REMEDIAL ACTION WORK PLAN

Coit Services Site
Woodinville, Washington
Facility/Site #36189742
Cleanup Site #16672

November 26, 2024

Prepared for

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LIST OF ABBREVIATIONS AND ACRONYMS

µg/L	micrograms per liter
Adapt	Adapt Engineering, Inc.
bgs	below ground surface
cDCE	cis-1,2-dichloroethene
COC	contaminant of concern
CODA	CODA Consulting Group
Coit	Coit Services
CSM	conceptual site model
Ecology	Washington State Department of Ecology
EPA	US Environmental Protection Agency
ERD	enhanced reductive dechlorination
ESA	environmental site assessment
EVO	emulsified vegetable oil
FS	feasibility study
ft	feet, foot
ft/day	feet per day
ft/year	feet per year
GPRS	Ground Penetrating Radar Systems, LLC
H_2	hydrogen
HASP	health and safety plan
HRO	Newman Zone HRO™
HVOC	halogenated volatile organic compound
IDW	investigation-derived waste
Landau	Landau Associates, Inc.
mg/kg	milligrams per kilogram
MTCA	Model Toxics Control Act
NFA	no further action
PCE	tetrachloroethene
PVC	polyvinyl chloride
redox	reduction oxidation
RI	remedial investigation
ROW	right-of-way
Seattle Pump	Seattle Pump and Equipment Co.
SF	square feet
Site	Coit Services Site
SLR	SLR International Corporation
Subject Property	Woodinville West Business Park Building C

LIST OF ABBREVIATIONS AND ACRONYMS (CONTINUED)

TCE ..... trichloroethene
UIC ..... underground injection control
VC ..... vinyl chloride
VOC ..... volatile organic compound
WAC ..... Washington Administrative Code
Wincraft ..... Wincraft, Inc.
work plan ..... remedial action work plan

1.0 INTRODUCTION

On behalf of Woodinville CD, LLC, the former owner of the Building C property of the Woodinville West Business Park (Subject Property), Landau Associates, Inc. (Landau) has prepared this remedial action work plan (work plan) to implement enhanced reductive dechlorination (ERD) at the Coit Services (Coit) Site (Site) located at 16750 Woodinville-Redmond Road NE in Woodinville, Washington (Subject Property). The recommended remedial alternative was updated in the Final Additional Investigation Report (Landau 2024), which was approved by the Washington State Department of Ecology (Ecology) in an Opinion Letter on August 29, 2024 (Ecology 2024). The remedial action described in this work plan will be implemented to reduce the remaining halogenated volatile organic compound (HVOC) concentrations in the soil and groundwater to below applicable cleanup levels, and to obtain a no further action (NFA) opinion from Ecology.

1.1 Description of Subject Property

The Subject Property is located at the northern portion of the Woodinville West Business Park (see Figure 1). The business park consists of an approximately 9.76-acre property (King County parcel No. 0926059084), which is located within an industrial area at the southwestern part of Woodinville. The Subject Property is currently owned by Terreno Woodinville II LLC and Terreno Realty Corporation.

The Subject Property is developed with a 19,000-square foot (SF) warehouse (designated as Building C). The building was constructed in 1999. Building C contains three suites (C-101, C-102, and C-103) that are currently occupied by the following tenants:

- Suite C-101—Occupied by Seattle Pump and Equipment Co. (Seattle Pump), which provides water pump, high-pressure industrial cleaning equipment, sprayers, “jetters,” and pipe cleaning equipment sales, rentals, and repairs. Prior to Seattle Pump, Wincraft, Inc. (Wincraft), a former tenant, conducted screen and sign printing operations in Suite C-101. Wincraft reportedly used trichloroethene (TCE) in its operations, and during a Phase I Environmental Site Assessment (ESA) in 2008, waste from the print washing operations was observed discharging directly to a floor drain in the print washing area. The floor drain is reportedly connected to the sanitary sewer system (Adapt Engineering, Inc. [Adapt] 2008).
- Suite C-102—Currently vacant. Most recently occupied by Intertek Professional Service Industries, Inc., a construction project services and concrete testing company until fall 2024. Before relocating to Suite C-103, Coit occupied C-102. Coit cleans residential and commercial air ducts, area rugs, carpets, upholstery, and other products, and also provides fire, smoke, and water damage restoration services. Coit formerly operated a dry-cleaning machine along the east wall of Suite C-102 that used tetrachloroethene (PCE) from approximately 1999 through at least March 2008 (Adapt 2008). An underground oil/water separator and a catch basin that is plumbed to the separator are located within a partially bermed area that is outside a roll-up door of Suite C-102. The oil/water separator discharges to the sanitary sewer system (AECOM 2019). The approximate locations of the former dry-cleaning machine and the oil/water separator are shown on Figure 2.
- Suite C-103 is occupied by Coit.

The Subject Property is bounded to the north by a large office/warehouse building that is occupied by a utility locating service, a biotechnology research company, a specialty metal and titanium supplier to the aerospace industry, and an engineering firm; to the west by a former railroad right-of-way (ROW) currently owned by King County Parks, beyond which is the Woodinville-Redmond Road ROW and a manufacturer of commercial marine deck hatches; to the east by the Sammamish River, beyond which is the Sammamish River Trail and Woodin Creek Park; and to the south by Building D of the Woodinville West Business Park, which is a large warehouse occupied by a manufacturer of a powdered drink mix and an electrical contractor business.

1.2 Previous Investigations

Several previous investigations were conducted at the Subject Property and surrounding area from 2019 through 2024. A detailed description of previous investigations, including tables presenting analytical results and groundwater monitoring data, is included in the Additional Investigation Report (Landau 2024).

Previous investigations include Phase II ESAs conducted in 2019 and 2021 by AECOM and CODA Consulting Group (CODA), respectively; remedial investigation (RI) and feasibility studies (FS) conducted in 2022 and 2023 by SLR International Corporation (SLR); and additional investigations conducted in 2023 and 2024 by Landau. Results from the Phase II ESA and RI sampling indicated the soil and groundwater contaminants of concern (COCs) at the Site are chlorinated solvents (PCE and breakdown products cis-1,2-dichloroethene [cDCE] and vinyl chloride [VC]). The soil COCs are PCE, cDCE, and VC, and the only groundwater COC is VC. The sources of contamination appear to be releases of PCE at the former dry-cleaning machine area in Suite C-102 and from the underground oil/water separator or the associated bermed area catch basin or line that drain into the separator.

In 2022, SLR conducted an FS to develop and evaluate three potential remedial action alternatives for the Site. Based on the results of a disproportionate cost analysis, ERD (Alternative 1), was the recommended alternative (SLR 2023). After completing additional investigations in 2023 and 2024, Landau updated the scope of work and revised the cost estimate of the ERD that is further described in Sections 5.0 and 6.0.

In 2023, Landau formally applied and was accepted for entry into Ecology's Voluntary Cleanup Program in order to obtain Ecology's opinions regarding the previous investigation results and an updated recommended remedial alternative for the Site.

1.3 Site Geology and Hydrogeology

The geology at the Site consists of an alluvial sand to silty sand unit that varies in thickness from 35 to 45 feet (ft) underlain by a 2-ft-thick silt unit. A shallow, discontinuous silt to organic silt unit is present from depths ranging from 5 to 15 ft across the Site. The thickness of the shallow silt unit ranges from 2 ft to 10 ft. Additional silt lenses are present in the upper 15 ft.

The groundwater table is present at depths from approximately 8.7 to 16.5 ft below ground surface (bgs) and seasonally fluctuates up to 3 ft at individual wells (SLR 2023). The general shallow groundwater

flow direction beneath the Subject Property area is to the northeast with easterly flow components. The lack of detected volatile organic compound (VOC) analytes in the groundwater samples from deep wells DMW-1 (screened from 42.5 to 47.5 ft bgs) and DMW-2 (screened from 44 to 49 ft bgs) indicate that HVOC-impacted groundwater does not extend to the bottom of the perched zone.

2.0 NATURE AND EXTENT OF CONTAMINATION

As described in SLR's conceptual site model (CSM; SLR 2023) and Landau's Additional Investigation Reports (Landau 2023, 2024), the soil and groundwater COCs at the Site are chlorinated solvents (PCE and breakdown products cDCE and VC) associated with the previous dry-cleaning operations in Suite C-102. The sources of contamination appear to be releases of PCE at the former dry-cleaning machine area in Suite C-102 and from the underground oil/water separator or the associated bermed area catch basin or line that drain into the separator.

The soil COCs are PCE, cDCE, and VC, and the only groundwater COC is VC. Therefore, the PCE, cDCE, and VC concentrations were used to evaluate the extents of the HVOC-impacted soil at the Site, and the VC concentrations were used to evaluate the extents of the HVOC-impacted groundwater. The fact that PCE breakdown product VC is the only groundwater COC indicates that substantial natural attenuation of PCE and other breakdown products (TCE and cDCE) under reduced aquifer conditions is occurring at the Site. Site conditions are illustrated on various site figures. The lateral extents of HVOC-impacted soil and groundwater are shown on Figures 3 and 4, respectively. Figure 5 shows groundwater elevation contours and northeast to easterly groundwater flow toward the Sammamish River. Geologic cross sections locations are shown on Figure 6, with cross sections depicting subsurface conditions and the vertical extents of soil impacts shown on Figures 7 and 8.

2.1 Former Dry-Cleaning Machine Area (Southern Area and Plume)

2.1.1 Soil

The soil sample analytical results from investigations at the Subject Property show that PCE concentrations greater than the Model Toxics Control Act (MTCA) Method A cleanup level and cDCE and VC concentrations greater than the Method B cleanup levels occur at the former dry-cleaning machine area. The horizontal extents of the HVOC-impacted soil at the former dry-cleaning machine area have been delineated in all directions. The vertical extents of the impacted soil have been delineated, except at DMW-1 where the deepest sample, collected at a depth of approximately 47.5 ft bgs, was analyzed outside the analytical method's required holding time. Shallower soil samples from DMW-1, collected at depths of approximately 10 and 20 ft bgs, contained cDCE concentrations greater than the MTCA Method B cleanup levels based on protection of groundwater. Because the groundwater sample from deep well DMW-1, which is screened from approximately 42.5 to 47.5 ft bgs, did not contain detectable HVOC concentrations, it appears that the soil at the bottom of boring DMW-1 does not contain cDCE concentrations greater than the Method B cleanup level. The vertical extents of HVOC-impacted soil near and downgradient (northeast) of the former dry-cleaning machine are depicted on geologic cross section B-B' (see Figure 8). The location of the cross-section B-B' is shown on Figure 6.

The estimated area of HVOC-impacted soil at the former dry-cleaning machine area is shown on Figure 3. The area extends from the eastern portion of Suite C-102 in the vicinity of MW-1 to the east into Suite C-101 in the vicinity of MW-4 and DMW-1.

2.1.2 Groundwater

The groundwater sample analytical results from previous assessments at the Site indicated that the southern VC plume has been delineated to the MTCA Method B cleanup level based on protection of surface water (0.02 micrograms per liter [µg/L]) in all directions, except in the downgradient direction (northeast; see Figure 4). The VC concentration (0.17 µg/L) at downgradient monitoring well MW-16 exceeded this cleanup level; however, the lack of detectable HVOC analytes in previous surface water sample SW-3, located downgradient of the southern VC plume, provides evidence that the plume does not extend to the Sammamish River.

The southern VC plume extends from the former dry-cleaning machine area to the northeast, just beyond MW-16. Based on two previous VC concentrations greater than the Method B cleanup level in 2022 (non-detectable VC since January 2023), MW-3 approximates the southern edge of the plume.

The lack of detected VOC analytes in the groundwater sample from southern deep well DMW-1 indicates that the HVOC-impacted groundwater does not extend to the bottom of the perched groundwater zone and that the vertical extent of the HVOC-impacted groundwater has been defined.

2.2 Oil/Water Separator Area (Northern Area and Plume)

2.2.1 Soil

The soil sample analytical results from the previous investigations at the Subject Property indicate that there is a localized area near the oil/water separator where cDCE concentrations exceed the MTCA Method B cleanup level. The lateral extents of the impacted soil have been delineated in all directions and the vertical extent has been defined. The soil sample analytical results from boring DMW-2 indicate that the impacted soil does not extend to 20 ft bgs. The estimated area of HVOC-impacted soil at the oil/water separator area is shown on Figure 3. The vertical extents of HVOC-impacted soil near and downgradient (northeast) of the oil/water separator area are depicted on geologic cross section A-A' (see Figure 7). The location of the cross-section A-A' is shown on Figure 6.

2.2.2 Groundwater

The groundwater analytical results from previous investigations at the Site indicate that the northern VC plume has been delineated in all directions, except in the downgradient direction (northeast). The VC concentrations (up to 0.220 µg/L) at downgradient monitoring well MW-15 exceed the MTCA Method B cleanup level based on protection of surface water (0.02 µg/L). However, based on the lack of detectable HVOC concentrations in any surface water samples (SW-3 through SW-6) located directly downgradient of the northern VC plume, it appears that the plume does not extend to the Sammamish River. The estimated area of the northern VC plume and the locations of the surface water samples are shown on Figure 4.

The lack of detected VOC analytes in the groundwater sample from northern deep well DMW-2 indicates that the HVOC-impacted groundwater does not extend to the bottom of the perched groundwater zone and that the vertical extent of the HVOC-impacted groundwater has been defined.

3.0 PRE-REMEDIAL DESIGN EVALUATION

Landau conducted slug tests in four shallow groundwater monitoring wells (MW-1, MW-2, MW-3, and MW-14) located within the two VC plumes and further assessed the locations of existing stormwater and sanitary sewer infrastructure near the planned remedial injection locations. A summary of the results of that work is presented below.

3.1 Slug Tests

This section describes the slug test procedures and the associated data analysis Landau completed to develop estimates of hydraulic conductivity of the areas of impacted groundwater at the Site.

3.1.1 Field Methods

Slug tests were completed by Landau staff on October 10, 2024. Pressure transducers were temporarily installed during slug testing and programmed to measure hydrostatic pressure (i.e., water level above the transducer) at ⅛-second increments throughout the testing of each well. Prior to each slug test, a static water-level measurement was obtained at the well. A falling head test was performed as a slug—a 4-ft length of 1.3-inch outer diameter polyvinyl chloride (PVC) pipe filled with water and capped on both ends—was rapidly lowered down into the well to be fully submerged below the static water level, causing the water level to immediately rise (initial displacement), followed by the recovery of the water level back to static conditions. After the water level re-stabilized at the static level, a rising head test was conducted by rapidly pulling the slug out of the well, causing the water level to drop (initial displacement), followed by the recovery of the water level back to static conditions once more.

Landau selected the data from two representative rising head tests from each well for analysis. The falling head tests were not analyzed because the well screens were only partially saturated.[1] The water level data recorded by the transducer was post-processed in Microsoft Excel (to convert the data to displacement magnitude over time for individual tests) and analyzed with the Aqtesolv curve-fitting software (Duffield 2007) to obtain estimates of hydraulic conductivity. The pressure transducer data was compensated for barometric pressure. Landau estimated hydraulic conductivity using both the Hyder et al. (1994) and Bouwer and Rice (1976) solutions.

3.1.2 Results

Preliminary analysis of the slug test results indicated hydraulic conductivity estimates of approximately 1 to 84 feet per day (ft/day), which is within the range of typical hydraulic conductivity documented in the literature (e.g., USGS 1982) for the saturated soil at each tested well (predominantly sand). The table below summarizes the hydraulic conductivity estimates for all tested wells:

[1] Falling head slug tests are not appropriate for wells with partially submerged screens because of confounding effects related to the unsaturated sand pack around the well screen and the initial displacement, which extends above the water table and fills the sand pack affecting both the initial displacement and recovery curve.

Well Name	Test	Bouwer & Rice K (ft/day)	KGS K (ft/day)
MW-1	1st rising head	18	22
	2nd rising head	49	56
MW-2	1st rising head	84	54
	2nd rising head	71	57
MW-3	1st rising head	1	6
	2nd rising head	1	9
MW-14	1st rising head	37	37
	4th rising head	28	36

The geometric mean hydraulic conductivities using both analytical methods were 32, 66, 2.7, and 34 ft/day for MW-1, MW-2, MW-3, and MW-14, respectively.

The average groundwater seepage velocities calculated using a desktop evaluation in the Additional Investigation Report (Landau 2024) are revised here using the slug test hydraulic conductivity values for MW-1, MW-2, and MW-14 above, an estimated effective porosity of 0.21, and the hydraulic gradients from April 2024. Due to the likely local influence of fine-grained lithology on the slug test results in MW-3, those results were not used in the seepage velocity calculations. The revised average groundwater seepage velocity of the northern plume is approximately 610 feet per year (ft/year; 1.7 ft/day) and 542 ft/year (1.5 ft/day) for the southern plume.

3.2 Utility Evaluation

On October 18, 2024, Ground Penetrating Radar Systems, LLC (GPRS) located and inspected the underground stormwater and sanitary sewer lines in the vicinity of the proposed injection points to verify the alignment, construction, and integrity of each pipe. The purpose of the work was to evaluate the actions, if any, that should be taken to prevent the injected solution from entering the utilities. The work was completed using ground-penetrating radar equipment and scoping cameras. GPRS' job summary report is provided as Appendix A.

The locations of some of the sewer lines were revised on Figures 2 through 6 as a result of the work. Blockages were identified within various lines, which prevented full scoping. The floor drain and cleanout within Suite C-102 from the former sink could not be scoped due to the pipes being blocked with heavy debris. Suite C-102 was undergoing construction during the locate, and the contractors indicated that the line would not be reconnected to any new infrastructure.

The sanitary sewer line to the north of the building was identified as 8-inch cast iron with spalling, encrustation, and dried cement noted during the scoping. The line was identified at approximately 7 ft bgs, becoming more shallow to the east.

Storm lines were PVC of varying diameters (4-inch, 6-inch, 12-inch) located approximately 3 to 4 ft bgs. Broken storm lines were identified in the catch basin located adjacent to monitoring well MW-8. The PVC lines outside the catch basins were in good condition.

The clean out adjacent to the oil/water separator was accessed and a connection to the sanitary sewer line was observed. Per the GPRS report, this line appeared to have been abandoned due to no observed flow and debris filling the pipe.

4.0 REMEDIAL OBJECTIVES

The remedial objectives for the Site are:

1) To achieve Washington State's MTCA Method B cleanup level based on protection of surface water for VC (0.02 µg/L).
2) Once the groundwater cleanup level has been consistently attained throughout the Site, a confirmation soil boring will be drilled in the vicinity of previous boring GP-4 to verify that the remaining PCE concentrations in the soil are below the Method A direct contact cleanup level of 0.05 milligrams per kilogram (mg/kg). The cDCE and VC concentrations in the soil exceed the MTCA Method B cleanup levels based on protection of groundwater, so an empirical demonstration (groundwater concentrations below the cleanup level) will be used to show that the remaining cDCE and VC concentrations in the soil are protective of human health and the environment.

It is the intention of Woodinville CD, LLC to apply for a Site-specific NFA opinion from Ecology when the groundwater cleanup standards are achieved. To receive an NFA, cleanup standards need to be achieved and an official opinion will need to be requested from Ecology.

5.0 SELECTED REMEDIAL APPROACH

The selected remedial approach for HVOCs in Site groundwater is bioremediation, which will involve further stimulation of the ERD that has occurred naturally at the Site. An emulsified vegetable oil (EVO) product for remediation will be diluted and injected into rows of permanent injection wells located at the upgradient end of each groundwater plume. Treatment will rely on the fermentation of EVO and downgradient transport of resulting dissolved organic carbon. This approach is referred to as "inject and drift." Organic carbon from the EVO provides the electron donor (i.e., food) for dechlorinating bacteria and for other aquifer bacteria, which will maintain the required aquifer conditions for further ERD of VC. The description of required aquifer conditions for the ERD mechanism are described below.

5.1 Required Aquifer Conditions

Anaerobic aquifer conditions are generally required for biotic (biological) and abiotic (chemical) degradation of PCE and its breakdown products (including VC targeted for treatment at the Site). Aerobic and anaerobic conditions are characterized by sequential reduction oxidation (redox) reactions of naturally occurring compounds, whereby aquifer microorganisms (including bacteria) obtain energy. These redox reactions require an electron donor (i.e., a source of organic carbon, which ferments to volatile fatty acids and hydrogen) and an electron acceptor (e.g., oxygen, nitrate, iron, sulfate, carbon dioxide, and PCE and breakdown products).

Microorganisms obtain the greatest energy yield using oxygen as an acceptor, which is highly oxidized and, therefore, can be easily reduced. Less oxidized acceptors provide sequentially less energy to aquifer microorganisms and are utilized only after available oxygen has been consumed. When oxygen is largely depleted, microorganisms use the less oxidized electron acceptors present in the aquifer in the following order: nitrate, manganese (IV), iron (III), sulfate, and carbon dioxide. The redox state of the aquifer (e.g., sulfate-reducing) is defined by which natural electron acceptors (e.g., sulfate) are being used (i.e., reduced) at a given time.

Understanding the redox state of the aquifer is important, as various biotic and abiotic degradation pathways of PCE and breakdown products require specific redox conditions. PCE and TCE are relatively oxidized and can be transformed by dechlorinating bacteria under mild, iron-reducing, and sulfate-reducing conditions (Chapelle 1996). cDCE and VC require more reducing aquifer conditions; cDCE can be transformed under sulfate-reducing or methanogenic conditions (Chapelle 1996, Vogel et al. 1987), and VC can be transformed under methanogenic conditions (Ballapragada et al. 1997, Freedman and Gossett 1989, Maymó-Gatell et al. 1995, Vogel and McCarty 1985). Formation of reactive iron sulfide minerals responsible for complementary abiotic degradation requires sulfate-reducing conditions.

5.2 Biological Degradation

The most significant biodegradation process for the treatment of PCE and its breakdown products is reductive dechlorination. Reductive dechlorination occurs as bacteria gain energy from mediating redox reactions involving electron donors and chlorinated compounds utilized as electron acceptors. Dechlorinating bacteria utilize chlorinated compounds like PCE and VC as electron acceptors and rely on

hydrogen (H_2) as an electron donor. The fermentation of the organic carbon in applied donor substrate (such as EVO) releases a variety of volatile fatty acids that further ferment to H_2.

In the process of reductive dechlorination, chlorine atoms on the PCE molecule are sequentially replaced by an H_2 atom. This results in the formation of successively less chlorinated breakdown products and ultimately in non-toxic (non-chlorinated) end products ethene and ethane:

Reductive dechlorination: PCE → TCE → cDCE → VC → Ethene + Ethane

6.0 FIELD ACTIVITIES

This section describes the field activities related to ERD implementation, including injection of emulsified vegetable oil (EVO), groundwater monitoring, equipment decontamination, and management of residual wastes. Field activities will be conducted in accordance with the Site-specific health and safety Plan (HASP; Appendix B), which will apply to injection activities and groundwater monitoring and soil sampling.

It is anticipated that one injection event will be completed in early 2025; a contingent second injection will be completed within 2 years of the first event depending on its effectiveness. The need for additional injection, timing of injection, injection volumes, and mass of substrates will be assessed based on evaluation of groundwater sample analytical results.

6.1 Injection Well Installation

Two rows of injection wells will be used for injection of EVO to stimulate ERD in the northern and southern VC plumes. One row of four injection wells (IW-1 through IW-4; "Row A") will be installed in the oil/water separator area near monitoring well MW-7, and one row of three injection wells (IW-5, IW-6, and IW-7; "Row B") will be installed in the former dry cleaning machine area between monitoring wells MW-1 and MW-6 (Figure 6). The injection wells in each row will be spaced approximately 15 ft apart. The volume of diluted EVO injected to each well (Section 6.3) is designed for overlapping radii of injection, as shown on Figure 6. Both rows will be installed upgradient of each groundwater plume and perpendicular to groundwater flow. Injected EVO and fermentation products will be carried downgradient for plume treatment following completion of injection activities. EVO is expected to travel less than 40 ft before becoming immobile at residual saturation in aquifer soils. Fermentation products will extend further downgradient but, due to utilization/consumption along the flow path, are expected to be utilized by bacteria within 100 ft (southern plume) to 150 ft (northern plume; see Section 6.3 for explanation of custom EVO percentage for each plume). This expected distribution of fermentation products is well short of the distance between injection wells and the river, which are 280 ft (northern plume) and 210 ft (southern plume).

Both private and public utility locators will clear well locations for subsurface utilities prior to drilling. Well locations may be adjusted in the field based on the location of utilities and other observations made prior to drilling.

A licensed driller will use hollow-stem auger drilling methods to drill the borings for each new injection well to a total depth of approximately 35 ft bgs. Injection wells will be constructed using 2-inch Schedule 40 PVC casing and feature a 15-ft-long screen from approximately 20 to 35 ft bgs (0.020-inch slot size, 2-inch Schedule 40 PVC). The well seal above the sand pack will consist of cement bentonite grout to withstand injection pressures; 1–2 ft of coarse sand or bentonite pellets will be placed directly above the sand pack to prevent grout intrusion into the sand pack. Wells will be installed in accordance with Washington State standards for well construction (Washington Administrative Code [WAC] 173-160).

The injection wells will be developed approximately 1 week following installation by repeated surging and over-pumping using a 12-volt submersible pump. A minimum of 10 casing volumes of groundwater will be removed from each well, and development will continue until the water being removed is reasonably clear of fines.

Investigation-derived waste (IDW) will include drill soil cuttings, decontamination water used to clean drilling equipment, and groundwater removed during well development. Generated IDW will be stored in labeled drums and temporarily stored at the Subject Property in a consolidated area. Drums will be removed for offsite disposal at licensed facilities following analytical testing for disposal characterization (as needed).

6.2 UIC Registration

Prior to injection, the Site will be registered with Ecology's Underground Injection Control (UIC) program per WAC 173-218. Per WAC 173-218-040, the new injection wells at the Site will be considered Class V injection wells because they will receive "fluids intended to clean up, treat or prevent subsurface contamination." Class V UIC wells must be registered and either rule-authorized (WAC 173-218-070) or receive a state waste discharge permit issued by Ecology.

6.3 Injection Volume and Components

The design injection volume for each of the seven injection wells (IW-1 through IW-7) is 6,300 gallons, for a total injection volume of approximately 44,100 gallons. This design injection volume is based on the aquifer porosity, 15-ft targeted vertical treatment interval, and desired radius of injection of 8 ft.

A diluted EVO injection solution will be made by mixing a fermentable vegetable oil product with facility tap water. The selected vegetable oil product is Newman Zone HRO™ (HRO), which is a 100 percent fermentable electron donor product containing 90 percent by weight food-grade vegetable oil and oil-based emulsifiers. The following HRO concentrations will be used:

- Row A: 7.5 percent by volume
- Row B: 5 percent by volume.

The HRO concentration is different for each injection row because plume lengths targeted for treatment are different. The length of the northern plume (targeted by Row A) is approximately 1.5 times longer than the southern plume (targeted by Row B). To account for the longer plume, the HRO concentration used in Row A will be approximately 1.5 times the HRO concentration used in Row B. As noted in Section 6.1, fermentation products will extend downgradient of injection wells and immobilized EVO, but due to utilization/consumption along the flow path, fermentation products are expected to be utilized by bacteria within approximately 100 ft (southern plume) to 150 ft (northern plume), well short of the distance to the river at 280 ft (northern plume) and 210 ft (southern plume).

Row A injection wells (IW-1 through IW-4) will each receive 480 gallons of concentrated HRO (diluted in 5,820 gallons of water), and Row B injection wells (IW-5 through IW-7) will each receive 320 gallons of HRO (diluted in 5,980 gallons of water). This results in a total of 2,880 gallons of HRO concentrate

(23,000 pounds) injected to the two rows. Volumes and concentrations are summarized in Table 1. The safety data sheet for HRO is provided in Appendix C.

6.4 Mixing and Injection Procedures

The mixing and injection will be performed using a temporary 6,500-gallon poly tank, a gas-powered centrifugal pump, and various hoses and fittings. The poly tank will be used to mix the HRO with tap water. Approximately eight batches of diluted injection fluid (5,500 gallons each) will be prepared. The tank and pump will be set up inside a portable containment berm to contain any incidental spills during preparation of the injection solution. The totes of HRO will be set on drip pads created with 6-millimeter-thick poly sheeting. The location of the temporary mixing station with HRO totes is anticipated to be outdoors in the northern parking lot (near Row A).

To begin, the poly tank will contain tap water. Approximately 200 gallons of water from the tap water tank will be pumped to each of the seven injection wells to provide a pre-injection flush. This backflush helps to maximize injection rates.

After the pre-injection flush, HRO will be added to the batch tank and recirculated with the pump for mixing. Batched injection solution will be pumped to each well through hoses attached to the well casing using threaded connections. Hoses will need to be run indoors through man doors or rollup doors from the batch tank to Row B injection wells. After completing injection of the prepared injection solution, tap water will be pumped to each of the wells to provide a post-injection flush of approximately 200 gallons. The post-injection flush pushes injection solution from the well casing and sand pack into the formation to minimize biofouling of the well screen. Due to the sandy nature of the aquifer, low injection pressures of less than 20 pounds per square inch are anticipated.

6.5 Stormwater Protection Measures

In addition to the secondary containment and drip pad precautions described for the mixing station and HRO storage above, further precautions will be taken to prevent any discharges of injection fluid to the ground surface from entering the storm drain system:

- Injection hose camlock connections will be taped closed and hoses will be monitored for leaks.
- Good housekeeping practices will be used to keep the secondary containment areas clean. Potential incidental spills inside the secondary containments due to mixing operations will be cleaned expeditiously using a wet/dry vacuum, and the area will be rinsed to prevent track-out of the injection solution onto the pavement.
- Nearby storm drain catch basins will be covered with a foam rubber drain mat.
- Injection well vaults and surrounding pavement and nearby subsurface vaults will be monitored for potential water discharge indicative of injection short-circuiting to the surface. If injection fluid discharges to the ground surface through vaults, cracks in the pavement, in landscaped areas, etc., injection rates will be lowered to stop or minimize this discharge. Fluid will be contained to allow infiltration back into the ground and/or will be recovered using a wet/dry vacuum.

- Potential minor leaks occurring during injection will be collected and contained using buckets and a wet/dry vacuum.
- Additionally, a spill kit will be present at the injection location containing cat litter and adsorbent pads.

A storm drain occurs near injection row A that has a low potential for injection fluid infiltration into leaky storm drain piping or catch basin connections. Legs of the storm drain extend south near MW-7 and the injection row and to the east past MW-8. Infiltration is unlikely given the shallow depth of the storm drain (less than 5 ft) compared to the much deeper injection interval of 20 to 35 ft. However, out of an abundance of caution, an inflatable plug will be installed in the discharge pipe of the catch basin located near MW-8 prior to the injection; this will allow observation and removal of injection fluid that might collect in the catch basin behind the plug. The storm drains connect to the stormwater detention basin, which serves as an additional containment measure; substantial precipitation is required for the basin to fill with water before basin discharge occurs to the river.

The Site sanitary sewer is similarly much shallower than the injection interval (approximately 7 ft bgs or shallower). Any potential minor infiltration of injection fluid to the sanitary sewer is not a concern due to offsite treatment of sewer effluent.

6.6 Groundwater Performance Monitoring

Each injection event is anticipated to result in 2 years of enhanced treatment. The groundwater at the Subject Property area will be monitored over 2 to 4 years, depending on whether the contingent injection event is required. Monitoring will serve to evaluate the extent and effectiveness of ERD treatment of VC in groundwater. The groundwater monitoring events will be conducted on a quarterly basis.

During each groundwater monitoring event, the depths to groundwater will be measured in all 17 shallow groundwater monitoring wells and two deep groundwater monitoring wells at the Subject Property. Field water quality parameters (conductivity, temperature, dissolved oxygen, oxidation-reduction potential, and pH) will be recorded during sampling using a flow-through cell and YSI multimeter (or similar). Ferrous iron will be measured in the field using a Hach test kit.

Ecology-approved low-flow groundwater sampling techniques will be utilized to collect the groundwater samples from each of the 17 shallow and two deep monitoring wells at the Site during the first year of monitoring. Samples will be collected using dedicated tubing (stored in the well) and a peristaltic pump. The tubing intake will be set at approximately 2 ft below the water level in each well. Groundwater will be purged prior to sampling at a target flow rate of approximately 0.5 liters per minute, or until a maximum drawdown of the groundwater level in the well of 0.3 ft. Field parameters described above will be recorded every 3 minutes during purging and immediately before collecting samples. Purge water generated during sampling activities will be stored at the Subject Property pending off-site disposal at a licensed facility.

The samples will be submitted to Apex Laboratories, Inc. for analysis for PCE, TCE, and cDCE by US Environmental Protection Agency (EPA) Method 8260D and VC by EPA Method 8260D selected ion monitoring. Additionally, the samples from MW-1, MW-2, MW-3, MW-4, MW-7, MW-8, MW-9, MW-13, MW-14, MW-15, and MW-16 will also be analyzed for the following on a quarterly basis during the first year, then annually to monitor the extent of ERD:

- Total organic carbon (method SM 5310 B-11)
- Sulfate (method EPA 300.0)
- Methane, ethene, and ethane (Method RSK 175).

The locations of the monitoring wells are shown on Figure 6.

One field duplicate will be collected during each sampling event. Field duplicates are collected in order to independently check the laboratory analytical precision and indicate sample matrix variability. Field duplicates will be handled and analyzed in the same manner as the other samples.

If the VC concentrations in a monitoring well are below the cleanup level for four consecutive quarters, and the well is not being used to monitor ERD effectiveness and distribution, including protection of the Sammamish River, sampling will be discontinued at that location.

7.0 DATA EVALUATION AND REPORTING

Data evaluation and reporting will be performed during the period of active ERD treatment and groundwater monitoring. The reporting will include:

- Quarterly groundwater monitoring reports will present groundwater sampling analytical results. The first monitoring report after an injection event will also detail the injection activities. Annually, each fourth report will provide an evaluation of ERD extent and performance and will present any optimization recommendations. All reports will be submitted to Ecology.

8.0 HEALTH AND SAFETY

A site-specific HASP that covers project activities described in this work plan is provided in Appendix B. This includes the implementation of the ERD and associated well installation and groundwater monitoring. Landau field staff will follow the procedures described in this HASP. Contractors will prepare their own HASPs at least as comprehensive as Landau's or choose to adopt the HASP prepared by Landau when assisting with the remediation efforts.

9.0 USE OF THIS WORK PLAN

This work plan has been prepared for the use of the Woodinville CD, LLC for specific application to the remedial activities at the Coit Services Site in Woodinville, Washington. No other party, except applicable regulatory agencies, is entitled to rely on the information, conclusions, and recommendations included in this document without the express written consent of Landau. Further, the reuse of information and recommendations provided herein for extensions of this project or for any other project, without review and authorization by Landau, shall be at the user's sole risk. Landau warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. Landau makes no other warranty, either express or implied.

10.0 REFERENCES

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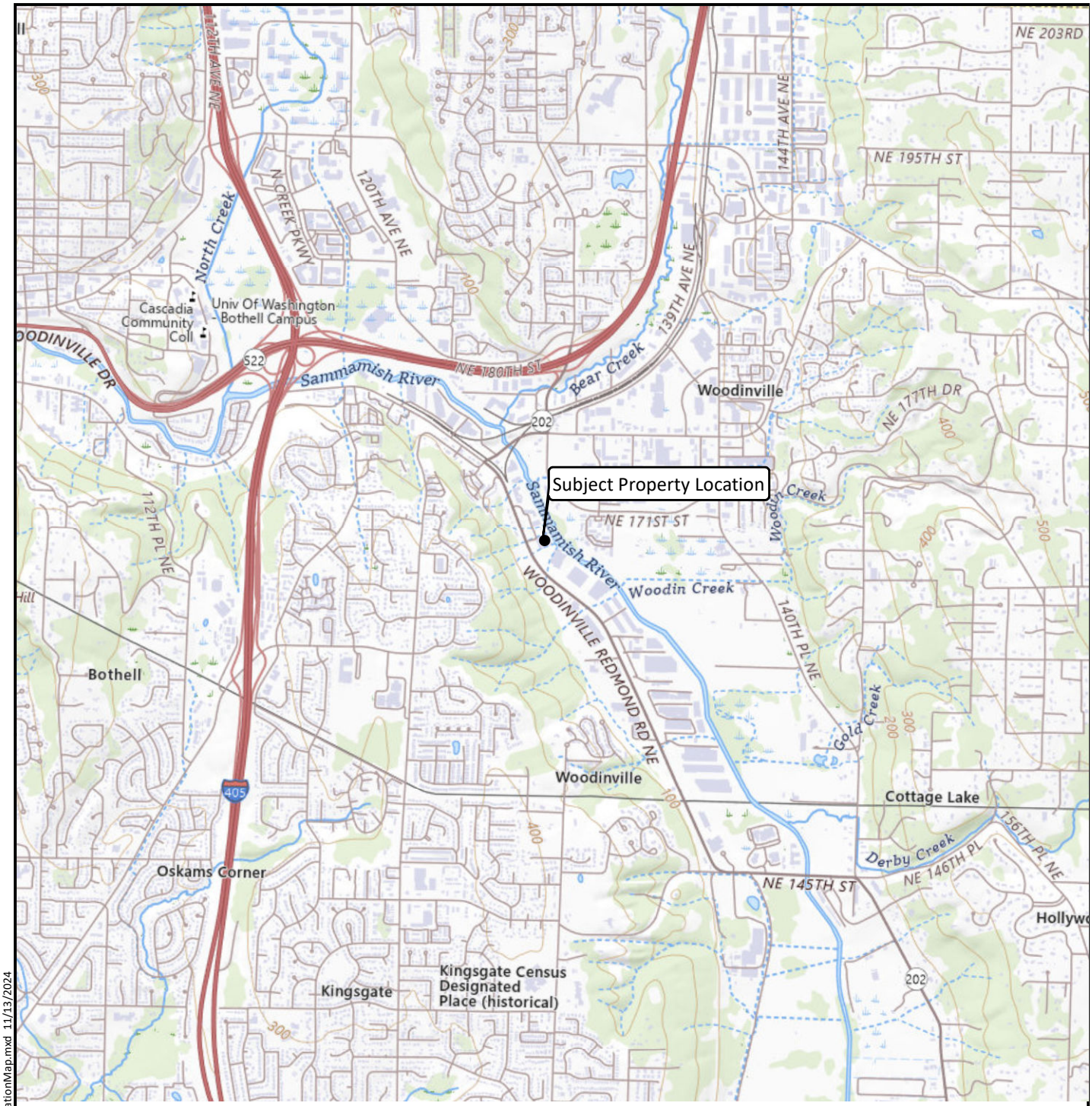

Data Source: Esri.

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LANDAU ASSOCIATES

Coit Services Site 16750 Woodinville Redmond Rd. NE Woodinville, Washington	**Subject Property Location Map**	Figure 1

N

SW-7

SAMMAMISH RIVER

SW-6

SW-5

SW-4

SW-3

SW-2

SW-1

MW-17

MW-15

STORMWATER DETENTION BASIN

B-5

MW-12

MW-13

MW-16

MW-8

MW-14

B-6

B-4

OIL/WATER SEPARATOR

SB-6

B-7

GP-2

MW-2

SB-7

DMW-2

MW-9

MW-7

GP-3

GP-1

MW-10

MW-4

DMW-1

MW-3

CLEAN OUT

OFFICE

FORMER WINCRAFT PRINT WASHING AREA

FLOOR DRAIN

SB-5

B-3

SB-8

SB-1

FORMER SINK

SB-4

B-11

MW-1

GP-4

B-10

MW-6

B-12

SB-2

GP-5

MW-11

CONTAINMENT BERM

CLEAN OUT

OFFICE

SB-3

MW-5

SOIL TESTING ROOM

FORMER DRY CLEANING MACHINE

STE. C-102

B-2

Notes

1. BUILDING FLOOR PLAN BASED ON CODA CONSULTING GROUP'S 2021 SAMPLE PLAN.
2. LOCATIONS OF FEATURES ARE APPROXIMATE.
3. BLACK AND WHITE REPRODUCTION OF THIS COLOR ORIGINAL MAY REDUCE ITS EFFECTIVENESS AND LEAD TO INCORRECT INTERPRETATION.

LEGEND

- MW-17 — 2024 SHALLOW GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
- MW-11 — MAY THROUGH JULY 2023 SHALLOW GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
- SB-7 — MAY 2023 SOIL BORING LOCATION AND DESIGNATION
- DMW-1 — 2023 DEEP GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
- SB-1 — APRIL 2022 SOIL BORING LOCATION AND DESIGNATION
- MW-6 — EXISTING SHALLOW GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
- GP-1 — 2019 SOIL BORING AND TEMPORARY WELL LOCATION AND DESIGNATION
- B-6 — 2021 SOIL BORING AND TEMPORARY WELL LOCATION AND DESIGNATION
- B-10 — 2021 SOIL BORING LOCATION AND DESIGNATION
- SW-1 — 2023 SURFACE WATER SAMPLE LOCATION AND DESIGNATION
- UNDERGROUND OIL/WATER SEPARATOR
- STORM DRAIN MANHOLE
- SD — STORM DRAIN LINE
- STORMWATER CATCH BASIN
- SANITARY SEWER MANHOLE
- SS — SANITARY SEWER LINE
- PROPERTY LINE

0 40 80

Scale in Feet

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Coit Services Site
16750 Woodinville Redmond Rd. NE
Woodinville, Washington

Soil, Groundwater, and Surface Water Investigation Locations

Figure 2

N

STORMWATER DETENTION BASIN

MW-15

B-5

MW-12

MW-13

MW-14

MW-8

B-6

B-4

OIL/WATER SEPARATOR

SB-6

B-7

GP-2

MW-9

CLEAN OUT

OFFICE

MW-7

SB-7

DMW-2

MW-10

GP-3

GP-1

ESTIMATED AREA OF HVOC-IMPACTED SOIL

MW-3

MW-2

SB-8

MW-4

DMW-1

FORMER WINCRAFT PRINT WASHING AREA

SB-1

GP-4

FORMER SINK

SB-4

FLOOR DRAIN

B-3

CONTAINMENT BERM

B-11

MW-1

SB-5

SB-2

B-10

ESTIMATED AREA OF HVOC-IMPACTED SOIL

MW-6

MW-11

B-12

GP-5

SB-3

OFFICE

SOIL TESTING ROOM

MW-5

FORMER DRY CLEANING MACHINE

STE. C-102

B-2

Notes

1. BUILDING FLOOR PLAN BASED ON CODA CONSULTING GROUP'S 2021 SAMPLE PLAN.
2. LOCATIONS OF FEATURES ARE APPROXIMATE.
3. HVOC = HALOGENATED VOLATILE ORGANIC COMPOUNDS
4. BLACK AND WHITE REPRODUCTION OF THIS COLOR ORIGINAL MAY REDUCE ITS EFFECTIVENESS AND LEAD TO INCORRECT INTERPRETATION.

Legend

SB-7	MAY 2023 SOIL BORING LOCATION AND DESIGNATION
MW-11	MAY THROUGH JULY 2023 SHALLOW GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
DMW-1	2023 DEEP GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
SB-1	APRIL 2022 SOIL BORING LOCATION AND DESIGNATION
MW-6	EXISTING SHALLOW GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
GP-1	2019 SOIL BORING AND TEMPORARY WELL LOCATION AND DESIGNATION
B-6	2021 SOIL BORING AND TEMPORARY WELL LOCATION AND DESIGNATION
B-10	2021 SOIL BORING LOCATION AND DESIGNATION
	UNDERGROUND OIL/WATER SEPARATOR
	STORM DRAIN MANHOLE
SD	STORM DRAIN LINE
	STORMWATER CATCH BASIN
	SANITARY SEWER MANHOLE
SS	SANITARY SEWER LINE
	PROPERTY LINE
	ESTIMATED AREA OF HVOC-IMPACTED SOIL

0 30 60

Scale in Feet

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Coit Services Site
16750 Woodinville Redmond Rd. NE
Woodinville, Washington

Estimated Areas of HVOC-Impacted Soil

Figure
3

N

SW-7

SAMMAMISH RIVER

SW-6

SW-5

SW-4

SW-3

SW-2

SW-1

MW-17

MW-15

MW-12

MW-13

MW-8

MW-14

MW-16

MW-9

MW-7

MW-2

DMW-2

MW-10

GP-2

GP-3

GP-1

B-7

B-6

B-4

B-5

MW-4

DMW-1

MW-3

B-11

GP-4

MW-1

GP-5

MW-6

MW-11

MW-5

B-2

B-3

STORMWATER DETENTION BASIN

OIL/WATER SEPARATOR

OFFICE

CLEAN OUT

CONTAINMENT BERM

FORMER SINK

FLOOR DRAIN

FORMER WINCRAFT PRINT WASHING AREA

SOIL TESTING ROOM

FORMER DRY CLEANING MACHINE

STE. C-102

ESTIMATED AREAS OF VINYL CHLORIDE CONCENTRATIONS GREATER THAN MTCA METHOD B CLEANUP LEVEL BASED ON PROTECTION OF SURFACE WATER (0.020 MICROGRAMS PER LITER)

NOTES

1. BUILDING FLOOR PLAN BASED ON CODA CONSULTING GROUP'S 2021 SAMPLE PLAN.
2. LOCATIONS OF FEATURES ARE APPROXIMATE.
3. BLACK AND WHITE REPRODUCTION OF THIS COLOR ORIGINAL MAY REDUCE ITS EFFECTIVENESS AND LEAD TO INCORRECT INTERPRETATION.

LEGEND

- MW-17 — 2024 SHALLOW GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
- MW-11 — MAY THROUGH JULY 2023 SHALLOW GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
- SB-7 — MAY 2023 SOIL BORING LOCATION AND DESIGNATION
- DMW-1 — 2023 DEEP GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
- MW-6 — EXISTING SHALLOW GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
- GP-1 — 2019 SOIL BORING AND TEMPORARY WELL LOCATION AND DESIGNATION
- B-6 — 2021 SOIL BORING AND TEMPORARY WELL LOCATION AND DESIGNATION
- SW-1 — 2023 SURFACE WATER SAMPLE LOCATION AND DESIGNATION
- ESTIMATED AREA OF VINYL CHLORIDE-IMPACTED GROUNDWATER
- UNDERGROUND OIL/WATER SEPARATOR
- STORM DRAIN MANHOLE
- SD — STORM DRAIN LINE
- STORMWATER CATCH BASIN
- SANITARY SEWER MANHOLE
- SS — SANITARY SEWER LINE
- PROPERTY LINE
- GROUNDWATER FLOW DIRECTION

0 40 80

Scale in Feet

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Coit Services Site
16750 Woodinville Redmond Rd. NE
Woodinville, Washington

Estimated Areas of Vinyl Chloride-Impacted Groundwater

Figure 4

N

Notes

1. BUILDING FLOOR PLAN BASED ON CODA CONSULTING GROUP'S 2021 SAMPLE PLAN.
2. LOCATIONS OF FEATURES ARE APPROXIMATE.
3. BLACK AND WHITE REPRODUCTION OF THIS COLOR ORIGINAL MAY REDUCE ITS EFFECTIVENESS AND LEAD TO INCORRECT INTERPRETATION.

LEGEND

- MW-17 — 2024 SHALLOW GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
- MW-11 — MAY THROUGH JULY 2023 SHALLOW GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
- MW-6 — EXISTING SHALLOW GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
- UNDERGROUND OIL/WATER SEPARATOR
- STORM DRAIN MANHOLE
- SD — STORM DRAIN LINE
- STORMWATER CATCH BASIN
- SANITARY SEWER MANHOLE
- SS — SANITARY SEWER LINE
- PROPERTY LINE
- (20.68) — GROUNDWATER ELEVATION ON APRIL 2, 2024 (IN FEET ABOVE NAVD88 DATUM)
- 20.8 – GROUNDWATER CONTOUR AND ELEVATION (IN FEET ABOVE NAVD88 DATUM)
- GENERAL GROUNDWATER FLOW DIRECTION

SAMMAMISH RIVER

STORMWATER DETENTION BASIN

MW-17 (20.88)
MW-15 (20.68)
MW-16 (20.68)
MW-14 (21.72)
MW-13 (21.82)
MW-12 (22.03)
MW-8 (22.12)
MW-9 (22.04)
MW-7 (22.42)
MW-10 (21.97)
MW-2 (22.29)
MW-4 (21.82)
MW-3 (21.22)
MW-1 (22.17)
MW-6 (22.34)
MW-11 (21.71)
MW-5 (22.16)

OFFICE
OIL/WATER SEPARATOR
CLEAN OUT
CONTAINMENT BERM
FORMER SINK
FORMER WINCRAFT PRINT WASHING AREA
SOIL TESTING ROOM
FORMER DRY CLEANING MACHINE
STE. C-102

20.7 20.8 20.9 21.0 21.1 21.2 21.3 21.4 21.5 21.6 21.7 21.8 21.9 22.0 22.1 22.2 22.3 22.4

0 40 80
Scale in Feet

Coit Services Site 16750 Woodinville Redmond Rd. NE Woodinville, Washington	**Shallow Groundwater Elevation Contour Map - April 2, 2024**	Figure 5

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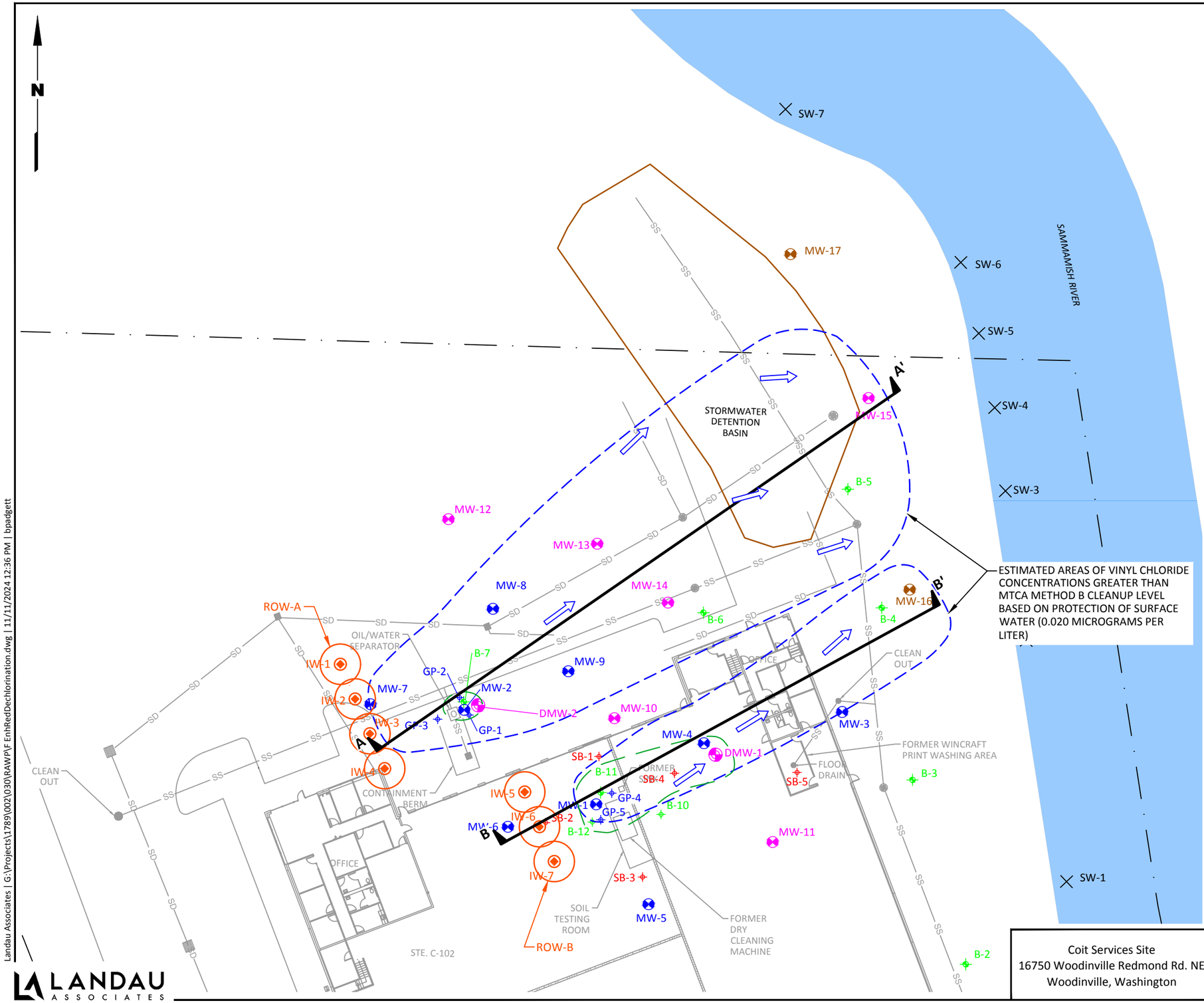

NOTES

1. BUILDING FLOOR PLAN BASED ON CODA CONSULTING GROUP'S 2021 SAMPLE PLAN.
2. LOCATIONS OF FEATURES ARE APPROXIMATE.
3. BLACK AND WHITE REPRODUCTION OF THIS COLOR ORIGINAL MAY REDUCE ITS EFFECTIVENESS AND LEAD TO INCORRECT INTERPRETATION.

LEGEND

- PROPOSED VERTICAL INJECTION POINT WITH 8' RADIUS OF INJECTION
- MW-17 — 2024 SHALLOW GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
- MW-11 — MAY THROUGH JULY 2023 SHALLOW GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
- SB-1 — APRIL 2022 SOIL BORING LOCATION AND DESIGNATION
- SB-7 — MAY 2023 SOIL BORING LOCATION AND DESIGNATION
- DMW-1 — 2023 DEEP GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
- MW-6 — EXISTING SHALLOW GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
- GP-1 — 2019 SOIL BORING AND TEMPORARY WELL LOCATION AND DESIGNATION
- B-6 — 2021 SOIL BORING AND TEMPORARY WELL LOCATION AND DESIGNATION
- SW-1 — 2023 SURFACE WATER SAMPLE LOCATION AND DESIGNATION
- ESTIMATED AREA OF VINYL CHLORIDE-IMPACTED GROUNDWATER
- ESTIMATED AREA OF HVOC-IMPACTED SOIL
- UNDERGROUND OIL/WATER SEPARATOR
- STORM DRAIN MANHOLE
- SD — STORM DRAIN LINE
- STORMWATER CATCH BASIN
- SANITARY SEWER MANHOLE
- SS — SANITARY SEWER LINE
- PROPERTY LINE
- GROUNDWATER FLOW DIRECTION
- A A' — CROSS SECTION LOCATION AND DESIGNATION

0 40 80
Scale in Feet

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Coit Services Site 16750 Woodinville Redmond Rd. NE Woodinville, Washington	**Enhanced Reductive Dechlorination Injection Locations**	Figure 6

A
SOUTHWEST

A'
NORTHEAST

ELEVATION (FT, NAVD88)

50
25
0
-25

ROW-A
Injection Wells

MW-7
Offset 16' N

GP-3
Offset 4' S

MW-2
Offset 7' S

DMW-2
Offset 8' S

SB-7
Offset 15' S

MW-9
Offset 17' S

MW-13
Offset 18' N

EXISTING GROUND SURFACE

STORMWATER DETENTION BASIN

B-5
Offset 21' S

MW-15
Offset 4' N

SAND TO SILTY SAND

SILT

ORGANIC SILT

SAND

P: <0.026
C: <0.021

P: <0.039
C: <0.039

P: <0.028
C: <0.022

P: <0.0447
C: <0.0456

P: <0.0297
C: <0.0297

P: <0.005
C: <0.005

D=23'
D=20'
D=18'
D=35'
D=49'

0 20 40

Horizontal Scale: 1" = 20'
Vertical Scale: 1" = 10'

GEOLOGY/LITHOLOGY KEY

- CONCRETE
- ASPHALT
- SAND TO SILTY SAND
- SILT
- ORGANIC SILT

EXPLORATION KEY

LOCATION ID
OFFSET DISTANCE (FT)

- INFERRED GEOLOGIC CONTACT
- ESTIMATED GEOLOGIC CONTACT
- HIGH WATER TABLE (APRIL 2024)
- LOW WATER TABLE (AUGUST 2023)
- SCREENED INTERVAL
- SOIL SAMPLE — P: <0.005 — PCE CONCENTRATION (MG/KG)
  C: <0.005 — cis-1,2-DCE CONCENTRATION (MG/KG)
- D = 20' — BOTTOM DEPTH OF EXPLORATION

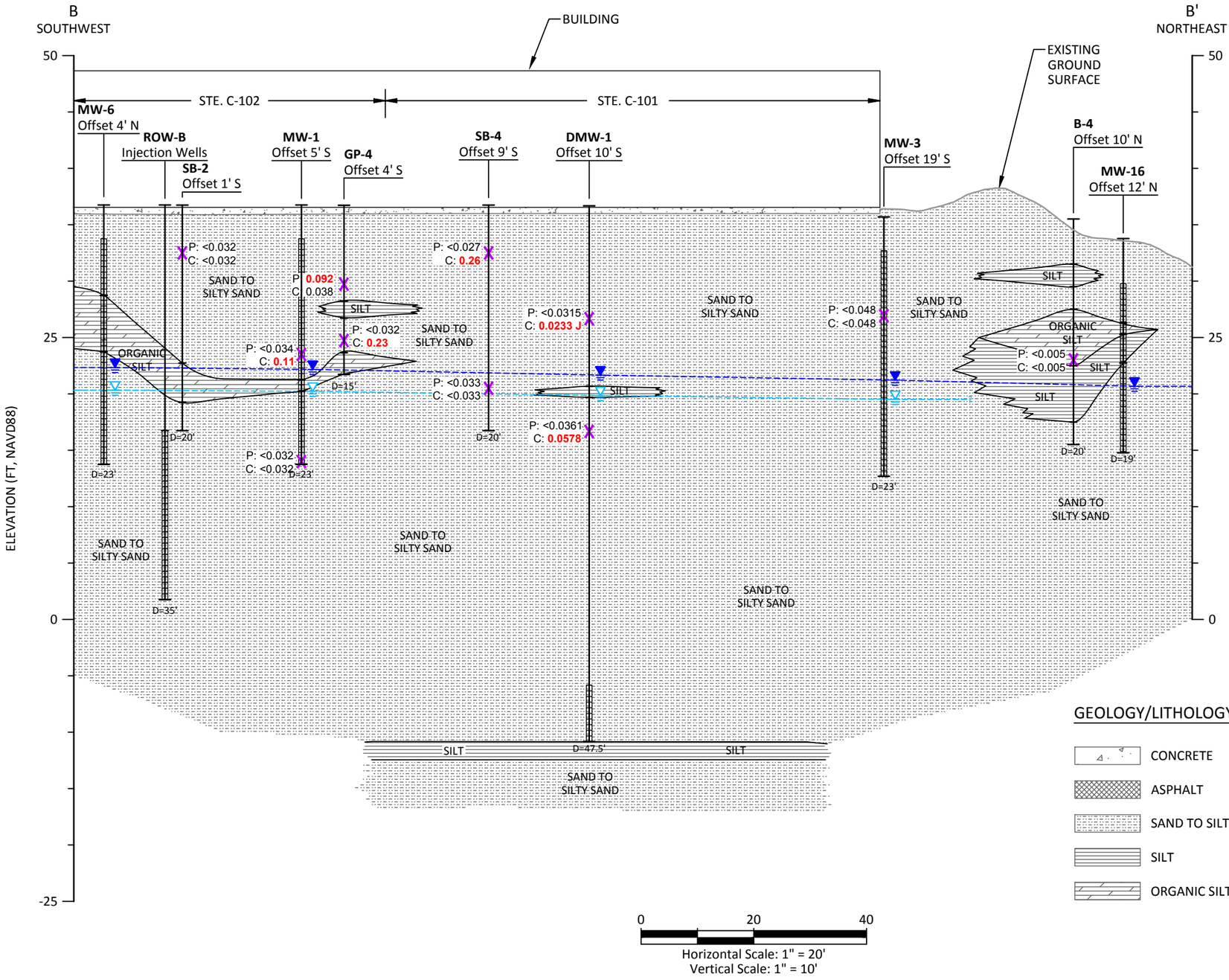
Notes

1. Concentrations in bold and **red** exceed the site soil cleanup level.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Source: King County LiDAR, 2017

Coit Services Site 16750 Woodinville Redmond Rd. NE Woodinville, Washington	**Cross Section A-A'**	Figure 7

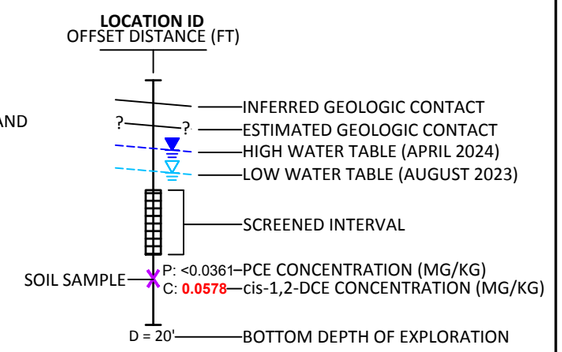
LANDAU ASSOCIATES



GEOLOGY/LITHOLOGY KEY

- CONCRETE
- ASPHALT
- SAND TO SILTY SAND
- SILT
- ORGANIC SILT

EXPLORATION KEY



Notes

1. Concentrations in bold and **red** exceed the site soil cleanup level.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Source: King County LiDAR, 2017

Coit Services Site 16750 Woodinville Redmond Rd. NE Woodinville, Washington	**Cross Section B-B'**	Figure 8

LANDAU ASSOCIATES

Table 1
Enhanced Reductive Dechlorination Injection Summary
Coit Services Site
Woodinville, Washington

Parameter	Row A					Row B				Injection Total
	IW-1	IW-2	IW-3	IW-4	Row Total	IW-5	IW-6	IW-7	Row Total	
HRO Volume (gal)	480	480	480	480	1,920	320	320	320	960	2,880
HRO Concentration (by vol)	7.5%	7.5%	7.5%	7.5%	---	5%	5%	5%	---	---
Water Volume (gal)	5,820	5,820	5,820	5,820	23,280	5,980	5,980	5,980	17,940	41,220
Injection Volume (gal)	**6,300**	**6,300**	**6,300**	**6,300**	**25,200**	**6,300**	**6,300**	**6,300**	**18,900**	**44,100**

Abbreviations and Acronyms:

% = percent
gal = gallons
HRO = Newman Zone HRO™
vol = volume

APPENDIX A

Ground Penetrating Radar Systems, LLC
Job Summary Report

JOB SUMMARY REPORT

Order Number:	Work Order #718264	**Job Date:**	Oct 18, 2024 3:15:00 PM
Customer:	143940 LANDAU ASSOCIATES INC	**Billing Address:**	LANDAU ASSOCIATES INC 155 NE 100th Street, Ste 302 Seattle WA 98125 United States

JOB DETAILS

Jobsite Location	16750 Woodinville Redmond Road NE, Woodinville, Washington, 98072
Work Order Number	Work Order #718264
Job Number	
PO Number	1789002.020.024
GPRS Project Manager:	Robert Rasmussen

Thank you for using GPRS on your project. We appreciate the opportunity to work with you. If you have questions regarding the results of this scanning, please contact the lead GPRS project manager on this project.

EQUIPMENT USED

The following equipment was used on this project:

- **GPS:** This handheld unit offers accuracy down to 4 inches; however, the accuracy achieved will depend on the satellite environment at the time of collection and is not considered survey-grade. Features can be collected as points, lines, or areas and then exported as a KML/KMZ or overlaid on a CAD drawing. For more information, please visit: Link
- **Video Push Camera:** This push camera is designed for video pipe inspection and pipe locating. It has a 1”-2” diameter, self-leveling camera head that provides high-quality images in pipes with a diameter between 2”-8”. Behind the camera is a 512 Hz sonde that can be located from above ground to provide the approximate depth of the pipe up to 10’ deep. The locatable signal from the sonde will not pass through solid metal barriers or metal pipes other than cast iron. Access through a structure such as a cleanout, drain, etc., or an open pipe within arm’s reach is required for inspection service and locating. An operator can push the camera through the pipe to a maximum of 325’ depending on the model used. If the project requires entry into confined spaces to gain access to the subject piping, GPRS will need the client to coordinate all confined space entry and obtain any required permits. Video and photos of the interior of pipes can be provided, along with inspection reports. The client must request inspection reports before fieldwork begins. For more information, please visit: Link
- **VPI Robotic Crawler Camera:** This modular, 6-wheel robotic video pipe inspection camera (crawler) is capable of 0° turns and can be adapted to most pipe applications with varying wheel treads and sizes. The crawler is typically used to inspect andlocate pipes 8" in diameter and up. This device is controlled by an operator at the surface using a remote control. The operator can observe a live video feed during collection to note observations in real-time. A 512 Hz sonde behind the camera head can be located from above ground to provide the position and approximate depth of the pipe up to 10 ft deep. (Please note that the locatable signal from the sonde does not pass through metal pipes or solid metal barriers except for cast iron.) Access through a structure such as a manhole, catch basin, etc., or an open pipe within arm's reach is required for inspection service and locating. The operator can direct the camera through the pipe to up to 1000'. In large diameter pipe applications (24" and above), the crawler can be coupled with a carriage that allows for larger and more rugged wheels and a lift that raises the camera head to 18". The carriage and lift enable the camera to be centered in the pipe for lines up to 36" in diameter. If the project requires entry into confined spaces to gain access to the subject piping, GPRS will need the client to coordinate all confined space entry and obtain any required permits. Video and photos of the interior of pipes can be provided, along with inspection reports. The client must request inspection reports before fieldwork begins. For more information, please visit: Link
- **Sonde:** The sonde can be connected to the end of the traceable rodder and pushed through an accessible pipe. GPRS will use a sonde transmitting a signal at 512Hz, 33KHz, or 8KHz depending on the conditions of your project. The sonde signal can pass through cast-iron or non-metallic pipes and be detected at depths of up to 10’-15’ depending on the conditions. The signal can then be located from the surface using the EM pipe locator.

JOB SUMMARY REPORT

WORK PERFORMED

VIDEO PIPE INSPECTION	
Client Provided Drawings	Yes
Scope of Work	Locate underground utilitie. Inspect sanitary and storm pipelines.
NASSCO Report Performed	Yes
Inclination Report Performed	No
Manhole Inspection Level 1 Performed	No
Manhole Inspection Level 2 Performed	No
Total Pipe Segments Recorded	5
Pipe Infrastructure Located	Yes
Lateral Locating Performed	No
Entry point obstructions blocking access?	Yes
Describe	GPRS could not push camera into floor drain and clean out inside of building due to pipelines being blocked with heavy debris.
Pipe segments unable to be inspected?	No
Unable to determine depths at any location?	No
Unable to locate entirety of pipe segments?	No
Any segments require cleaning?	Yes
Marking Medium	- Spray Paint
Results Notes	GPRS accessed sanitary manhole #1 (AMH1) with a robotic crawler and inspected the 8” sanitary cast iron pipeline downstream to sanitary manhole #2 (AMH2) GPRS did find some defects within the sanitary pipeline such as, spalling, encrustation, dried cement. Reference NASSCO report and video footage of these findings. GPRS accessed storm square catch basins #’s 1, 2 & 3 with a robotic crawler and inspected the 12” PVC storm pipeline. GPRS did find at approximately 1’-2’ inside of catch basin #3 the pipeline is broken at the 10 o’clock to 2 o’clock position. Reference NASSCO report and video footage of for further defects within the storm pipelines. GPRS accessed the 4” storm PVC clean out #1 with a video push camera and traced the pipeline to catch basin #2 GPRS accessed the 6” PVC storm clean out with a video push camera and was able to locate the pipeline approximately 70FT but could not push further due to the bends in the pipeline. GPRS accessed storm square catch basin #4 located next to the bay doors with a video push camera and traced the 6” PVC pipeline to the storm vault.

	GPRS accessed storm clean out in front of storm vault and found that it ties into sanitary pipeline. Lateral seems to be abandoned due to no activity and pipeline is filled with debris. GPRS marked the surface with green spray paint with depths and location of the storm and sanitary pipelines.

JOB SUMMARY REPORT

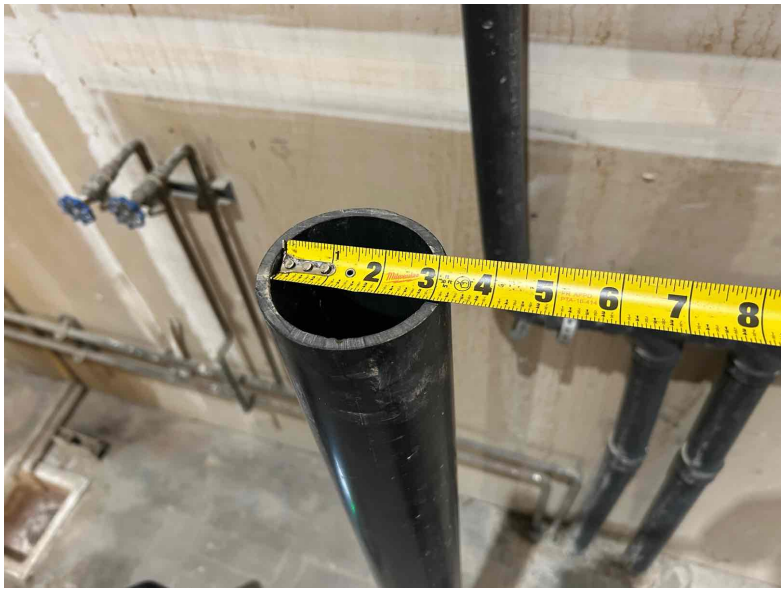
JOBSITE IMAGES

Jobsite Photo #1

Jobsite Photo #2

Jobsite Photo #3

Jobsite Photo #4



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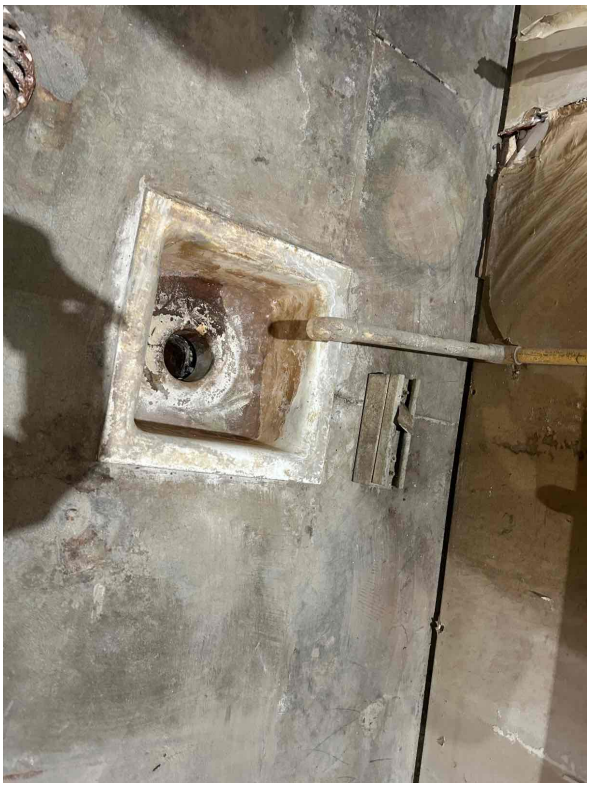
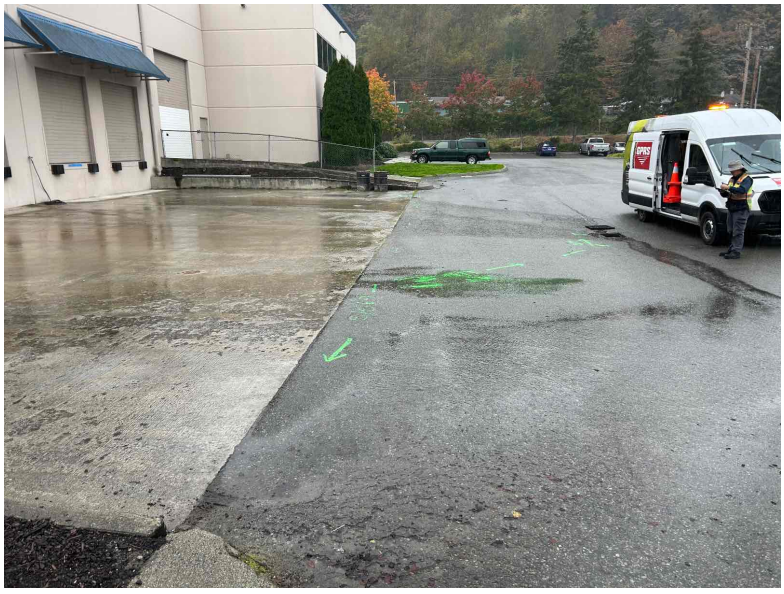


Jobsite Photo #6

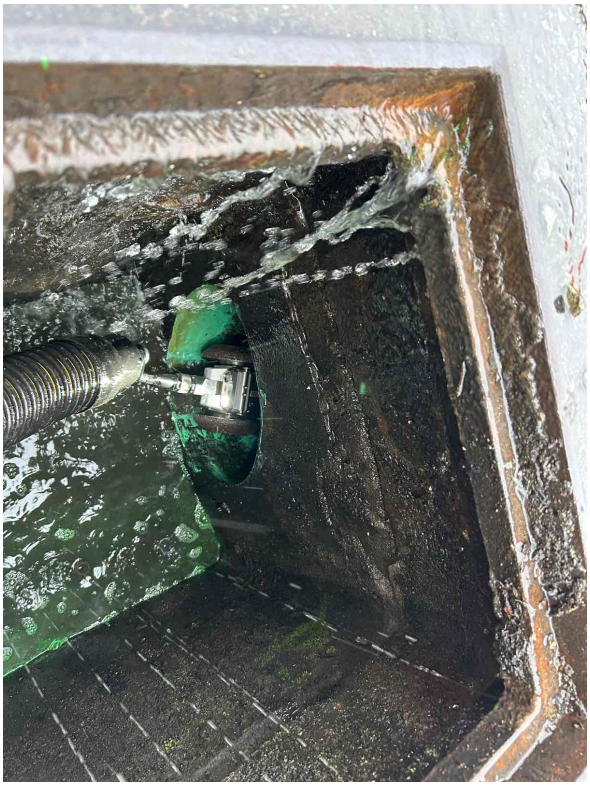
Jobsite Photo #7

Jobsite Photo #8



Jobsite Photo #9

Jobsite Photo #10



Jobsite Photo #11

Jobsite Photo #12

Jobsite Photo #13

Jobsite Photo #14

Jobsite Photo #15

Jobsite Photo #16

Jobsite Photo #17

Jobsite Photo #18

Jobsite Photo #19

Jobsite Photo #20

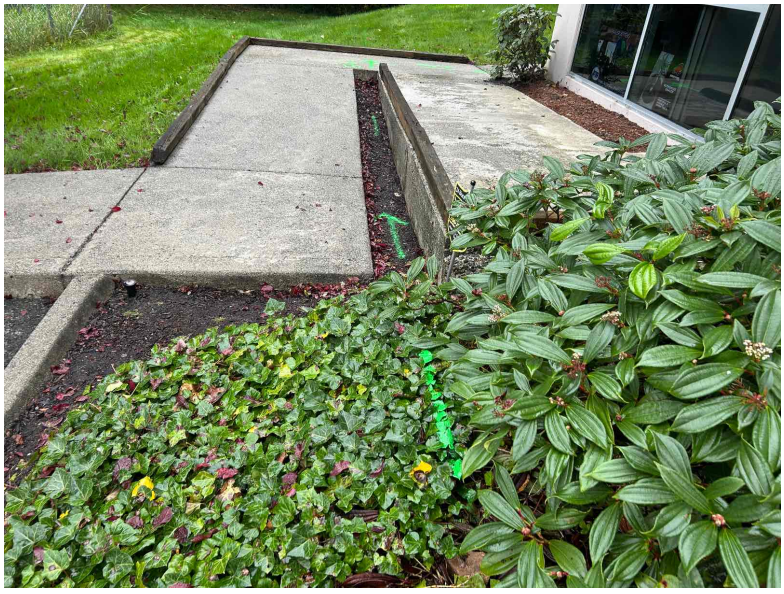
Jobsite Photo #21

Jobsite Photo #22

Jobsite Photo #23

Jobsite Photo #24

Jobsite Photo #25



Jobsite Photo #26

Jobsite Photo #27

Jobsite Photo #28

JOB SUMMARY REPORT

CONTACT / SIGNATURE INFORMATION

Contact Information

Contact Name	Elyssa Dixon	**Email**	edixon@landauinc.com

TERMS & CONDITIONS

http://www.gprsinc.com/termsandconditions.html

APPENDIX B

Health and Safety Plan

SITE-SPECIFIC HEALTH AND SAFETY PLAN

Project Number:	1789002.030	**Reviewed by:**	Christine Kimmel
Prepared by:	Sam Bartish	**Date:**	November 14, 2024
Date:	October 25,2024		

Work Location Description

Project Name:	Coit Services Site
Location:	16750 Woodinville-Redmond Road NE, Woodinville, WA
Anticipated Activities	• Injection well installations • Groundwater monitoring and sampling • Bioremediation injections
Size:	9.76 acres
Surrounding Population:	Industrial properties
Buildings/Homes/Industry:	Office, warehouses, utility locating company, metal supplier, and a former railroad right-of-way (ROW) currently owned by King County Parks
Topography:	20-30 ft msl
Anticipated Weather:	Typical northwest weather for year around services
Unusual Features:	The Subject Property is developed with a 19,000-square foot (SF) warehouse (designated as Building C), which was constructed in 1999. Building C contains three suites (C-101, C-102, and C-103) that are currently occupied by the following tenants: - Suite C-101—Seattle Pump and Equipment Co. (Seattle Pump) provides water pump, high-pressure industrial cleaning equipment, sprayers, “jetters,” and pipe cleaning equipment sales, rentals, and repairs - Suite C-102—Currently vacant. - Suite C-103 is occupied by Coit.
Site History:	A timeline of the Subject Property owners, including the dates that the property was acquired, is provided below: - December 2021—Terreno Woodinville II LLC and Terreno Realty Corporation - July 2020—Woodinville CD, LLC - June 2015—Woodinville West LLC - January 2006—Everything Else LLC - March 1995—Wilcoxon Family Limited Partners - December 1994—Robert and Marjorie Wilcoxon - December 1994—Intrawest Properties Partnership.

Prior to Seattle Pump, Wincraft, a former tenant, conducted screen and sign printing operations in Suite C-101. Wincraft reportedly used trichloroethene (TCE) in its operations, and during a Phase I Environmental Site Assessment (ESA) in 2008, waste from the print washing operations was observed discharging directly to a floor drain in the print washing area. The floor drain is reportedly connected to the sanitary sewer system.

Before relocating to Suite C-103, Coit occupied C-102. Coit cleans residential and commercial air ducts, area rugs, carpets, upholstery, and other products, and also provides fire, smoke, and water damage restoration services. Coit formerly operated a dry-cleaning machine along the east wall of Suite C-102 that used tetrachloroethene (PCE) from approximately 1999 through at least March 2008. An underground oil/water separator and a catch basin that is plumbed to the separator are located within a partially bermed area that is outside a roll-up door of Suite C-102. The oil/water separator discharges to the sanitary sewer system.

Previous investigations include: Phase II ESAs conducted in 2019 and 2021 by AECOM and CODA Consulting Group (CODA), respectively; remedial investigation (RI) and feasibility studies (FS) conducted in 2022 and 2023 by SLR International Corporation (SLR); and additional investigations conducted in 2023 and 2024 by Landau. The soil COCs are PCE, cDCE, and VC, and the only groundwater COC is VC.

Hazard Description

Background Review: ☒ Complete ☐ Partial

If partial, why? Click here to enter text.

Hazard Level: ☐ B ☐ C ☒ D ☐ Unknown

Justification: Existing data regarding site conditions and planned activities.

Types of Hazards: **(Attach additional sheets as necessary)**

A. ☒ Chemical ☒ Biological ☒ Ingestion ☐ O_2 Def. ☒ Skin Contact ☒ Inhalation ☐ Explosive

Describe: Exposure to chemical hazards. Nitrile gloves will be worn. Respirators will be kept on site and will be worn if necessary (as described below).

B. ☒ Physical ☒ Cold Stress ☒ Noise ☐ Heat Stress ☒ Other

Describe: Noise and physical hazards associated with working near a drill rig or rotary hammer. Eye contact with drill operators or other signaling methods will be

used near operating equipment. Reflective vests and ear protection will be worn.

C. ☐ Radiation

Describe:

Nature of Hazards:

☒ Air	Describe:	Exposure to volatile organic compounds (VOCs) is possible. Breathing zone vapors will be analyzed with a photoionization detector (PID) during any activities where soil and/or groundwater is being disturbed.
☒ Soil	Describe:	Exposure to VOCs in the soil is possible. Nitrile gloves will be worn when handling soil and equipment. Conduct screening with PID and visual indication for impacted soil conditions.
☐ Surface Water	Describe:	None
☒ Groundwater	Describe:	Exposure to VOCs in the groundwater is possible. Nitrile gloves will be worn while sampling groundwater and handling equipment. Safety glasses will be worn during sampling in the event of splashing.
☒ Other	Describe:	Exposure to remediation chemicals in injection solution is possible. Nitrile gloves and safety glasses will be worn during preparation of injection solution. Proper lifting techniques will be used when handling containers/packages of remediation chemicals.

Chemical Contaminants of Concern ☐ N/A

Contaminant	PEL/TWA (ppm)	IDLH (ppm)	Source/Quantity Characteristics	Route of Exposure	Symptoms of Acute Exposure	Instruments Used to Monitor Contaminant
Tetrachloroethene	25 ppm	150 ppm	Maximum concentration in soil: 0.14 mg/kg	Inhalation absorption, ingestion, dermal contact	Irritated eyes, nose, and throat; nausea, flush face and neck, vertigo, dizziness, incoordination, headache, sleepiness, skin redness	PID
Cis-1,2,-dichloroethene	200 ppm	1,000 ppm	Maximum concentration in soil: 0.27 mg/kg	Dermal, ingestion, inhalation	Dizziness, nausea, dermatitis, irritation of mucous membranes	PID
Vinyl Chloride	1 ppm	400 ppm	Maximum concentration in soil: 0.007 mg/kg; Maximum concentration in groundwater: 9.83 µg/L	Inhalation absorption, ingestion, dermal contact	Weakness; abdominal pain (blood in the urine), renal shutdown; dermatitis, optical neuritis, corneal damage	PID

Notes: ppm: parts per million; PEL: permissible exposure limits; TWA: time-weighted average; IDLH: immediately dangerous to life and health; PID: photoionization detector

Physical Hazards of Concern ☐ N/A

Hazard	Description	Location	Procedures Used to Monitor Hazard
Moving parts of drill rig, falling and flying objects	A drill rig has many moving parts, pinch points, and torque	Near drill rig	Alert observation of surroundings; minimize time spent near drill rig; no loose clothing; wear assigned PPE. Know location and test working conditions of emergency shutoff system.
Vehicles and heavy equipment used at the site	Presence of vehicular traffic associated active industrial processes	All site area	Alert observation of surroundings, use of brightly colored safety vest. Establish a work area to isolate from public operations using cones and cautions tape-only Hazwoper training personnel inside work area.
Slips, trips, and falls	Associated with completing field tasks	Any area	Alert observation of surroundings. Clean housekeeping work practices. Identify hose routes and minimize facility operation interferrence.
Pressurized injection hoses	Hoses pressurized while pumping injection solution into wells	Injection area	Ensure hoses are in good conditions and free of holes. Ensure all hose connections are secure before pumping. Monitor hose pressure; do not exceed 10 pounds per square inch (psi).
Noise	Loud noises associated with drilling activities	Drilling locations	Appropriate hearing protection (i.e., earmuffs or ear plugs with a noise reduction rating of at least 20 A-weighted decibels [dBA]) will be used if individuals work near high-noise generating equipment (>85 dBA).
Overhead and underground utilities	Damage to utilities through drilling activities	Drilling locations	Client to provide utility maps and both public and private utility locating service will be utilized. No

			raised towers within 20 feet of power lines.
Vehicular traffic	Travel to and from the site, between drilling areas	Any area	Attentiveness, adhering to LAI standards for operating a motor vehicle, obeying all driving laws.
Weather stress	Completing field activities in inclement weather	Any area	Know the signs of weather-related illness (hypothermia and heat exposure) Take breaks, avoid caffeine, drink water, wear appropriate clothing.

Work Location Instrument Readings ☒ N/A

Location: ______

Percent O_2:	______	Percent LEL:	______
Radioactivity:	______	PID:	______
FID:	______	Other:	______
Other:	______	Other:	______
Other:	______	Other:	______

Location: ______

Percent O_2:	______	Percent LEL:	______
Radioactivity:	______	PID:	______
FID:	______	Other:	______
Other:	______	Other:	______
Other:	______	Other:	______

Location: ______

Percent O_2:	______	Percent LEL:	______
Radioactivity:	______	PID:	______
FID:	______	Other:	______
Other:	______	Other:	______
Other:	______	Other:	______

Location: ______

Percent O_2:	______	Percent LEL:	______
Radioactivity:	______	PID:	______
FID:	______	Other:	______
Other:	______	Other:	______
Other:	______	Other:	______

Location: ______

Percent O_2:	______	Percent LEL:	______
Radioactivity:	______	PID:	______
FID:	______	Other:	______
Other:	______	Other:	______
Other:	______	Other:	______

Hazards Expected in Preparation for Work Assignment ☐ N/A

Describe:

Personal Protective Equipment

Level of Protection:

☐ A ☐ B ☐ C ☒ D

Location/Activity: All

☐ A ☐ B ☒ C ☐ D

Location/Activity: Upgrade to level C PPE if ambient air conditions meet target monitoring.

Protective Equipment:

Respirator: ☐ N/A

- ☐ SCBA, Airline
- ☐ Full-Face Respirator
- ☒ Half-Face Respirator (Cart. Organic vapor) (Only if upgrade to Level C)
- ☐ Escape mask
- ☐ Other:
- ☐ Other:

Clothing: ☐ N/A

- ☐ Fully-Encapsulating Suit
- ☐ Chemically-Resistant Splash Suit
- ☐ Apron; Type:
- ☒ Tyvek Coverall (only if upgrade to Level C)
- ☐ Saranex Coverall
- ☐ Coverall; Type:
- ☒ Other: Safety vest

Head & Eye: ☐ N/A

- ☒ Hard Hat
- ☒ Goggles
- ☐ Face Shield
- ☒ Safety Eyeglasses
- ☒ Other: Earplugs

Hand Protection: ☐ N/A

- ☐ Undergloves; Type:
- ☒ Gloves; Type: Chemical resistant (nitrile) Abrasion resistant (leather)
- ☐ Overgloves; Type:
- ☐ Other:

Foot Protection: ☐ N/A

- ☒ Leather Boots with Steel Toe
- ☐ Neoprene Boots with Steel Toe/Shank
- ☐ Disposable Overboots
- ☐ Other:

Monitoring Equipment: ☐ **N/A**

- ☐ CGI
- ☐ O_2 Meter
- ☐ Rad Survey
- ☐ Detector Tubes; Type:
- ☒ PID
- ☐ FID
- ☐ Other:

Decontamination

Personal Decon: ☒ Required ☐ Not Required

If required, describe: Avoid hand to mouth movements, exchange disposable PPE (gloves) between sampling locations, wash hands and face with soap and hot water prior to leaving site.

Equipment Decon: ☒ Required ☐ Not Required

If required, describe: If required, describe: All sampling equipment will be decontaminated using wet decontamination procedures:

- Wash and scrub equipment with Alconox/tap water solution.
- Rinse with tap water.
- Rinse with de-ionized water.
- Repeat entire procedure or any parts of the procedure as necessary.

Down-the-hole equipment will be decontaminated using the procedures described above or a hot-water, high-pressure steam cleaner.

In addition to the wet decontamination procedures, other measures will be taken to prevent cross-contamination. These measures include changing out disposable gloves between each sampling location, using fresh paper towels at each sample location, maintaining a clean work area, and by working from known or suspected "clean" areas of the site toward more environmentally impacted areas.

Activities Covered Under This Plan

Task No.	Description	Preliminary Schedule
1	Groundwater Monitoring	Quarterly
2	Install Injection Wells	1st Quarter 2025
3	Conduct ERD	1st Quarter 2025, 2026

Subcontractor's Health and Safety Program Evaluation ☐ N/A

Subcontractor: TBD

Address:

Evaluation Criteria:

Item	Adequate	Inadequate	Comments
Medical Surveillance Program	☐	☐	
Personal Protective Equipment Availability	☐	☐	
Onsite Monitoring Equipment Availability	☐	☐	
Safe Working Procedures Specification	☐	☐	
Training Protocols	☐	☐	
Ancillary Support Procedures (if any)	☐	☐	
Emergency Procedures	☐	☐	
Evacuation Procedures Contingency Plan	☐	☐	
Decontamination Procedures Equipment	☐	☐	
Decontamination Procedures Personnel	☐	☐	

Results of Evaluation: ☐ **Adequate** ☐ **Inadequate**

Additional Comments:

Evaluation Conducted By: Date:

Personnel and Roles

Name	Work Location Title/Task	Medical Current	Respirator Fit Test Current	Hazwoper Training Current
Ben Hecht	Senior Staff GIT/ GW monitoring / Injections	☒	☒	☒
Mike Staton	Senior Principal Geologist	☐	☐	☒
Jenny Green	Senior Project Engineer/ Injections	☒	☒	☒
Elyssa Dixon	Senior Engineer	☐	☐	☒
		☐	☐	☐
		☐	☐	☐
		☐	☐	☐
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		☐	☐	☐
		☐	☐	☐

Emergency Facilities and Numbers

Hospital: Evergreen Health Medical Center

Telephone: (425) 899-1000

Address: 12040 NE 128th St
Kirkland, WA 98034

Directions:
1. Turn right onto Redmond – Woodinville Rd– go 0.2 mile
2. Turn left onto 127th Pl NE – go 144 ft
3. Turn right onto NE 173rd Pl – go 0.2 miles
4. Slight left on NE 173rd Pl- becomes 124th ave – go 2.8 miles
5. Arrive at hospital entrance on right.

Emergency Transportation Systems (Fire, Police, Ambulance): 911

Emergency Routes: See Attachment B

Emergency Contacts:

Name	Offsite	Onsite
Woodinville Police Department	(425) 877-2279 for non-emergencies or 911 for emergencies	
Woodinville Fire Department	(425) 483-2131 for non-emergencies or 911 for emergencies	
Chris Kimmel	(206) 786-3801	(425)784-8524
Mike Station	(206) 707-5199	

In the event of an emergency, do the following:

1. Call for help as soon as possible. Call 911. Give the following information:
   - WHERE the emergency is – use cross streets or landmarks
   - PHONE NUMBER you are calling from
   - WHAT HAPPENED – type of injury
   - WHAT is being done for the victim(s)
   - YOU HANG UP LAST – let the person you called hang up first.
2. If the victim can be moved, paramedics will transport to the hospital. If the injury or exposure is not life-threatening, decontaminate the individual first. If decontamination is not feasible, wrap the individual in a blanket or sheet of plastic prior to transport.

Health and Safety Plan
Approval/Sign Off Form

I have read, understood, and agreed with the information set forth in this Health and Safety Plan (and attachments) and discussed in the Personnel Health and Safety briefing.

Name	Signature	Date
Click here to enter text. Site Safety Coordinator		Click here to enter text.
Chris Kimmel Landau H&S Manager	Christine Kimmel	11/14/2024
Elyssa Dixon Landau Project Manager	Elyssa Dixon	11/14/2024

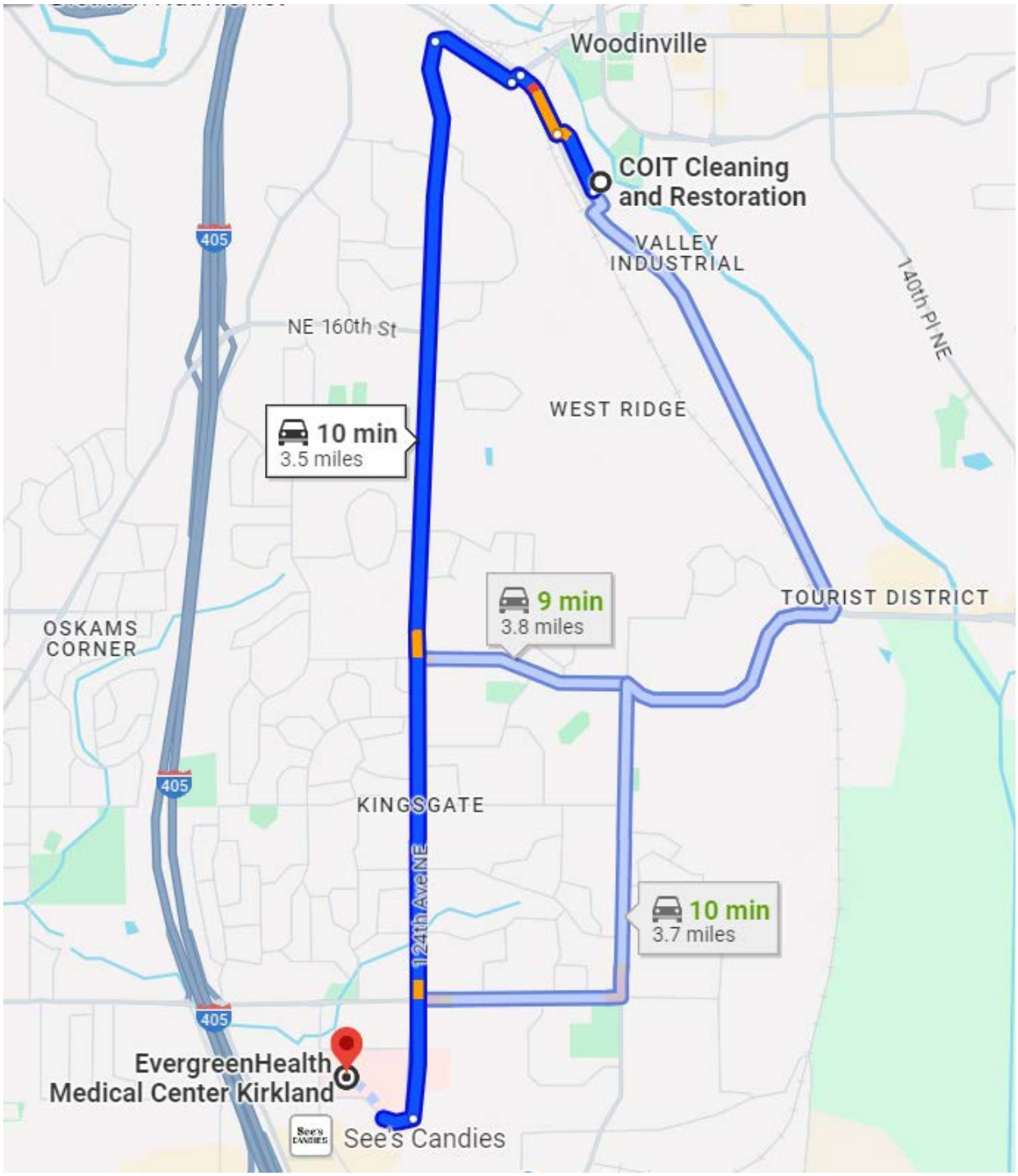
Personnel Health and Safety Briefing Conducted by:

Name	Signature	Date

Attachment A
Action Levels for Respiratory Protection

Monitoring Parameter	Reading	Level of Protection
Organic Vapors	PID reading >1 ppm at point of operations for more than 1 minute	Establish 25-ft diameter exclusion zone around work area, monitor worker's breathing zone
	PID reading >5 ppm in worker's breathing zone for more than 1 minute	Upgrade to Level C-half face respirator with organic vapor/HEPA cartridge, establish contamination reduction
	PID reading >15 ppm in worker's breathing zone for more than 1 minute	Evacuate area and move upwind to allow vapors to dissipate, may resume work in Level C PPE after vapors dissipate.
	PID reading >25 ppm in worker's breathing zone for more than 1 minute **OR** >50 ppm instantaneous	Evacuate area and move upwind. Notify onsite contact and Landau Health and Safety Manager.

Attachment B
Emergency Route–Map to the Hospital



APPENDIX C

Safety Data Sheet

SAFETY DATA SHEET

Newman Zone HRO

Prepared to U.S. OSHA, CMA, ANSI, Canadian WHMIS Standards, Australian WorkSafe, Japanese Industrial Standard JIS Z 7250:2000, and European Directives

1. PRODUCT IDENTIFICATION

TRADE NAME (AS LABELED):	***Newman Zone HRO***
SYNONYMS:	None known
CAS#:	Mixture
PRODUCT USE:	This product is used for soil and ground water remediation. It is formulated and processed using food grade additives, following packaging, sanitation and storage as required by Best Practices used for Food products.
CHEMICAL SHIPPING NAME/CLASS:	Non-Regulated Material
U.N. NUMBER:	None
MANUFACTURER'S NAME:	**RNAS Remediation Products**
ADDRESS:	6712 West River Road, Brooklyn Center, MN 55430
BUSINESS PHONE:	1-763-585-6191
EMERGENCY PHONE:	1-800-424-9300 (Chemtrec 24 Hr Service – Emergency Only)
DATE OF CURRENT REVISION:	January 16, 2016
DATE OF LAST REVISION:	April 11, 2014

2. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This product is a clear light yellow colored liquid with a vegetable oil odor.
Health Hazards: Prolonged or repeated exposure may cause irritation to skin. May cause irritation to eyes upon contact. Inhalation of vapors/sprays or mist may cause respiratory irritation. Ingestion of large amounts of this product may cause gastrointestinal irritation.
Flammability Hazards: This product is a Non-Flammable liquid with a flash point of >235°F (>113°C).
Reactivity Hazards: None known
Environmental Hazards: The Environmental effects of this product have not been investigated. Release of this product is not anticipated to have significant adverse effects in the aquatic environment.

US DOT SYMBOLS	CANADA (WHMIS) SYMBOLS	EUROPEAN and (GHS) Hazard Symbols
		None
Non-Regulated Material	Complies with WHMIS 2015	Signal Word: **None**

CLASSIFICATION OF SUBSTANCE OR MIXTURE IN ACCORDANCE WITH 29 CFR 1910.1200 (OSHA HCS) AND THE EUROPEAN UNION DIRECTIVES:
This product does not meet the definition of a hazardous substance or preparation as defined by OSHA in 29 CFR 1910.1200 or the European Union Council Directives 67/548/EEC, 1999/45/EC, 1272/2008/EC and subsequent Directives.

EU HAZARD CLASSIFICATION OF INGREDIENTS PER DIRECTIVE 1272/2008/EC:
None of the ingredients are listed in Annex VI of Directive 67/548/EEC
Substances not listed either individually or in group entries must be self classified.

Component(s) Contributing to Classification(s):
All Ingredients

GHS Hazard Classification(s):
None known

Hazard Statement(s):
None known

Precautionary Statement(s):
None known

HEALTH HAZARDS OR RISKS FROM EXPOSURE:
SYMPTOMS OF OVEREXPOSURE BY ROUTE OF EXPOSURE: The most significant routes of overexposure for this product are by contact with skin or eyes, inhalation of vapors and ingestion. The symptoms of overexposure are described below.
ACUTE:
INHALATION: Not expected to cause adverse health effects when used as intended. Inhalation of vapors/mist/spray may cause respiratory irritation.
CONTACT WITH SKIN: Not expected to cause adverse health effects when used as intended. Prolonged and repeated contact may cause irritation to skin.

EYE CONTACT: Direct eye contact can cause irritation with redness, tearing and blurred vision.
INGESTION: Under normal conditions of intended use, this material is not expected to be an ingestion hazard. Ingestion of large quantities may cause gastrointestinal irritation, nausea and vomiting.
CHRONIC: None known
TARGET ORGANS: Acute: Skin, Respiratory System and Eyes **Chronic:** None known

3. COMPOSITION AND INFORMATION ON INGREDIENTS

Hazardous Ingredients:	WT%	CAS#	EINECS #	GHS Hazard Classification(s)
Blend of Soybean Oil and Soybean Oil Esters	85 - 95%	8001-22-7	232-274-4	Not Classified
Proprietary Food Grade Surfactant Blend	5 – 15%	Proprietary	Not Listed in ESIS	Not Classified
Balance of other ingredients is less than 1% in concentration (or 0.1% for carcinogens, reproductive toxins, or respiratory sensitizers).				

NOTE: This product has been classified in accordance with the hazard criteria of 29CFR1910.1200 and the SDS contains all the information required by the CPR, EU Directives and the Japanese Industrial Standard *JIS Z 7250: 2000*.

4. FIRST-AID MEASURES

EYE CONTACT: If product enters the eyes, open eyes while under gentle running water for at least 15 minutes. Seek medical attention if irritation persists.
SKIN CONTACT: Wash skin thoroughly with soap and water after handling. Seek medical attention if irritation develops and persists.
INHALATION: If breathing becomes difficult, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Seek medical attention.
INGESTION: If product is swallowed, call physician or poison control center for most current information. If professional advice is not available, do not induce vomiting. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or who cannot swallow. Seek medical advice. Take a copy of the label and/or SDS with the victim to the health professional.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: None known
RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate overexposure.

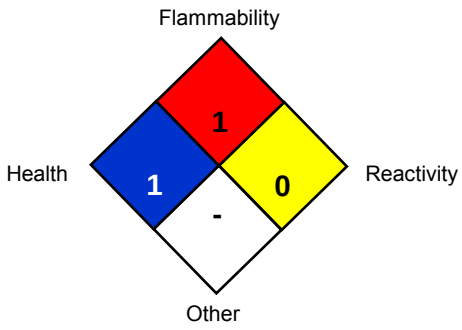
5. FIRE-FIGHTING MEASURES

FLASH POINT: Non-Flammable with flash point >235°F (>113°C)
AUTOIGNITION TEMPERATURE: Not Available
FLAMMABLE LIMITS (in air by volume, %): Lower NA Upper NA
FIRE EXTINGUISHING MATERIALS: Use fire extinguishing methods below:

Water Spray: Yes	Carbon Dioxide: Yes
Foam: Yes	Dry Chemical: Yes
Halon: Yes	Other: Any "C" Class

UNUSUAL FIRE AND EXPLOSION HAZARDS: Not considered a fire or explosion hazard. During a fire irritating gases may be produced.
Explosion Sensitivity to Mechanical Impact: No
Explosion Sensitivity to Static Discharge: No
SPECIAL FIRE-FIGHTING PROCEDURES: Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Isolate materials not yet involved in the fire and protect personnel. Move containers from fire area if this can be done without risk; otherwise, cool with carefully applied water spray. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.

NFPA RATING SYSTEM



HMIS RATING SYSTEM

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH HAZARD (BLUE)	1
FLAMMABILITY HAZARD (RED)	1
PHYSICAL HAZARD (YELLOW)	0

PROTECTIVE EQUIPMENT			
EYES	RESPIRATORY	HANDS	BODY
	See Sect 8		See Sect 8

For Routine Industrial Use and Handling Applications

Hazard Scale: **0** = Minimal **1** = Slight **2** = Moderate **3** = Serious **4** = Severe * = Chronic hazard

6. ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Stop the flow of material, if this can be done safely. Contain discharged material. Absorb spill using an absorbent, non-combustible material such as earth, sand, or vermiculite. Place in a proper container for disposal. Dispose of in accordance with U.S. Federal, State, and local hazardous waste disposal regulations and those of Canada and its Provinces, those of Australia, Japan and EU Member States (see Section 13, Disposal Considerations).

7. HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Use good hygiene practices.

STORAGE AND HANDLING PRACTICES: Store in original container. Keep container closed when not in use. Store in a cool, dry location. Avoid freezing or extended storage in high temperatures and away from incompatible materials.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

Chemical Name	CAS#	ACGIH TLV	OSHA TWA
Blend of Soybean Oil and Soybean Oil Esters	8001-22-7	10 mg/m³ Oil Mists	15 mg/m³ Oil Mists
Proprietary Food Grade Surfactant Blend	Proprietary	10 mg/m³ Oil Mists	15 mg/m³ Oil Mists

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation to ensure exposure levels are maintained below the limits provided above.

The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132) or equivalent standard of Canada, or standards of EU member states (including EN 149 for respiratory PPE, and EN 166 for face/eye protection), and those of Japan. Please reference applicable regulations and standards for relevant details.

RESPIRATORY PROTECTION: Not required when using this product. Maintain airborne contaminant concentrations below guidelines listed above, if applicable. If necessary, use only respiratory protection authorized in the U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), equivalent U.S. State standards, Canadian CSA Standard Z94.4-93, the European Standard EN149, or EU member states.

EYE PROTECTION: Safety glasses or goggles are recommended to avoid eye contact. If necessary, refer to U.S. OSHA 29 CFR 1910.133, Canadian Standards, and the European Standard EN166, Australian Standards, or relevant Japanese Standards.

SKIN PROTECTION: Wear impervious gloves for prolonged or repeated exposure as appropriate to task avoid when using this product. If necessary, refer to U.S. OSHA 29 CFR 1910.138, the European Standard DIN EN 374, the appropriate Standards of Canada, Australian Standards, or relevant Japanese Standards.

BODY PROTECTION: Use body protection appropriate to task being performed. If necessary, refer to appropriate Standards of Canada, or appropriate Standards of the EU, Australian Standards, or relevant Japanese Standards.

9. PHYSICAL and CHEMICAL PROPERTIES

APPEARANCE (Physical State) and COLOR: This product is a clear light yellow colored liquid with a vegetable oil odor.
ODOR: Slight
ODOR THRESHOLD: Not Applicable
pH: Not Available
MELTING/FREEZING POINT: Not Available
BOILING POINT: Not Available
FLASH POINT: >235°F (>113°C)
EVAPORATION RATE (n-BuAc=1): Not Available
FLAMMABILITY (SOLID, GAS): Not Applicable
UPPER/LOWER FLAMMABILITY OR EXPLOSION LIMITS: Not Applicable
VAPOR PRESSURE (mm Hg @ 20°C (68°F)): Not Available
VAPOR DENSITY: Not Available
SPECIFIC GRAVITY: 0.92 @ 25°C
SOLUBILITY IN WATER: Non - Soluble
WEIGHT PER GALLON: 7.68 Lbs per gal
PARTITION COEFFICENT (n-octanol/water): Not Available
AUTO-IGNITION TEMPERATURE: Not Applicable
DECOMPOSITION TEMPERATURE: Not Available
VISCOSITY: Not Available

10. STABILITY and REACTIVITY

STABILITY: Stable under conditions of normal storage and use.
HAZARDOUS DECOMPOSITION PRODUCTS: Thermal decomposition products include oxides of carbon and irritating odors.
MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Strong oxidizing materials.
POSSIBILITY OF HAZARDOUS REACTIONS: Will not occur.
CONDITIONS TO AVOID: Incompatible materials.

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA:
No LD50 Data available for this product.
SUSPECTED CANCER AGENT: Ingredients within this product are not found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, or CAL/OSHA and therefore are not considered to be, nor suspected to be, cancer-causing agents by these agencies.
IRRITANCY OF PRODUCT: No specific data available
SENSITIZATION TO THE PRODUCT: This product is not a skin and respiratory sensitizer.
REPRODUCTIVE TOXICITY INFORMATION: No information concerning the effects of this product and its components on the human reproductive system.

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.
ENVIRONMENTAL STABILITY: No specific data available on this product.
CHEMICAL EFFECT ON PLANTS, ANIMALS AND AQUATIC LIFE: This product is not expected to cause significant harm to plants, animals or aquatic life.
WATER ENDANGERMENT CLASS: Water endangering in accordance with EU Guideline 91/155-EWG – Not Determined.
SPECIFIC AVAILABLE COMPONENT INFORMATION: No additional data available at this time.

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate U.S. Federal, State, and local regulations, those of Canada, Australia, EU Member States and Japan.

EU Waste Code: Not determined.

14. TRANSPORTATION INFORMATION

US DOT, IATA, IMO, ADR:

U.S. DEPARTMENT OF TRANSPORTATION (DOT) SHIPPING REGULATIONS: This product is classified (per 49 CFR 172.101) by the U.S. Department of Transportation, as follows:

PROPER SHIPPING NAME:	Non-Regulated Material
HAZARD CLASS NUMBER and DESCRIPTION:	None
UN IDENTIFICATION NUMBER:	None
PACKING GROUP:	NA
DOT LABEL(S) REQUIRED:	None

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER: None

RQ QUANTITY: None

MARINE POLLUTANT: The components of this product are not designated by the Department of Transportation to be Marine Pollutants (49 CFR 172.101, Appendix B).

INTERNATIONAL AIR TRANSPORT ASSOCIATION SHIPPING INFORMATION (IATA): This product is not considered as dangerous goods.

INTERNATIONAL MARITIME ORGANIZATION SHIPPING INFORMATION (IMO): This product is not considered as dangerous goods.

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR): This product is not considered by the United Nations Economic Commission for Europe to be dangerous goods.

15. REGULATORY INFORMATION

UNITED STATES REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: The components of this product are subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act as follows: None.

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for the components of this product. The default Federal SDS submission and inventory requirement filing threshold of 10,000 lbs (4,540 kg) therefore applies, per 40 CFR 370.20.

U.S. CERCLA REPORTABLE QUANTITY (RQ): None.

U.S. TSCA INVENTORY STATUS: The components of this product are listed on the TSCA Inventory or are exempted from listing.

OTHER U.S. FEDERAL REGULATIONS: None

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): Ingredients within this product are not on the Proposition 65 Lists.

CANADIAN REGULATIONS:

CANADIAN DSL/NDSL INVENTORY STATUS: The components of this product are on the DSL Inventory, or are exempted from listing.

OTHER CANADIAN REGULATIONS: Not applicable.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS:

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all of the information required by those regulations.

CANADIAN WHMIS CLASSIFICATION and SYMBOLS: Complies with WHMIS 2015.

EUROPEAN ECONOMIC COMMUNITY INFORMATION:

This product does not meet the definition of a hazardous substance or preparation as defined by the European Union Council Directives 67/548/EEC, 1999/45/EC, 1272/2008/EC and subsequent Directives.
See Section 2 for Details.

AUSTRALIAN INFORMATION FOR PRODUCT: The components of this product are listed on the International Chemical Inventory list.

JAPANESE INFORMATION FOR PRODUCT:

JAPANESE MINISTER OF INTERNATIONAL TRADE AND INDUSTRY (MITI) STATUS: The components of this product are not listed as Class I Specified Chemical Substances, Class II Specified Chemical Substances, or Designated Chemical Substances by the Japanese MITI.

JAPANESE ENCS INVENTORY: The components of this product are on the ENCS Inventory as indicated in the section on International Chemical Inventories, below.

POISONOUS AND DELETERIOUS SUBSTANCES CONTROL LAW: No component of this product is a listed Specified Poisonous Substance under the Poisonous and Deleterious Substances Control Law.

INTERNATIONAL CHEMICAL INVENTORIES:

Listing of the components on individual country Chemical Inventories is as follows:
Asia-Pac: Listed or Exempt from listing
Australian Inventory of Chemical Substances (AICS): Listed or Exempt from listing
Korean Existing Chemicals List (ECL): Listed or Exempt from listing
Japanese Existing National Inventory of Chemical Substances (ENCS): Listed or Exempt from listing
Philippines Inventory if Chemicals and Chemical Substances (PICCS): Listed or Exempt from listing
Swiss Giftliste List of Toxic Substances: Listed or Exempt from listing
U.S. TSCA: Listed

16. OTHER INFORMATION

ABBREVIATIONS AND ACRONYMS:

EPA: United States Environmental Protection Agency
ARD: European Agreement concerning the International Carriage of Dangerous Goods by Road
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)

PREPARED BY: Paul Eigbrett – (**GHS MSDS Compliance PLUS)**
DATE OF PRINTING: January 16, 2016

The information contained herein is believed to be accurate but is not warranted to be so. Data and calculations are based on information furnished by the manufacturer of the product and manufacturers of the components of the product. Users are advised to confirm in advance of the need that information is current, applicable and suited to the circumstances of use. RNAS Remediation Products assumes no responsibility for injury to vendee or third party person proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Furthermore, RNAS Remediation Products assumes no responsibility for injury caused by abnormal use of this material even if reasonable safety procedures are followed.

END OF SDS SHEET