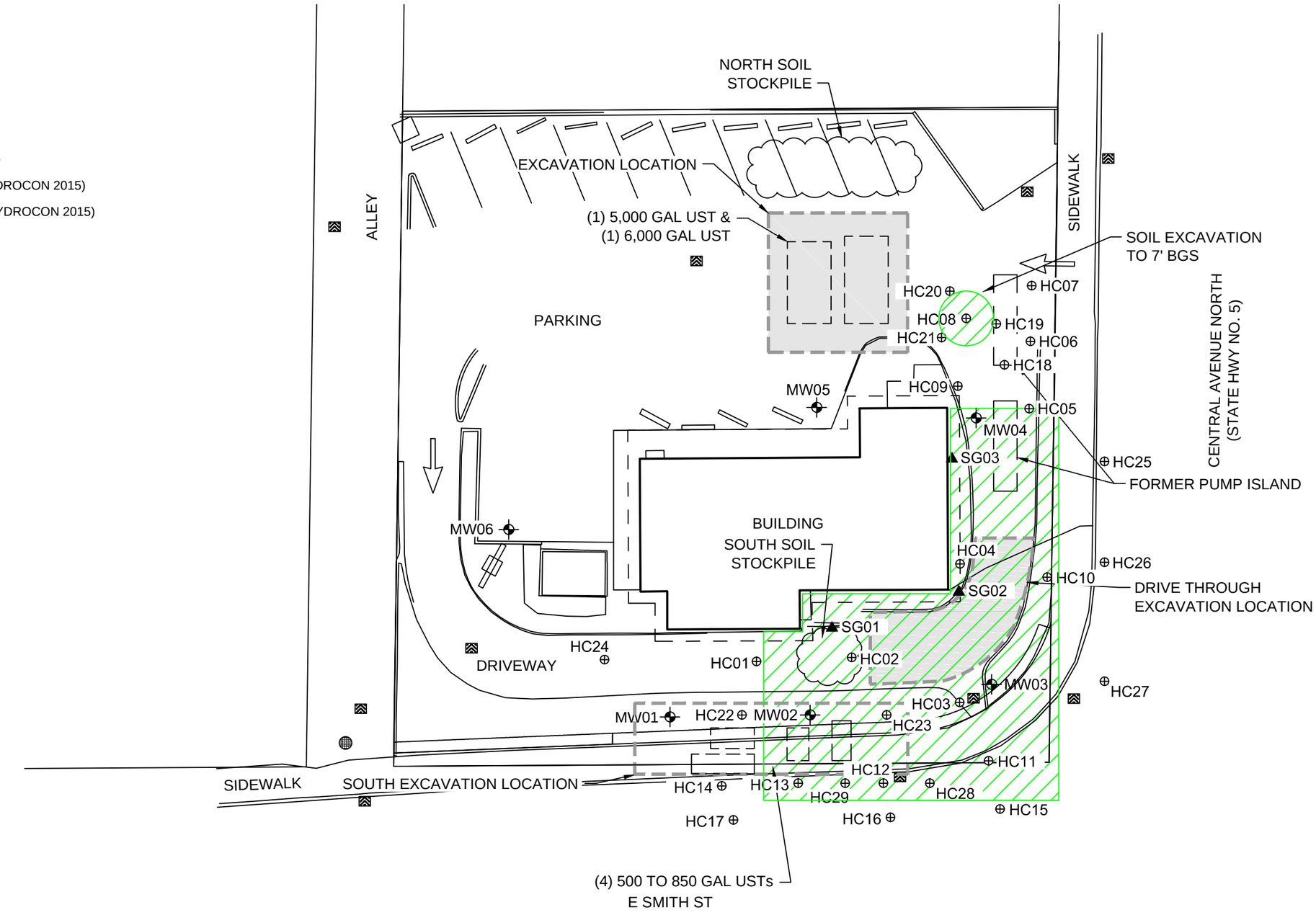
PROJECT NO: 01-323

FIGURE 6
2015 TIER 1 VAPOR RESULTS

TOC HOLDING CO. FACILITY NO. 01-323
301 N CENTRAL AVE
KENT, WA.

LEGEND

- BUILDING
- MW01 — MONITORING WELL
- CATCH BASIN
- EXCAVATION LOCATIONS
- HC01 — BORING LOCATIONS (HYDROCON 2015)
- SG01 — SOIL GAS LOCATIONS (HYDROCON 2015)
- SITE BOUNDARY



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PROJECT NO: 01-323

FIGURE 7
SITE BOUNDARY DEFINITION

TOC HOLDING CO. FACILITY NO. 01-323
301 N CENTRAL AVE
KENT, WA.

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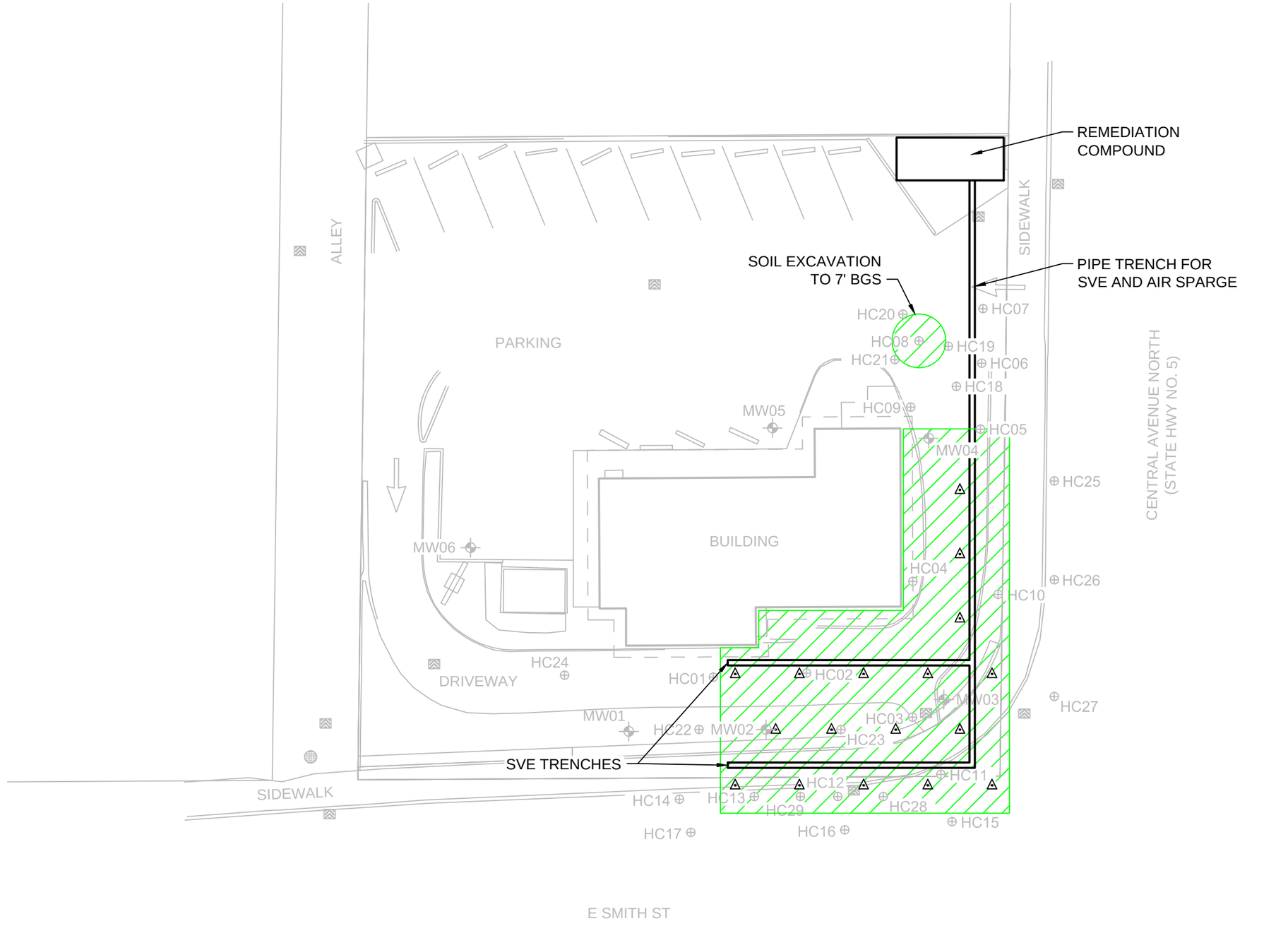
LEGEND

- BUILDING
- MW01 — MONITORING WELL
- CATCH BASIN
- PROPOSED SVE TRENCHES
- HC01 — BORING LOCATIONS (HYDROCON 2015)
- SG01 — SOIL GAS LOCATIONS (HYDROCON 2015)
- SITE BOUNDARY
- PROPOSED AIRSPARGE LOCATIONS



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SCALE IN FEET
1" = 20'

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DATE: 2-11-16
DWN: JJT
CHK: MS
APPROVED: MS
PRJ. MGR: CH
PROJECT NO: 01-323

FIGURE 8
CONCEPTUAL SITE LAYOUT
CLEANUP ACTION ALTERNATIVE 1
AIR SPARGE WITH SVE
TOC HOLDING CO. FACILITY NO. 01-323

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TABLES

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Table 1
ARARs for the Cleanup Action

Potential ARAR	Citation or Source
MTCA	Chapter 70.105 of the Revised Code of Washington (RCW)
MTCA Cleanup Regulation	WAC 173-340
Ecology, Toxics Cleanup Program – Guidance To Be Considered	*Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action*, Review DRAFT, October 2009, Updated April 2015, Publication No. 09-09-047
State Environmental Policy Act	RCW 43.21C
Washington State Shoreline Management Act	RCW 90.58; WAC 173-18, 173-22, and 173-27
The Clean Water Act	33 United States Code [USC] 1251 et seq.
Comprehensive Environmental Response, Compensation, and Liability Act of 1980	42 USC 9601 et seq. and Part 300 of Title 40 of the Code of Federal Regulations [40 CFR 300]
The Fish and Wildlife Coordination Act	16 USC 661-667e; the Act of March 10, 1934; Ch. 55; 48 Stat. 401
Endangered Species Act	16 USC 1531 et seq.; 50 CFR 17, 225, and 402
Native American Graves Protection and Repatriation Act	25 USC 3001 through 3013; 43 CFR 10 and Washington's Indian Graves and Records Law (RCW 27.44)
Archaeological Resources Protection Act	16 USC 470aa et seq.; 43 CFR 7
Washington Dangerous Waste Regulations	WAC 173-303
Solid Waste Management Act	RCW 70.95; WAC 173-304 and 173-351
Occupational Safety and Health Administration Regulations	29 CFR 1910, 1926
Washington Department of Labor and Industries Regulations	WAC 296
Water Quality Standards for Surface Waters of the State of Washington	RCW 90.48 and 90.54; WAC 173-201A
Water Quality Standards for Ground Water	WAC 173-200
Department of Transportation Hazardous Materials Regulations	40 CFR 100 through 185
Washington State Water Well Construction Act	RCW 18.104; WAC 173-160
City of Kent regulations, codes, and standards	All applicable or relevant and appropriate regulations, codes, and standards
King County regulations, codes, and standards	All applicable or relevant and appropriate regulations, codes, and standards

ARAR = applicable or relevant and appropriate requirement
CFR = Code of Federal Regulations
MTCA = Model Toxics Control Act
RCW = Revised Code of Washington
USC = United States Code
WAC = Washington Administrative Code

APPENDIX A

Sampling and Analysis Plan

Cleanup Action Plan
Appendix A
Sampling and Analysis Plan

TOC Holdings Co. Facility No. 01-323
301 Central Avenue North
Kent, Washington 98032

Prepared for:
TOC Holdings Co.
2737 W. Commodore Way
Seattle, WA 98199

April 29, 2016

Prepared by:

HydroCon, LLC
510 Allen Street, Suite B Kelso, Washington 98626
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ACRONYMS

BTEX	benzene, toluene, ethylbenzene, and total xylenes
CAP	Cleanup Action Plan
CATOX	catalytic oxidizer
COC	chemical of concern
CUL	cleanup level(s)
DO	dissolved oxygen
DPE	dual-phase extraction
DRPH	diesel-range petroleum hydrocarbons
Ecology	Washington State Department of Ecology
EPA	United States Environmental Protection Agency
FS	Feasibility Study
GAC	granular activated carbon
GRPH	gasoline-range petroleum hydrocarbons
HASP	Health and Safety Plan
HydroCon	HydroCon Environmental LLC
LDPE	low-density polyethylene
MRL	method reporting limit
MTCA	Model Toxics Control Act
NWTPH-Dx	Northwest Total Petroleum Hydrocarbons-Diesel Range
NWTPH-Gx	Northwest Total Petroleum Hydrocarbons-Gasoline Range
O&M	operations and maintenance
ORP	oxidation-reduction potential
ORPH	oil-range petroleum hydrocarbons
OSHA	Occupational Safety and Health Administration
PAHs	polynuclear aromatic hydrocarbons
PCS	petroleum-contaminated soil
POTW	publicly-owned treatment works
PQL	Practical Quantitation Limit (laboratory)
PSCAA	Puget Sound Clean Air Agency
PVC	polyvinyl chloride
QA/QC	Quality assurance/quality control
QAPP	Quality Assurance Project Plan
RAOs	remedial action objectives
RI	Remedial Investigation
ROW	right-of-way
SAP	Sampling and Analysis Plan
SVE	soil vapor extraction
TOC	TOC Holdings Co.

ACRONYMS (Continued)

TPH	total petroleum hydrocarbons
TSDF	treatment, storage or disposal facility
UCL_{95}	95% upper confidence limit on the mean
VCP	Voluntary Cleanup Program
VOCs	volatile organic compounds
VPH/EPH	volatile and extractable petroleum hydrocarbons
WAC	Washington Administrative Code

A1 INTRODUCTION

This Sampling and Analysis Plan (SAP) has been prepared by HydroCon on behalf of TOC Holdings Co. to describe the sampling and analysis requirements associated with the cleanup action at their Facility No. 01-323 located at 301 Central Avenue North, Kent, Washington. The location of the Property is shown on Figure A-1. According to the Washington State Department of Ecology's (Ecology) Guidelines for Property Cleanups Under the Voluntary Cleanup Program[1] (VCP), a site is defined by the nature and extent of contamination associated with one or more releases of hazardous substances prior to any cleanup of that contamination. Based on this definition of a site and that provided in Section 200 of Chapter 340 of Title 173 of the Washington Administrative Code (WAC-173- 340-200), the TOC Holdings Co. Facility No. 01-323 site (the Site) includes the full lateral and vertical extent of petroleum hydrocarbon contamination that resulted from the historical operation of a retail gasoline service station on the Property. This area is located in the southeastern portion of the Property extending approximately 10 feet to the south into the City of Kent's E. Smith Street right-of-way. The vertical extent of the PCS appears to be limited to depths ranging from 10 to 20 feet below ground surface (bgs).

A1.1 DOCUMENT PURPOSE AND OBJECTIVES

The purpose of the SAP is to provide the protocols pertaining to sample locations, measurement frequencies, sampling equipment and procedures, and sample handling and analysis that will be used during the cleanup action, conducted as an independent remedial action in accordance with WAC 173- 340-515 of Washington State Model Toxics Control Act (MTCA). The SAP has been prepared in accordance with MTCA as established in WAC 173-340-820. In addition, the SAP provides a basis for planning field activities and a mechanism for implementing quality assurance requirements. The Quality Assurance Project Plan (QAPP) and the Health and Safety Plan (HASP) for the cleanup action at the Site are provided in Appendices B and C of the RI/FS/CAP, respectively. The QAPP describes both quantitative and qualitative measures of data quality to verify that the data quality objectives for the cleanup action are achieved. The HASP outlines the health and safety requirements for the cleanup action.

A1.2 DOCUMENT ORGANIZATION

The SAP is organized into the following sections:

- **Section 1.0, Introduction.** This section describes the purpose of the SAP and the cleanup action.
- **Section 2.0, Cleanup Action Work Elements.** This section provides a description of the work elements for the cleanup action at the Site.

[1] *Ecology. 2015. Guidelines for Property Cleanups Under the Voluntary Cleanup Program. Toxics Cleanup Program. Publication No. 08-09-044. July.*

- **Section 3.0, Sampling Protocols and Procedures.** This section presents sampling and analysis procedures for protection monitoring, field screening, performance monitoring, and confirmation monitoring for soil, groundwater, and vapor during and following the cleanup action.
- **Section 4.0, Management of Investigation-Derived Waste.** This section provides details on waste sampling, profiling, and handling.
- **Section 5.0, Field Documentation.** This section summarizes the field documentation procedures to be implemented during the cleanup action.

A2 CLEANUP ACTION WORK ELEMENTS

The selected cleanup action involves the installation of an air-sparging (AS) and soil vapor extraction (SVE) system within the Property boundary. Figure 8 in the CAP shows a conceptual site plan for the system layout. Soil gas is the only contaminated medium that will be recovered for above-ground treatment. Treated soil gas will be discharged to the ambient air under a Notice of Construction (NOC) administered by the Puget Sound Clean Air Agency (PSCAA).

The contaminants of concern (COCs) for the Site include gasoline-; diesel-; and oil-range petroleum hydrocarbons (GRPH, DRPH, ORPH); benzene, toluene, ethylbenzene, and total xylenes (BTEX); and naphthalene. A detailed discussion of the cleanup action for the Site is provided in the CAP.

The specific work elements for the CAP include:

- Possible field scale pilot test for SVE and AS design
- Drilling of air-sparge wells
- Excavation of trenches for SVE and AS pipelines
- Backfill and compaction of imported structural fill for trenches
- Installation and startup of the remediation compound and mechanical equipment
- Operation and maintenance (O&M) of the AS/SVE system.
- Collecting vapor performance and confirmational samples from the remediation system for the analytes required by PSCAA.
- Collecting groundwater performance and confirmational samples from the well network within the Site during and after the operational life of the remediation system and submitting the samples for laboratory analysis of COCs as defined in the CAP.
- Collecting soil confirmational samples to confirm that site cleanup goals were achieved at the presumed conclusion of the operational life of the remediation system.
- Restoring the Site after completion of the cleanup action. A summary of the cleanup action work elements is provided below.

A description of the cleanup action work elements is provided in the following sections.

A2.1 AIR SPARGE AND SVE INSTALLATION

This work element includes the installation of AS wells and the buried compressed air and SVE lines. AS well installation is assumed to be in a triangular grid pattern at a spacing of 12 feet over the area identified as the Site boundary. AS wells will be installed to a depth of approximately 20 feet bgs. SVE will be implemented by excavating one or more shallow trenches to a depth of approximately 4 to 5 feet bgs. A four-inch diameter slotted polyvinyl chloride (PVC) pipe will be installed in each trench at a depth of approximately 3.5 feet bgs and backfilled with crushed rock or pea gravel. The top of the trench will be sealed with polyethylene sheeting to minimize the collection of atmospheric air and to maximize the horizontal distance of vacuum induced by the SVE blower. The compressed air lines supplying the AS wells from a sparge blower located in the remediation compound, as well as the SVE pipe(s) installed in the SVE trench(es) would be buried in a pipe trench in the approximate location shown in Figure 8 of the CAP. Contaminated soil generated by the installation of AS wells and SVE trench excavation would be loaded into haul trucks for transport to CEMEX in Everett, WA, a facility permitted by Ecology for treatment of contaminated soil by thermal desorption.

A2.2 BACKFILL AND COMPACT TRENCHES

Trucks hauling PCS to CEMEX will return with loads of clean structural fill that will be backfilled into the trenches and compacted in accordance with the material and installation specifications of the design documents. Areas where asphalt pavement or concrete was removed to enable trenching for the AS and SVE piping will be paved over the compacted backfill to match the surrounding pavement.

A2.3 INSTALL ABOVEGROUND REMEDIATION COMPONENTS

The aboveground system components will be installed following completion of the excavation and backfill portion of the CAP. The system is designed to remediate petroleum-impacted groundwater and subsurface soils located beneath the southeast corner of the Property, and the south adjacent E. Smith Street. The system employs AS of contaminated groundwater to remediate volatile contaminants of concern by phase transfer, while remediating other nonvolatile target compounds by insitu aerobic biodegradation. Contaminants transferred to the vapor phase from groundwater by AS, and those present in soil gas that potentially threaten the nearby building indoor air will be recovered by SVE. Recovered soil vapor will be treated prior to atmospheric discharge. Air emissions will be controlled and monitored on a monthly basis in accordance with requirements of the PSCAA.

The major aboveground components of the AS/SVE system include:

- an air sparging blower to supply clean compressed air to the air sparging wells.
- An SVE blower to recover contaminated soil gas;
- a moisture separator to remove water from recovered soil gas;

- vapor control by granular activated carbon or catalytic oxidation to treat recovered soil gas.
- a control panel to operate equipment and annunciate alarm conditions.

A2.4 SYSTEM OPERATION, MAINTENANCE, AND MONITORING

Prior to operating the system on a full-time basis, startup testing will be performed to ensure that the system is operating properly. Once proper operation has been confirmed, the system will be monitored at least monthly to document system performance and collect confirmation samples to document permit compliance. Influent and treated effluent vapor samples will be collected monthly and analyzed for the analytes required under the PSCAA permit. Monitoring of the system will continue until the remediation system is no longer providing a remedial benefit or until the remedial action objectives are achieved. A description of the vapor monitoring and sampling is provided in Section 3.0.

A2.5 GROUNDWATER MONITORING AND SAMPLING

Performance groundwater samples will be collected on a quarterly basis from monitoring wells at the Site to document the performance of the remediation system. Confirmation groundwater samples will be collected following shutdown of the remediation system and will be used to confirm the long-term effectiveness of the cleanup action. Details on groundwater sampling are discussed in Section 3.0.

A2.6 SITE RESTORATION

The cleanup action will be considered complete by Ecology when the cleanup goals have been achieved in all affected media at the points of compliance as defined in the FS and CAP. After the cleanup action is considered complete, the aboveground remediation system components will be removed and the remediation and groundwater monitoring wells will be decommissioned in accordance with WAC 173-160, Minimum Standards for Construction and Maintenance of Wells, and the site restoration and closure requirements of the City of Kent (if applicable).

A3 SAMPLING PROTOCOLS AND PROCEDURES

Compliance monitoring during the cleanup action will include protection, performance, and confirmational monitoring. Specific protocols for protection monitoring are provided in the HASP (Appendix C of the CAP). The specific protocols for performance and confirmational monitoring for soil, vapor and groundwater for the cleanup action are provided in Sections A3.1, A3.2, and A3.3, respectively. The containers, preservation procedures, and holding times for all media samples are summarized in Table A-1 and follow standard laboratory protocols. Documentation requirements for the performance and confirmational monitoring are presented in Section A5.0. Laboratory reporting limits for the analytes discussed in each subsection are presented in Table A-2. Any deviations from the procedures presented below must be approved by the HydroCon Project Manager prior to implementation and will be discussed in the Closure Report for the Site.

A3.1 SOIL EXCAVATION PERFORMANCE AND CONFIRMATIONAL MONITORING

The objectives for soil performance and confirmational monitoring are to demonstrate compliance with the MTCA cleanup regulations, and to document the Property conditions upon completion of the cleanup action. To demonstrate compliance, the following separate performance monitoring activities for soil are planned during the remedial action:

- Waste profiling for off-site treatment or disposal;
- Confirm that cleanup levels have been achieved; and
- Structural use of imported fill material

The performance monitoring activities are described in the following sections.

A.3.1.1 Waste Profiling for Off-site Treatment or Disposal

Wastes generated during the cleanup action will require analytical testing before being offered for off-site transportation and disposal. Generally, the treatment, storage, or disposal facility (TSDF) receiving the waste specifies the minimum number of samples and analytical tests before accepting wastes from the project. Wastes that will be generated from the remedial action destined for off-site disposal include:

- Contaminated soil removed by excavation;
- Contaminated groundwater from excavation dewatering;
- Contaminated personnel protective equipment;
- Decontamination solutions; and
- Miscellaneous solid wastes

Each waste stream will be profiled separately in accordance with the minimum waste analyses requirements of the respective permitted TSDF. Based on site characterization data, clean overburden soil may be segregated from deeper contaminated soil.

Both the presumed clean overburden and the excavated contaminated soil will be subjected to performance monitoring. Ecology guidance[2] suggests that samples of stockpiled excavated soil be collected from locations where field instrumentation (e.g., a total organic vapor survey detector) indicates that contamination is likely to be present, and to collect samples from a depth of 6 to 12 inches beneath the surface of the pile. The minimum number of samples recommended to characterize excavated stockpiled soil is listed in Table A-3. The number of samples collected for performance monitoring of soil destined for off-site disposal will be the number shown in Table A-3 or the number required by the TSDF for waste profiling, whichever is greater. The required analytical tests for these samples will be either: 1) Ecology's Method A Soil CULs for Unrestricted Land Use for site-specific petroleum hydrocarbon-related

[2] *Ecology. 2011. Guidance for Remediation of Petroleum Contaminated Sites. Toxics Cleanup Program. Publication No. 10-09-057. September.*

constituents (Table 740-1 at WAC 173-340-900), or 2) the TSDF waste profiling requirements, whichever is more stringent.

A.3.1.2 Confirm That Cleanup Levels Have Been Achieved

A separate Closure Subsurface Investigation Work Plan will be prepared for Ecology review to confirm that CULs in soil have been achieved at the presumed completion of the cleanup action.

A3.1.3 Structural Use of Overburden and Imported Fill Material.

Imported fill will require testing to confirm its suitability for the intended structural use. The imported fill will also be tested to ensure compliance with the Method A CULs for petroleum hydrocarbons. The project geotechnical engineer recommends that the contractor providing imported fill analyze samples of the fill for gradation. The gradation results will then be submitted to the engineer for approval prior to construction. Imported fill will be rejected if a gradation test shows the fines content (that portion passing the U.S. No. 200 sieve) is greater than 5%.

Compaction testing of the fill will also be performed. The compacted fill will be tested to ensure a minimum of 90 percent of the modified Proctor maximum dry density as determined by ASTM Method D1557. The moisture content will be monitored during site placement and compaction.

A3.2 VAPOR PERFORMANCE AND CONFIRMATIONAL MONITORING

Performance vapor effluent samples will be collected to evaluate the effectiveness of the remediation system on soil and groundwater contamination beneath the Site and to eventually demonstrate compliance with applicable cleanup standards. Performance vapor effluent samples that do not contain concentrations of GRPH or BTEX that exceed the laboratory's lower reporting limit will be considered confirmational samples. The following subsections describe the field sampling procedures for performance and confirmational vapor sample collection and handling. The vapor sampling frequency, procedures for sample collection and handling, sample identification, analytical testing methods, and quality assurance/quality control (QA/QC) for vapor performance and confirmational monitoring are presented below.

A3.2.1 Sampling Frequency

Vapor influent and effluent performance monitoring and sampling will be conducted on a monthly basis and will continue until concentrations of COCs are reduced to below laboratory detection limits, at which point the samples will be considered confirmational.

A3.2.2 Sample Collection and Handling Procedures

One vapor influent and one vapor effluent sample will be collected upstream and downstream, respectively of any air emissions control technology installed to treat contaminants in the recovered vapor stream. This sampling is typically conducted while the air moving equipment is

on and producing positive pressure at the sampling locations. Samples on the positive pressure side of the SVE blower will be collected using the following procedures:

- New silicon and polyethylene tubing will be connected to the sample port on the discharge stack
- The Tedlar bag, supplied by the laboratory, will be inspected for leaks.
- If no leaks are found, the Tedlar bag will be connected to the fitting on the stack and the valve opened slightly to gradually fill the bag.
- The initial vapor sampled collected within the bag will be evacuated after the bag is filled.
- The Tedlar bag fill and evacuation process will be repeated two more times. After the third filling and evacuation cycle, the Tedlar bag will be filled a fourth time at which time the valve on the Tedlar bag and the valve on the discharge stack fitting will be closed. The sample ID, date, and time will be written on the Tedlar bag.

Although not planned, any vapor samples that are collected from piping under negative pressure (vacuum) will be collected using the following procedures:

- New silicon and polyethylene tubing will be connected to the sample port on the vapor piping, the lung sampler, and a portable vacuum pump.
- The Tedlar bag, supplied by the laboratory, will be inspected for leaks.
- If no leaks are found, the Tedlar bag will be placed in the lung sampler and connected to the silicon tubing.
- The vacuum pump will be connected to the lung sampler and started. The Tedlar bag will be filled by the vacuum imparted on the lung sampler.
- The vapor within the bag will be evacuated after the bag is full.
- The Tedlar bag fill and evacuation process will be repeated two more times. After the third filling and evacuation cycle, the Tedlar bag will be filled a fourth time at which time the valve on the Tedlar bag and the valve on the piping will be closed and tubing disconnected from the vacuum pump. The sample ID, date and time will be written on the Tedlar bag.

A3.2.3 Sample Identification

Following sample collection, the Tedlar bag will be labeled with a unique sample identification (ID) number. The sample ID number will include the project number 01-323 followed by a “V” representing vapor followed by “INF” for influent, or “EFF” for effluent. For example, an influent vapor sample be identified as 01-323 VINF. All sample collection information will be documented on a Sample Chain of Custody form, including the Site and sample ID numbers, the media type, the date and time of sample collection, and the sampler’s name or initials. The chain-of- custody protocols will be maintained during sample transport and submittal to the laboratory.

A3.3 GROUNDWATER PERFORMANCE AND CONFIRMATIONAL MONITORING

Performance groundwater samples will be collected quarterly for laboratory analysis to monitor the effectiveness of the remediation system. Groundwater confirmational monitoring will be initiated once performance monitoring indicates that the cleanup objectives have been achieved and remediation system has been shut down. The groundwater sampling frequency and locations, procedures for sample collection and handling, analytical testing methods, and QA/QC for groundwater performance and compliance monitoring are presented below.

A3.3.1 Sampling Frequency

Performance groundwater sampling will be conducted on a quarterly basis and will continue until the data indicates that cleanup levels at the point of compliance at the Site have been met, at which time the remediation system will be shut down. Confirmational groundwater sampling will be performed on a quarterly basis for a minimum of four consecutive quarters after the remediation system has been shut down. If the results of four consecutive confirmatory sampling events indicate that concentrations of the COCs in groundwater are below the CULs, the cleanup action for groundwater will be considered complete. Following concurrence by Ecology of the completion of the cleanup action, no further groundwater monitoring will be necessary.

A3.3.2 Sample Locations

Performance and confirmational groundwater samples will be collected from the existing well network.

A3.3.3 Sample Identification

The groundwater samples collected for groundwater performance and confirmational monitoring will be assigned a unique sample identifier. The number will include the well identification. For example, the groundwater sample collected from monitoring well MW01 would be numbered MW01. The sample identification will be placed on the sample label, the Daily Field Report form, the Groundwater Sample Form, and the Sample Chain of Custody form.

A3.3.4 Sample Collection and Handling Procedures

Groundwater samples for performance monitoring will be collected and handled in accordance with HydroCon's Standard Operating Procedure (SOP) -3, titled "Low-Flow Peristaltic Pump Groundwater Sampling". This SOP is provided as Attachment A1.

A3.4 ANALYTICAL TESTING

Compliance samples will be submitted to Friedman and Bruya, Inc., an Ecology-accredited analytical laboratory, on a standard 7- to 10-day turnaround time. The contract laboratory is expected to meet the following minimum requirements when completing chemical analyses for this project:

- Adhere to the analytical methods outlined in this SAP and QAPP (CAP Appendix B).
- Deliver hard copy and electronic data reports as specified.
- Meet reporting requirements for deliverables.
- Meet turnaround time for deliverables.
- Comply with the laboratory QA/QC procedures as described in the QAPP
- Notify the HydroCon Project Manager of any QA/QC problems when they are identified to enable quick resolution; and
- Cooperate with any audits to be performed, if requested.

Vapor performance and confirmational samples collected during the cleanup action will be analyzed for GRPH by Northwest Total Petroleum Hydrocarbon (NWTPH) Method NWTPH-Gx, and BTEX by U.S. Environmental Protection Agency (EPA) Method 8021B. The resultant concentrations of COCs in recovered samples will be compared to the limits stipulated by the Notice of Construction for air emissions issued by the PSCAA. Mass concentrations of COCs in the vapor samples will be plotted as a function of time to determine the mass removal rate. The cumulative mass of COCs discharged through the remediation system's vapor effluent will be calculated and compared to PSCAA limits, to assure that the cleanup action complies with discharge limits.

Pretreated groundwater and groundwater performance monitoring samples collected during the cleanup action will be analyzed for the parameters listed in Table A-2. Table A-2 summarizes the analytes, analytical methods, and practical quantitation limits (PQLs) for performance and confirmatory samples, which are compared to applicable regulatory limits. The PQL for each analyte remains below the applicable regulatory limits.

A3.5 QUALITY ASSURANCE/QUALITY CONTROL

Field and laboratory activities must be conducted in such a manner that the results be valid and meet the data quality objectives for this project. Guidance for QA/QC is derived from the protocols developed for the cited methods within EPA's documents, Test Methods for the Evaluation of Solid Waste' Physical/Chemical Methods SW-846 (1986) and the Contract Laboratory Program National Functional Guidelines for Data Review (2004). For a detailed explanation of the QA/QC procedures in the field and at the laboratory, please refer to the QAPP (Appendix B of the CAP).

QA/QC groundwater samples will be collected during the course of the groundwater performance and confirmational monitoring to provide for data validation as detailed in the QAPP (Appendix B of the CAP). QA/QC samples will consist of blind field duplicates. QA/QC samples will be collected and shipped to the laboratory along with the primary field samples. Based on the sampling frequency and number of groundwater samples anticipated, it is estimated that one blind field duplicate sample will be submitted per sampling event. The blind field duplicate samples will be assigned a unique sample number such as MW99 or MW98 (if

two field duplicates are collected). HydroCon will note the well location of the field duplicates in the field notes.

A4 MANAGEMENT OF INVESTIGATION-DERIVED WASTE

Contaminated wastewater and disposable equipment generated during the cleanup action at the Site will be handled in accordance with the CAP. The procedures for managing investigation-derived waste for both of the expected waste streams are discussed below.

A4.1 WASTEWATER

Wastewater will be generated during the cleanup action in the course of equipment decontamination activities and purge water from the monitoring wells. Decontamination water and purge water generated from compliance monitoring activities will be hauled offsite for disposal at an Ecology-permitted TSDF.

A4.2 EXPENDABLES

Disposable personal protective clothing (e.g., Tyvek suits, rubber gloves, and boot covers) and disposable sampling devices (e.g., plastic tubing, plastic scoops, and bailers) will be placed in plastic garbage bags and disposed of as nonhazardous waste.

A5 FIELD DOCUMENTATION

Documentation of field activities will be included on Daily Field Report forms, Groundwater Sample Forms, Sample ID Labels, Waste Material Labels, Waste Inventory Forms, and Sample Chain-of-Custody forms. Documentation generated during the field program will be retained in the project file and included in the reports generated, as appropriate.

A5.1 DAILY FIELD REPORT FORM

Field personnel are required to keep a daily field log on a Field Report form. Field notes will be as descriptive and as inclusive as possible, allowing independent parties to reconstruct the sampling situation from the recorded information. Language will be objective, factual, and free of inappropriate terminology. A summary of each day's events will be completed on a Field Report form. At a minimum, field documentation will include the date, job number, project identification and location, weather conditions, sample collection data, personnel present and responsibilities, field equipment used, and activities performed in a manner other than specified in the SAP. In addition, if other forms are completed or used (e.g., Sample Chain of Custody form), they will be referred to in and attached to the Field Report form. Field personnel will sign the Field Report form. An example of the Field Report form is included in Attachment A2 to this SAP.

A5.2 GROUNDWATER PURGE AND SAMPLE FORM

Field personnel will be required to prepare Groundwater Purge and Sample Forms during groundwater monitoring and sampling activities. The forms will include depth to groundwater and total depth measurements, as well as water quality measurements, including pH, temperature, dissolved oxygen, specific conductance, ORP, and/or turbidity. In addition, the sample ID, date of sample collection, and analyses will be recorded on the form. An example of the Groundwater Sample Form is included as Attachment A3.

A5.3 SAMPLE ID LABEL

Sample ID labels are filled out and affixed to appropriate containers immediately prior to sample collection. The label is filled out in indelible ink and includes the following information: date, time sampled, sample identification and number, project name, project number, and analyte preservative(s) if any. An example of the Sample ID label is provided in Attachment A4.

A5.4 SAMPLE CHAIN-OF-CUSTODY FORM

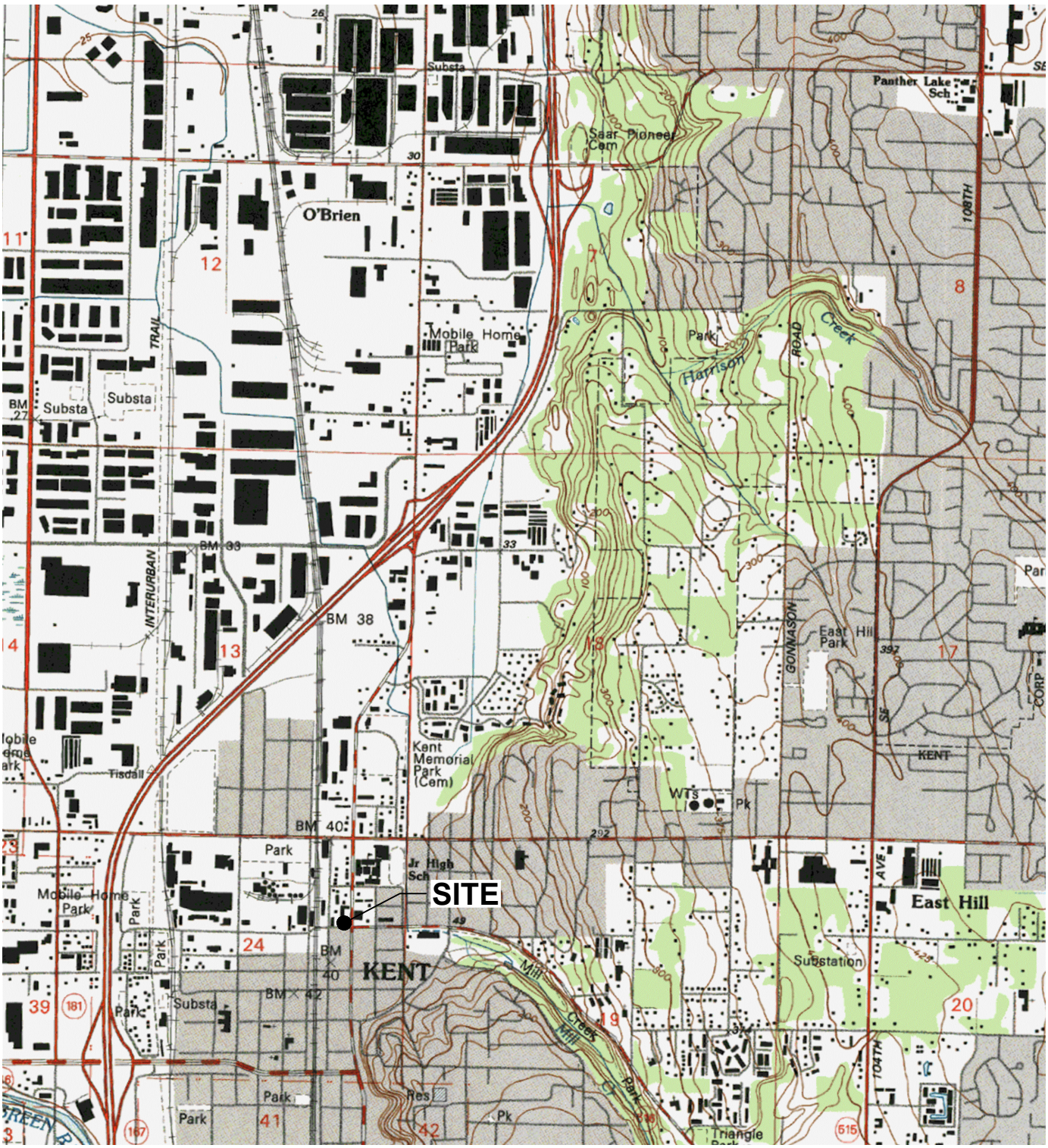
The documentation procedures that are followed whenever samples are collected, transferred, stored, analyzed, or destroyed are designed to provide an accurate written record that can be used to trace the possession and handling of the sample from the moment of its collection through analysis and reporting of analytical values. This written record, the Sample Chain-of-Custody form, will be filled out by the field sampling team at the time the sample is obtained. An example of the Sample Chain-of-Custody form is provided in Attachment A5.

Samples submitted to the laboratory will be accompanied by the Sample Chain-of-Custody form. This form is checked for accuracy and completeness and then signed and dated by the laboratory sample custodian accepting the sample. At the laboratory, each sample is assigned a unique, sequential laboratory identification number that is stamped or written on the Sample Chain-of-Custody form.

Samples will be held under internal chain of custody in the Sample Control room using the appropriate storage technique (i.e., ambient, refrigeration, frozen). The laboratory project manager assigned to a particular client is responsible for tracking the status of the samples throughout the laboratory. Samples are signed out of the Sample Control room in a sample control logbook by the analyst who will prepare the samples for analysis.

The Sample Chain-of-Custody form will include the following information: client; project name and number; date and time sampled; sample identification; sampler's initials; analyses requested; sample container type, size, and number; and field preservation method(s), if any are used.

FIGURES



NOTE(S):

USGS, RENTON QUADRANGLE
WASHINGTON-KING CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

0 2000 4000

SCALE IN FEET
1" = 2000'

N
W E
S

HydroCon

DATE: 2-11-16
DWN: JJT
CHK: NV
APPROVED: CH
PRJ. MGR: RH
PROJECT NO: 01-323

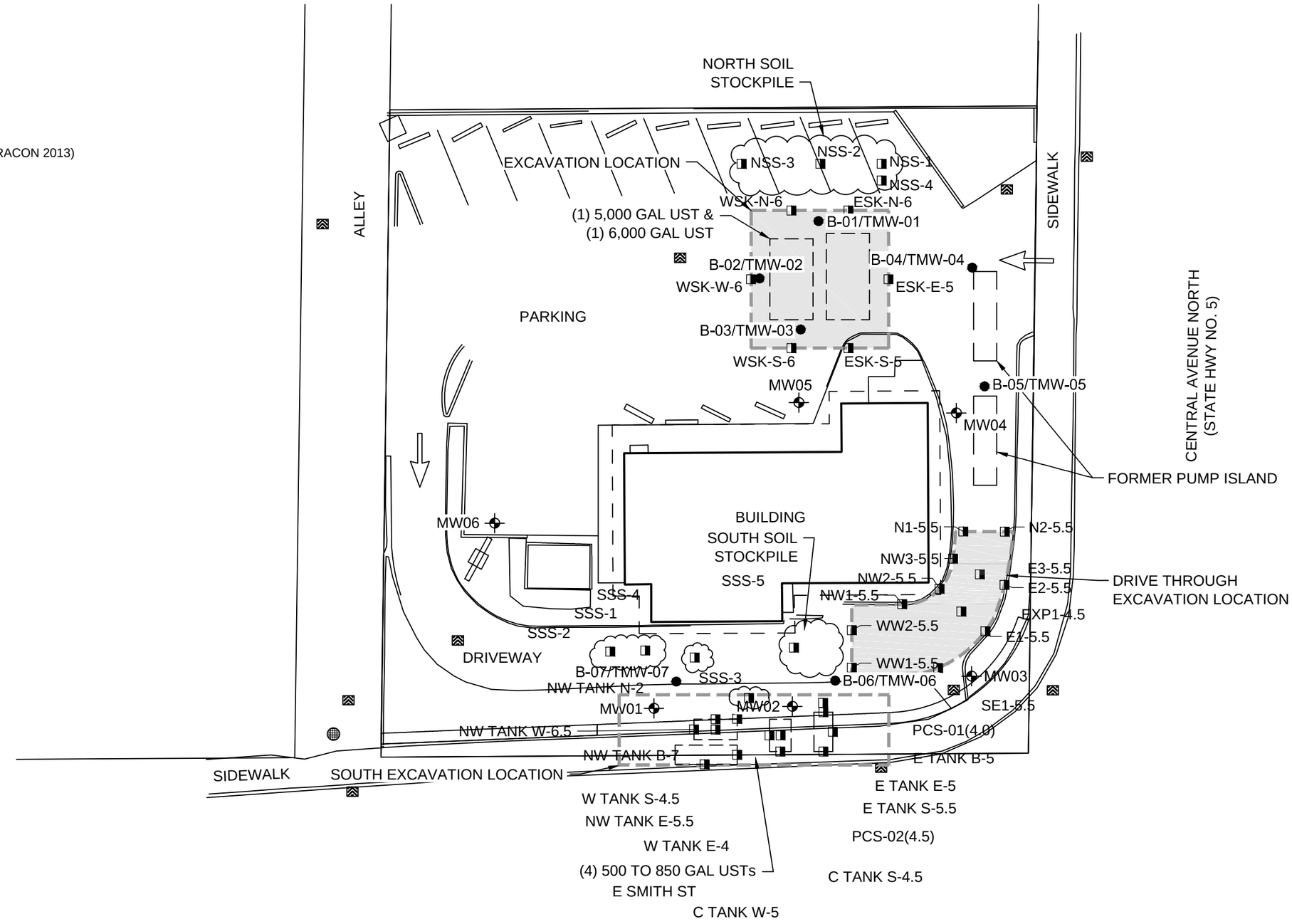
FIGURE A-1
SITE LOCATION MAP

TOC HOLDING CO. FACILITY NO. 01-323
301 N CENTRAL AVE
KENT, WA.

C:\Users\Josh\Desktop\Autocad Backup\Hydrocon-Autocad\01-323 Kent\2016\Jan 2016\01-323_RI-021116.dwg 2.17.2014

LEGEND

- BUILDING
- MW01 — MONITORING WELL
- CATCH BASIN
- BORING LOCATIONS (TERRACON 2013)
- EXCAVATION LOCATIONS



N

W E

S

0 20 40

SCALE IN FEET
1" = 20'

Hydro Con

510 Allen St. Suite B Kelso, Wa 98626, Ph(360)-703-6086

DATE: 2-11-16
DWN: JJT
CHK: NV
APPROVED: CH
PRJ. MGR: CH
PROJECT NO: 01-323

FIGURE 2
SITE FEATURES AND UTILITIES

TOC HOLDING CO. FACILITY NO. 01-323
301 N CENTRAL AVE
KENT, WA.

C:\Users\Josh\Desktop\Autocad Backup\Hydrocon-Autocad\01-323 Kent\2016\Jan 2016\01-323_R1-021116.dwg 2.17.2014

TABLES

Table A-1
Analytical Methods, Containers, Preservation, and Holding Times
TOC Holdings Co. Facility No. 01-323
301 Central Avenue North
Kent, WA

Analytical Method	Container	Minimum Volume Required	Number of Containers	Preservation Requirements	Holding Time
Soil Samples					
GRPH by NWTPH-Gx	4 ounce glass	20 grams	1	Cool to 4°C	14 days
BTEX by EPA Method 8260C		20 grams			
Naphthalene by EPA Method 8260C		20 grams			
DRPH/ORPH by NWTPH-Dx	4 ounce glass	50 grams	1		14 days to extraction
Vapor Samples					
GRPH by NWTPH-Gx	Tedlar Bags	1 liter	2	none	3 days
EDC by EPA Method 8260					
BTEX by EPA Method 8021B					
Groundwater Samples					
GRPH by NWTPH-Gx	40 ml VOA vials with Teflon Septa	200	6	Hydrochloric acid and cool to 4°C	7 days to extraction unpreserved; 14 days to extraction preserved
BTEX by EPA Method 8260C					
Naphthalene by EPA Method 8260C					
DRPH/ORPH by NWTPH-Dx	500 ml amber glass bottle	500 ml	1	Hydrochloric acid and cool to 4°C	7 days to extraction unpreserved; 14 days to extraction preserved
Dissolved lead by EPA Method 200.8	500 ml poly bottle; field filtered to 0.45 micron	200 ml	1	Nitric acid/cool to 4°C	6 months

NOTES:

BTEX = benzene, toluene, ethylbenzene, total xylenes

DRPH = diesel-range petroleum hydrocarbons

EDC = ethylene dichloride

GRPH = gasoline-range petroleum hydrocarbons

ml = milliliters

ORPH = oil-range petroleum hydrocarbons

VOA = volatile organic analysis

Table A-2
Medium-Specific Analytical Methods, Laboratory PQLs
and Applicable Regulatory Limits
TOC Holdings Co. Facility No. 01-323
301 Central Avenue North
Kent, WA

Analytes and Method	Units	Laboratory PQL[1]	Applicable Regulatory Limit[2]
Soil			
GRPH by NWTPH-Gx	mg/kg	2	30
Benzene by EPA Method 8260C	mg/kg	0.03	0.03
Toluene by EPA Method 8260C	mg/kg	0.05	7
Ethylbenzene by EPA Method 8260C	mg/kg	0.05	6
meta-, para-xylenes by EPA Method 8260C	mg/kg	0.1	9
ortho xylene by EPA Method 8260C	mg/kg	0.05	
Naphthalene by EPA Method 8260C	mg/kg	0.05	5
DRPH by NWTPH-Dx	mg/kg	50	2000
ORPH by NWTPH-Dx	mg/kg	250	2,000
Vapor			
GRPH by Modified EPA Method 8021 B and NWTPH-Gx	mg/m^3	10	To Be Determined by PSCAA
Benzene by Modified EPA Method 8021 B and NWTPH-Gx	mg/m^3	0.1	To Be Determined by PSCAA
Toluene by Modified EPA Method 8021 B and NWTPH-Gx	mg/m^3	0.1	To Be Determined by PSCAA
Ethylbenzene by Modified EPA Method 8021 B and NWTPH-Gx	mg/m^3	0.1	To Be Determined by PSCAA
EDC by EPA Method 8260CSIM	mg/m^3	0.1	To Be Determined by PSCAA
meta-, para-xylenes by Modified EPA Method 8021 B and NWTPH-Gx	mg/m^3	0.3	To Be Determined by PSCAA
ortho xylene by Modified EPA Method 8021 B and NWTPH-Gx	mg/m^3		To Be Determined by PSCAA
Groundwater			
GRPH by NWTPH-Gx	µg/L	100	800/1,000[4]
Benzene by EPA Method 8260CSIM	µg/L	0.1	5
Toluene by EPA Method 8260CSIM	µg/L	0.1	1,000
Ethylbenzene by EPA Method 8260CSIM	µg/L	0.1	700
meta-, para-xylenes by EPA Method 8260CSIM	µg/L	0.2	1,000
ortho xylene by EPA Method 8260CSIM	µg/L	0.1	
Naphthalene by EPA Method 8260CSIM	µg/L	0.1	160
DRPH by NWTPH-Dx	µg/L	50	500
ORPH by NWTPH-Dx	µg/L	250	500
Dissolved lead by EPA Method 200.8	µg/L	1	15

NOTES:

[1] Laboratory Practical Quantitation Limit is the laboratory's low-level detection limit for the medium and method specified

[2] Applicable regulatory limit is the Model Toxics Control Act Method A Cleanup Level, unless otherwise noted

[3] Regulatory limit is the soil value protective of the groundwater (saturated zone); because the value is lower than the PQL, the PQL is the CUL

[4] 800 µg/L when benzene is also present/1,000 when no benzene is present

DRPH = diesel-range petroleum hydrocarbons

EDC = ethylene dichloride or 1,2 dichloroethane

GRPH = gasoline-range petroleum hydrocarbons

kg = kilogram

L = liter

µg = microgram

m^3 = cubic meter

mg = milligram

ORPH = oil-range petroleum hydrocarbons

PQL = Practical Quantitation Limit

PSCAA = Puget Sound Clean Air Agency

VOA = volatile organic analysis

Table A-3
Typical Number of Samples Needed
to Adequately Characterize Stockpiled Soil

Cubic Yards of Soil	Number of Samples for Chemical Analysis
0-100	3
101-500	5
501-1,000	7
1,001-2,000	10
>2,000	10 + 1 for each additional 500 cubic yards
Source: Ecology, 2011	

ATTACHMENTS

ATTACHMENT A1

Standard Operating Procedure (SOP) -3
Low Flow Peristaltic Pump Groundwater Sampling

STANDARD OPERATING PROCEDURE
LOW-FLOW PERISTALTIC PUMP GROUNDWATER SAMPLING
SOP – 3

This standard operating procedure (SOP) describes the procedures for taking representative groundwater samples from monitoring wells utilizing a low-flow peristaltic pump. Groundwater samples will be collected using low-flow (minimal drawdown) purging and sampling methods as discussed in U.S. EPA, Ground Water Issue, Publication Number EPA/540/S-95/504, July 1996 by Puls, R.W. and M.J. Barcelona - "Low Stress (low flow) Purging and Sampling Procedure for the Collection of Ground Water Samples from Monitoring Wells."

The field technician's objective is to purge and collect a representative sample of formation water utilizing proper techniques and equipment appropriate for the sampling task.

INITIAL PUMP FLOW TEST PROCEDURES

If possible, the flow rate for each well will be established during well development, redevelopment, or in advance of the actual sampling event.

Measure and record the Static Water Level (SWL) on field data sheet following the procedures outlined in SOP 1.

The appropriate tubing type (Teflon, HDPE, PVC, polyethylene, etc.) should be preselected based on the analytes of interest.

The mid-point of the saturated screen length is used by convention as the location of the tubing intake. Site specific work plans may change the location of sample intake depth in order to sample from the highest yielding zone within the screened interval. In wells with a fully saturated screen length of over 10 feet, testing should be performed (if possible) during development to determine highest water yielding zone within screened interval.

After tubing installation and confirmation that the SWL has returned to its original level (as determined prior to tubing installation), the peristaltic pump should be started at a discharge rate less than 0.5 liters per minute (0.13 gal/min) without any In-Line Flow Cell connected. The water level in the well casing must be monitored continuously for any change from the original measurement. If significant drawdown is observed, the pump's flow rate should be reduced until the SWL drawdown stabilizes. Total drawdown from the initial (static) water level should not exceed 0.3 feet. In any case, the water level in the well should not be lowered below the top of the screen/intake zone of the well.

Once the specific well's optimum flow rate has been determined and documented, connect the In-Line Flow Cell system (if available) to be used to the well discharge and determine the control settings required to achieve the well's determined optimum flow

rate with the In-Line Flow Cell connected (due to the system's back-pressure, the flow rate will be decreased by 10 to 20 percent).

WELL PURGING AND SAMPLING EVENTS

Prior to the initiation of purging a well, the SWL will be measured and documented. The peristaltic pump will be started utilizing its documented control settings and its flow rate will be confirmed by volumetric discharge measurement with the In-Line Flow Cell connected. Minor modifications to the control settings may be necessary to achieve the well's optimum flow rate and should be documented on the appropriate field form. When the optimum pump flow rate has been established, the SWL drawdown has stabilized within the required range, and at least one pump system volume (down well extraction tubing, pump head tubing, and discharge tubing volume) has been purged, begin taking field measurements for pH, temperature (T), conductivity (Ec), oxygen reduction potential (ORP), dissolved oxygen (DO), and turbidity (TU) using an In-Line Flow Cell or if unavailable, individual water quality meters. All water chemistry field measurements will be documented on the appropriate field form. Measurements should be taken every three to five minutes until stabilization has been achieved. Stabilization is achieved after all parameters have stabilized for three consecutive readings. In lieu of measuring all five parameters, a minimum subset would include pH, conductivity, and turbidity or dissolved oxygen. Three consecutive measurements indicating stability should be within:

Temperature	± 3 percent of reading (minimum of ± 0.2° C)
pH	± 0.1 units, minimum
Conductance	± 3 percent of reading
Dissolved Oxygen	± 10 percent of reading
Redox (ORP)	± 10 mV
Turbidity	± 10 percent NTU or < 10 NTU (Turbidity is not a water chemistry indicator parameter but is useful as an indicator of pumping stress on the formation)

When water quality parameters have stabilized, and there has been no change in the stabilized SWL (i.e., no continuous drawdown), sample collection may begin.

FIELD PROCEDURES

A summary of field procedures used to collect groundwater samples using a peristaltic pump is provided below.

- Calibrate all field instruments at the start of each day following the instrument manufacturer's instructions. Record calibration data on field form.
- Prior to use at each well, decontaminate all instruments that will be lowered in the well (electronic water level indicator and/or oil/water interface probe) by washing

with phosphate-free detergent, rinsing with potable water, and rinsing with deionized water.

- Make notes in the appropriate field form documenting condition of the well and activity in the vicinity of the well.
- Measure the depth to water from the surveyed reference mark on the wellhead and record the measurement on the appropriate field form. Lock the water level meter in place so that the level can be monitored during purging and sampling.
- Place a new length of disposable sampling tubing into the well casing so that the tip of the tubing is located at appropriate sampling depth within the well screen.
- Place a new length of silicone tubing into the peristaltic pump head fixture.
- Connect the sample tubing to the influent end of the silicone tubing in the peristaltic pump head fixture.
- Place a new length of disposable sample tubing to the effluent end of the silicone tubing on the peristaltic pump and secure to drain the water purged from the well into the collection container (i.e., 5 gallon bucket).
- Start the peristaltic pump. Set the pump controller settings to the appropriate settings for the specific well. Confirm the flow rate is equal to the well's established optimum flow rate. Modify as necessary (documenting any required modifications).
- Monitor the water level and confirm that the SWL drawdown has stabilized within the well's allowable limits.
- Remove the pump discharge tubing.
- Connect the pump discharge tubing to the In-Line flow cells "IN" fitting.
- Connect the Flow Cell's "OUT" line and secure to drain the water purged from the well into the collection container (i.e., 5 gallon bucket).
- After purging the first system volume (down well sampling tubing, pump head silicone tubing, and discharge tubing volume) record the water quality field measurements every three to five minutes until all parameters have stabilized within their allowable ranges for at least three consecutive measurements. Begin sampling after stabilization has been achieved.
- Disconnect the flow cell and tubing from the pump discharge line before collecting samples. Decrease the pump rate to 100 milliliters per minute or less by lowering the pump controller's setting prior to collecting samples for volatiles. Place the samples in a chilled cooler with enough blue ice or ice to keep the temperature at 4 degrees C.

- Once samples for volatiles have been collected, re-establish pump flow rate to the original purge flow rate by inputting the documented controller settings for the well without the In-Line Flow Cell connected, and collect remaining samples.
- Consolidate purge water into a labeled 55-gallon drum(s).
- Remove and decontaminate the electronic water level indicator with phosphate-free detergent, rinsing with potable water and rinsing with deionized water.
- Disconnect and dispose the sample and silicone tubing used to collect the sample.
- Secure the peristaltic pump in the portable pump carrying case.
- Place the wellhead cover on the well and secure with a lock.
- Move equipment to next well to be sampled and repeat.
- At the end of each day clean and decontaminate the In-Line Flow Cell with phosphate-free detergent, rinsing with potable water, and rinsing with deionized water.
- Make a photocopy of all completed field forms. The copies should be retained on site. The original forms will be kept in the AEC's project file.

EQUIPMENT LIST

The following equipment is needed to conduct low flow purging and sampling:

- Peristaltic pump equipped with a flow controller.
- Appropriate amount of disposable sample tubing to collect groundwater samples from each well at the site.
- In-Line Flow Cell and meter(s) with connection fittings and tubing to measure water quality.
- Water quality meters as backup in-case of In-Line Flow Cell malfunction.
- Photoionization detector (PID).
- Electronic Water Level Indicator Probe.
- Laboratory-prepared sample containers appropriate for the analytical requirements.
- Field documentation forms.
- Measuring cup.
- Five gallon bucket(s) for containerizing purge water.
- Stopwatch.
- Cleaning and decontamination supplies.

ATTACHMENT A2

Daily Field Report Form

DAILY FIELD REPORT

HydroCon	Project Name:	Hydrocon Job Number:
		Date:
360.703.6079/Fax 360.703.6086 510 Allen Street, Suite B; Kelso, WA 98626	Client:	Page: Of
Prepared By:	Location:	Arrival:
		Departure:
Purpose:	Weather:	Permit:

ATTACHMENT A3

Groundwater Purge and Sample Form

GROUNDWATER PURGE AND SAMPLE FORM

Well I.D. Number:

Project Name:_____ Sample I.D._____ Time:_____
Project #: _____ Field Duplicate I.D._____ Time:_____
Date_____ Personnel:_____

WELL INFORMATION

Monument condition: ☐ Good ☐ Needs repair_____ ☐ Water in Monument
Well cap condition: ☐ Good ☐ Replaced ☐ Needs replacement ☐ Surface Water in Well
Headspace reading: ☐ Not measured _____ ppm ☐ Odor_____
Well diameter: ☐ 2-inch ☐ 4-inch ☐ 6-inch ☐ Other _____
Comments _____

PURGING INFORMATION

Total well depth_____ft Bottom: ☐ Hard ☐ Soft ☐ Not measured Screen Interval(s):_____
Depth to product_____ft
Depth to water_____ft Intake Depth (BTOC)_____ Begin Purging Well:_____
Casing volume _____ft (H_2O) X _____gal/ft = _____gal. X 3 =_____gal.
Volume Conversion Factors: 3/4"=0.02 gal/ft 1"=0.04 gal/ft 2"=0.16 gal/ft 4"=0.65 gal/ft 6"= 1.47 gal/ft

PURGING/DISPOSAL METHOD

Pump type ☐ Peristaltic ☐ Centrifugal ☐ Dedicated Bladder ☐ Non-Dedicated Bladder Other_____
Bailer type:_____ Water Disposal:☐ Drummed ☐ Remediation System ☐ Other _____

FIELD PARAMETERS

Odor and/or Sheen:_____

Time	Water Level (BTOC)	Purge Rate (L/min)	Temp. (^{0}C)	Sp. Cond. (mS/cm) (±3%)	Dissolved Oxygen (±10% or ≤1.00 ±0.2)	pH (SU) (±0.1)	ORP (mV)	Turbidity (NTU) (± 10% or ≤10)

Stabilization achieved if three successive measurements for pH, Conductivity and Turbidity and/or Dissolved Oxygen are recorded within their respective stabilization criteria. A minimum of six measurements should be recorded.
Purging Comments:_____

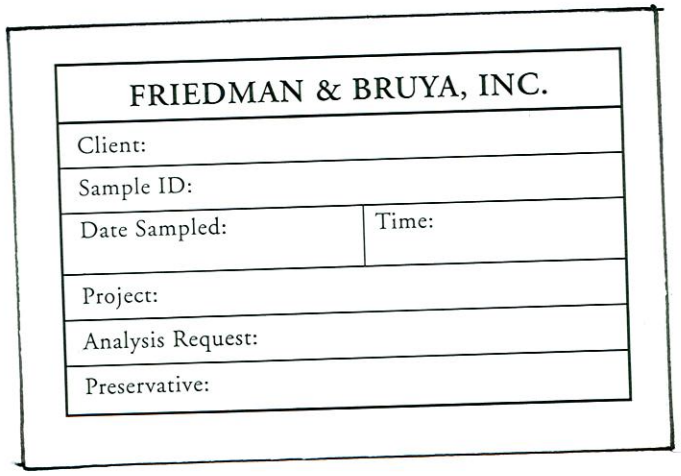
SAMPLE INFORMATION

Container Type	Bottle Count	Preservative	Field Filtered?	Analysis
			No 0.45 0.10	
			No 0.45 0.10	
			No 0.45 0.10	
			No 0.45 0.10	
			No 0.45 0.10	

Sampling Comments:_____
_____

ATTACHMENT A4

Sample ID Label


FRIEDMAN & BRUYA, INC.
Client:
Sample ID:
Date Sampled:
Time:
Project:
Analysis Request:
Preservative:

ATTACHMENT A5

Sample Chain of Custody Form

SAMPLE CHAIN OF CUSTODY

Send Report To _____

Company _____

Address _____

City, State, ZIP _____

Phone #_____ Fax #_____

SAMPLERS *(signature)*	
PROJECT NAME/NO.	PO#
REMARKS	

Page #_____ of _____

TURNAROUND TIME
- ☐ Standard (2 Weeks)
- ☐ RUSH_____

Rush charges authorized by _____

SAMPLE DISPOSAL
- ☐ Dispose after 30 days
- ☐ Return samples
- ☐ Will call with instructions

						ANALYSES REQUESTED												
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS							Notes

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

FORMS\COC\COC.DOC

APPENDIX B

Quality Assurance Project Plan

Cleanup Action Plan
Appendix B
Quality Assurance Project Plan

TOC Holdings Co. Facility No. 01-323
301 Central Avenue North
Kent, Washington 98032

Prepared for:

TOC Holdings Co.
2737 W. Commodore Way
Seattle, WA 98199

April 29, 2016

Prepared by:

HydroCon, LLC
510 Allen Street, Suite B Kelso, Washington 98626
p: (360) 703-6079 f: (360) 703-6086
www.hydroconllc.net

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ACRONYMS

bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and total xylenes
CAP	Cleanup Action Plan
COC	chemical of concern
DQOs	data quality objectives
DRPH	diesel-range petroleum hydrocarbons
Ecology	Washington State Department of Ecology
EPA	United States Environmental Protection Agency
FBI	Friedman & Bruya, Inc. (Analytical Laboratory)
FS	Feasibility Study
GRPH	gasoline-range petroleum hydrocarbons
HASP	Health and Safety Plan
HydroCon	HydroCon Environmental LLC
MRL	method reporting limit
MTCA	Model Toxics Control Act
NWTPH-Dx	Northwest Total Petroleum Hydrocarbons-Diesel Range
NWTPH-Gx	Northwest Total Petroleum Hydrocarbons-Gasoline Range
ORPH	oil-range petroleum hydrocarbons
OSHA	Occupational Safety and Health Administration
PCS	petroleum-contaminated soil
PQL	Practical Quantitation Limit (laboratory)
QA/QC	Quality assurance/quality control
QAPP	Quality Assurance Project Plan
RAOs	remedial action objectives
RI	Remedial Investigation
ROW	right-of-way
SAP	Sampling and Analysis Plan
TOC	TOC Holdings Co.
TPH	total petroleum hydrocarbons
VCP	Voluntary Cleanup Program
VOCs	volatile organic compounds
WAC	Washington Administrative Code

B1 INTRODUCTION

This Quality Assurance Project Plan (QAPP) has been prepared by HydroCon Environmental, LLC (HydroCon) on behalf of TOC Holdings Co. to summarize the field and laboratory quality assurance and quality control (QA/QC) procedures that will be employed for the cleanup action to be conducted at TOC Facility No. 01-323, located at 301 Central Avenue North, in Kent, Washington (hereinafter referred to as the Property). According to the Washington State Department of Ecology's (Ecology) Guidelines for Property Cleanups Under the Voluntary Cleanup Program[1] (VCP), a site is defined by the nature and extent of contamination associated with one or more releases of hazardous substances prior to any cleanup of that contamination. Based on this definition of a site and that provided in Section 200 of Chapter 340 of Title 173 of the Washington Administrative Code (WAC-173-340-200), the TOC Holdings Co. Facility No. 01-323 site (the Site) includes the full lateral and vertical extent of petroleum hydrocarbon contamination that resulted from the historical operation of retail gasoline service stations on the Property. This area is located in the southeastern portion of the Property extending approximately 10 feet to the south into the City of Kent's E. Smith Street right-of-way. The vertical extent of the petroleum-contaminated soil appears to be limited to depths ranging from 10 to 20 feet below ground surface (bgs). This QAPP is part of the cleanup action and was prepared in accordance with WAC 173- 340-820 and WAC 173-340-830. The cleanup action at the Site will be conducted in accordance with the Cleanup Action Plan (CAP).

The purpose of this QAPP is to:

- Assist the project manager and project team to focus on the factors affecting data quality during the planning stage of the project.
- Facilitate communication among field, laboratory, and project staff as the project progresses.
- Document the planning, implementation, and assessment procedures for QA/QC activities for the cleanup action.
- Verify that the data quality objectives (DQOs) are achieved.
- Provide a record of the project to facilitate final report preparation.

The DQOs for the project include both qualitative and quantitative statements describing the type of data to be collected, and decision rules for data that is judged to be of acceptable quality. To verify that the DQOs are achieved, this QAPP details aspects of sample collection and analysis including analytical methods, QA/QC procedures, and data quality reviews.

[1] *Ecology. 2015. Guidelines for Property Cleanups Under the Voluntary Cleanup Program. Toxics Cleanup Program. Publication No. 08-09-044. July.*

B2 PROJECT ORGANIZATION AND KEY PERSONNEL

The project organization for the completion of the cleanup action, including identification of key personnel and their responsibilities, is described in the subsections below.

B2.1 REGULATORY AGENCY

The Ecology is the lead regulatory agency for the cleanup action at the Site, as promulgated in the Washington State Model Toxics Control Act (MTCA). The cleanup action is being conducted as an independent remedial action in accordance with WAC 173-340-515 of MTCA. Ecology's Site Manager for the project is:

Mr. Michael Warfel
Washington State Department of Ecology
3190 160th Avenue Southeast
Bellevue, Washington 98008

B2.2 PROJECT CONTACT

HydroCon has been contracted by TOC Holdings Co. to plan and implement the cleanup action at the Site. The Project Contact for TOC Holdings Co. is:

Mr. Mark Chandler
Vice President Environmental Services
TOC Holdings Co.
2737 West Commodore Way
Seattle, Washington 98199

B2.3 HYDROCON PROJECT MANAGER

The Project Manager has overall responsibility for developing the QAPP, monitoring the quality of the technical and managerial aspects of the cleanup action, and implementing the QAPP and corresponding corrective measures, when necessary. The Project Manager for HydroCon is:

Mr. Craig Hultgren, LHG #1809
HydroCon Environmental, LLC
510 Allen Street, Suite B
Kelso, Washington 98626
(360) 703-6079
CraigH@hydroconllc.net

B2.4 LABORATORY PROJECT MANAGER

Friedman and Bruya Inc., (FBI) of Seattle, Washington, has been contracted by TOC Holdings Co. to perform the laboratory analysis for compliance samples collected during the cleanup action. The Laboratory Project Manager is responsible for scheduling and managing the laboratory's sample analyses and reporting processes. The Laboratory Project Manager is:

Mr. Mike Erdahl
Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, Washington 98119
(206) 285-8282

B2.5 PROJECT QA/QC OFFICER

The Project QA/QC Officer reports to the HydroCon Project Manager with the responsibility to monitor and verify that the analytical work is performed in accordance with the Sampling and Analysis Plan (SAP) and this QAPP. The Project QA/QC Officer has the responsibility to evaluate and monitor the effectiveness of the QA/QC program and to recommend modifications to the program when applicable. The Project QA/QC Officer is responsible for assuring that the personnel assigned to the project are trained relative to the requirements of the QA/QC program and for reviewing and verifying the disposition of nonconformance and corrective action reports. The Project QA/QC Officer is:

Ms. Allison Greiner
Eureka Project Solutions LLC.
(503) 347-2272 cell

B2.6 FIELD STAFF

Members of the field staff are responsible to understand and implement the QAPP, coordinate and participate in the field sampling activities; coordinate sample deliveries to laboratory; and report any deviations from the QAPP. Field staff report to the HydroCon Project Manager.

B3 DATA QUALITY OBJECTIVES

The DQOs for the cleanup action define the minimum requirements for data quality. Observations and measurements will be made and recorded in such a manner as to yield results representative of the media and conditions observed and/or measured.

Laboratory data quality will be assessed by qualitative and quantitative measures of precision, accuracy, representativeness, completeness, comparability, and sensitivity. Definitions of these parameters and the applicable QC procedures are described in Subsections B3.1 through B3.6 of this QAPP. Quantitative DQOs for the data are provided following each definition. Laboratory

DQOs have been established by the analytical laboratory and the specific analytical methods requested for each sample. Applicable quantitative goals for these DQOs are listed in Table B-1.

B3.1 PRECISION

Precision measures the reproducibility of measurements under a given set of conditions. Specifically, it is a quantitative measure of the variability of two or more measurements compared to their average values. Precision is calculated from results of duplicate sample analyses. Precision is quantitatively expressed as the relative percent difference (RPD) and is calculated as follows:

$$RPD = \frac{(C_1 - C_2)}{(C_1 + C_2)/2} \times 100$$

Where:
RPD = relative percent difference
C_1 = larger of the two duplicate results (i.e., the highest detected concentration)
C_2 = smaller of the two duplicate results (i.e., the lowest detected concentration)

The recommended control limits for the RPD for field duplicate sample analysis are listed in the following table:

Recommended Control Limits for Field Duplicate Sample Analysis RPD

Compounds	**Aqueous Samples**	**Soil, Sludge, Sediment, Oil & Waste Samples**
All Target Analytes	± 25%	± 40%

RPD control limits for laboratory QA/QC samples are defined by the specified analytical methods, which are summarized in Table B-1.

B3.2 ACCURACY

Accuracy is a measure of the closeness (bias) of the measured value to the true value. The accuracy of chemical analytical results is assessed by "spiking" samples in the laboratory with known standards (a surrogate or matrix spike of known concentration) and determining the percent recovery. The accuracy is measured as the percent recovery (%R) and is calculated as follows:

$$\%R = \frac{(M_{sa} - M_{ua})}{C_{sa}} \times 100$$

Where:

%R = percent recovery
M_{sa} = measured concentration in spiked aliquot
M_{ua} = measured concentration in unspiked aliquot
C_{sa} = actual concentration of spike added

Laboratory matrix spikes and surrogates will be carried out at the analytical laboratory in accordance with the U.S. Environmental Protection Agency (EPA) guidance document Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, also known as SW-846, and Ecology methods and procedures for inorganic and organic chemical analyses. The frequency of matrix spikes and matrix spike duplicates will each be one per batch of 20 samples or less for soil samples. Quantitative percent recovery criteria for organic analyses will be based on laboratory-derived control limits for surrogate recovery and matrix spike results.

The accuracy of sample results can also be affected by the introduction of contaminants to the sample during collection, handling, or analysis. Contamination of the sample can occur because of improperly cleaned sampling equipment, exposing samples to chemical concentrations in the field or during transport to the laboratory, or because of chemical concentrations in the laboratory. To demonstrate that the samples collected are not contaminated, laboratory method blank samples will be analyzed. The laboratory will run method blanks at a minimum frequency of 5 percent or one per batch to assess potential contamination of the sample within the laboratory.

B3.3 REPRESENTATIVENESS

Representativeness is a qualitative assessment of how closely the measured results reflect the actual concentration or distribution of the constituent concentrations in the matrix sampled. The sampling plan design, sample collection techniques, sample handling protocols, sample analysis methods, and data review procedures have been developed to verify that the results obtained are representative of the Site conditions. These issues are addressed in detail in Section A3, Sampling Protocols and Procedures, and Section A4, Management of Investigation-Derived Waste, of the SAP (Appendix A of the CAP).

B3.4 COMPLETENESS

Completeness is defined as the percentage of measurements judged to be valid. Results will be considered valid if they are not rejected during data validation (see Section B6). Completeness is calculated as follows:

$$C = \frac{(number\ of\ valid\ measurements)}{(total\ number\ of\ measurements)} \times 100$$

The objectives for completeness are based, in part, on the subsequent uses of the data (i.e., the more critical the data, the greater the completeness objective). The objective for completeness is expressed as a percentage, which refers to the minimum acceptable

percentage of samples received at the laboratory in good condition and acceptable for analysis. During routine operation and maintenance (O&M), the completeness objective is 95 per cent. These objectives will be met through the use of proper sample containers, proper sample packaging procedures to prevent breakage during shipment, proper sample preservation, and proper labeling and chain-of-custody procedures. Since a loss of 5 to 10 per cent of intended samples is common due to breakage and transport losses, replicate volumes of media for critical confirmation samples that require 100 per cent completeness will be collected to ensure that the completeness objective is achieved.

B3.5 COMPARABILITY

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. The use of standard Ecology- and EPA-specified methods and procedures for both sample collection and laboratory analysis will make the data collected comparable to both internal and other data generated.

B3.6 SENSITIVITY

Analytical sensitivities are measured by laboratory practical quantitation limits (PQLs), which are defined as the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. PQLs are determined by the laboratory. The specific analytes and their corresponding PQLs that will be required for the cleanup action are summarized in Table B-1. The detection or reporting limits for actual samples may be higher depending on the sample matrix and laboratory dilution factors.

B4 DATA COLLECTION APPROACH

Procedures that will be used to collect, preserve, transport, and store samples are described in Section A3, Sampling Protocols and Procedures, of the SAP. Sampling protocols will be performed in accordance with generally accepted environmental practices and will meet or exceed current regulatory standards and guidelines. Sampling procedures may be modified, if necessary, to satisfy amendments to current regulations, methods, or guidelines. The data collection approach for key elements of the cleanup action field program will ensure that the project DQOs are met or exceeded. The key elements include soil samples collected and analytical results used to demonstrate that the concentrations of chemicals of concern at the limits of the remedial excavation are below applicable cleanup levels as defined in the SAP. The total number of samples collected and specific analyses to be performed will be based on field screening results, field observations, and analytical results for performance and confirmational monitoring.

B5 ANALYTICAL PROCEDURES

Chemical and physical analysis will be conducted at FBI for confirmation and compliance samples collected during the cleanup action. FBI is accredited in Washington State. All chemical

and physical testing will adhere to EPA's SW-846 QA/QC procedures and analysis protocols or follow the appropriate Ecology methods. In completing chemical analyses for this project, the laboratory is expected to meet the following minimum requirements:

- Adhere to the methods outlined in this QAPP, including methods referenced for each analytical procedure.
- Provide a detailed discussion of any modifications made to approved analytical methods.
- Deliver PDF and electronic data as specified.
- Meet reporting requirements for deliverables.
- Meet turnaround times for deliverables.
- Implement QA/QC procedures, including the QAPP data quality requirements, laboratory QA requirements, and performance evaluation testing requirements.
- Allow laboratory and data audits to be performed, if deemed necessary.

Copies of the *Laboratory Quality Assurance Manual* from FBI are on file at HydroCon's office for reference and will be followed throughout the cleanup action. Access to laboratory personnel, equipment, and records pertaining to samples, collection, transportation, and analysis can be provided.

Compliance sample laboratory analytical results for each analyte will be compared to regulatory limits applicable to the cleanup action. A detailed description of the analytical methods and applicable regulatory limits is provided in Section A4 of the SAP. Table B-1 presents the analytes, analytical methods, and PQLs for various methods and media, which are ultimately compared to applicable regulatory limits. The PQL for each analyte is equal to or less than the applicable regulatory limits for all analytes in the media of concern, which is equivalent to saying that the analytical sensitivity is sufficient to detect a low level exceedance of the respective regulatory limits.

B6 DATA MANAGEMENT, REDUCTION, QA REVIEW, AND REPORTING

This section outlines the procedures to be followed for the inventory, control, storage, and retrieval of data collected during performance of the cleanup action. The procedures referenced in this QAPP are designed to verify that the integrity of the collected data is maintained for subsequent use. Moreover, project-tracking data (e.g., schedules and progress reports) will be maintained to monitor, manage, and document the progress of the cleanup action.

B6.1 DATA TYPES

A variety of data will be generated by the cleanup action, including sampling and analytical data. The laboratory analytical data will be transmitted to HydroCon and the Project QA/QC Officer as an electronic file, in addition to a hardcopy laboratory data report. This procedure will facilitate the subsequent validation and analysis of these data while avoiding transcription errors that may occur with computer data entry. Examples of data types include manually recorded field data, such as boring logs, and electronically reported laboratory data.

B6.2 DATA TRANSFER

Procedures controlling the receipt and distribution of incoming and outgoing data packages to HydroCon's Project Manager (non-laboratory generated data) and the Project QA/QC Officer (laboratory-generated data reports) include the following:

- Incoming documents will be date-stamped and filed. Correspondence and transmittal letters for all reports, maps, and data will be filed chronologically. Data packages, such as those from field personnel, laboratories (such as soil data) and surveyors (elevation data), will be filed by project number, subject heading, and date. If distribution is required, the appropriate number of copies will be made and distributed to the appropriate persons or agencies.
- A transmittal sheet will be attached to all project data and reports that are distributed outside of HydroCon's office. A copy of each transmittal sheet will be kept in the administrative file and the project file. The Project Manager and QA/QC Officer will review all outgoing reports and maps.

B6.3 DATA INVENTORY

Procedures for filing, storage, and retrieval of project data and reports are discussed below.

B6.3.1 Document Filing and Storage

As previously discussed, project files and raw data files will be maintained at HydroCon's office. Files will be organized by project tasks or subject heading and maintained by the document control clerk. Hard copy project files will be archived for a minimum of 3 years after completion of the project. Electronic copies of files will be maintained in a project directory and backed up on a daily, weekly, and monthly basis.

B6.3.2 Access to Project Files

Access to project files will be controlled and limited to TOC Holdings Co. and its authorized representatives, Ecology, and HydroCon personnel. When a hard copy file is removed for use, a sign-out procedure will be used to track custody. If a document is to be used for a long period, a copy will be used, and the original will be returned to the project file. Electronic access to final reports, figures, and tables will be write-protected in the project directory.

B6.4 INDEPENDENT DATA QUALITY REVIEW

Data quality review will be performed where applicable using the current EPA Functional Guidelines for Organic Data Quality Review. The following types of QC information will be reviewed, as appropriate:

- Method deviations
- Sample extraction and holding times
- Method reporting limits
- Blank samples (equipment rinsate and laboratory method)
- Duplicate samples
- Matrix spike/matrix spike duplicate samples (accuracy)
- Surrogate recoveries
- Percent completeness and RPD (precision)
- A QA review of the final analytical data packages for samples collected during the cleanup action

B6.5 DATA REDUCTION AND ANALYSIS

The Project Manager and QA/QC Officer are responsible for data review and validation. Data validation parameters are outlined in Section B3, Data Quality Objectives. The particular type of analyses and presentation method selected for any given data set will depend on the type, quantity, quality, and prospective use of the data in question. The analysis of the project data will require data reduction for the preparation of tables, charts, and maps. To verify that data are accurately transferred during the reduction process, two data reviews will be performed, one by the Project QA/QC Officer or Project Manager and another by the Project Principal, prior to issuing the documents. Any incorrect transfers of data will be highlighted and changed.

B6.6 DATA REPORTING FORMATS

The physical and chemical characterization information developed in connection with the cleanup action will be presented in the final report in the following format.

B6.6.1 Summary Tables and Plots

The laboratory reports will be sorted according to various parameters to summarize the information for easier assimilation and presentation. Soil sampling and analysis data can be sorted in multiple ways depending on the reporting objective; however, at a minimum, the sample identification, the date and time of sample collection, and the analytical result with appropriate qualifiers will be reported.

B6.6.2 Maps

Maps needed to illustrate results of the cleanup action will be assembled or prepared. They may include, but are not limited to, plans and cross-sections of the Site showing confirmed and suspected sources, sampling locations, chemical concentrations for individual chemicals and groups of chemicals, groundwater elevation contour maps, the Site features and potential preferential pathways (e.g., sewer lines), and cross section locations.

B6.6.3 Cross Sections

Vertical profiles or cross sections may be generated from field data to display the Site stratigraphy or other aspects of the cleanup action.

B6.7 QUALITY CONTROL SUMMARY REPORT

A QC summary report will be prepared by HydroCon based on the QC summary data provided by the laboratory and validation report provided by the Project QA/QC Officer.

B7 QUALITY CONTROL PROCEDURES

This section describes the QC procedures for both field activities and laboratory analysis. The field QC procedures include standard operating procedures for sample collection and handling, equipment calibration, and field QC samples.

B7.1 FIELD QUALITY CONTROL

Field QC is established primarily by the use of standard operating procedures for field screening and sample collection. The basis for these field data collection activities will be documented on the field report forms, as described in Section A5, Field Documentation, of the SAP. Field QC samples (i.e., blind duplicate samples) are also planned for this project. The purpose of these QC samples is discussed in Section B3, Data Quality Objectives. Any deviations from the established protocols will be documented on the field report forms.

B7.2 LABORATORY QUALITY CONTROL

Analytical laboratory QA/QC procedures are provided in FBI's *Laboratory Quality Assurance Manual* that is on file at HydroCon's office.

B7.3 DATA QUALITY CONTROL

All data generated by FBI will undergo two levels of QA/QC evaluation: one by the laboratory and one by the Project QA/QC Officer. As specified in FBI's *Laboratory Quality Assurance Manual*, the laboratory will perform initial data reduction, evaluation, and reporting. The analytical data will then be validated under the supervision of the Project QA/QC Officer. The following types of QC information will be reviewed, as appropriate:

- Method deviations

- Sample transport conditions (temperature and integrity)
- Sample extraction and holding times
- Method reporting limits
- Blank samples
- Duplicate samples
- Surrogate recoveries
- Percent completeness
- RPD (precision)

Field records and results of field observations and measurements will be reviewed to verify that procedures were properly performed and documented. The review of field procedures will include:

- Completeness and legibility of field logs
- Preparation and frequency of field QC samples
- Equipment calibration and maintenance
- Sample Chain-of-Custody forms

Any QC problems detected by the Project QA/QC Officer will initiate corrective actions as described further in Section B10.

B7.4 DATA ASSESSMENT PROCEDURES

The Project Manager and Project QA/QC Officer are responsible for data review and validation. Upon receipt of each data package from the laboratory, calculations using the equations presented for precision, accuracy, and completeness will be performed. Results will be compared to quantitative DQOs, where established, or qualitative DQOs. Data validation parameters are outlined in Section B3, Data Quality Objectives.

B7.5 QUALITY CONTROL SUMMARY REPORT

A QC summary report will be prepared by HydroCon based on the QC summary data provided by the laboratory.

B8 PERFORMANCE AND SYSTEM AUDITS

Performance audits will be completed for both sampling and analysis work. Field performance will be monitored through regular review of Sample Chain-of-Custody forms, field forms, and field measurements. The Project Manager and/or the Project QA/QC Officer may also perform periodic review of work in progress at the Site.

Accreditations received from Ecology for each analysis demonstrate the laboratory's ability to properly perform the requested methods. Therefore, a systematic audit of the analytical laboratory during the course of this project is not planned and will not be conducted, except if necessary as described in Section B10, Corrective Actions.

The Project Manager and/or Project QA/QC Officer will oversee communication with the analytical laboratory on a frequent basis while samples are being processed and analyzed at the laboratory. This will allow an assessment of compliance with the DQOs and to implement corrective actions in a timely manner if problems are detected.

The Laboratory Project Manager is responsible for identifying and correcting, as appropriate, any deviations from performance standards as discussed in the laboratory QA manual. The laboratory will communicate to the Project Manager or the Project QA/QC Officer all deviations to the performance standards and the appropriate corrective measures made during sample analysis.

B9 PREVENTATIVE MAINTENANCE

Operation and maintenance manuals will accompany all field monitoring and sampling equipment when deployed in the field. Included in these manuals are procedures for calibration, operation, and troubleshooting. All maintenance activities will be documented in the project field report forms and/or equipment logbooks. A schedule of preventive maintenance activities will be maintained. In addition, spare parts and tools will be included in each equipment storage case to minimize equipment downtime.

B10 CORRECTIVE ACTION

Corrective actions are the joint responsibility of the Project Manager, the Project QA/QC Officer, and the Laboratory Project Manager (if laboratory problems are detected). Corrective procedures can include:

- Identifying the source of the violation.
- Audits of analytical laboratory procedures
- Re-analyzing samples, if holding time criteria permit.
- Resampling and analyzing.
- Evaluating and amending sampling and analytical procedures.
- Qualifying data to indicate the level of uncertainty.

During field sampling operations, the field team members are responsible for identifying and correcting protocols that may compromise the quality of the data. All corrective actions taken

will be documented in the field notes. The Project Manager will also perform routine QC performance and system audits of the field data.

B11 QUALITY ASSURANCE REPORTS

The Cleanup Action Report will include a QA section that summarizes data quality information in the deliverables generated during the project. This summary will include at a minimum the following:

- Assessment of data precision, accuracy and completeness.
- Results of performance and/or system audits and corrective actions taken, if necessary.
- Significant QA problems and their impacts on the DQOs.
- A transmittal sheet will be attached to all project data and reports sent out. A copy of each transmittal sheet will be kept in the administrative file and the project file. The Project Manager and QA/QC Officer will review all outgoing reports.

TABLE B1

Data Quality Objectives for
Precision, Accuracy, Completeness, and Sensitivity

Table B-1
Data Quality Objectives for Precision, Accuracy, Completeness, and Sensitivity
TOC Holdings Co. Facility No. 01-323
301 Central Avenue North
Kent, WA

Analyte	Analytical Method	Precision[1]		Accuracy[2]			Completeness (%)[3]	Sensitivity[4]
		Field Duplicates RPD (%)	Lab Duplicates RPD (%)	Surrogate (% Recovery)	MS (% Recovery)	LCS (% Recovery)		PQL[5]
Soil for Confirmation								
GRPH	NWTPH-Gx	± 40	± 30	50-150	70-130	70-130	100%	2 mg/kg
Benzene	EPA Method 8260	± 40	± 30	70-130	70-130	70-130	100%	0.03 mg/kg
Toluene	EPA Method 8260	± 40	± 30	70-130	70-130	70-130	100%	0.05 mg/kg
Ethylbenzene	EPA Method 8260	± 40	± 30	70-130	70-130	70-130	100%	0.05 mg/kg
meta-, para-xylenes	EPA Method 8260	± 40	± 30	70-130	70-130	70-130	100%	0.1 mg/kg
ortho xylene	EPA Method 8260	± 40	± 30	70-130	70-130	70-130	100%	0.05 mg/kg
naphthalene	EPA Method 8260	± 40	± 30	70-130	70-130	70-130	100%	0.05 mg/kg
DRPH	NWTPH-Dx	± 40	± 30	60-140	70-130	70-130	100%	50 mg/kg
ORPH	NWTPH-Dx	± 40	± 30	60-140	70-130	70-130	100%	250 mg/kg
Vapor Compliance Monitoring								
GRPH	NWTPH-Gx	±25	±20	50-150	--	70-130	95%	10 mg/m^3
Benzene	EPA Method 8021B	±25	±20	50-150	--	70-130	95%	0.1 mg/m^3
Toluene	EPA Method 8021B	±25	±20	50-150	--	70-130	95%	0.1 mg/m^3
Ethylbenzene	EPA Method 8021B	±25	±20	50-150	--	70-130	95%	0.1 mg/m^3
Total Xylenes	EPA Method 8021B	±25	±20	50-150	--	70-130	95%	3 mg/m^3
Groundwater Performance and Compliance Monitoring								
GRPH	NWTPH-Gx	±30	±20	50-150	70-130	70-130	95%	100 µg/L
Benzene	EPA Method 8260	±30	±20	50-150	70-130	70-130	95%	0.1 µg/L
Toluene	EPA Method 8260	±30	±20	50-150	70-130	70-130	95%	0.1 µg/L
Ethylbenzene	EPA Method 8260	±30	±20	50-150	70-130	70-130	95%	0.1 µg/L
meta-, para-xylenes	EPA Method 8260	±30	±20	50-150	70-130	70-130	95%	0.2 µg/L
ortho xylene	EPA Method 8260	±30	±20	50-150	70-130	70-130	95%	0.1 µg/L
naphthalene	EPA Method 8260	±30	±20	50-150	70-130	70-130	95%	0.1 µg/L
DRPH	NWTPH-Dx	±30	±20	60-140	70-130	70-130	95%	50 µg/L
ORPH	NWTPH-Dx	±30	±20	60-140	70-130	70-130	95%	250 µg/L

NOTES:

[1]Precision measured in RPD between sample and lab duplicate, LCS and LCS duplicate, and/or MS and MS duplicate.
[2]Laboratory to follow in accordance with the EPA SW-846 and Ecology methods and procedures for inorganic and organic chemical analyses. Method Blanks will be analyzed for each analyte in addition to the quantitative data quality objectives listed in this table.
[3]Refers to the minimum acceptable percentages of samples received at the laboratory in good condition that are acceptable for analysis.
[4]Sensitivity is measured by the laboratory PQL for each analyte.
[5]Standard PQLs for specified analytical methods and achievable by Friedman & Bruya, Inc. for low level samples

-- = not measured/not performed
µg/L = micrograms per liter
mg/m^3 = milligrams per cubic meter
mg/kg = milligrams per kilogram
DRPH = diesel-range petroleum hydrocarbons
EPA = U.S. Environmental Protection Agency
GRPH = gasoline-range petroleum hydrocarbons
LCS = laboratory control sample
MS = matrix spike
MSD = matrix spike duplicate
NWTPH = Northwest Total Petroleum Hydrocarbon
ORPH = oil-range petroleum hydrocarbons
PQL = practical quantitation limit
RPD = relative percent difference

APPENDIX C

Health and Safety Plan

Cleanup Action Plan
Appendix C
Site Specific Health and Safety Plan

TOC Holdings Co. Facility No. 01-323
301 Central Avenue North
Kent, Washington 98032

Prepared for:
TOC Holdings Co.
2737 W. Commodore Way
Seattle, WA 98199

Version 3.0
April 29, 2016

Prepared by:

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This Health & Safety Plan (HASP) has been prepared to meet the requirements of the Occupational Safety and Health Administration (OSHA) standards, 29 Code of Federal Regulations (CFR) Part 1910 and 29 CFR Part 1926, including the "Hazardous Waste Operations and Emergency Response" regulation (29 CFR §1910.120 and 29 CFR §1926.65) and other regulations that are referred to or cross referenced in these standards. Washington DOSH was also referred to during the creation of this document.

Although the aforementioned regulations were used to generate this plan, this plan does not substitute for any provisions of local, state or federal health & safety law.

If a change in conditions occurs, an addendum will be created and acknowledged by signature by all affected personnel.

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Site Safety Plan Acknowledgement

I have reviewed the Site Safety Plan for the TOC Facility No. 01-323 project and understand the hazards presented on this project. I agree to follow the procedures outlined in this plan and to inform the Site Manager and/or the Contractor Safety Representative should any unsafe conditions be noted. I understand that failure to follow safety requirements can result in my removal from this project.

Name	Signature	Date	Organization

ACRONYMS

ACGIH	American Conference of Governmental Industrial Hygienists
APR	air-purifying respirator
bgs	below ground surface
bpm	beats per minute
BT	body temperature
BTEX	benzene, toluene, ethylbenzene, and total xylenes
CAP	Cleanup Action Plan
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
COC	chemical of concern
CPR	cardio-pulmonary resuscitation
CRZ	Contaminant Reduction Zone
DOSH	Washington Department of Safety and Health
DQOs	data quality objectives
DRPH	diesel-range petroleum hydrocarbons
Ecology	Washington State Department of Ecology
EDB	ethylene dibromide or 1,2 dibromoethane
EDC	ethylene dichloride or 1,2 dichloroethane
EPA	United States Environmental Protection Agency
EZ	Exclusion Zone
FBI	Friedman & Bruya, Inc. (Analytical Laboratory)
GRPH	gasoline-range petroleum hydrocarbons
HASP	Health and Safety Plan
HEPA	high efficiency particulate arresting
HR	heart rate
HydroCon	HydroCon Environmental LLC
LEL	lower explosive limit
MRL	method reporting limit
MTBE	methyl tertiary butyl ether
MTCA	Model Toxics Control Act
NWTPH-Dx	Northwest Total Petroleum Hydrocarbons-Diesel Range
NWTPH-Gx	Northwest Total Petroleum Hydrocarbons-Gasoline Range
ORPH	oil-range petroleum hydrocarbons
OSHA	Occupational Safety and Health Administration
PP/PD	positive pressure/pressure demand
PAPR	powered-air purifying respirator
PCS	petroleum-contaminated soil
PEL	Permissible Exposure Limit (OSHA)
PID	photoionization detector
PM	Project Manager

ACRONYMS (continued)

PPE	personal protective equipment
ppm	parts per million
PQL	Practical Quantitation Limit (laboratory)
QA/QC	Quality assurance/quality control
QAPP	Quality Assurance Project Plan
RAOs	remedial action objectives
REL	Recommended Exposure Limit
RI	Remedial Investigation
ROW	right-of-way
SAP	Sampling and Analysis Plan
SCBA	self-contained breathing apparatus
SM<	Site Manager
SSR	Site Safety Representative
SZ	Support Zone
TLV	Threshold Limit Value (ACGIH)
TOC	TOC Holdings Co.
TPH	total petroleum hydrocarbons
TWA	Time-weighted average
VOCs	volatile organic compounds
WAC	Washington Administrative Code

Introduction

This Health & Safety Plan (HASP) addresses worker exposure to potentially hazardous and/or contaminated substances expected to be encountered during site work.

Compliance with this plan is required of all on-site personnel, subcontractors, and associated third parties at any of the properties. All field personnel, subcontractors, and visitors will review the HASP prior to site work. Personnel who do not comply with safety requirements may be immediately dismissed from the site.

The contents of this HASP may be revised and/or amended should additional information become available regarding the hazards present at a site and/or should significant changes occur in the scope of work, operational procedures, or control measures. The HASP shall be implemented and/or revised by key personnel listed in the next section. All affected personnel will be informed of any changes. A copy of this HASP will be maintained onsite during work activities and will be available for inspection and review by any site or agency personnel.

Project Organization & Responsibilities

Project Manager Craig Hultgren

Office	360.703.6079
Cell	360.431.6253

Site Manager Rob Honsberger

Office	360.703.6079
Cell	206.856.6679

Site Safety Representative Larry Namba

Office	N/A
Cell	360.846.3966

Health & Safety Director Brian Daltoso

Office	360.703.6079
Cell	509.288.1443

These personnel are responsible for site safety and delegation of responsibility to ensure compliance with this HASP. In addition, the Site Manager will be responsible for implementing this plan and will serve as the Site Safety Representative in the absence of the HydroCon Project Manager and Health & Safety Director.

Project Manager

The Project Manager (PM) is responsible for overall direction, coordination, technical consistency, and review of the entire project contract. In coordination with HydroCon's Health & Safety Director, the PM will emphasize the importance of safety and hold site personnel accountable for safe performance. The PM will enforce implementation and compliance with the HASP. Lastly, the PM will provide resources and support to the Site Manager for effective completion of duties.

Health & Safety Director

The Health & Safety Director is responsible for the overall health and safety program for HydroCon. They will emphasize the importance of safety and hold site personnel accountable for safe performance. In conjunction with the PM and other required personnel, they are responsible for revision of the HASP. They are also responsible for managing health and safety paperwork including daily tailgate meeting notes, incident reports, and for completing incident investigations. The Health & Safety Director may also complete unannounced site inspections at any time during the project.

Site Manager

The Site Manager (SM) is charged with overall responsibility for the successful completion of field operations. The SM is responsible for the implementation and enforcement of the HASP. The SM may serve as the contractor safety representative in the absence of the PM and Health & Safety Director. SM responsibilities also include:

- Prepare and organize project activities onsite
- Review and approve site specific health and safety plans
- Provide operation / health and safety equipment for project operations
- Emphasize the importance of safety and hold site personnel accountable for safe job performance
- Ensure immediate correction of identified unsafe work condition and/or work practices
- Monitor and evaluate health and safety performance of project operations

Site Safety Representative

The Site Safety Representative (SSR) is the onsite health and safety representative and is present during field work activities. If the SSR must be absent from the site, the health and safety duties will be delegated to another responsible party at the site with appropriate qualifications. SSR responsibilities include:

- Maintain copies of HASP onsite during field activities
- Be on-site and present during hazardous and/or contaminated substance(s) work
- Implementation, enforcement, and monitoring of the HASP
- Conducting pre-construction training, pre-entry briefings, and other periodic training of all

onsite personnel with regard to contents of the HASP and other safety requirements to be observed during construction

- Require that site personnel meet training, medical monitoring and field experience requirements
- Ensure personnel work in a safe manner
- Direct decontamination procedures
- Perform and/or coordinate site exposure monitoring requirements
- Maintain project health and safety records
- Investigate incidents, accidents, and near-misses as needed

Onsite Personnel

Onsite personnel responsibilities include:

- Understand and comply with the HASP and health and safety instructions given by the SSR or other competent authority
- Promptly report all incidents, accidents, and near-misses
- Immediately report any unsafe work conditions, practices and violation of the HASP to the SM or SSR.

Site Characterization

Site Address	301 Central Avenue North, Kent, WA
Field Activities	Installation and O&M of Air Sparge/Soil Vapor Extraction System
Potential Hazards	• Ergonomic hazards • Slips, trips, and falls • Temperature extremes • Traffic & moving equipment • Heavy equipment and drilling rigs

Site Background

The Property is a 0.31-acre square lot located at 301 Central Avenue North, Kent, Washington 97032. The Property address also includes 305 Central Avenue North and 215 East Smith Street. A 1,656-square foot restaurant, Taqueria El Rinconsito, is located in the southeastern portion of the Site. A paved parking lot and a drive-thru lane south of the restaurant comprise the remainder of the Property.

A retail gasoline service station was historically located in the eastern portion of the Property from at least 1935 to 1953. The facilities included two 500-gallon underground storage tanks (USTs), a fuel pump island and canopy, and a service bay with a “grease shed” and hoist. The 1953 gas station

was demolished and replaced by Wagner's Sav-Way gas station. The new service building was reportedly built in the western central portion of the Site. The gas station was demolished in approximately 1972 and replaced by the current restaurant structure.

An ASTM Phase I Environmental Site Assessment conducted in 2010 listed some Recognized Environmental Conditions that were further investigated between 2010 and the present. Subsurface investigations conducted between 2010 and the present confirm that releases from former underground fuel storage tank systems (USTs) resulted in adverse environmental impacts to soil, groundwater, and soil gas. Laboratory analytical data indicate that concentrations of gasoline-, diesel- and heavy oil-range petroleum hydrocarbons, as well as benzene, toluene, ethylbenzene, total xylenes and naphthalene exceed the Washington State Model Toxics Control Act Method A cleanup levels in either soil or groundwater beneath the Property. Soil gas samples collected outside of, but adjacent to the perimeter of the restaurant building revealed concentrations of several volatile hydrocarbons above the Washington State Department of Ecology's sub-slab vapor screening levels.

Site Control

Site work zones will be established as needed where contaminated media is known to exist or whenever field observations or screening tests show the possibility of contaminated materials. Work zone demarcation may include with the use of barricades, cones, warning tape, and/or other physical markers. If an area is located where pedestrian access is possible, temporary fencing will be considered.

Exclusion Zone

The Exclusion Zone (EZ) is the work zone which represents the area of highest contamination at the site and/or the area with the greatest risk of exposure to safety hazards. The outer border of the EZ will be identified with warning tape, barricades, and/or cones. No personnel or visitors will be allowed to enter the EZ without prior approval, without first reviewing this HASP, and must possess the appropriate training, medical review, and personal protective equipment (PPE).

Contamination Reduction Zone

The contamination reduction zone (CRZ) is the work zone which represents the transition area between the EZ and the support zone. The outer border of the CRZ will be delineated as necessary. Single use equipment, contaminated PPE, and trash will be left at the site for disposal.

Support Zone

The support zone (SZ) is the work zone just outside the CRZ which represents the clean areas established at the site. The medical station, equipment and supply station, and other support facilities will be located in the SZ. All breaks, lunches, and meetings take place in the SZ. Any visitors or site personnel who are not required to be in the EZ must remain in the SZ.

Site Communication

This area is served by the 911 Emergency Number System. 911 will be used for any serious medical emergencies. In addition, site communications are critical to allow for expedient communication of operational instructions and safety information. Cell phones will be carried by key personnel.

Site Security

Site security measures will be taken to prevent unauthorized access to the sites. When working hours conclude, all work areas will be fenced and posted to prevent public access. Any stockpiled contaminated material will be secured onsite away from public access. Other measures will be taken as necessary to prevent unauthorized access and ensure the safety of individuals.

Pre-Entry Briefings

All personnel must review the HASP prior to beginning work on the site. Personnel will receive site hazard training before being allowed to work at the site in known areas of contamination. Briefings will include: site hazards anticipated including health effects and hazards of contaminants.

- Exposure monitoring program
- Site control procedures
- PPE requirements
- Decontamination measures
- Procedure for reporting unsafe conditions or unsafe work practices
- Procedures for reporting and injury, illness, or near-miss
- Emergency procedures
- Location and route to the nearest hospital
- Training requirements

Acknowledgement of this plan for general site testing is sufficient; however, should field work (drilling, remedial excavation, etc.) occur a daily tailgate meeting will be performed to document the day's work and potential hazards. All documented meetings will be returned to HydroCon's Health & Safety Director at the end of each work week.

Hazard Analysis

The information provided in this section is based on current data provided to HydroCon during the development of this plan. Hazards not anticipated may be encountered during site work. This section may be updated at any time to address these encounters.

Chemical Hazards

The following chemical hazards are a result of the highest known concentrations found at the project site:

Medium: Groundwater

Analyte	Maximum Concentration (µg/L or ppb)
Gasoline	6,900
Diesel	19,000
Oil	1,100
Benzene	20
Toluene	15
Ethylbenzene	40
Xylenes	21.8
Naphthalene	ND

Medium: Soil

Analyte	Maximum Concentration (mg/kg or ppm)
GRPH	14,000
DRPH	6,700
ORPH	2,800
Benzene	0.524
Toluene	1.57
Ethylbenzene	2.64
Total Xylenes	5.81
Naphthalene	4.73

Medium: Soil Gas

Analyte	Maximum Concentration ($\mu g/m^3$)
APH EC5-8 aliphatic	140,000,000
APH EC9-12 aliphatics	54,000,000
APH EC9-12 aromatics	410,000
Benzene	6,600
Toluene	9,200
Ethylbenzene	35,000
Total Xylenes	9,300
1,2 dichloroethane (EDC)	63
Naphthalene	2.6

Please note that levels of each analyte will vary due to remediation activities.

A summary of the health effects, potential routes of entry and the OSHA 8-hour time-weighted average (TWA), permissible exposure limits (PELs) and/or American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit values (TLV)s for the contaminants listed are summarized in Attachment A to this HASP.

Physical Hazards

Physical hazards associated with excavation and the use of heavy equipment are the most significant hazards on site. Other physical hazards may also be present on site. This section identifies the primary physical hazards that will definitely be encountered during site remediation, as well as other hazards that may be encountered during site work, and provides a list of procedures to mitigate these hazards. An OSHA fact sheet summarizing the hazards related to trenching and excavation and regulations pertaining to control procedures are attached in Attachment B to this HASP.

Trenching and Excavation[1]

- An excavation is any man-made cut, cavity, trench, or depression in an earth surface formed by earth removal. The employer must provide a workplace free of recognized hazards that may cause serious injury or death. The employer must comply with the trenching and excavation requirements of 29 CFR 1926.651 and 1926.652 or comparable OSHA-approved state plan requirements.
- Trench (Trench excavation) means a narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 meters)
- Cave-ins pose the greatest risk from trenching and excavation. Other potential hazards include falls, falling loads, hazardous atmospheres, and incidents involving mobile equipment. Do not enter an unprotected trench or excavation.
- Trenches 5 feet deep or greater require a protective system unless the excavation is made entirely in stable rock. If less than 5 feet deep, a competent person may determine that a protective system is not required. A “Competent Person” is an individual who is capable of identifying existing and predictable hazards or working conditions that are hazardous, unsanitary, or dangerous to workers, soil types and protective systems required, and who is authorized to take prompt corrective measures to eliminate these hazards and conditions. The SM and SSR meet the requirements of a “Competent Person” for the purpose of this HASP.
- Trenches 20 feet deep or greater require that the protective system be designed by a registered professional engineer or be based on tabulated data prepared and/or approved by a registered professional engineer. Trenching at these depths will not be conducted as part of this cleanup action.
- OSHA and DOSH standards require safe access and egress to all excavations, including

[1] *U.S. Department of Labor, Occupational Safety and Health Administration. 2011. OSHA Fact Sheet; Trenching and Excavation Safety. DOC FS-3476 9/11. September.*

ladders, steps, ramps or other safe means of exit for employees working in trench excavations 4 feet or deeper. These devices must be located with 25 feet of all workers.

- General Trenching and Excavation Rules:
    - Keep heavy equipment away from trench edges.
    - Identify other sources that might affect trench stability.
    - Keep excavated soil (spoils) and other materials at least 2 feet (0.6 meters) from trench edges.
    - Know where underground utilities are located before digging.
    - Test for atmospheric hazards such as low oxygen, hazardous fumes and toxic gases when > 4 feet deep.
    - Inspect trenches at the start of each shift.
    - Inspect trenches following a rainstorm or other water intrusion.
    - Do not work under suspended or raised loads and materials.
    - Inspect trenches after any occurrence that could have changed conditions in the trench.
    - Ensure that personnel wear high visibility or other suitable clothing when exposed to vehicular traffic.

Working Alone

- Prior to entering the work site, personnel will assess risks of the tasks to be completed and will implement any measure to avoid or control risks.
- Personnel are only permitted to work alone if there is safe ingress/egress, all temporary access equipment, machinery and goods can be safety handled by one person, the use of non-hazardous chemicals/materials are present. In addition, all high risk tasks (confined space entry, work from heights, use of hazardous equipment, etc.) require additional personnel to be present.
- Personnel must be medically fit and suitable to work alone; consider the routine work and foreseeable emergencies which may impose additional physical and mental burdens on an individual.
- Personnel must be sufficiently experienced and competent in the tasks they are completing.
- Ensure personnel know when to stop work and seek advice from a supervisor.
- Supervision: Lone workers cannot be subject to constant supervision. Supervision can be carried out when checking the progress and quality of the work; it may take the form of periodic site visits combined with discussion in which health and safety issues are raised or pre-agreed intervals of regular contact using phones or email.

Emergencies

Lone workers should be capable of responding correctly to emergencies. Risk assessments

should identify foreseeable events. Information about emergency procedures and danger areas should be provided to the lone worker based on the jobsite. All personnel should have access to first-aid materials suitable for treating minor injuries.

Underground Utilities

Underground utilities present a number of specialized problems. Utilities that need to be considered are:

- Natural gas – fire and explosive hazard
- Electrical – electrocution and fire hazard
- Water lines – excavation, erosion, unsafe working conditions
- Telephone – major disruption of local communication networks

Washington Dig Law:

- Prior to calling for a locate you must outline the area you intend to dig with white paint
- It is HydroCon's responsibility to maintain the locate marks for up to 45 days. After that time, HydroCon has to call for a new locate
- If digging within 100 feet of a transmission pipeline, HydroCon must notify the pipeline company
- No digging will take place until all known facilities are marked or HydroCon is provided information regarding underground facilities by the utility operator
- All damage to underground utilities must be reported to the Utilities Transportation Commission within 45 days of the incident

Vehicle Traffic

Vehicle and equipment traffic control procedures will be required due to the presence of vehicle and/or pedestrian traffic and will require the following precautions:

- Highly visible reflective safety vests will be worn by site personnel where exposure to vehicle or equipment traffic exists.
- Workers will be cautioned to look carefully where they walk to avoid vehicles and moving equipment and to maintain eye contact with heavy equipment operators.
- Use of traffic signs, barricades, flashers, delineators, traffic cones, caution tape, and/or flagmen around work areas with vehicle or equipment traffic (as needed).
- The SM and/or SSR will establish vehicle and equipment traffic patterns to be used. Traffic haul routes will be identified during daily safety meetings and will take into account times and locations of concern for vehicle, heavy equipment, and pedestrian traffic exposures in the work area.
- Vehicle and heavy equipment traffic control patterns, other control measures, and times of operation will be communicated to facility and other affected personnel.

- If the level of vehicle and equipment traffic warrants, the SM and/or SSR will:
  - Establish a written traffic control plan
  - Identify type of traffic concerns (i.e., vehicle, heavy equipment, pedestrian, etc.)
  - Identify specific locations of traffic concerns
  - Identify peak traffic exposure times
  - Designate quantity and placement of traffic control equipment, including use of traffic signs, barricades, flashers, delineators, cones, caution tape, and flagmen
  - Construct and/or designate protected walkways for pedestrians, as needed
  - Designate hours of work operation

Noise Exposure

The operation of heavy equipment and machinery at a site may generate excessive noise levels and will require:

- Hearing protection to be used by site personnel whenever noise exposures exceed 85 decibels on the A-weighted scale (dBA)
- Noise exposures in excess of 85 dBA will be assumed to be present whenever voices must be raised to be heard in normal conversation at three (3) feet apart and also whenever working in the immediate areas of operating heavy equipment, generators, compressors, and similar equipment.
- Personnel working in the immediate area of operating equipment will use hearing protection (e.g., foam ear plugs). Hearing protection shall have a corrected NRR rating capable of reducing noise levels in the ear to a maximum of 85 dBA.

Inclement Weather

In cases of inclement weather or other adverse environmental conditions (strong winds, rain, lightning, snow, hurricane, tornado, earthquake, etc.), the following safety instructions are required:

- Presence of strong winds will cause stoppage of affected work activities at elevated work locations (e.g., towers, roofs, ladders, scaffolds, platforms, etc.) and stoppage of use of equipment whose safe operation can be affected by high winds.
- Presence of heavy rain or snow will cause stoppage of affected work activities where the heavy rain or snow can create safety hazards due to limited visibility, wet work surfaces, slippery equipment controls, increased electrical hazards, cold stress, etc.
- Presence of lightning will cause stoppage of affected work activities where lightning presents an increased safety hazard of electrocution.
- Occurrence of a hurricane, tornado, or earthquake will require stoppage of affected work activities and evacuation of workers from excavations/trenches, confined spaces, and buildings of questionable stability.

In case of work stoppage due to inclement weather conditions, work will not resume until an all clear

signal has been communicated to affected personnel. In case of work stoppage due to lightning, an all-clear will not be given until no lightning has appeared in the area for a period of ten (10) minutes.

Temperature Stress (Heat & Cold)

Heat Stress

If heat stress is a concern, the following heat stress precautions and prevention measures will be taken.

- Personnel will be made aware that heat stress can occur during periods of elevated ambient temperatures, moderate to heavy workloads, and when impermeable protective clothing is in use.
- Personnel will be informed regarding the various forms of heat stress (e.g., heat cramps, heat exhaustion, and heat stroke) and the symptoms of exposure.

Disorder	Symptoms	Signs	Cause	First Aid	Prevention
Heat Stroke	Chills, restlessness, irritability	Euphoria, red face, disorientation, hot/dry skin, erratic behavior, unconsciousness, convulsions, body temp ≥104°F	Excessive exposure, subnormal heat tolerance (genetic or acquired), drug/alcohol abuse	Immediate, aggressive effective cooling; transport to hospital	Self-determination of heat stress exposure; maintain a healthy life- style; acclimation; follow prevention methods below
Dehydration	No early symptoms, fatigue/weakness; dry mouth	Loss of work capacity, increased response time	Excessive fluid loss cause by sweating, illness (vomiting or diarrhea), alcohol consumption	Fluid and salt replacement	Drink water frequently; add salt to food
Heat Syncope	Blurred vision (gray out), fainting (brief black out), normal temperature	Brief fainting or near-fainting behavior	Pooling of blood in the legs and skin from prolonged static posture & heat exposure	Lie on back in cool environment; drink water	Flex leg muscles several times before moving; stand or sit up slowing

Heat Cramps	Painful muscle cramps, especially in abdominal or fatigued muscles	Incapacitating pain in muscles	Electrolyte, imbalance caused by prolonged sweating without adequate fluid and salt intake	Rest in cool environment; drink salted water (0.5% salt solution); massage muscles	If hard physical work is part of the job, workers should add extra salt to food
Heat Rash	Itching skin, skin eruptions, reduced sweating	Skin eruptions	Prolonged, uninterrupted sweating, inadequate hygiene practices	Keep skin clean & dry; reduce heat exposure	Keep skin clean and periodically allow skin to dry

- Initial phases of work activity will be closely monitored to identify personnel who are more susceptible to heat exposure; it takes approximately 5 days to fully acclimate.
- Workers will be responsible for observing each other and themselves for development of heat stress symptoms.
- Personnel will be encouraged to drink generous amounts water and electrolyte replacement fluids (even if not thirsty) to prevent dehydration.
- Adequate shelter will be provided to protect personnel from direct sun exposure.
- Sufficient breaks will be provided so that personnel can remove impermeable protective clothing and cool down.
- Personal protective equipment can increase the risk of heat stress. It is important to remove PPE while taking breaks. In addition, if employees should notify the site safety officer when PPE is causing them to overheat or feel uncomfortable.
- Work/rest regimens will be adjusted as required to avoid heat stress.
- Personnel are encouraged to wear cotton, non-synthetic clothing.

Heat Stress Monitoring

Heat stress monitoring will be conducted at times when elevated ambient temperatures, moderate to heavy workloads and impermeable protective clothing are being used (Note: Level D Protection will not require the use of impermeable protective clothing). Heat stress monitoring will be completed, as required by the SSR, when impermeable protective clothing is in use and ambient temperatures exceed 75°F. The frequency of monitoring will increase as the ambient temperature increases or if slow recovery rates are indicated. When ambient temperatures exceed 80°F, monitoring will be completed after each work period (approx. every 2 hours or as determined by the SSR/CIH).

Heat stress monitoring and establishment of work-rest regimens for heat stress prevention will be

completed through physiological monitoring of workers. Physiological monitoring is completed by measuring the body temperature in degrees Fahrenheit (°F) with an ear thermometer set on an adult oral temperature setting.

Heart rate is measured by measuring the worker's radial pulse rate. Action levels for elevated body temperatures to be used are 99.6°F (for the SSR to observe/evaluate the condition of the individual) and 100.6°F (for removal of the individual from work involving heat exposure for the rest of the work day). Physiological monitoring for heat stress involves the following:

- Body temperature monitoring. Measure the body temperature (BT) using an ear thermometer:
  - Complete baseline measurements at the start of work before entering the EZ.
  - Following the first work period, measure the BT as soon as possible in the rest period before drinking. If the BT exceeds 99.6°F (or the baseline by 1°F), reduce the next work cycle by one-third without changing the duration of the rest period.
  - Following the next work period, if the BT still exceeds 99.6°F (or the baseline by 1°F), then again shorten the following work cycle by one-third while keeping the length of the rest period the same.
  - Watch for signs and symptoms of heat stress throughout the work process. Pay strict attention to anyone whose body temperature exceeds 99.6°F (or 1-2°F above baseline) and contact the SSR for an evaluation of the individual. Do not permit a worker to wear semi-impermeable or impermeable garments when the BT exceeds 100.6°F. If the BT exceeds 100.6°F, immediately contact the SSR, remove the worker from the work area, remove protective clothing from the worker, and treat for heat exhaustion/heat stroke if symptoms are evident. If the BT exceeds 100.6°F, the worker must not be allowed to do work involving heat exposure for the rest of the work day.
- Heart rate monitoring:
  - Complete baseline measurements at the start of work before entering the EZ. Measure the heart rate (HR) by counting the radial pulse for a 30 second period and multiply the value by two to determine the number of beats per minute (bpm).
  - Following the first work period, measure the HR as early as possible in the resting period. If the HR exceeds 110 bpm, then reduce the next work period by one-third while keeping the length of the rest period the same. Following the next work period, if the HR still exceeds 110 bpm, then again shorten the following work cycle by one-third while keeping the length of the rest period the same.
  - Watch for signs and symptoms of heat stress throughout the work process. Contact the SSR for an evaluation when a worker's HR exceeds 110 bpm.

Cold Stress

Cold stress can occur upon exposure to cold environments where there is heat loss to the body, feet,

hands, and/or head. Primary cold stress injuries are hypothermia and frostbite. Cold can also adversely affect mental capabilities resulting in accidents or injuries. The body's initial response to cold is shivering, vasoconstriction, increased oxygen consumption, accelerated respiration and pulse, and increased heart output and blood pressure. Cold stress can occur from exposure to external elements including weather or as a result from falling into water.

Personnel will be informed about the various forms of cold stress (e.g., hypothermia, frostbite, etc.) and the symptoms of exposure (Table reproduced from National Safety Council's Fundamentals of Industrial Hygiene, 4th Ed.)

Disorder	Symptoms	Signs	Causes	First Aid
Hypothermia	Chills, pain in extremities, fatigue or drowsiness	Euphoria, slow/ weak pulse, slurred speech, collapse, shivering, unconsciousness, body temperature <95°F	Excessive exposure, exhaustion or dehydration, subnormal tolerance (genetic or acquired)	Move to warm area and remove wet clothing; modest external warming (external heat packs, blankets, etc.); drink warm, sweet fluids if conscious; transport to hospital
Frostbite	Burning sensation at first, coldness, numbness, tingling	Skin color white or grayish, yellow to reddish, violet to black, blisters, response to touch depends on depth of freezing	Exposure to cold, vascular disease	Move to warm area and remove wet clothing; external warming (e.g. warm water); drink warm, sweet fluids if conscious; treat as a burn, do not rub affected area; transport to hospital
Frost-nip	Possible itching or pain	Skin turns white	Exposure to cold (above freezing)	Similar to frostbite
Trench Foot	Severe pain, tingling, itching	Edema, blisters, response to touch depends on depth of freezing	Exposure to cold (above freezing) and dampness	Similar to frostbite
Chilblain	Recurrent localized itching, painful inflammation	Swelling, sever spasms	Inadequate clothing, exposure to cold and dampness, vascular disease	Remove to warm area; consult physician
Raynaud's Disorder	Finger tingle, intermittent	Fingers blanch with cold exposure	Exposure to cold and vibration	Remove to warm area

Cold stress prevention measures include:

- Recognize cold stress conditions and exposure symptoms. Use personal protection by dressing for warmth, wind, and wet conditions. Wear layered clothing (i.e., wear thinner, lighter clothing next to the body with heavier clothing layered outside the inner clothing. Stay active as activity generates heat. Provide a warm break area when working in cold environments. Have first-aid equipment available.
- At temperatures lower than 25°F, do not permit continuous cold exposure to exposed skin.
- At temperatures lower than 45°F, wear warm clothing to include as needed: Boots; heavy socks (e.g., wool or polypropylene); mittens, insulated gloves; insulated head covers; thermal underwear; and insulated coveralls.
- Workers that get immersed in water or whose clothing becomes wet will be immediately provided with a change of clothing and be treated for hypothermia if symptoms become evident.

Personal Protective Equipment

At a minimum, all field crew and visitors will wear Level D Protection. Visitors should supply their own PPE; however, should they not have the appropriate gear, they are required to remain in their vehicle or go to a designated area to meet with the appropriate personnel.

The HydroCon SSR is the only person authorized to establish and modify the level of PPE for HydroCon personnel working in the EZ and CRZ.

Level D Protection

Level D Protection is worn when minimal protection is needed and activities are not likely to involve direct contact with contaminated materials. Level D protection consists of:

- Steel-toe work boots
- Gloves (nitrile)
- Orange safety vest
- Hardhat (may be removed while taking measurement, collecting samples, etc.)
- Safety glasses
- Ear protection (as needed)

Modified Level D Protection

Modified Level D Protection is used when some skin protection is desired to avoid accidental skin contact with contaminants. Modified Level D Protection consists of:

- Disposable coveralls (e.g. PVC, Kleenguard or Tyvek)
- Steel-toe work boots
- Chemical-resistant gloves (e.g. nitrile or PVC)
- Hardhat
- Respiratory protection – NIOSH approved dust mask or half-mask
- Safety vest
- Boot covers (PVC or latex)
- Safety glasses with side shields
- Goggles and/or face shield (as needed for liquid splash protection)
- Ear protection (as needed)

Level C Protection

Level C Protection may be required if the conditions are upgraded. Level C Protection consists of:

- Full-face air-purifying respirator (APR) or powered air-purifying respirator (PAPR) with appropriate cartridge/filter (e.g. P-100 HEPA for dust exposure) and organic vapor for hydrocarbon exposures)
- Suit, chemical-resistant, disposable with hood (e.g. PVC, Kleenguard, or Tyvek)
- Boots, chemical-resistant, steel-toe/shank (e.g. PVC, neoprene or nitrile blend)
- Gloves, inner, chemical-resistant (e.g. nitrile or latex)
- Gloves, outer, chemical-resistant (e.g. nitrile or PVC)
- Hard hat
- Safety vest
- Boot covers (PVC or latex)
- Ear Protection (as needed)

Level B Protection

Level B Protection would be required if conditions necessitate the highest level of respiratory protection. This would be determined by the SSR through the use of the hazard monitoring protocols and actions levels described in this HASP. If action levels dictate Level B protection, the SSR will stop work and not allow work to restart work until conditions downgrade to a level suitable for the use of Level C protection. HydroCon personnel are not authorized to work in Level B protection on this project. For informational purposes, Level B protection consists of the following PPE:

- Direct-airline respirator, or self-contained breathing apparatus (SCBA) operated in the positive pressure/pressure demand (PP/PD) mode.
- Suit, chemical-resistant, disposable with hood (e.g. PVC, Kleenguard, or Tyvek)

- Boots, chemical-resistant, steel-toe/shank (e.g. PVC, neoprene or nitrile blend)
- Gloves, inner, chemical-resistant (e.g. nitrile or latex)
- Gloves, outer, chemical-resistant (e.g. nitrile or PVC)
- Hard hat
- Safety vest
- Boot covers (PVC or latex)
- Ear Protection (as needed)

PPE Maintenance

Personnel are responsible for the proper use of required PPE. Maintenance of reusable PPE (e.g. hardhats, safety glasses, boots, etc.) and respirators is the responsibility of each worker. Torn protective clothing or damaged PPE is prohibited and must be immediately repaired or replaced.

Hazard Monitoring/Action Levels

All monitoring will be determined on a case-by-case basis. Monitoring may be performed to determine personnel exposures to chemical contaminants and physical agents during various project activities. It will also be used to determine the level of PPE to be worn onsite.

Combustible Gases and Oxygen Concentration

A combustible gas indicator/oxygen meter is used as a direct reading air monitoring instrument to detect flammable vapor and gas concentrations in percent of the lower explosive limit (LEL). Oxygen can be measured within a range of 0-25 %.

Monitoring for combustible gases and oxygen deficiency is conducted where the presence of flammable vapors/gases or oxygen deficient/enriched atmospheres is suspected. Work is not permitted in areas where combustible gas concentrations exceed 10% of the LEL, or where oxygen levels are below 19.5% or are above 23.5%. The combustible gas/oxygen indicator is calibrated before use to a known concentration of combustible gas in accordance with manufacturer instructions.

Volatile Organic Compounds (VOCs)

A photoionization detector (PID) will be used during site activities to determine the presence of VOCs. Personnel will wear Level D PPE in the EZ unless the PID indicates a sustained airborne concentration >5 ppm (see below). Attachment A summarizes the exposure limits for the COCs.

The action level for Level C protection for volatile COCs is 0.5 ppm based on ½ of the TLV-TWA of the chemical with the lowest TLV, which for benzene is 1 ppm. Since this low level of detection is not sufficiently reproducible using a PID for real-time monitoring, the Level C action level is set at 5 ppm for total organic vapors on the PID. If PID readings exceed 5 ppm (the STEL for benzene), then

benzene specific exposure will be confirmed using colorimetric detector tubes on initial entry. If the benzene-specific colorimetric detector tubes show that the TLV-TWA for benzene of 0.5 ppm is not exceeded at a reading of 5 ppm on the PID, the Level C action level will be 5 ppm based on real-time monitoring with a PID. The Level B action level will be set at 10 times the Level C action level, or 50 ppm as measured on the PID. If real time monitoring with the PID indicates that the Level B action level has been reached, all work will stop until airborne hazards are below the Level C action level.

Decontamination

Eating, drinking, chewing gum, tobacco, or smoking in a contaminated zone is prohibited. These actions may occur in a personal vehicle or in a location that is considered outside the working area. Site personnel will wash prior to eating, drinking, and returning home.

The remainder of this section will outline decontamination procedures based on the level of protection used.

Level D Protection - Decontamination Procedures with Low Contamination

Station 1:	Equipment Drop	1. Deposit used equipment on sheet plastic or in container/plastic bag.
Station 2:	Outer Garment, Boots, and Gloves Wash and Rinse	2. Remove and dispose of Coveralls (if worn) and Outer Gloves in a lined plastic container (trash)
Station 3:	Field Wash	3. Wash hands and face thoroughly.

Modified Level D Protection - Decontamination Procedures

Station 1:	Equipment Drop	1. Deposit used equipment on sheet plastic or in container/plastic bag.
Station 2:	Outer Garment, Boots, and Gloves Wash and Rinse	2. Scrub outer boots, outer gloves, and suit with detergent/water solution. Rinse off with water.
Station 3:	Outer Boot and Glove Removal	3. Remove outer boots and gloves. Deposit in container with plastic liner.
Station 4:	Boots and Outer Garments Removal	4. Remove boots, suit, and inner gloves and deposit in container with plastic bag.
Station 5:	Field Wash	5. Wash hands and face thoroughly.

Level C Protection - Decontamination Procedures

Station 1:	Equipment Drop	1. Deposit used equipment on sheet plastic or in container/plastic bag.
Station 2:	Outer Garment, Boots, and Gloves Wash and Rinse	2. Scrub outer boots, outer gloves, and suit with detergent/water solution. Rinse off with water.
Station 3:	Outer Boot and Glove Removal	3. Remove outer boots and gloves. Deposit in container with plastic liner.
Station 4:	Cartridge or Mask Change-Out	4. Change-out cartridge or facepiece as needed, don new outer gloves and boot covers, tape at joints, and return to Exclusion Zone (Note: Last step in decon sequence for canister, cartridge, or mask change-out; continue decon sequence if entering Support Zone)
Station 5:	Boots, Gloves and Outer Garment Removal	5. Remove boots and suit and deposit in container with plastic bag.
Station 6:	Respirator Facepiece and Inner Gloves Removal	6. Remove respirator facepiece (avoid touching face with fingers) and deposit on sheet plastic or in plastic bag. Remove inner gloves.
Station 7:	Field Wash	7. Wash hands and face thoroughly.

Waste Storage and Disposal

Waste will be handled, stored, and disposed accordingly. The appropriate level of PPE will be worn when handling waste materials. Waste of any kind will not remain on site at project completion unless pre-arranged with the project owner.

Emergency Response Plan

For major emergency events (e.g. large fires, gas line or electrical line breaks, etc.) personnel will be evacuated to a designated refuge area and local fire, police, and/or emergency medical services will be notified. The SM, SSR, and/or PM will work cooperatively to resolve emergency events.

All site personnel are required to immediately notify the site manager in the event of any type of emergency. Once notified, the SM will contact any necessary emergency services. An emergency telephone list will be maintained at the site during all operations.

Emergency supplies that will be immediately available at the site will include:

- First aid kit
- Emergency eyewash supplies
- Supply of clean water
- Fire extinguisher

The remainder of this section will outline response procedure for various emergency situations.

Response to Fire

In the event of a fire, the following procedures will be implemented:

- Large fire (beyond immediate control of a small onsite fire extinguisher)
  - Personnel will immediately evacuate the work area and reassemble at a pre-determined safe location
  - Fire department will be called
  - Site personnel will not re-enter the fire area and will wait for fire department arrival
- Small fire
  - Trained personnel will use an onsite fire extinguisher to put out the fire

Response to Chemical Spill

In the event of a chemical spill, the following procedures will be implemented:

- If containment can be done safety without exposure to personnel
  - Liquid chemical spills will be contained through prompt application of absorbents (e.g. absorbent boom, pads or solid absorbent) and placement of containment berms (or equivalent method)
  - Solid chemical spills will be contained initially by covering with sheet plastic (or equivalent method)
  - Spilled material will be collected in bags, drums, overpack drums, dump trucks or other suitable containers and disposed of as required
  - Necessary person will be contacted regarding the spill

Response to Heat Stress

In the event of a heat stress illness, the following procedures will be implemented:

- Heat Exhaustion
  - Move them to a cool shaded area to rest & stay with them
  - Loosen & remove heavy clothing
  - Give cool water to drink, about a cup every 15 minutes
  - Fan the person, spray with cool water, or apply a wet cloth to skin (back of neck)
  - Remove from hot environment work that day
  - Call 911 if they do not feel better in a few minutes
- Heat Stroke
  - CALL 911
  - Move them to a cool shaded area & stay with them
  - Lay the person down
  - Loosen & remove heavy clothing
  - Fan the person, spray with cool water, or wipe with a wet cloth or cover with a wet sheet
  - Place icepacks under the armpits and in the groin area

Response to Medical Emergency

In the event of a medical emergency, the following procedures will be implemented:

- All personnel will be notified and if necessary, will evacuate to a designated refuge area.
- The exposed or injured employee will be removed from immediate danger, first aid and/or CPR will be administered by a trained employee and the victim will be decontaminated according to methods determined by the SSR if it is safe to do so.

- Emergency services will be called and the following will be provided:
  - Name and location of person reporting
  - Location of accident or incident
  - Specific directions to the location
  - Phone number from which the person is called
  - Number of persons needing help
  - What is currently being done for the victim(s)
  - Name and affiliation of victim(s)
  - Description of injuries
  - Details of any chemical(s) involved
  - Summary of the accident including suspected causes and time of occurrence
  - Temporary control measures taken to minimize further risk
- The SSR will designate an individual to accompany or follow the victim to the emergency hospital to assist with any needs that arise and to report back regarding the victim(s) status.
- A map to the nearest hospital can be found in Attachment C to this document.

Emergency Contact List

Contact	Number
Ambulance (emergency)	911
Fire Department (emergency)	911
Police (emergency)	911
HydroCon Main Office	360.703.6079
Project Manager – Craig Hultgren	360.703.6079 or 360.431.6253
Site Manager – Rob Honsberger	206.856.6679
Site Safety Representative – Larry Namba	360.846.3966
HydroCon Health & Safety Director – Brian Daltoso	360.703.6079

Training

Any required certifications or licenses required to complete a project will be kept on site for review by any personnel requesting proof.

HAZWOPER Training

All personnel working or present in the EZ requiring chemical protective PPE must have completed hazardous waste operations (HAZWOPER) training as required by OSHA 29 CFR §1910.120. Required training includes:

- 40-hours of initial training and 3 days of supervised field experience applicable to the site
- 8 additional hours of training for managers/supervisors
- 8-hours of an annual refresher

Personnel working in the areas of known contamination will receive training for the on-site contaminants, exposure, and decontamination procedures.

First Aid & CPR

At least one site worker must be trained and certified in the application of emergency first aid and CPR.

Medical Surveillance

Medical surveillance under the HAZWOPER standard is not required for this project.

Exposure Incident Medical Examinations

A chemical exposure incident medical examination will be completed if a worker is exposed to chemicals (or if suspicious symptoms exist). The chemical exposure incident medical examination is mandatory and should be completed as soon as possible, but in no case later than 48 hours after the incident. The contractor safety representative and/or CIH (if applicable) will provide the treating physician with a list of suspected chemicals that the worker may have contacted, and additional information which may aid the physician. The worker will not be allowed back to work until a return to work notice has been issued by the examining physician.

Alcohol & Controlled Substances Testing Program

HydroCon is committed to maintaining its reputation for quality work and customer service by providing a healthy, safe, and alcohol & controlled substance free work environment. Employees shall not use, sell, manufacture, receive, distribute, conceal, possess, or be under the influence of any controlled substances, including medicinal & recreational marijuana, and/or alcohol during scheduled working hours. Working hours include all lunches and breaks. Employees will not engage in the aforementioned activities while on company or client property, jobsites, or while operating company, client, or personally owned or leased vehicles & equipment.

The alcohol & controlled substances program requires field personnel to complete pre-employment, random, reasonable suspicion, post-accident, and return to duty testing, as applicable.

The request to undergo a reasonable suspicion test will be based on specific, contemporaneous, articulable observation concerning the appearance, behavior, speech, or odor of the employee. A HydroCon employee whom has undergone reasonable suspicion training must be the one to make this determination. In the event that the employee is unsure, they should consult another trained employee.

The complete program is kept under separate cover and can be provided upon request.

Recordkeeping

In general, all health and safety related documented will be maintained onsite by the SSR. At project completion, documents will be provided to the Health & Safety Director to file accordingly.

Health and safety records can include the following:

- Safety data sheets
- Training documentation, including licenses/certifications
- Tailgate meeting records
- Equipment inspection reports
- Hot work Permits
- Confined Space Permits
- Exposure monitoring records, employee notifications and data summaries
- Accident investigation records
- Operating manuals and/or instructions
- Other necessary documentation

Confined Space Procedures

It is not anticipated that confined spaces will be entered. However, if confined space must be entered the confined space program, under separate cover, must be followed.

Spill Prevention Control & Countermeasures Plan

HydroCon is committed to the prevention of discharges of hazardous substances, including fuels and lubricants, to navigable waters or the environment. The following section describes general procedure for spill prevention and countermeasures (SPCC). In the event of a discharge of oil, fuel, or chemicals into water, or onto land with the potential for entry into waters, containment and cleanup efforts shall begin immediately and be completed as soon as possible, taking precedence over normal work. Cleanup will include the proper disposal of all spilled material and used cleanup materials.

Spill Prevention & Response Procedures

Housekeeping

Housekeeping practices are designed to maintain a clean and orderly work environment. Areas where chemicals are used or stored must be maintained using good housekeeping and best management practices. This includes, but is not limited to clean and organized storage, labeling, and secondary containment where necessary. Every effort will be made to prevent pollutants from entering the environment by accidental spill or release.

Storage

All chemicals, including hazardous materials will be properly identified, handled, and stored. Any underground or aboveground storage tanks will be designed and managed in accordance with applicable regulations, be identified as a potential pollution source, and have secondary containment, such as a berm or dike with an impervious surface. Chemical substances will be stored in the appropriate tanks and containers to minimize the potential for a spill. Whenever possible, all chemicals will be kept in closed containers and stored so they are not exposed to stormwater or other environmental influences. All site personnel will be made aware of and properly instructed on the hazards of all chemicals stored on site.

Discharge Prevention

HydroCon employees are trained to implement spill prevention practices for work with and around liquid sources. They will use common sense and rely on spill prevention practices at all times to minimize the potential for a release of liquids. The following practices will be followed:

- Keep container lids securely fastened at all times
- Do not leave portable sources unattended (outside)
- Return portable sources to their storage location after use
- Use pads, drip pans, and funnels when transferring petroleum products from a portable container

- Protect liquid sources from damage by moving equipment
- Keep dike valves closed at all times except when discharging clean stormwater from the diked area
- Contaminated water within the diked area and piping and dispenser sumps will be removed and disposed of by a licensed hazardous waste contractor
- Do not store oil sources near catch basins or floor drains
- Loading and unloading of petroleum products will be attended at all times

Emergency Communication

Proper communication measures must be in place and initiated in the event of a spill or release of materials. Communication procedures will be based on type and quantity of materials spilled. Given that HydroCon performs work on an array of job sites, cell phones will be the main source of communication to outside emergency personnel such as the police, fire department or local emergency response teams. In addition, cell phones will be used to notify other personnel on large job sites. Specific emergency communication and procedures will be documented in site specific health and safety plans.

Important Telephone Numbers

National Response Center	1.800.424.8802
Washington Emergency Response System	1.800258.5990

The following information should be provided:

- Where is the spill?
- What spilled?
- How much spilled?
- How concentrated is the spilled material?
- Who spilled the material?
- Is anyone cleaning up the spill?
- Are there resource damages (e.g. dead fish or oiled birds)?
- Who is reporting the spill?
- Contact information

In Washington, you may receive additional requests to complete paperwork relating to the spill/release from the Department of Ecology.

If a single spill greater than 1,000 gallons occurs, or two spills each greater than 42 gallons occur within any twelve (12) month period, in addition to the notification procedures above, HydroCon will provide written information to the EPA Regional Administrator as required by the federal SPCC rules. A copy of this information must be provided to the appropriate state agency.

ATTACHMENT A

Chemical Hazard Information

Attachment A - Chemical Hazard Information

CHEMICAL OF CONCERN	EXPOSURE LIMITS	ROUTE OF EXPOSURE	HEALTH EFFECTS
Benzene	DOSH PEL: 1ppm TWA 5ppm STEL AL: 0.5 ppm TWA NIOSH REL: 0.1 ppm TWA 1ppm STEL IDLH: 500 ppm FP: 12°F LEL: 1.2%	Inhalation, ingestion, skin absorption, eye contact	Irritation of eyes, skin, nose, respiratory system; dizziness; headache; nausea (carcinogen)
EDC (1,2-Dichloroethane, ethylene chloride)	OSHA PEL: 50 ppm TWA 100 ppm C 200 ppm (5 min max. peak)	Inhalation, ingestion, skin absorption, skin or eye contact	Irritation to eyes, corneal opacity; central nervous system depression; nausea, vomiting; dermatitis; liver, kidney, cardiovascular system damage; potential occupational carcinogen
Ethylbenzene	DOSH PEL: 100 ppm TWA 125 ppm STEL NIOSH REL: 50 ppm TWA 100 ppm STEL IDLH: 700 ppm FP: 55°F LEL: 0.8%	Inhalation, ingestion, skin or eye contact	Irritation of eyes, skin nose, respiratory system; dizziness; headache; drowsiness; unsteady gait; defatting; inflammation of skin; possible liver injury; reproductive effects
Lead	OSHA PEL: 0.050 mg/m^3 TWA NIOSH REL: 0.050 mg/m^3 TWA	Inhalation, ingestion, skin or eye contact	Lassitude, insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation to eyes; hypertension
Naphthalene	DOSH PEL: 10 ppm TWA 15 ppm STEL NIOSH REL: 10 ppm TWA 15 ppm STEL IDLH 250 ppm LEL 0.9%	Inhalation, ingestion, skin absorption, eye contact	Eye irritation, headache, confusion, excitement, malaise, nausea, vomiting, abdominal pain, irritable bladder, profuse sweating, jaundice, blood in urine, renal shutdown, inflammation of skin
Toluene	OSHA PEL: 200 ppm TWA 300 ppm C 500 ppm 10 min. max. peak NIOSH REL: 100 ppm TWA	Inhalation, skin absorption, ingestion, skin or eye contact	Eye irritation, nose irritation; lassitude, confusion, euphoria, dizziness, headache; dilated pupils, lacrimation; anxiety, muscle fatigue, insomnia; paresthesia; dermatitis; liver, kidney damage
TPH as Diesel (petroleum distillates as a surrogate)	DOSH PEL: 100 ppm TWA 150 ppm STEL OSHA PEL: 500 ppm TWA NIOSH REL: 86 ppm TWA 444 ppm STEL IDLH: 1,100 ppm FP: -40 to -86°F LEL: 1.1%	Inhalation, ingestion, skin or eye contact	Irritation of eyes, nose, throat; dizziness; drowsiness; headache; nausea; dry cracked skin; inflammation of lungs

TPH as Gasoline	DOSH PEL: 300 ppm TWA 500 ppm STEL FP: -45°F LEL: 1.4%	Inhalation, ingestion, skin absorption, skin or eye contact	Irritation of eyes, skin, and mucous membranes; inflammation of skin and lungs; headache; weakness; exhaustion; blurred vision; dizziness, slurred speech; confusion; convulsions; possible liver and kidney damage; potential occupational carcinogen
Xylenes	DOSH PEL: 100 ppm TWA 150 ppm STEL NIOSH REL: 100 ppm TWA 150 ppm STEL IDLH: 900 ppm FP: 81-90°F LEL: 0.9-1.1%	Inhalation, ingestion, skin absorption, skin or eye contact	Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal cell debris; anorexia, nausea, vomiting, abdominal pain; inflammation of skin

LEGEND:

$\mu g/m^3$:	micrograms per cubic meter of air
mg/m^3:	milligrams per cubic meter of air
AL:	Occupational Safety and Health Administration (OSHA) 8-hour TWA Action Level
C:	Ceiling Limit
DOSH	Washington Department of Occupational Safety and Health
FP:	Freezing Point
IDLH:	Immediately Dangerous to Life and Health
LEL	lower explosive limit
NIOSH:	National Institutes for Occupational Safety and Health PEL: OSHA 8-hour TWA Permissible Exposure Limit
OSHA	Occupational Safety and Health Administration
ppm	parts per million by volume
PEL	permissible exposure limit (OSHA)
REL:	Recommended Exposure Level
STEL:	Short-Term Exposure Limit
TLV-TWA:	American Conference of Governmental Industrial Hygienists (ACGIH) 8-hour TWA Threshold Limit Value (TLV)
STEL:	ACGIH 15-minute Short-Term Exposure Limit (STEL)
TWA:	Time Weighted Average

ATTACHMENT B

OSHA Fact Sheet
Trenching & Excavation

OSHA® FactSheet

Trenching and Excavation Safety

Two workers are killed every month in trench collapses. The employer must provide a workplace free of recognized hazards that may cause serious injury or death. The employer must comply with the trenching and excavation requirements of 29 CFR 1926.651 and 1926.652 or comparable OSHA-approved state plan requirements.

An excavation is any man-made cut, cavity, trench, or depression in an earth surface formed by earth removal.

Trench (Trench excavation) means a narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 meters).

Dangers of Trenching and Excavation

Cave-ins pose the greatest risk and are much more likely than other excavation-related accidents to result in worker fatalities. Other potential hazards include falls, falling loads, hazardous atmospheres, and incidents involving mobile equipment. One cubic yard of soil can weigh as much as a car. An unprotected trench is an early grave. Do not enter an unprotected trench.

Trench Safety Measures

Trenches 5 feet (1.5 meters) deep or greater require a protective system unless the excavation is made entirely in stable rock. If less than 5 feet deep, a competent person may determine that a protective system is not required.

Trenches 20 feet (6.1 meters) deep or greater require that the protective system be designed by a registered professional engineer or be based on tabulated data prepared and/or approved by a registered professional engineer in accordance with 1926.652(b) and (c).

Competent Person

OSHA standards require that employers inspect trenches daily and as conditions change by a competent person before worker entry to ensure elimination of excavation hazards. A competent person is an individual who is capable of identifying existing and predictable hazards or working conditions that are hazardous, unsanitary, or dangerous to workers, soil types and protective systems required, and who is authorized to take prompt corrective measures to eliminate these hazards and conditions.

Access and Egress

OSHA standards require safe access and egress to all excavations, including ladders, steps, ramps, or other safe means of exit for employees working in trench excavations 4 feet (1.22 meters) or deeper. These devices must be located within 25 feet (7.6 meters) of all workers.

General Trenching and Excavation Rules

- Keep heavy equipment away from trench edges.
- Identify other sources that might affect trench stability.
- Keep excavated soil (spoils) and other materials at least 2 feet (0.6 meters) from trench edges.
- Know where underground utilities are located before digging.
- Test for atmospheric hazards such as low oxygen, hazardous fumes and toxic gases when > 4 feet deep.
- Inspect trenches at the start of each shift.
- Inspect trenches following a rainstorm or other water intrusion.
- Do not work under suspended or raised loads and materials.
- Inspect trenches after any occurrence that could have changed conditions in the trench.
- Ensure that personnel wear high visibility or other suitable clothing when exposed to vehicular traffic.

Protective Systems

There are different types of protective systems.

Benching means a method of protecting workers from cave-ins by excavating the sides of an

excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels. *Benching cannot be done in Type C soil.*

Sloping involves cutting back the trench wall at an angle inclined away from the excavation.

Shoring requires installing aluminum hydraulic or other types of supports to prevent soil movement and cave-ins.

Shielding protects workers by using trench boxes or other types of supports to prevent soil cave-ins. Designing a protective system can be complex because you must consider many factors: soil classification, depth of cut, water content of soil, changes caused by weather or climate, surcharge loads (e.g., spoil, other materials to be used in the trench) and other operations in the vicinity.

Additional Information

Visit OSHA's Safety and Health Topics web page on trenching and excavation at
www.osha.gov/SLTC/trenchingexcavation/index.html
www.osha.gov/dcsp/statestandard.html

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.

For assistance, contact us. We can help. It's confidential.

OSHA® Occupational Safety and Health Administration

U.S. Department of Labor
www.osha.gov (800) 321-OSHA (6742)

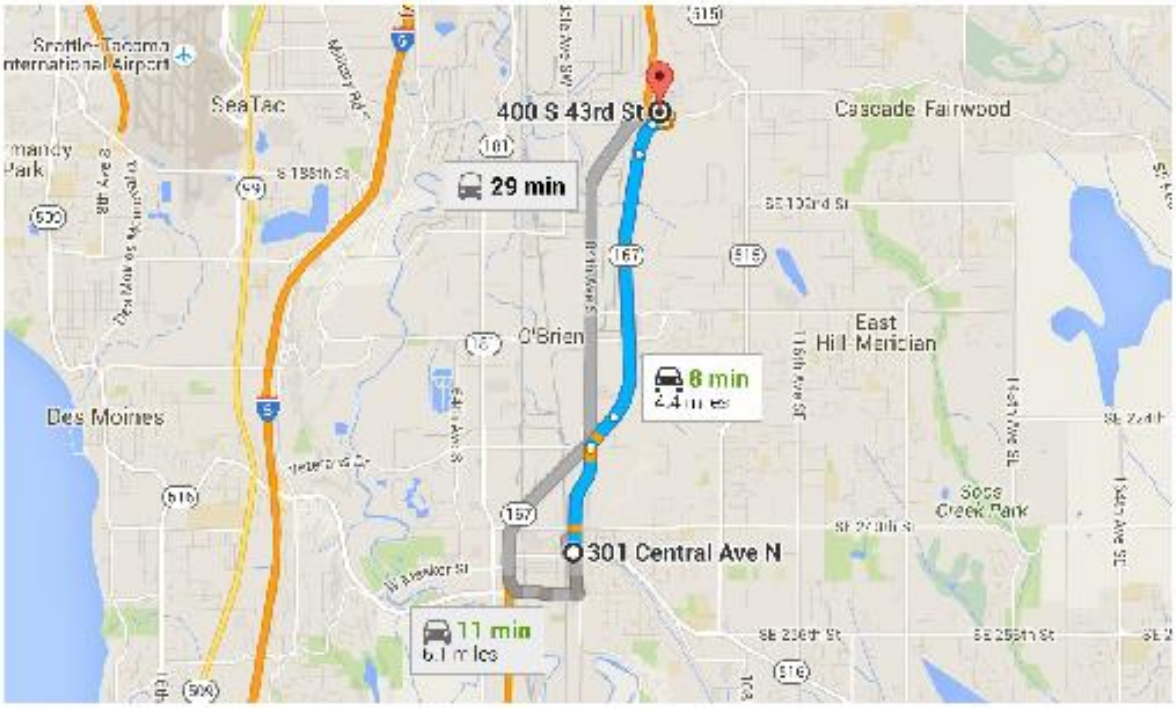
DOC FS-3476 9/2011

ATTACHMENT C

Route to Hospital Map

Directions from 301 Central Ave N to 400 S 43rd St

Google



301 Central Ave N
Kent, WA 98032

Get on WA-167 N

1.4 mi

- Head north on Central Ave N toward E Pioneer St

  1.0 mi

- Continue onto 84th Ave S

  174 ft

- Turn right to merge onto WA-167 N toward Renton

  0.3 mi

Continue on WA-167 N to Renton. Take the S 180th St/SW 43rd St exit from WA-167 N

2.8 mi

- Merge onto WA-167 N

2.5 mi

Take the S 180th St/SW 43rd St exit toward Hospital

0.3 mi

Continue on S 43rd St to your destination

0.3 mi

Turn right onto S 43rd St (signs for 43rd Street S)

0.1 mi

Turn left onto Talbot Rd S

394 ft

Turn left

154 ft

Turn left

26 ft

400 S 43rd St
Renton, WA 98055