REMEDIAL INVESTIGATION AND FEASIBILITY STUDY WORK PLAN
RIVERSIDE PROPERTY
BOTHELL, WASHINGTON

Project No. 2007-098-700

Prepared for
City of Bothell

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1. INTRODUCTION

1.1 BACKGROUND

This Remedial Investigation / Feasibility Study (RI/FS) Work Plan is prepared for the Riverside site in Bothell, Washington. A RI/FS is planned as part of an Agreed Order number DE 6295 between the City of Bothell and the Washington State Department of Ecology (Ecology) (Appendix A). The City of Bothell currently owns the property. A portion of the property will accommodate the realignment of SR 522 scheduled for construction in 2010. Remnant portions of the property may be redeveloped. The southern remnant is likely to retain its park function.

The approximately two acre property is located on the south side of SR-522, between downtown Bothell and the Sammamish River (Figure 1-1). The property is currently vacant and used for public parking. The property formerly contained a gasoline service station.

1.2 OBJECTIVE

The objective of this RI/FS is to meet the requirements of the Agreed Order in accordance with the Model Toxics Control Act (MTCA) Cleanup Regulation (Washington Administrative Code WAC 173-340). The RI is designed to characterize site conditions in order to complete a FS and select a cleanup action as described in WAC 173-340-360 through 173-340-390.

1.3 WORK PLAN ORGANIZATION

This Work Plan is prepared using the United States Environmental Protection Agency's (EPA's) Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (OSWER Directive 9355.3-01) as a reference for work plan organization and content. The scope of work described in the work plan is designed to gather information required for a RI/FS study as described in WAC 173-340-350. The organization of the Work Plan is presented below:

- Section 1: Introduction – background, objective, work plan organization, and regulatory framework
- Section 2: Site Background and Physical Setting – description and history of operations and environmental setting
- Section 3: Initial Evaluation – summary of previous investigations, known and expected contaminants, and the conceptual site model
- Section 4: Work Plan Rationale – data quality objective needs and general approach

- Section 5: Remedial Investigation Tasks – project planning, sample collection and analysis, data validation and evaluation, and assessment of risks

- Section 6: Project Management – schedule and project management staff

1.4 REGULATORY FRAMEWORK

The site is listed on Ecology's leaking underground storage tank database with a facility ID of 53578168. The site has not been ranked under the Washington Ranking Method. Investigations and cleanup actions conducted in the early 1990's were completed as independent remedial actions.

Further remedial actions at the Riverside property will be conducted under the provisions of the Agreed Order with Ecology. The provisions include the requirement that the City of Bothell complete a RI/FS study as required by MTCA Cleanup Regulation WAC 173-340.

In Washington State, the administrative process and standards for investigating and cleaning up facilities impacted by hazardous substances are promulgated under MTCA (WAC 173- 340; Ecology, 2007). Under MTCA (WAC 173-340-350) a RI/FS is required once a site is prioritized for remedial action. The RI/FS focuses on collecting, developing, and evaluating enough information to select a cleanup action under WAC 173-340-360 through 390.

2. SITE BACKGROUND AND PHYSICAL SETTING

2.1 SITE BACKGROUND

The property is currently undeveloped and used for nearby city park and greenbelt parking. Historic operations on this property included a gasoline service station, known as the "Flying A" station, located at the northwestern portion of the site (SEACOR, 1990). Site investigation work in the early 1990's discovered residual soil and ground water chemicals attributed to the service station operation. Restaurants were located in buildings on either side of the service station and a barber shop and cabinet shop may have been located near the northeast corner of the property (SEACOR, 1990; City of Bothell, 2007).

An 1897 topographic map shows a railroad spur line that may have crossed on or near the western edge of the property (EDR, 2007). The spur line is not shown on a 1944 topographic map.

The service station opened in 1946 (ECOSS, 2007) and operated until the early 1960's (SEACOR, 1990). The service station building was demolished some time after 1965. The station contained at least two 1,000 gallon underground storage tanks (USTs) (ECOSS, 2007). The tanks were apparently removed before 1990 (SEACOR, 1990). UST system pipelines exposed in excavations in 1990 suggest at least some pipes remain in the ground.

2.2 PHYSICAL SETTING

The approximately two-acre property is located at the approximate address of 10005 Woodinville Drive, Bothell, Washington, King County Tax Parcels Nos. 082605-9120 and 082605-9284, and 082605-9031.

Figure 2-1 shows the subject property site plan. The subject property consists of an approximately triangular lot located on the south side of Woodinville Drive between Bothell Way, and 101st Avenue East. Vehicle access is from Northeast 180th Street on the south.

The subject property is predominantly a flat gravel area with landscaped strips along the north and south property boundaries. A portion of the west boundary consists of vegetated ground sloping down to Horse Creek. The gravel area is used by the city as a parking lot for adjacent parks and green belts. The Sammamish River is between 50 and 100 feet south of the property line and separated from the property by Northeast 180th Street.

Based on observations during investigations, soil at this site typically consists of approximately four to nine feet of silty sand to sandy silt fill with occasional debris over alluvial soil consisting of interbedded silt, sandy silt, peat, and silty sand to a depth of 20 to 25 feet below ground surface (bgs). A buried soil horizon was observed at some

locations at the fill-alluvium contact. Much of the fill material is likely dredge spoils placed on the property from re-alignment of the Sammamish River in the 1960s. Below these deposits is predominantly dense sand with variable gravel to a depth of 40 to 50 feet bgs. This sand may be a glacial outwash deposit. Beneath the dense sand is a stiff to hard clay or silt with a maximum thickness of at least 14 feet. This unit is inferred to be a drift deposit of glacial-lacustrine origin.

Most fill material appears to be derived from three sources: circa 1940's property development on the northern portion of the property along Woodinville Drive, dredge and soil spoils placed on the southern portions of the property by the Army Corps of Engineers between 1961 and 1966, and excavated fill material placed back into its excavation in 1992 and 1993 along with 1,200 yards of imported fill. Some 1940's era fill material may have been associated with former septic tank drain fields. Peat or silt beds with high organic content up to two feet thick are present within the alluvial soil, generally at depths greater than 10 feet below ground surface. These organic-rich beds appear to underlie most of the property but may not represent a contiguous layer.

Ground water typically occurs in soil borings at depths of approximately eight to sixteen feet bgs (HWA, 2008). Depth to water in monitoring wells gauged from 1992 to 1994 by others ranged between 4 and 10 feet bgs (GTI, 1994). Ground water flow was previously reported to vary from southeasterly to westerly based on the gauging data. However, the monitoring wells were in a near-linear alignment which precludes establishing a ground water flow direction with a high degree of confidence.

The measured ground water gradient at the adjacent western site (Bothell Landing site) is to the southeast, with a gradient ranging from approximately 0.025 to 0.0125 ft/ft.

3. INITIAL EVALUATION

3.1 SUMMARY OF PREVIOUS INVESTIGATIONS

Investigations began in 1990 and 1991 when petroleum impacted soil and ground water, and solid waste were encountered in site excavations (SEACOR 1990, 1991; RZA, 1992). The solid waste included discarded motor oil cans, oil filters, automatic transmission fluid cans, antifreeze cans, and small barrels. A corrugated metal pipe septic tank was also encountered and removed. Four-inch diameter clay or cement drain tiles (pipes) were also exposed but their former use, location, or disposition is unknown.

The initial investigations continued through 1994 and included the installation of six ground water monitoring wells (three pairs of wells completed at two depths), with four ground water sample collection events. Approximately 4,500 cubic yards of petroleum-impacted soil were excavated and treated on site from 1991 to 1993. The treated soil was returned to the excavation in 1992 and 1993.

In 2008 HWA conducted a site investigation as part of a Phase II environmental site assessment and a geotechnical site investigation. The investigation included the drilling of 11 GeoProbe soil borings and three hollow stem auger soil borings. One monitoring well was also constructed. Investigation findings document the presence of lube oil range petroleum hydrocarbons in soil at concentrations greater than screening levels in the vicinity of the former soil excavation.

The investigation also documents the presence of halogenated volatile organic compounds (HVOCs) with concentrations greater than screening levels in ground water at more than one on-site location. There are no documented on-site HVOC sources and these compounds are likely related to upgradient sources. Additional site investigation history can be found in the Phase II Environmental Site Assessment (HWA, 2008).

3.2 KNOWN AND EXPECTED CONTAMINANTS

Based on background information and analytical data from previous studies presented in Section 2.1, several categories of Contaminants Of Interest (COI) are identified as either known or expected to be found in site soils and ground water. They are as follows:

- Petroleum hydrocarbons
- Semivolatile organic compounds (SVOCs)
- VOCs including chlorinated hydrocarbons
- Lead
- Arsenic

Detected chemicals in soil and ground water based on sampling data from 2008 are presented in Tables 3-1 and 3-2. Arsenic is not a known contaminant. However, arsenic may be a contaminant at other MTCA sites in the Bothell Crossroads area. Therefore

arsenic will be analyzed in Riverside RI ground water samples to provide area-wide, background ground water arsenic concentrations in the Bothell Crossroads area.

Screening criteria are used in this work plan to identify chemicals of interest requiring additional characterization. As shown in Tables 3-1 and 3-2, the following compounds have concentrations greater than screening levels (typically MTCA Method A or B cleanup levels) in one or more soil and water samples:

- Lube Oil Range Petroleum Hydrocarbons (soil)
- TCE (water)
- PCE (water)
- Vinyl Chloride (water)
- Benzene (water)

Additional discussion of site chemical concentrations are available in the Phase II report (HWA, 2008).

3.3 CONCEPTUAL SITE MODEL

The conceptual site model for the Riverside property identifies the primary contaminant sources, release mechanisms, transport mechanisms, secondary contaminant sources, potential pathways, and exposure routes. Existing chemical data, site characterization data, and identification of potential human and ecological receptors were used to develop the model. These data were used to identify the additional data needs described in this Work Plan. The model first identifies the primary contaminant sources and then describes the release mechanism from the sources into environmental media. Then, the migration of potential contaminants through media and the subsequent release mechanisms are summarized. This results in the identification of potentially contaminated media to which receptors are most likely to be exposed (exposure media). Once the exposure media are identified, the specific human and ecological receptors are incorporated into the model, completing the exposure pathway.

Figure 3-1 shows the conceptual site model for the Riverside property. Each component of the conceptual site model is described below.

The conceptual site model brings together multiple environmental and anthropogenic variables to formulate an understanding of the potential pathways of contaminant movement that may exist at the site. The model also brings together the physical descriptions of the environment, the extent of the potential contamination, the fate and transport processes, and the potential routes by which human and ecological receptors are exposed to contaminants. In general, the site model consists of sequential steps that trace potential contaminants from the primary sources to the final receptors (human and ecological).

3.3.1 Primary Contaminant Sources

The primary contaminant source at the site is the former gasoline service station, including potential releases from tanks, dispenser, piping, other automotive operations, and buried fill. Off site sources (e.g., for chlorinated solvents) may also be present. The primary contaminants associated with the gasoline service station include petroleum hydrocarbons, SVOCs, VOCs (especially BTEX), and lead. The primary contaminants associated with potential off site sources are chlorinated VOCs.

3.3.2 Primary Release Mechanisms

The primary potential release mechanisms for contaminants associated with the gasoline service station include leaks from fuel or lubricant storage systems (e.g., USTs, containers, piping, dispensers, etc.); accidental spills and leaks; spills from discarded containers of automotive fluid products such as motor oil, transmission fluid, and antifreeze; and possibly disposal of contaminants in former on-site septic systems.

3.3.3 Primary Transport Mechanisms

Primary transport mechanisms for contaminants potentially present at the Riverside property include the following:

- Contaminant leaching from soils above and below the water table
- Leaching from separate phase liquids within soil pore spaces
- Volatilization from vadose zone and water table
- Ground water to surface water transport

The degree of contaminant leaching is controlled by chemical properties of the contaminants, ground water chemical properties, physical properties of the soil, characteristics of the ground water flow system, and precipitation recharge. Volatilization is controlled by the concentration and chemical properties of the contaminants, physical properties of the soil, and soil gas characteristics. Ground water to surface water transport is controlled by ground water flow path, and the concentrations present in ground water at the point where it discharges to surface water bodies.

3.3.4 Secondary Sources

HVOC impacted ground water from upgradient and off-site sources represents a secondary contaminant source at the site. This ground water flows onto the site from the north. The contaminant source(s) cannot currently be attributed to a specific location but three known current and former dry cleaning businesses are located upgradient (north) from the property. Figure 3-2 shows the location of these and other nearby sites. The contaminants can potentially partition from ground water onto soil and organic particles as ground water flows across the site. Contaminants may also partition from ground water into vadose zone soil gas. Investigation findings to date suggest that most chlorinated

hydrocarbons in ground water flowing onto the site remains in the dissolved phase as this ground water flows across the site.

3.3.5 Potential Pathway and Exposure Routes

Complete exposure pathways have the following components: 1) a chemical source, 2) a transport pathway, 3) an exposure point where contact can occur, and 4) an intake mechanism. Potential exposure routes for human and ecological receptors include the following:

- *Dermal/Direct Contact*. Dermal contact with soil on site is a potential intake mechanism for current and future on-site workers or visitors. Vertebrate wildlife tend to have thick fur coats or feathers which serve as barriers to chemicals that they contact in the soil. However, such wildlife spend time grooming, and this leads to an increase in the potential for incidental soil ingestion as noted below. Plants and burrowing or ground-dwelling invertebrates (e.g., earthworms) are exposed directly to the soil.

- *Inhalation*. Suspended particulates from soil can be transported by air and inhaled by potential on-site and off-site receptors. Emissions of volatile chemicals from soil and ground water (human receptors only) may also be transported as vapors by air, but are considered to be pathways of secondary concern because, in ambient conditions, such vapors are rapidly diluted and degraded.

- *Ingestion*. Accidental ingestion of chemicals in site soil and ground water are primary intake mechanisms for human receptors. Ingestion of chemicals in site soil is a primary intake mechanism for ecological receptors. The following section describes specific exposure pathways of primary concern.

Exposure Pathways of Concern

Complete exposure pathways by which chemicals may reach potential receptors include the following:

- *Accidental spills and leaks, and uncontrolled releases from discarded containers of automotive fluid products*. During the service station operation, gasoline may have been released to subsurface soil by leaks or overfills from the UST system. Automotive fluid products may have been released to surface soil or shallow subsurface soil when automotive fluid product containers were discarded on-site. However, soil that was formerly at or near the ground surface when the service station was in operation is now buried by subsequent fill activities. Therefore, exposure to contaminants from accidental spills, leaks, and uncontrolled releases is primarily through exposure to subsurface soil. Incidental ingestion and dermal contact of these chemicals are complete exposure pathways for future on-site construction and utility workers. Ecological receptors are also potentially impacted by these exposure pathways.

- *HVOC Impacted Ground Water From Up-gradient Sources*. Future human exposure via this pathway would be through direct exposure to impacted ground water or through exposure to VOCs that have migrated into indoor air after volatilizing from ground water. Incidental ingestion and dermal contact with these chemicals are complete exposure pathways for future on-site construction and utility workers. Inhalation of HVOC compounds in indoor air is a complete exposure pathway for future building occupants (workers or residents). Exposure of ecologic receptors through this pathway is unlikely.

4. WORKPLAN RATIONALE

The following section describes the general approach to the remedial investigation. A discussion of data quality objectives, a discussion of identified data gaps, and approaches to collect the data necessary to fill those gaps is presented in this section. Each subsequent section provides an overview of data gaps by media type, and the approach to collecting the necessary information in the remedial investigation. Specific sampling locations, analytes, and methods are documented in the Sampling and Analysis Plan (SAP; Appendix B).

4.1 DATA QUALITY OBJECTIVES

Data quality objectives (DQOs) are qualitative and quantitative statements that specify the characteristics of the data necessary to support decisions and the required quality of the data collected (EPA QA/G4, 2006). Through the development of DQOs, the objectives and methods to be used in the field investigations are defined. These are provided in the Quality Assurance Project Plan (Appendix C).

The objective of this RI/FS study is to meet the requirements of the Agreed Order in accordance with the MTCA Cleanup Regulation (WAC 173-340) rules for RI/FS studies. The RI is designed to characterize site conditions in order to complete a FS and select a cleanup action as described in WAC 173-340-360 through 173-340-390.

To meet the RI/FS study objective, site data will be collected that is of known, acceptable, and documented quality. To ensure that site data meet these criteria the following Quality Assurance objectives are established for the study:

- Implement procedures described in this work plan and the SAP for field sampling, sample custody, equipment operation and calibration, laboratory analysis, and data reporting that will facilitate consistency and thoroughness of generated data.

- Achieve the acceptable level of confidence and quality required so that data generated are scientifically valid and of known and documented quality. This will be performed by establishing criteria for precision, accuracy, representativeness, completeness, and comparability, and by testing data against these criteria.

Specific DQOs to evaluate data quality and usability are provided in the sections below.

4.1.1 Detection Limits

Analytical methods have quantitative limitations at a given statistical level of confidence that are often expressed as the method detection limit (MDL). Individual instruments often can detect but not accurately quantify compounds at concentrations lower than the MDL, referred to as the instrument detection limit (IDL). Although results reported near the MDL or IDL provide insight to site conditions, quality assurance dictates that analytical methods achieve a consistently reliable level of detection known as the

practical quantitation limit (PQL). The PQL is the lowest concentration level that can be reliably achieved within the specified limits of precision and accuracy, and is typically several times the MDL.

4.1.2 Precision

Precision is the measure of mutual agreement among replicate or duplicate measurements of an analyte from the same sample and applies to field duplicate or split samples, laboratory replicate analyses, and duplicate spiked environmental samples (matrix spike duplicates). The closer the measured values are to each other, the more precise the measurement process. Precision error may affect data usefulness. Good precision is indicative of relative consistency and comparability between different samples. Precision will be expressed as the relative percent difference (RPD) for spike sample comparisons of various matrices and field duplicate comparisons for water samples. This value is the difference between two measurements divided by the average, calculated by:

$$RPD=((D1-D2) / (D1+D2)/2)*100$$

Where:
D1 = Concentration of analyte in sample, and
D2 = Concentration of analyte in duplicate sample.

The calculation applies to split samples, replicate analyses, duplicate spiked samples (matrix or blank spike duplicates), and laboratory control duplicates. The RPD will be calculated for samples and compared to the applicable criteria. Precision can also be expressed as the percent difference (%D) between replicate analyses. Acceptable precision values (QC limits) vary according to the analyte, analytical method, and specific laboratory conditions (e.g., calibration results, etc).

4.1.3 Accuracy

Accuracy is a measure of bias in the analytic process. The closer the measurement value is to the true value, the greater the accuracy. This measure is defined as the difference between the reported value versus the actual value and is often measured with the addition of a known compound to a sample. The amount of known compound reported in the sample, or percent recovery, assists in determining the performance of the analytical system in correctly quantifying the compounds of interest. Since most environmental data collected represent one point spatially and temporally rather than an average of values, accuracy plays a greater role than precision in assessing the results. In general, if the percent recovery is low, non-detect results may indicate that compounds of interest are not present when in fact these compounds are present. Detected compounds may be biased low or reported at a value less than actual environmental conditions. The reverse is true when recoveries are high. Non-detect values are considered accurate while detected results may be higher than the true value. Accuracy will be expressed as the percent recovery of a surrogate compound (also know as “system monitoring compound”), a

blank or matrix spike result, or from a standard reference material. The recovery percent is the measured amount divided by the known amount, or:

(D1-D2) / D3 x 100

Where

D1 = amount of compound detected in spiked sample
D2 = amount of compound in sample (i.e., detected before spiking)
D3 = amount of spike compound added

Accuracy criteria for surrogate spikes, matrix spikes, and laboratory control spikes are found in the SAP.

4.1.4 Representativeness, Completeness and Comparability

Representativeness expresses the degree to which data accurately and precisely represent the actual site conditions. The determination of the representativeness of the data will be performed by completing the following:

- Comparing actual sampling procedures to those delineated within the SAP and this work plan.
- Comparing analytical results of field duplicates to determine the variations in the analytical results.
- Invalidating nonrepresentative data or identifying data to be classified as questionable or qualitative. Only representative data will be used in subsequent data reduction, validation, and reporting activities.

Completeness establishes whether a sufficient amount of valid measurements were obtained to meet project objectives. The number of samples and results expected establishes the comparative basis for completeness. Completeness goals are 90 percent useable data for samples/analyses planned. If the completeness goal is not achieved an evaluation will be made to determine if the data are adequate to meet study objectives.

Comparability expresses the confidence with which one set of data can be compared to another. Although numeric goals do not exist for comparability, a statement on comparability will be prepared to determine overall usefulness of data sets, following the determination of both precision and accuracy.

4.1.5 Holding Times

Holding times are defined as the time between sample collection and extraction, sample collection and analysis, or sample extraction and analysis. Some analytical methods specify a holding time for analysis only. For many methods, holding times may be extended by sample preservation techniques in the field. If a sample exceeds a holding time, then the results may be biased low. For example, if the extraction holding time for

volatile analysis of soil sample is exceeded, then the possibility exists that some of the organic constituents have volatilized from the sample or degraded. Results for that analysis will be qualified as estimated to indicate that the reported results may be lower than actual site conditions. Holding times are presented in the SAP.

4.1.6 Blanks

According to the *National Functional Guidelines for Organic Data Review* (USEPA 1999), "The purpose of laboratory (or field) blank analysis is to determine the existence and magnitude of contamination resulting from laboratory (or field) activities. The criteria for evaluation of blanks apply to any blank associated with the samples (e.g., method blanks, instrument blanks, trip blanks, and equipment blanks)." Trip blanks are placed with samples during shipment; method blanks are created during sample preparation and follow samples throughout the analysis process. Analytical results for blanks will be interpreted in general accordance with *National Functional Guidelines for Organic Data Review* and professional judgment.

4.2 DATA GAP ANALYSIS

Previous site characterization data exist for the Riverside property. The scope of previous site characterizations was not designed to create a data set for an RI/FS study. However, some previous data can be combined with data collected as part of the RI/FS study to meet the study objectives. This section describes data gaps in the existing data set and the rationale for collecting data necessary to fill those gaps.

4.2.1 Sources of Existing Data

Most existing site data are described in the following three reports:

- RZA AGRA, Inc., 1992, *Site Remediation, Phase 1, Riverside Property, SR 522 and Bothell-Everett Highway, Bothell, Washington*.
- SEACOR, 1990, *Site Investigation, City of Bothell Riverside Property, Bothell, Washington.*
- SEACOR, 1991, *Preliminary Groundwater Investigation, Riverside Property, Bothell, Washington*.
- Groundwater Technology, September 18, 1992, *Report of Preliminary Environmental Site Assessment, SR 522 & NE 180th Street Property, Bothell, Washington.*
- Groundwater Technology, October 5, 1994, *Groundwater Monitoring Report, SR 522 & NE 180th Street, Riverside Property, Bothell, Washington.*
- HWA Geosciences, Inc., March 28, 2008, *Phase II Environmental Site Assessment, Riverside Property, Bothell, Washington.*

4.2.2 Existing Exploration and Sampling Locations

Existing exploration and sampling locations are shown on Figure 2-1. These locations include the following:

- Geophysical (EM and GPR) reconnaissance traverse lines conducted in 2008 (see 2008 HWA report).
- Three monitoring well pairs (6 wells) installed by Groundwater Technology in 1992 (MW-1, MW-1A, MW-2, MW-2A, MW-3, MW-3A). Ground water in these wells was sampled between 1992 and 1994. The wells were installed in a nearly linear alignment resulting in poorly constrained estimates of ground water flow gradients. The wells were decommissioned about 1995 (no longer present).
- Eleven environmental direct push soil borings advanced and sampled by HWA in 2008 (R-1 through R-11).
- Two geotechnical/environmental soil boring advanced and sampled by HWA in 2008 (BC-4 and BC-6).
- Two geotechnical/environmental monitoring wells installed and sampled by HWA in 2008 (BC-3 and BC-5).

4.2.3 Known or Suspected Impacts to Soil and Ground Water

Based on previous investigation findings and knowledge of site operational history, known or suspected impacts include:

- Soil: Petroleum hydrocarbons (oil range) in soil, in the area previously excavated and remediated (R-11)
- Soil: Potential impacts from Horse Creek to adjacent bank soils
- Ground Water: Potential impacts from Horse Creek to adjacent ground water
- Ground Water: Benzene at R-9 (down gradient of soil excavation area); PCE, TCE at R-4 and BC-3 (eastern portion of site – likely off site source)
- Surface water: potential impacts to Sammamish River (discharge of HVOC impacted ground water)

4.2.4 Data Gaps

The following data gaps are identified for the RI/FS study:

1. **Extent of TPH-impacted soil**. Treated TPH-impacted soil is present as backfill at the location of the former excavation. Some of this soil may have TPH concentrations greater than screening levels. The collection of additional soil sampling data is proposed to delineate the horizontal and vertical extent of this soil. Soil sample data outside the former excavation show TPH concentrations are less than screening levels.
2. **Potential impacts from Horse Creek to adjacent soils or ground water**. Potential impacts to bank soils along the Horse Creek channel from overbank or flooding events will be assessed via shallow soil samples collected along the

banks (outside the normal channel) of Horse Creek. Potential impacts to ground water will be assessed via a direct push boring ground water sample adjacent to the creek.

3. **Extent of benzene in ground water**. The benzene concentration was 6 ppb in one ground water grab sample from a location adjoining the former soil excavation. Ground water monitoring wells are proposed to delineate the extent of this potential dissolved benzene plume.
4. **Extent of HVOCs** (e.g., PCE/TCE) in ground water and the potential for discharge of these HVOCs to the Sammamish River. HVOCs are present in ground water on the eastern portion of the property.
5. **Source areas and potential migration pathways for HVOCs in site ground water**. No known HVOC sources occur on the site. Multiple potential source areas are located hydraulically up-gradient of the site. Multiple utility lines also exist in the area. The potential for these utility lines to act as contaminant transport pathways has not been evaluated, although all utilities will be removed during roadway construction. Sampling of native soils and ground water will therefore address this issue.
6. **Properties of the site ground water flow system** are poorly constrained. These properties include the depth and extent of unconfined and confined aquifers, hydraulic connection of the ground water flow system with Horse Creek and the Sammamish River, hydraulic conductivity and storage coefficients of aquifer material, direction and magnitude of hydraulic gradients, ground water flow velocity, seasonal variations in the ground water flow system, etc.
7. **Collect treatability information**, i.e., chemical and aquifer properties needed to select and design ground water remediation methods.
8. **Data to define exposure pathways** for human health and ecological risk assessments. Much of this data will be collected to close other data gaps in this assessment.

The field sampling plan presented in the next section describes the type and location of data that will be collected to close these data gaps.

5. REMEDIAL INVESTIGATION AND FEASIIBILITY STUDY TASKS

The scope of work for the remedial investigation/feasibility study investigation is described in the Agreed Order. The scope of work includes the following tasks:

1. Develop a RI/FS project plan
2. Conduct a remedial investigation study
3. Conduct a feasibility study
4. Complete an RI/FS report

Tasks 1 and 2 will be completed using the approach described in this section.

5.1 PROJECT PLANNING

The project plan for the RI/FS study consists of this work plan, a SAP, a Quality Assurance Project Plan (QAPP), a Health and Safety Plan (HSP), and a Public Participation Plan. The SAP, QAPP, and HSP are provided in Appendices B, C, and D, respectively. The Public Participation Plan is issued as a separate document, and is included in the Agreed Order. These documents will be revised as needed through the iterative process of regulatory interaction and public participation.

5.2 FIELD SAMPLING PLAN

The field sampling plan presented in the next section is designed to meet investigation objectives described in the Agreed Order and this work plan. The sampling strategy and rationale are described in this section. Detailed sampling methodology is described in the SAP.

5.2.1 Ground Water Flow System Properties

The characterization of ground water flow system properties will provide data needed to close data gaps involving contaminant transport pathways, treatability studies, and human health and ecological exposure pathways. The characterization will be completed by installing ground water monitoring wells, collecting and physical property testing of soil samples, time series water level measurements, aquifer testing, and time series surface water elevation measurements.

Ground Water Monitoring Well Installation –Seven wells will be installed at the locations shown on Figure 5-1. The spacing and location of these wells are designed to provide hydrogeologic data points across the site and adjoining off-site areas. The planned screen length and completion depth is 10 feet and 25 feet below ground surface, respectively. One well (RMW-10) will be drilled to a maximum depth of 50 feet, and screened in a lower aquifer, if present. Individual well specifications may change based on location specific conditions. Monitoring well construction specifications are in the SAP.

Soil Physical Property Testing – Selected soil samples will be collected from soil borings for physical property testing. The testing may include one or more of the following, as needed:

- USCS classification including particle size analysis and Atterberg limits
- Bulk density
- Porosity
- Total organic carbon

The proposed physical testing program is summarized in Table 5-1. The location, depth, and test parameters of individual soil samples may vary from those presented in Table 5-1 based on location specific conditions.

Aquifer Testing – Aquifer testing is proposed to characterize aquifer properties beneath the site. Slug tests will be conducted on all new and existing site monitoring wells to provide point estimates of hydraulic conductivity. Specific slug test methodologies are discussed in the SAP.

Time series ground water and surface water elevation measurements – These measurements will be collected at regular intervals from site monitoring wells and surface water bodies to establish seasonal and long-term variations in the ground water flow system and its relation to the surface water systems of Horse Creek and the Sammamish River. Measurements may be collected manually, or via datalogging pressure transducers installed in wells or surface water.

Planned RI sampling includes one round of ground water monitoring in summer 2009. Existing data (summarized below) augmented by the RI sampling may be sufficient to plan remediation. Seasonal ground water hydrographs consisting of 13 rounds of ground water monitoring over a nine year period are available for the adjacent Bothell Landing site, which is in the same geologic environment as the Riverside site. Additional ground water monitoring will also be conducted after remediation. Ground water cleanup methods will likely be flexible or "scalable" with regard to locations and depths (e.g., in situ treatments, hydraulic control, pumping rates, etc.) such that additional injection or extraction points or wells (or changes in injection pressure, extraction rates, etc.) can easily be accommodated during the remediation process, based on future ground water monitoring results. Existing and planned ground water quality data may be sufficient to select ground water remediation methods, which can later be fine tuned as to location and treatment parameters. Existing data for the site are summarized below:

- GTI monitoring well sampling (6 wells), July 15, 1992, February 25, 1993, October 12, 1993, August 26, 1994
- HWA Phase II ESA (12 GeoProbe ground water samples), February 11 to 13, 2008
- HWA Ground water sampling from monitoring wells BC-1 (December 30, 2008), BC-2 (February 4, 2009), BC-3 & BC-5 (September 5, 2008)
- HWA planned RI sampling (5 new wells, 4 existing wells) summer 2009

5.2.2 Soil and Ground Water Chemical Sampling

Site soil and ground water will be sampled to characterize the magnitude and extent of contamination, identify areas requiring remedial action to achieve cleanup levels, and characterize exposure point concentrations for human health and ecological risk assessments. Proposed soil sample locations, depths, rationale, and analytes are described in Table 5-2. Proposed ground water sample locations, rationale, and analytes are described in Table 5-3. Soil and ground water sample locations are shown on Figure 5-1. Specific sample collection and chemical analytical methodologies are presented in the SAP.

Soil sampling is planned during soil boring and monitoring well installation. Ground water sampling is planned once after monitoring well installation (anticipated in summer of 2009.

Two shallow (1-2 feet) soil samples will be collected along the banks (outside the normal channel) of Horse creek to assess potential impacts from Horse Creek to adjacent soils.

Organic vapor testing will be conducted on soil samples in areas of potential future redevelopment (not under future roadways or in future park areas), to assess potential vapor pathway concerns. Organic vapor testing will include photoionization detector and chemical-specific (PCE, TCE, and vinyl chloride) colorimetric tube testing, which are described in the SAP.

5.3 FEASIBILITY STUDY

A FS will be conducted as stipulated in the Agreed Order. The study will be conducted in accordance with WAC 173-340-350 (8). This regulation describes the elements that must be included in the FS. The study will identify remedial alternatives to achieve cleanup levels as set forth in MTCA.

5.4 REMEDIAL INVESTIGATION AND FEASIBILITY STUDY REPORT

A RI/FS report will be prepared after field data have been collected and the FS is complete. The report will transmit information described in the Agreed Order consistent with MTCA for RI/FS reports.

The completion of the report will allow the selection of a cleanup alternative, production of a draft cleanup action plan (CAP), and implementation of the cleanup alternative to reduce or remove site hazardous substances posing unacceptable risks to human health and the environment.

5.5 DATA VALIDATION AND EVALUATION

Data management and documentation will include checking all QA parameters, including holding times, method blanks, surrogate recoveries, spike recoveries, field and laboratory

duplicates, completeness, detection limits, laboratory control samples, and Chain-of-Custody forms. After the data has been checked, it will be entered into the project database with any assigned data qualifiers.

The project electronic database will be in a format compatible with the Ecology Environmental Information Management (EIM) system, and all analytical data will be entered into the EIM system.

Results of the sampling and laboratory testing will be summarized in a spreadsheet, plotted on a site map, and the data compared to established site cleanup levels. A report will describe any significant field sampling issues, laboratory QA/QC testing, water level monitoring data and water quality testing results.

6. PROJECT MANAGEMENT

6.1 SCHEDULE

The proposed RI/FS schedule is presented in Table 6-1. The main schedule constraint is imposed by the construction schedule of the SR 522 realignment. Construction is scheduled to start in 2010. Cleanup alternatives and a cleanup action plan must be in place prior to construction to allow cleanup implementation and construction to proceed concurrently. This will prevent delays in cleanup implementation and road construction.

6.2 PROJECT MANAGEMENT STAFF

Project management staff for the Riverside property RI/FS are listed in the SAP (Appendix B). Progress reports will be submitted to Ecology every 3 months as required by the Agreed Order.

7.0 REFERENCES

City of Bothell, 2007, *Map provided by public works department*.

ECOSS, 2007, *City of Bothell Revenue Development Area, Report on Tax Parcel History through 1972*.

EDR, 2007, *EDR Historical Topographical Map Report, Bothell Crossroads Central, 18030 Bothell Way NE, Bothell, WA 98011*.

Environmental Protection Agency (EPA), 1988, *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*, EPA/540/G-89/004 (OSWER Directive 9355.3-01).

EPA, 1999, *Contract Laboratory Program National Functional Guidelines for Organic Data Review*, EPA 540/R-99/008.

EPA, 2006, *Guidance on Systematic Planning Using the Data Quality Objectives Process*, EPA QA/G4.

GTI (Groundwater Technology, Inc.), 1992, *Report of Preliminary Environmental Site Assessment, SR 522 and NE 180th Street, Riverside Property, Bothell, Washington*.

GTI, 1994, *Groundwater Monitoring Report, SR 522 and NE 180th Street, Riverside Property, Bothell, Washington*.

HWA, 2008, *Phase II Environmental Site Assessment, Riverside Property, Bothell Washington*; Prepared for City of Bothell.

RZA AGRA, Inc., 1992, *Site Remediation, Phase 1, Riverside Property, SR 522 and Bothell-Everett Highway, Bothell, Washington*.

SEACOR, 1990, *Site Investigation, City of Bothell Riverside Property, Bothell, Washington.*

SEACOR, 1991, *Preliminary Groundwater Investigation, Riverside Property, Bothell, Washington*.

Table 3-1
Soil Analytical Data
(all results in milligrams per kilogram (mg/kg) except as noted)

	Sample Identification	R-1-4	R-2-6	R-3-8	R-4-8	R-5-9	R-6-14	R-7-12	R-8-12	R-9-4	R-10-15	R-11-3	MTCA A/B
	Location	R-1	R-2	R-3	R-4	R-5	R-6	R-7	R-8	R-9	R-10	R-11	
	Sample interval, ft bgs	6-8'	6-8'	10-12'	6-8'	6-8'	10-12'	6-8'	6-8'	2-4'	6-8'	2-4'	
Hydrocarbon Identification (HCID) (mg/kg)	Gasoline Range	NA	NA	<23	<22	<22	<29	<30	NA	NA	<34	<44	100/30*
	Diesel Range	NA	NA	<57	<56	<55	<72	<75	NA	NA	<86	<110	2000
	Lube Oil Range	NA	NA	<110	**>110**	**>110**	<140	**>150**	NA	NA	<170	**>220**	2000
Total Petroleum Hydrocarbons (NWTPH) (mg/kg)	Gasoline Range	<5.3	<5.4	NA	NA	NA	NA	NA	<7.8	<5.3	NA	NA	100/30*
	Diesel Range	<28	<28	NA	<28	<28	NA	<37	<31	<28	NA	<260	2000
	Lube Oil Range	**120**	<56	NA	**94**	**800**	NA	**80**	**210**	**93**	NA	**9200**	2000
VOCs (8260B) (mg/kg)	Acetone	<0.0065	**0.016**	<0.0057	<0.0047	NA	NA	NA	NA	NA	NA	NA	8000
	Tetrachloroethene	<0.0065	<0.0044	<0.0057	**0.009**	NA	NA	NA	NA	NA	NA	NA	0.05

Notes:
MTCA A / B – Ecology MTCA Method A / B soil cleanup levels, Chapter 173-340 WAC, shown for reference only. These cleanup levels may not apply at this site, and are provided as a screening level indication of the environmental quality of the site only.
mg/kg– Milligrams per kilogram
NA – Not Analyzed / Not Applicable
NE – Not Established
< - not detected at listed reporting limit
> -Hydrocarbon range concentration greater than reporting limit
NA - Not analyzed
bgs - below ground surface
Bold – Analyte Detected
Bold / highlighted – Analyte exceeds cleanup level
Other VOCs analyzed in 2008 but not detected are not included in this table. For full list of analytes see the Phase II Environmental Site Assessment Report by HWA, 2008.
* - The Method A Soil cleanup levels for gasoline mixtures without benzene and the total of ethylbenzene, toluene, and xylenes are less than 1% of the gasoline mixture are 100 mg/kg/all other mixtures are 30 mg/kg

Table 3-2
Ground Water Analytical Data

Sample ID		R-1-13	R-1-20	R-2-13	R-2-20	R-3-12	R-4-15	R-5-20	R-6-20	R-7-20	R-8-20	R-9-18	R-10-20	MTCA A/B
Screen Interval (feet below ground surface)		10-13	17-20	10-13	17-20	7-12	10-15	15-20	15-20	15-20	15-20	13-18	15-20	
Approximate Depth to Water (ft bgs)		10	16.5	9.5	16	11	9.2	16.5	14.5	16.25	13.5	13.1	11.3	
Field Parameters	pH	6.26	6.63	6.38	7.48	6.35	5.82	6.59	6.68	6.44	6.66	6.8	6.55	
	Conductivity (uS/cm)	526	159	309	115	349	231	359	581	1169	1050	934	457	
	Temperature (C)	8.85	11.3	9.83	10.86	9.35	11.2	12.71	12.57	12.75	11.86	9.03	11.14	
	Dissolved Oxygen (mg/l)#	0.75	0.4	6.1	15.25	6.43	5.07	1.1	0.54	0.44	5.72	9.84	4.08	
Hydrocarbon Identification (HCID) (mg/L)	Gasoline Range	NA	NA	NA	NA	<0.10	<0.10	<0.10	<0.10	<0.10	NA	NA	<0.10	0.8/1.0*
	Diesel Range	NA	NA	NA	NA	<0.25	<0.25	<0.25	<0.26	<0.25	NA	NA	<0.26	0.5
	Lube Oil Range	NA	NA	NA	NA	<0.40	<0.41	<0.40	<0.41	<0.40	NA	NA	<0.41	0.5
Total Petroleum Hydrocarbons (NWTPH) (mg/L)	Gasoline Range	<0.10	<0.10	<0.10	<0.10	NA	NA	NA	NA	NA	<0.10	0.31	NA	0.8/1.0*
	Diesel Range	<0.25	<0.25	<0.29	<0.25	NA	NA	NA	NA	NA	<0.25	<0.31	NA	0.5
	Oil Range	<0.40	<0.40	<0.46	<0.41	NA	NA	NA	NA	NA	<0.40	<0.49	NA	0.5
VOCs (8260B) (µg/L)	Benzene	<0.20	<0.20	<0.20	<0.20	<0.20	<2.0	NA	NA	NA	<1.0	**6.7**	NA	5
	Toluene	<0.20	0.54	<0.20	0.23	0.27	2.4	NA	NA	NA	<1.0	37	NA	1000
	Ethylbenzene	<0.20	<0.20	<0.20	<0.20	<0.20	<2.0	NA	NA	NA	<1.0	5.9	NA	700
	Xylenes	<0.40	<0.40	<0.40	<0.40	<0.40	<4.0	NA	NA	NA	<1.0	41	NA	1000
	Vinyl Chloride	<0.20	<0.20	<0.20	<0.20	<0.20	<2.0	**2.7**	<0.20	<0.20	NA	NA	<0.20	0.2
	(trans) 1,2-DCE	<0.20	<0.20	<0.20	<0.20	<0.20	<2.0	0.65	<0.20	<0.20	NA	NA	<0.20	160
	(cis) 1,2-DCE	<0.20	<0.20	0.25	<0.20	1.6	43	14	<0.20	<0.20	NA	NA	<0.20	80
	TCE	<0.20	<0.20	<0.20	<0.20	0.39	**140**	1.5	<0.20	<0.20	NA	NA	0.59	5
	PCE	<0.20	<0.20	<0.20	<0.20	0.56	**320**	<0.20	<0.20	<0.20	NA	NA	3.9	5
Polynuclear aromatic Hydrocarbons (8270 SIM) (µg/L)	Naphthalene	NA	NA	NA	NA	NA	NA	<0.095	<0.095	<0.096	<0.095	2.2	NA	160
	2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	<0.095	<0.095	<0.096	<0.095	0.59	NA	160
	1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	<0.095	<0.095	<0.096	<0.095	0.34	NA	160
	Benzo[a]anthracene	NA	NA	NA	NA	NA	NA	<0.0095	<0.0095	<0.0096	<0.0095	0.014	NA	0.012**
Metals (200.8) (µg/L)	Barium	69	<28	<28	<28	NA	NA	NA	NA	NA	NA	NA	NA	3200
	Lead	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	NA	15

Notes:
MTCA A / B – Ecology MTCA Method A / B soil cleanup levels, Chapter 173-340 WAC, shown for reference only.
These cleanup levels may not apply at this site, and are provided as a screening level indication of the environmental quality of the site only.
mg/L- micrograms per liter mg/L - milligrams per liter
< - not detected at listed reporting limit
> -Hydrocarbon range concentration greater than reporting limit
NA – Not Analyzed
Bold – detected
Bold / highlighted – Analyte concentration greater than cleanup level
Compounds and metals analyzed in 2008 but not detected are not included in this table. For full list of analytes see the Phase II Environmental Site Assessment Report by HWA, 2008.
(trans) or (cis)-1,2-DCE - (trans) or (cis)-1,2-Dichloroethylene

TCE – Trichloroethylene
PCE- Tetrachloroethene
Water samples analyzed for concentrations of metals were field filtered using a 0.45 micron filter. Water sample analysis for all other parameters were field filtered using a 1 micron filter.
Trip Blanks collected and analyzed for TPH-G and VOCs: No detections during analysis
* - The Method A Ground Water cleanup levels for gasoline mixtures without benzene and the total of ethylbenzene, toluene, and xylenes
are less than 1% of the gasoline mixture are 800 mg/l/all other mixtures are 1000 mg/l
** - The listed cleanup level is for total equivalent benzo[a]pyrene concentration per Ecology rules
All diesel range hydrocarbon sample extracts treated with an acid/silica gel cleanup procedure.
- Values greater than 5 mg/L may be due to instrument or calibration issues

Table 5-1
Physical Soil Sample Analyses

Location	Depth* (feet)	Analyses
RMW-4	20	Particle Size Analysis Atterberg Limits Bulk Density Porosity Total Organic Carbon
RMW-6	20	Particle Size Analysis Atterberg Limits Bulk Density Porosity Total Organic Carbon

* Depth may vary based on borehole stratigraphy

Table 5-2
Soil Sample Analytes and Rationale

Location	Depth (feet)	Analytes	Analytical Method	Rationale
R-12 through R-23	2 - 4	Lube Oil Range TPH Diesel Range TPH	NWTPH-Dx	Previously treated soils that may still contain lube oil range organic concentrations greater than cleanup levels.
		Extractible & volatile petroleum hydrocarbons	E-TPH	
		Organic vapors	Field headspace*	
RMW-4	6 - 8	Lube Oil Range TPH	NWTPH-Dx	Boring at location where ground water benzene concentration was 1 part per billion greater than Method A cleanup level.
		Diesel Range TPH		
		BTEX	8021B	
RMW-5	6 - 8	Lube Oil Range TPH	NWTPH-Dx	Potentially hydraulically down-gradient of RMW-4.
		Diesel Range TPH		
		BTEX	8021B	
RMW-6				No chemical soil sampling proposed.
RMW-7	6 - 8	Lube Oil Range TPH	NWTPH-Dx	Potentially hydraulically down gradient of elevated ground water HVOC concentration and former gasoline service station on southeast corner of 180th Street and Woodinville Drive.
		Diesel Range TPH		
		Gasoline Range TPH	NWTPH-G	
		BTEX	8021B	
RMW-8	6 - 8	Lube Oil Range TPH	NWTPH-Dx	Area of suspected elevated ground water HVOC concentration and former gasoline service station on southeast corner of 180th Street and Woodinville Drive.
		Diesel Range TPH		
		Gasoline Range TPH	NWTPH-G	
		BTEX	8021B	
RMW-9	6 - 8	Lube Oil Range TPH	NWTPH-Dx	Hydraulically up gradient from Riverside property and an area of suspected elevated ground water HVOC concentration.
		Diesel Range TPH		
		Gasoline Range TPH	NWTPH-G	
		BTEX	8021B	
RMW-10 RMW-11				No chemical soil sampling proposed.
R-SS-1 & R-SS-2	0-2	Gasoline Range TPH	NWTPH-G	Assess potential impacts from Horse Creek to adjoining soils
		Diesel Range TPH	NWTPH-Dx	
		HVOC	8260B	

E-TPH: Includes VPH by EPA 8021B, EPH by 8270C, for selected samples based on NWTPH-Dx results
* - Organic vapor headspace & chemical-specific colorimetric detector tube testing (see SAP)

Table 5-3
Ground Water Sample Analytes and Rationale

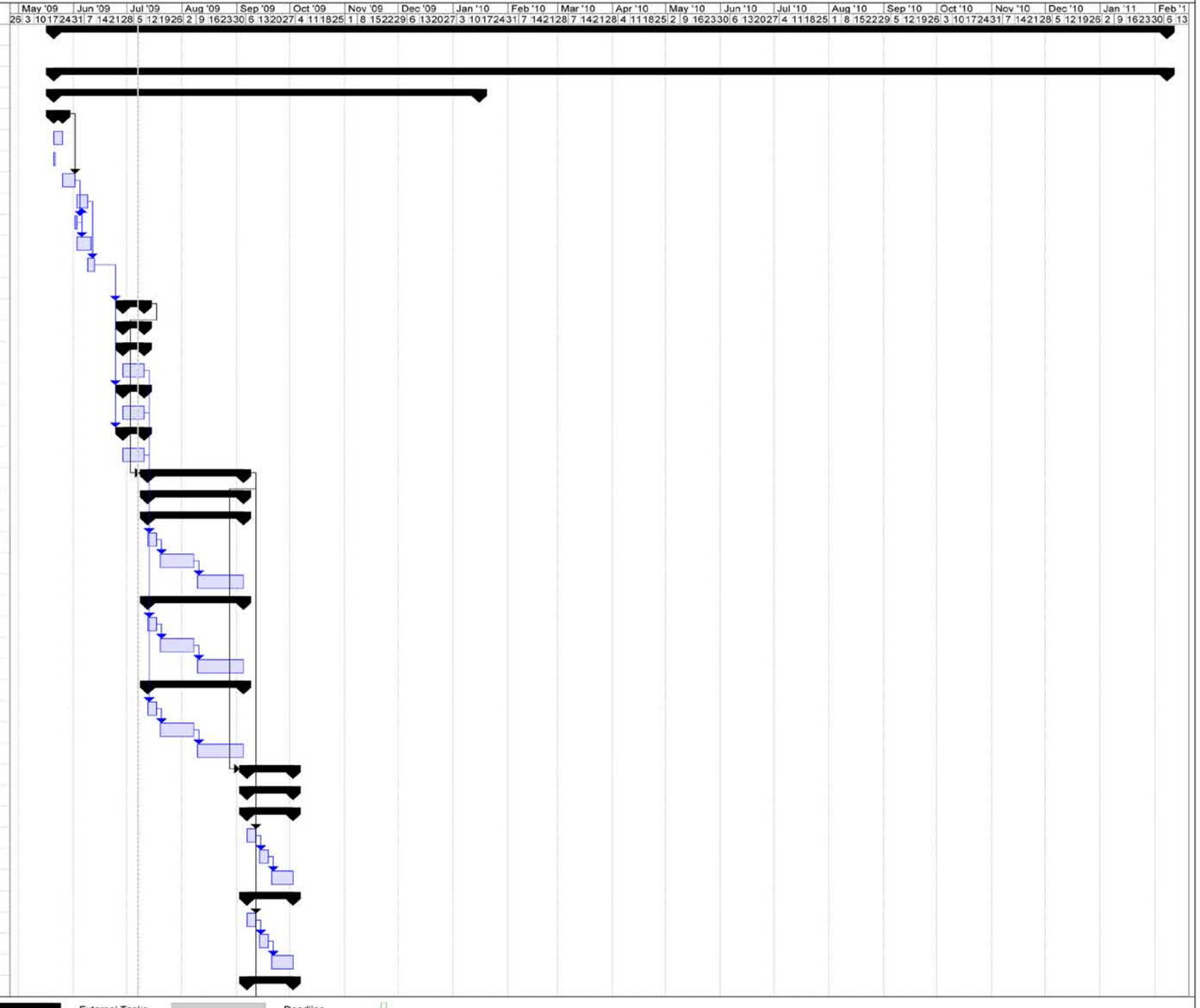
Location	Analytes	Analytical Method	Rationale
BC-3	HVOC Arsenic	8260B 6010	Existing Well
BC-5	Lube Oil Range TPH Diesel Range TPH BTEX Arsenic	NWTPH-Dx 8260B 6010	Existing Well
RMW-4	Lube Oil Range TPH Diesel Range TPH BTEX Arsenic	NWTPH-Dx 8260B 6010	Well at location where ground water benzene concentration was 1 part per billion greater than Method A cleanup level.
RMW-5	Lube Oil Range TPH Diesel Range TPH BTEX Arsenic	NWTPH-Dx 8260B 6010	Potentially hydraulically down-gradient of RMW-4.
RMW-6	HVOC Arsenic	8260B 6010	In area of elevated ground water HVOC concentration.
RMW-7	HVOC Arsenic	8260B 6010	Potentially hydraulically down gradient of elevated ground water HVOC concentration.
RMW-8	HVOC Arsenic	8260B 6010	Area of suspected elevated ground water HVOC concentration.
RMW-9	HVOC Arsenic	8260B 6010	Hydraulically up gradient from Riverside property and an area of suspected elevated ground water HVOC concentration
RMW-10	HVOC Arsenic	8260B 6010	Check deeper aquifer for HVOCs
R-24	Gasoline Range TPH Diesel Range TPH HVOC	NWTPH-G NWTPH-Dx 8260B	Assess potential impacts from Horse Creek to adjoining ground water

Note: BTEX: Benzene, Toluene, Ethylbenzene, Xylenes
HVOC: Halogenated Volatile Organic Compounds

Table 6-1
Proposed RI/FS Schedule

Table 6-1 Schedule

ID	Task Name	Duration	Start	Finish	Predecessors
1	**BOTHELL CROSSROADS PROGRAM MANAGEMENT**	**448 days**	**Thu 5/21/09**	**Mon 2/7/11**	
2					
3	**CROSSROADS ELEMENT**	**448 days**	**Thu 5/21/09**	**Mon 2/7/11**	
4	**Task Order 01**	**172 days**	**Thu 5/21/09**	**Fri 1/15/10**	
5	**Project Controls**	**3 days**	**Thu 5/21/09**	**Mon 5/25/09**	
6	Scheduling/WBS	3 days	Thu 5/21/09	Mon 5/25/09	
7	Resource Planning/Coordination	1 day	Thu 5/21/09	Thu 5/21/09	
8	Subcontracting	5 days	Tue 5/26/09	Mon 6/1/09	5
9	Document review	4 days	Wed 6/3/09	Mon 6/8/09	10
10	Site Visit	1 day	Tue 6/2/09	Tue 6/2/09	8
11	Meetings	6 days	Wed 6/3/09	Wed 6/10/09	10
12	Objectives	4 days	Tue 6/9/09	Fri 6/12/09	9
13					
14	**Task Order 01**	**10 days**	**Mon 6/29/09**	**Fri 7/10/09**	**12**
15	**Task 1 RI/FS Work Plans**	**10 days**	**Mon 6/29/09**	**Fri 7/10/09**	
16	**Bothell Landing**	**10 days**	**Mon 6/29/09**	**Fri 7/10/09**	
17	Finalize Plan with comments	10 days	Mon 6/29/09	Fri 7/10/09	
18	**Bothell Riverside**	**10 days**	**Mon 6/29/09**	**Fri 7/10/09**	**12**
19	Finalize Plan with comments	10 days	Mon 6/29/09	Fri 7/10/09	
20	**Bothell Paint & Decorating**	**10 days**	**Mon 6/29/09**	**Fri 7/10/09**	**12**
21	Finalize Plan with comments	10 days	Mon 6/29/09	Fri 7/10/09	
22	**Task Order 02**	**40 days**	**Mon 7/13/09**	**Fri 9/4/09**	**14**
23	**Task II Remedial Investigations**	**40 days**	**Mon 7/13/09**	**Fri 9/4/09**	
24	**Bothell Landing**	**40 days**	**Mon 7/13/09**	**Fri 9/4/09**	
25	Mobilization	5 days	Mon 7/13/09	Fri 7/17/09	17
26	Field work	15 days	Mon 7/20/09	Fri 8/7/09	25
27	Compile/QC data	20 days	Mon 8/10/09	Fri 9/4/09	26
28	**Bothell Riverside**	**40 days**	**Mon 7/13/09**	**Fri 9/4/09**	
29	Mobilization	5 days	Mon 7/13/09	Fri 7/17/09	19
30	Field work	15 days	Mon 7/20/09	Fri 8/7/09	29
31	Compile/QC data	20 days	Mon 8/10/09	Fri 9/4/09	30
32	**Bothell Paint & Decorating**	**40 days**	**Mon 7/13/09**	**Fri 9/4/09**	
33	Mobilization	5 days	Mon 7/13/09	Fri 7/17/09	21
34	Field work	15 days	Mon 7/20/09	Fri 8/7/09	33
35	Compile/QC data	20 days	Mon 8/10/09	Fri 9/4/09	34
36	**Task Order 02**	**20 days**	**Mon 9/7/09**	**Fri 10/2/09**	**22**
37	**Task III Feasibility Study**	**20 days**	**Mon 9/7/09**	**Fri 10/2/09**	
38	**Bothell Landing**	**20 days**	**Mon 9/7/09**	**Fri 10/2/09**	
39	Evaluate technologies	5 days	Mon 9/7/09	Fri 9/11/09	22
40	Develop Alternatives	5 days	Mon 9/14/09	Fri 9/18/09	39
41	Propose remedy	10 days	Mon 9/21/09	Fri 10/2/09	40
42	**Bothell Riverside**	**20 days**	**Mon 9/7/09**	**Fri 10/2/09**	
43	Evaluate technologies	5 days	Mon 9/7/09	Fri 9/11/09	22
44	Develop Alternatives	5 days	Mon 9/14/09	Fri 9/18/09	43
45	Propose remedy	10 days	Mon 9/21/09	Fri 10/2/09	44
46	**Bothell Paint & Decorating**	**20 days**	**Mon 9/7/09**	**Fri 10/2/09**	



Project: table 6-1 Schedule rev 4.mpp
Date: Tue 7/7/09

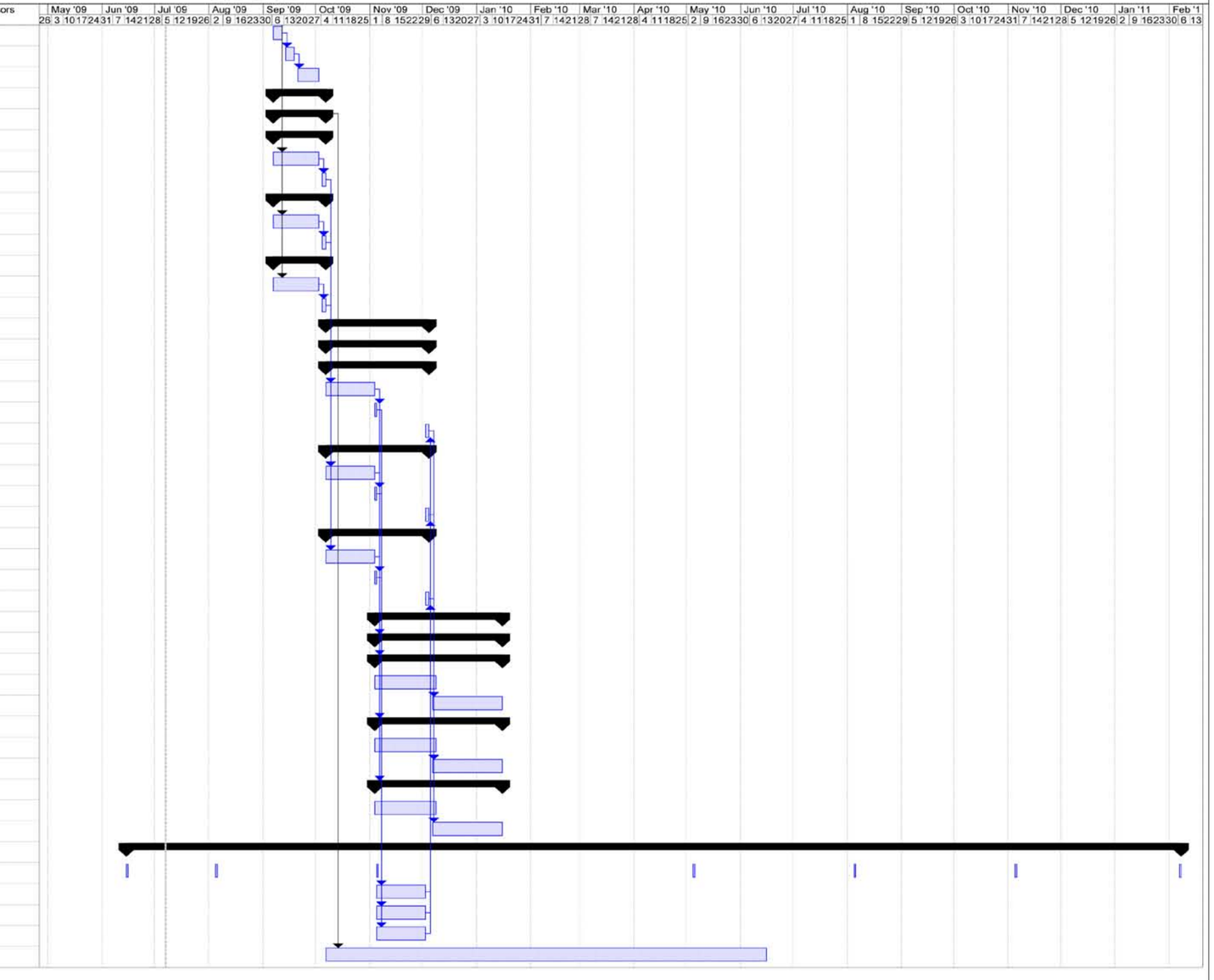
Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

Page 1

Table 6-1
Proposed RI/FS Schedule (Continued)

Table 6-1 Schedule

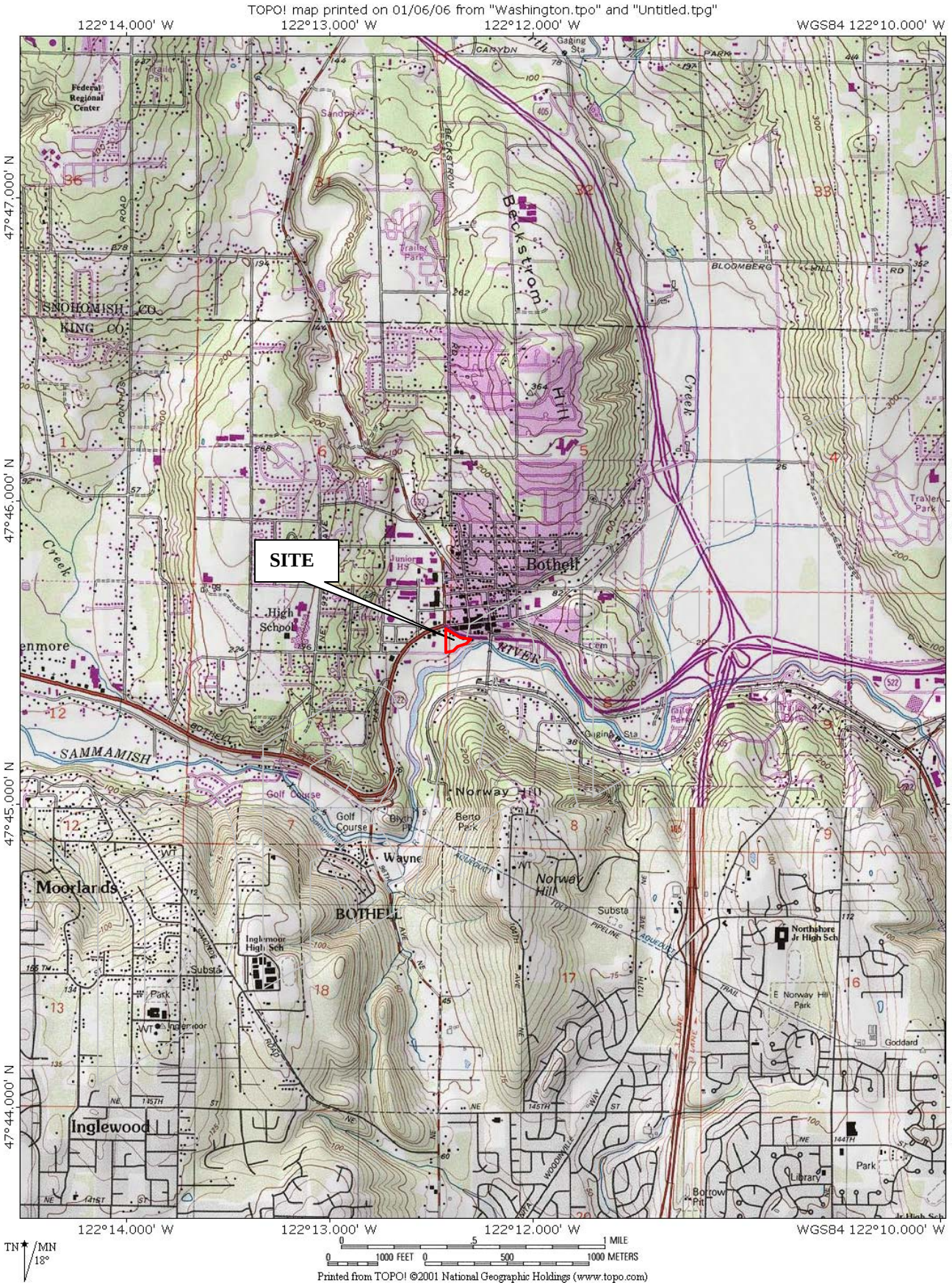
ID	Task Name	Duration	Start	Finish	Predecessors
47	Evaluate technologies	5 days	Mon 9/7/09	Fri 9/11/09	22
48	Develop Alternatives	5 days	Mon 9/14/09	Fri 9/18/09	47
49	Propose remedy	10 days	Mon 9/21/09	Fri 10/2/09	48
50	**Task Order 02**	**22 days**	**Mon 9/7/09**	**Tue 10/6/09**	
51	**Task IV RI/FS Report**	**22 days**	**Mon 9/7/09**	**Tue 10/6/09**	
52	**Bothell Landing**	**22 days**	**Mon 9/7/09**	**Tue 10/6/09**	
53	Develop Draft Report	20 days	Mon 9/7/09	Fri 10/2/09	22
54	Finalize Report with comments	2 days	Mon 10/5/09	Tue 10/6/09	53
55	**Bothell Riverside**	**22 days**	**Mon 9/7/09**	**Tue 10/6/09**	
56	Develop Draft Report	20 days	Mon 9/7/09	Fri 10/2/09	22
57	Finalize Report with comments	2 days	Mon 10/5/09	Tue 10/6/09	56
58	**Bothell Paint & Decorating**	**22 days**	**Mon 9/7/09**	**Tue 10/6/09**	
59	Develop Draft Report	20 days	Mon 9/7/09	Fri 10/2/09	22
60	Finalize Report with comments	2 days	Mon 10/5/09	Tue 10/6/09	59
61	**Task Order 03**	**43 days**	**Wed 10/7/09**	**Fri 12/4/09**	
62	**Task V Draft Cleanup Action Plan**	**43 days**	**Wed 10/7/09**	**Fri 12/4/09**	
63	**Bothell Landing**	**43 days**	**Wed 10/7/09**	**Fri 12/4/09**	
64	Develop Draft Plan	20 days	Wed 10/7/09	Tue 11/3/09	54
65	Submit to Ecology	1 day	Wed 11/4/09	Wed 11/4/09	64
66	Finalize Plan with comments	2 days	Thu 12/3/09	Fri 12/4/09	95
67	**Bothell Riverside**	**43 days**	**Wed 10/7/09**	**Fri 12/4/09**	
68	Develop Draft Plan	20 days	Wed 10/7/09	Tue 11/3/09	57
69	Submit to Ecology	1 day	Wed 11/4/09	Wed 11/4/09	68
70	Finalize Plan with comments	2 days	Thu 12/3/09	Fri 12/4/09	96
71	**Bothell Paint & Decorating**	**43 days**	**Wed 10/7/09**	**Fri 12/4/09**	
72	Develop Draft Plan	20 days	Wed 10/7/09	Tue 11/3/09	60
73	Submit to Ecology	1 day	Wed 11/4/09	Wed 11/4/09	72
74	Finalize Plan with comments	2 days	Thu 12/3/09	Fri 12/4/09	97
75	**Task Order 4**	**53 days**	**Wed 11/4/09**	**Fri 1/15/10**	
76	**Cleanup Actions**	**53 days**	**Wed 11/4/09**	**Fri 1/15/10**	**64,68,72**
77	**Bothell landing**	**53 days**	**Wed 11/4/09**	**Fri 1/15/10**	**64**
78	Plans/Specifications	25 days	Wed 11/4/09	Tue 12/8/09	
79	Construction	30 days	Mon 12/7/09	Fri 1/15/10	66
80	**Bothell Riverside**	**53 days**	**Wed 11/4/09**	**Fri 1/15/10**	**68**
81	Plans/Specifications	25 days	Wed 11/4/09	Tue 12/8/09	
82	Construction	30 days	Mon 12/7/09	Fri 1/15/10	70
83	**Bothell paint & Decorating**	**53 days**	**Wed 11/4/09**	**Fri 1/15/10**	**72**
84	Plans/Specifications	25 days	Wed 11/4/09	Tue 12/8/09	
85	Construction	30 days	Mon 12/7/09	Fri 1/15/10	74
86	**AOC COORDINATION**	**431 days**	**Mon 6/15/09**	**Mon 2/7/11**	
87	**Quarterly Reporting**	**431 days**	**Mon 6/15/09**	**Mon 2/7/11**	**12**
95	Public Comment Period	20 days	Thu 11/5/09	Wed 12/2/09	65
96	Public Comment Period	20 days	Thu 11/5/09	Wed 12/2/09	69
97	Public Comment period	20 days	Thu 11/5/09	Wed 12/2/09	73
98	**BROWNFIELDS GRANT MANAGEMENT**	180 days	Wed 10/7/09	Tue 6/15/10	51



Project: table 6-1 Schedule rev 4.mpp
Date: Tue 7/7/09

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

Page 2



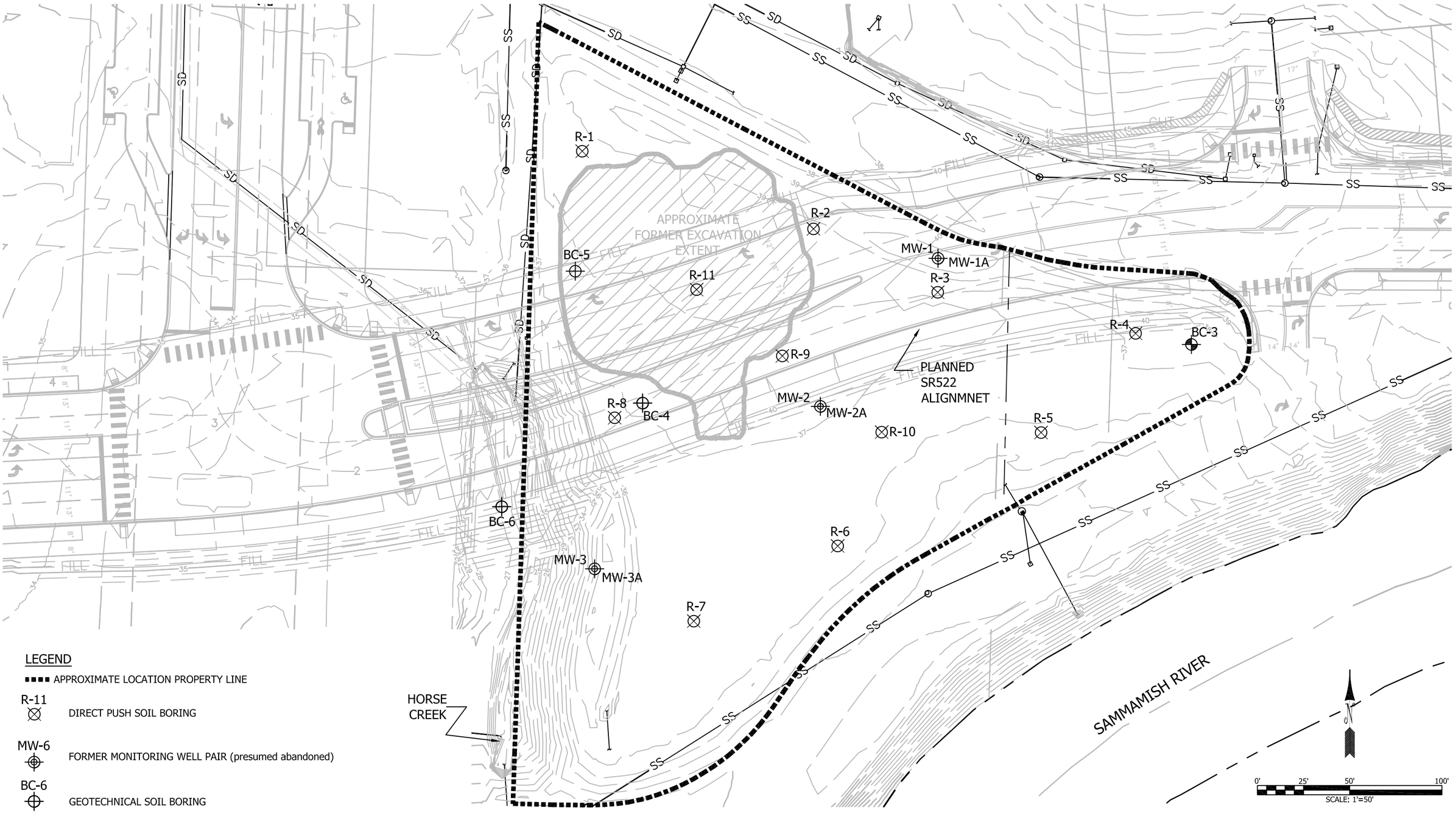
HWA GeoSciences Inc.

SITE VICINITY

RIVERSIDE PROPERTY
REMEDIAL INVESTIGATION/FEASABILITY STUDY
BOTHELL CROSSROADS PROJECT
BOTHELL, WASHINGTON

FIGURE NO.
1-1

PROJECT NO.
2007-098



LEGEND

- APPROXIMATE LOCATION PROPERTY LINE
- R-11 — DIRECT PUSH SOIL BORING
- MW-6 — FORMER MONITORING WELL PAIR (presumed abandoned)
- BC-6 — GEOTECHNICAL SOIL BORING
- BC-3 — GEOTECHNICAL SOIL BORING WITH MONITORING WELL

BASE MAP PROVIDED BY PERTEET ENGINEERING INC

S:\2007 PROJECTS\2007-098-22 BOTHELL CROSSROADS\CAD\HWA 2007-098-21 T220.DWG

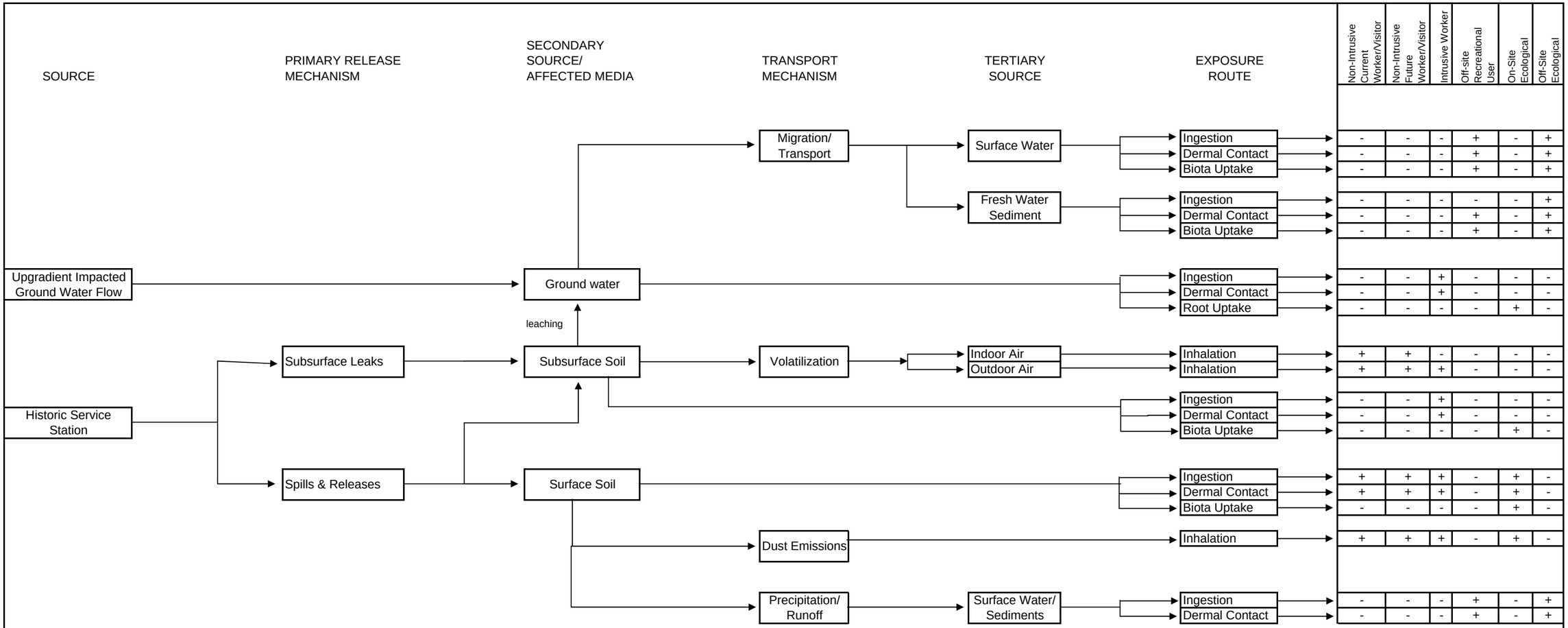
HWA GEOSCIENCES INC.

RIVERSIDE PROPERTY
REMEDIAL INVESTIGATION/FEASIBILITY
STUDY WORK PLAN
BOTHELL CROSSROADS PROJECT
BOTHELL, WASHINGTON

SITE PLAN
AND
PREVIOUS INVESTIGATION
LOCATIONS

DRAWN BY EFK
CHECK BY CB
DATE 01.15.09

FIGURE NO. 2-1
PROJECT NO. 2007-098-21
TASK 700



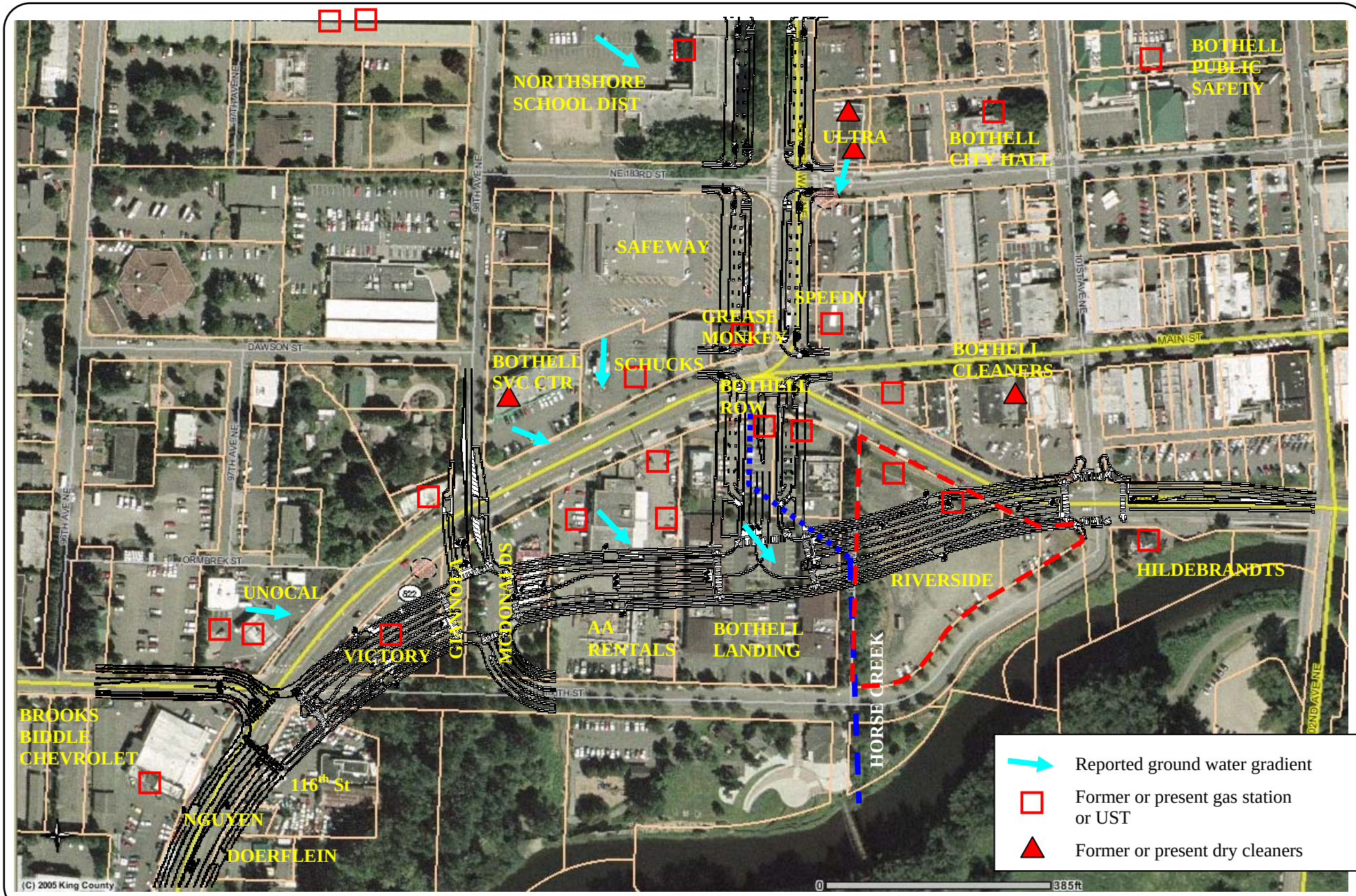
HWA GeoSciences Inc.

CONCEPTUAL SITE MODEL

RIVERSIDE PROPERTY
REMEDIAL INVESTIGATION/FEASIBILITY STUDY WORK PLAN
BOTHELL CROSSROADS PROJECT
BOTHELL, WASHINGTON

FIGURE NO.
3-1

PROJECT NO.
2007-098



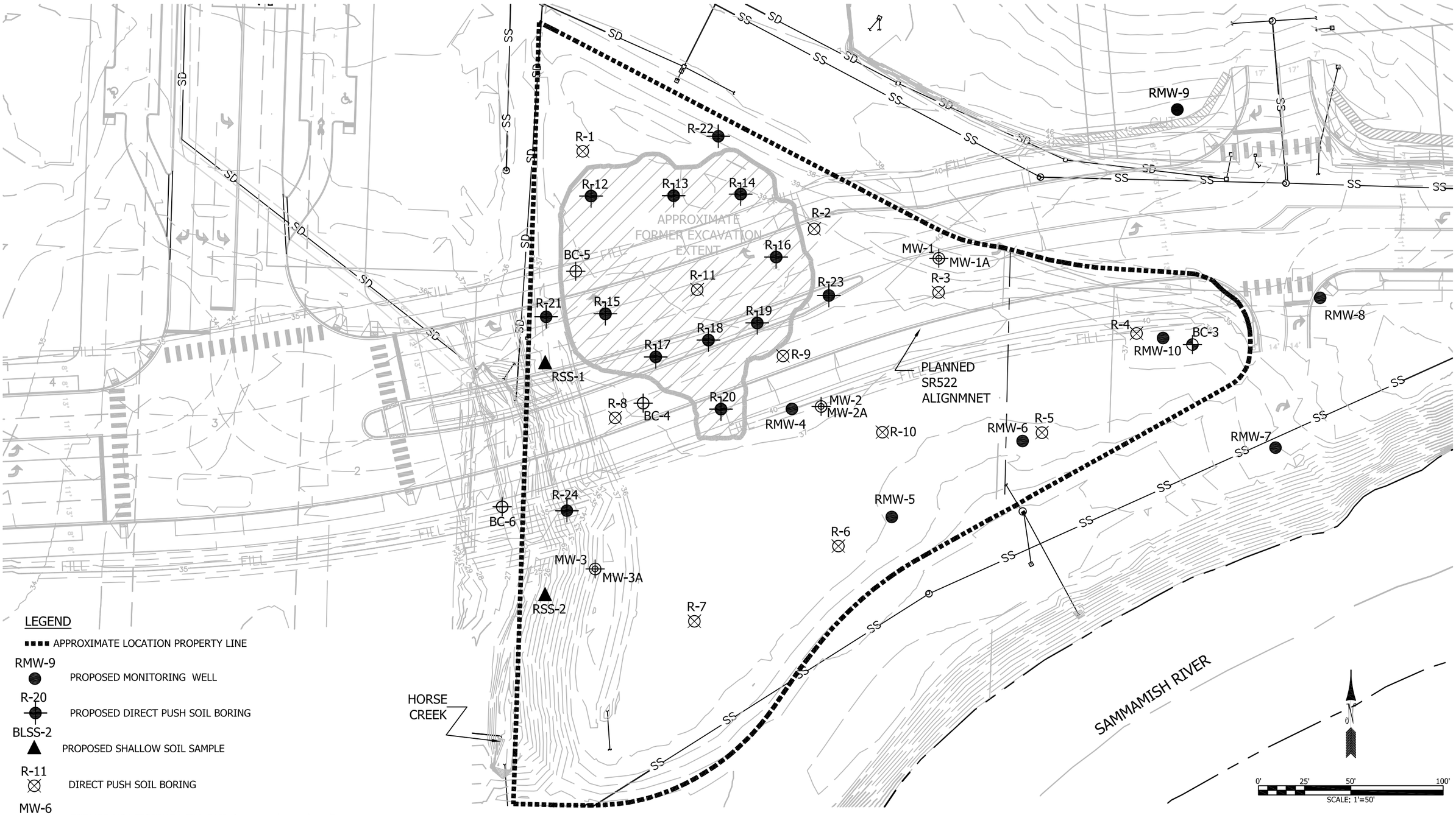
HWA GeoSciences Inc.

SURROUNDING SITES

RIVERSIDE FACILITY
REMEDIAL INVESTIGATION/FEASIBILITY STUDY WORK PLAN
BOTHELL, WASHINGTON

FIGURE NO.
3-2

PROJECT NO.
2007-098



LEGEND

- APPROXIMATE LOCATION PROPERTY LINE
- RMW-9 — PROPOSED MONITORING WELL
- R-20 — PROPOSED DIRECT PUSH SOIL BORING
- BLSS-2 — PROPOSED SHALLOW SOIL SAMPLE
- R-11 — DIRECT PUSH SOIL BORING
- MW-6 — FORMER MONITORING WELL PAIR (presumed abandoned)
- BC-6 — EXISTING GEOTECHNICAL SOIL BORING
- BC-3 — EXISTING GEOTECHNICAL SOIL BORING WITH MONITORING WELL

BASE MAP PROVIDED BY PERTEET ENGINEERING INC

S:\2007 PROJECTS\2007-098-22 BOTHELL CROSSROADS\CAD\HWA 2007-098-21 T220.DWG

HWA GEOSCIENCES INC.

RIVERSIDE PROPERTY
REMEDIAL INVESTIGATION/FEASIBILITY
STUDY WORK PLAN
BOTHELL CROSSROADS PROJECT
BOTHELL, WASHINGTON

PROPOSED
INVESTIGATION
LOCATIONS

DRAWN BY EFK
CHECK BY CB
DATE 01.15.09

FIGURE NO. 5-1
PROJECT NO. 2007-098-21
TASK 700

APPENDIX A

Agreed Order

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

In the Matter of Remedial Action by: **City of Bothell**	Bothell Riverside AGREED ORDER No. DE 6295

TO:

Robert S. Stowe
City Manager
City of Bothell
18305 101st Avenue NE
Bothell, WA 98011

TABLE OF CONTENTS

I. INTRODUCTION

The mutual objective of the State of Washington, Department of Ecology (Ecology) and the City of Bothell under this Agreed Order (Order) is to provide for remedial action at a facility where there has been a release or threatened release of hazardous substances. This Order requires the City of Bothell to conduct a remedial investigation/feasibility study (RI/FS) and to submit a draft cleanup action plan (DCAP) on the Bothell Riverside site located at Woodinville Drive (SR 522) and NE 180th Street in Bothell, WA. Ecology believes the actions required by this Order are in the public interest.

II. JURISDICTION

This Agreed Order is issued pursuant to the Model Toxics Control Act (MTCA), RCW 70.105D.050 (1).

III. PARTIES BOUND

This Agreed Order shall apply to and be binding upon the Parties to this Order, their successors and assigns. The undersigned representative of each party hereby certifies that he or she is fully authorized to enter into this Order and to execute and legally bind such party to comply with this Order. The City of Bothell agrees to undertake all actions required by the terms and conditions of this Order. No change in ownership or corporate status shall alter the City of Bothell's responsibility under this Order. The City of Bothell shall provide a copy of this Order to all agents, contractors, and subcontractors retained to perform work required by this Order, and shall ensure that all work undertaken by such agents, contractors, and subcontractors complies with this Order.

IV. DEFINITIONS

Unless otherwise specified herein, the definitions set forth in Chapter 70.105D RCW and Chapter 173-340 WAC shall control the meanings of the terms in this Order.

A. Site: The Site is referred to as the Bothell Riverside site located at Bothell, WA and is generally located at Woodinville Drive (SR 522) and NE 180th Street. The Site is defined by the extent of contamination caused by the release of hazardous substances at the Site. Based

upon factors currently known to Ecology, the Site is more particularly described in the Site Diagram (Exhibit A). The Site constitutes a Facility under RCW 70.105D.020(5).

B. Parties: Refers to the State of Washington, Department of Ecology and the City of Bothell, WA.

C. Potentially Liable Person (PLP): Refers to the City of Bothell, WA.

D. Agreed Order or Order: Refers to this Order and each of the exhibits to this Order. All exhibits are integral and enforceable parts of this Order. The terms "Agreed Order" or "Order" shall include all exhibits to this Order.

V. FINDINGS OF FACT

Ecology makes the following findings of fact, without any express or implied admissions of such facts by the City of Bothell:

A. The City of Bothell owns the property at Woodinville Drive (SR 522) and NE 180th Street, Bothell (King County Tax Parcels No. 082605-9120, 082605-9284, and 082605-9031). The City of Bothell acquired the property from Bestern Inn in 1990.

King County Assessor Real Property Records

http://www5.kingcounty.gov/kcgisreports/property_report.aspx?PIN=0826059120

http://www5.kingcounty.gov/kcgisreports/property_report.aspx?PIN=0826059284

http://www5.kingcounty.gov/kcgisreports/property_report.aspx?PIN=0826059031

B. The Site contained a former gasoline service station. Petroleum impacted soil and ground water were found on-site. Solid waste including discarded containers of motor oil, anti-freeze, and transmission fluid were also found. Approximately 4,500 yards of petroleum impacted soil were excavated, treated on-site, and returned to the excavation in the early 1990s by the City of Bothell and Texaco. Water was pumped from the excavation, treated and returned to the excavation during a 3-month period in 1991.

C. A Phase II ESA investigation performed for the City of Bothell in February 2008 documented the presence of petroleum impacted soil and chlorinated solvent impacted ground water at concentrations of potential regulatory concern. Chlorinated solvents detected in ground water at the eastern portion of the property may be from activities on an adjacent or other nearby

property. Petroleum hydrocarbon concentrations of soils treated and backfilled in 1991 may still exceed current MTCA cleanup levels.

D. This Site is on Ecology's Leaking Underground Storage Tank (LUST) and Underground Storage Tank (UST) database. Ecology's Integrated Site Information System including Confirmed and Suspected Contaminated Sites List (CSCSL) and LUST databases, does not indicate more recent reports or other information after 1994.

G. Several reports document the release of hazardous substances at the site. These documents, and other reports relating to the Site, are available at Ecology's Northwest Regional Office Central Records.

Report of Preliminary Environmental Site Assessment, SR 522 & NE 180th Street Property, Bothell, Washington, by Groundwater Technology, dated September 18, 1992.

Groundwater Monitoring Report, SR 522 & NE 180th Street, Riverside Property, Bothell, Washington, by Groundwater Technology, dated October 5, 1994.

Phase II Environmental Site Assessment, Riverside Property, Bothell, Washington, by HWA Geosciences, Inc., dated March 28, 2008.

VI. ECOLOGY DETERMINATIONS

A. The City of Bothell is an "owner or operator" as defined in RCW 70.105D.020(17) of a "facility" as defined in RCW 70.105D.020(5).

B. Based upon all factors known to Ecology, a "release" or "threatened release" of "hazardous substance(s)" as defined in RCW 70.105D.020(25) and RCW 70.105D.020(10), respectively, has occurred at the Site.

C. Based upon credible evidence, Ecology issued a PLP status letter to the City of Bothell dated November 20, 2008, pursuant to RCW 70.105D.040, -.020(21) and WAC 173-340-500. By letter dated November 25, 2008, the City of Bothell voluntarily waived its rights to notice and comment and accepted Ecology's determination that the City of Bothell is a PLP under RCW 70.105D.040.

D. Pursuant to RCW 70.105D.030(1) and -.050(1), Ecology may require PLPs to investigate or conduct other remedial actions with respect to any release or threatened release of hazardous substances, whenever it believes such action to be in the public interest. Based on the foregoing facts, Ecology believes the remedial actions required by this Order are in the public interest.

VII. WORK TO BE PERFORMED

Based on the Findings of Fact and Ecology Determinations, it is hereby ordered that the PLP take the following remedial actions at the Site and that these actions be conducted in accordance with Chapter 173-340 WAC unless otherwise specifically provided for herein:

A. The work to be performed includes the planning, implementation, and reporting on the conduct of a remedial investigation and feasibility study (RI/FS) and draft cleanup action plan (DCAP) for the Bothell Riverside site. A Scope of Work is attached hereto as Exhibit B for the completion of a RI/FS and DCAP. Exhibit B is incorporated by reference as an integral and enforceable part of the Order.

B. The PLP shall submit all necessary work plans to implement the Scope of Work (Exhibit B) to Ecology for review and approval according to the Schedule of Deliverables attached as Exhibit C. Upon approval by Ecology, the PLP will proceed with field implementation of the Work Plans in accordance with an agreed upon schedule.

C. Work Plans shall consist of a detailed description of site conditions, work to be performed, personnel requirements, and schedules for implementation and deliverables for the following:

TASK I.	RI/FS Project Plans including RI/FS Work Plan, Sampling and Analysis Plan, Health and Safety Plan, and Public Participation Plan
TASK II.	Remedial Investigation
TASK III.	Feasibility Study
TASK IV.	Remedial Investigation/Feasibility Study Report
TASK V.	Draft Cleanup Action Plan

These work plans and each element thereof shall be designed, implemented, and completed in accordance with the Model Toxics Control Act (Chapter 70.105D RCW) and its implementing

regulation (Chapter 173-340 WAC) as amended, and all applicable federal, state, and local laws and regulations.

D. Electronic data shall be entered into Ecology's Environmental Information Management (EIM) System.

E. If, at any time after the first exchange of comments on drafts, Ecology determines that insufficient progress is being made in the preparation of any of the deliverables required by this section, Ecology may complete and issue the final deliverable.

VIII. TERMS AND CONDITIONS OF ORDER

A. Public Notice

RCW 70.105D.030(2)(a) requires that, at a minimum, this Order be subject to concurrent public notice. Ecology shall be responsible for providing such public notice and reserves the right to modify or withdraw any provisions of this Order should public comment disclose facts or considerations which indicate to Ecology that this Order is inadequate or improper in any respect.

B. Remedial Action Costs

The PLP shall pay to Ecology costs incurred by Ecology pursuant to this Order and consistent with WAC 173-340-550(2). These costs shall include work performed by Ecology or its contractors for, or on, the Site under Chapter 70.105D RCW, including remedial actions and Order preparation, negotiation, oversight, and administration. These costs shall include work performed both prior to and subsequent to the issuance of this Order. Ecology's costs shall include costs of direct activities and support costs of direct activities as defined in WAC 173-340-550(2). The PLP shall pay the required amount within ninety (90) days of receiving from Ecology an itemized statement of costs that includes a summary of costs incurred, an identification of involved staff, and the amount of time spent by involved staff members on the project. A general statement of work performed will be provided upon request. Itemized statements shall be prepared quarterly. Pursuant to WAC 173-340-550(4), failure to pay Ecology's costs within ninety (90) days of receipt of the itemized statement of costs will result in interest charges at the rate of twelve percent (12%) per annum, compounded monthly. Pursuant

to RCW 70.105D.055, Ecology has authority to recover unreimbursed remedial action costs by filing a lien against real property subject to the remedial actions.

C. Implementation of Remedial Action

If Ecology determines that the PLP has failed without good cause to implement the remedial action, in whole or in part, Ecology may, after notice to the PLP, perform any or all portions of the remedial action that remain incomplete. If Ecology performs all or portions of the remedial action because of the PLP's failure to comply with its obligations under this Order, the PLP shall reimburse Ecology for the costs of doing such work in accordance with Section VIII. B (Remedial Action Costs), provided that the PLP is not obligated under this Section to reimburse Ecology for costs incurred for work inconsistent with or beyond the scope of this Order.

Except where necessary to abate an emergency situation, the PLP shall not perform any remedial actions at the Site outside those remedial actions required by this Order, unless Ecology concurs, in writing, with such additional remedial actions.

D. Designated Project Coordinators

The project coordinator for Ecology is:

Jerome Cruz
Department of Ecology
3190 160th Avenue SE
Bellevue, WA 98008-5452
(425) 649-7094
Email: jcru461@ecy.wa.gov

The project coordinator for the PLP is:

Steven M. Morikawa
Capital Program Manager
City of Bothell, Public Works Department
9654 NE 182nd Street
Bothell, WA 98011
(425) 486-2768, ext. 4443
Email: Steven.Morikawa@ci.bothell.wa.us

Each project coordinator shall be responsible for overseeing the implementation of this Order. Ecology's project coordinator will be Ecology's designated representative for the Site. To the maximum extent possible, communications between Ecology and the PLP, and all

documents, including reports, approvals, and other correspondence concerning the activities performed pursuant to the terms and conditions of this Order shall be directed through the project coordinators. The project coordinators may designate, in writing, working level staff contacts for all or portions of the implementation of the work to be performed required by this Order.

Any party may change its respective project coordinator. Written notification shall be given to the other party at least ten (10) calendar days prior to the change.

E. Performance

All geologic and hydrogeologic work performed pursuant to this Order shall be under the supervision and direction of a geologist licensed in the State of Washington or under the direct supervision of an engineer registered in the State of Washington, except as otherwise provided for by Chapters 18.220 and 18.43 RCW.

All engineering work performed pursuant to this Order shall be under the direct supervision of a professional engineer registered in the State of Washington, except as otherwise provided for by RCW 18.43.130.

All construction work performed pursuant to this Order shall be under the direct supervision of a professional engineer or a qualified technician under the direct supervision of a professional engineer. The professional engineer must be registered in the State of Washington, except as otherwise provided for by RCW 18.43.130.

Any documents submitted containing geologic, hydrologic or engineering work shall be under the seal of an appropriately licensed professional as required by Chapter 18.220 RCW or RCW 18.43.130.

The PLP shall notify Ecology in writing of the identity of any engineer(s) and geologist(s), contractor(s) and subcontractor(s), and others to be used in carrying out the terms of this Order, in advance of their involvement at the Site.

F. Access

Ecology or any Ecology authorized representative shall have full authority to enter and freely move about all property at the Site that the PLP either owns, controls, or has access rights to at all reasonable times for the purposes of, *inter alia*: inspecting records, operation logs, and contracts related to the work being performed pursuant to this Order; reviewing the PLP's

progress in carrying out the terms of this Order; conducting such tests or collecting such samples as Ecology may deem necessary; using a camera, sound recording, or other documentary type equipment to record work done pursuant to this Order; and verifying the data submitted to Ecology by the PLP. The PLP shall make all reasonable efforts to secure access rights for those properties within the Site not owned or controlled by the PLP where remedial activities or investigations will be performed pursuant to this Order. Ecology or any Ecology authorized representative shall give reasonable notice before entering any Site property owned or controlled by the PLP unless an emergency prevents such notice. All persons who access the Site pursuant to this Section shall comply with any applicable Health and Safety Plan(s). Ecology employees and their representatives shall not be required to sign any liability release or waiver as a condition of Site property access.

G. Sampling, Data Submittal, and Availability

With respect to the implementation of this Order, the PLP shall make the results of all sampling, laboratory reports, and/or test results generated by it or on its behalf available to Ecology. Pursuant to WAC 173-340-840(5), all sampling data shall be submitted to Ecology in both printed and electronic formats in accordance with Section VII. (Work to be Performed), Ecology's Toxics Cleanup Program Policy 840 (Data Submittal Requirements), and/or any subsequent procedures specified by Ecology for data submittal.

If requested by Ecology, the PLP shall allow Ecology and/or its authorized representative to take split or duplicate samples of any samples collected by the PLP pursuant to implementation of this Order. The PLP shall notify Ecology seven (7) days in advance of any sample collection or work activity at the Site. Ecology shall, upon request, allow the PLP and/or its authorized representative to take split or duplicate samples of any samples collected by Ecology pursuant to the implementation of this Order, provided that doing so does not interfere with Ecology's sampling. Without limitation on Ecology's rights under Section VIII. F (Access), Ecology shall notify the PLP prior to any sample collection activity unless an emergency prevents such notice.

In accordance with WAC 173-340-830(2)(a), all hazardous substance analyses shall be conducted by a laboratory accredited under Chapter 173-50 WAC for the specific analyses to be conducted, unless otherwise approved by Ecology.

H. Public Participation

A public participation plan is required for this Site. Ecology shall review any existing public participation plan to determine its continued appropriateness and whether it requires amendment. If no plan exists, Ecology shall develop a public participation plan alone or in conjunction with the PLP.

Ecology shall maintain the responsibility for public participation at the Site, and the PLP shall cooperate with Ecology.

1. Ecology will develop appropriate mailing lists with input from the PLP, prepare drafts of public notices and fact sheets at important stages of the remedial action, such as the submission of work plans, remedial investigation/feasibility study reports, interim actions and cleanup action plans. Ecology will edit, finalize and distribute such fact sheets and prepare and distribute public notices of Ecology's presentations and meetings. The PLP will be provided an opportunity to review fact sheets and public notices prior to distribution.

2. The PLP shall notify Ecology's project coordinator prior to any of the following regarding the site: the issuance of all press releases; distribution of fact sheets; performance of other outreach activities; meetings with the interested public and/or local governments. Likewise, Ecology shall notify the PLP prior to the issuance of all press releases and fact sheets, and before meetings with the interested public and local governments. For all press releases, fact sheets, meetings, and other outreach efforts by the PLP that do not receive prior Ecology approval, the PLP shall clearly indicate to its audience that the press release, fact sheet, meeting, or other outreach effort was not sponsored or endorsed by Ecology.

3. When requested by Ecology, the PLP shall participate in public presentations on the progress of the remedial action at the Site. Participation may be through attendance at public meetings to assist in answering questions, or as a presenter.

4. When requested by Ecology, the PLP shall arrange and/or continue information repositories to be located at the following locations:

(a) King County Bothell Library
18215 98th Ave. NE
Bothell, WA 98011

(b) Ecology's Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008-5452

At a minimum, copies of all public notices, fact sheets, and press releases; all quality assured monitoring data; remedial action plans and reports, supplemental remedial planning documents, and all other similar documents relating to performance of the remedial action required by this Order shall be promptly placed in these repositories.

I. Retention of Records

During the pendency of this Order, and for ten (10) years from the date of completion of work performed pursuant to this Order, the PLP shall preserve all records, reports, documents, and underlying data in its possession relevant to the implementation of this Order and shall insert a similar record retention requirement into all contracts with project contractors and subcontractors. Upon request of Ecology, the PLP shall make all records available to Ecology and allow access for review within a reasonable time.

J. Resolution of Disputes

1. In the event a dispute arises as to an approval, disapproval, proposed change, or other decision or action by Ecology's project coordinator, or an itemized billing statement under Section VIII. B (Remedial Action Costs), the Parties shall utilize the dispute resolution procedure set forth below.

a. Upon receipt of Ecology's project coordinator's written decision or the itemized billing statement, the PLP has fourteen (14) days within which to notify Ecology's project coordinator in writing of its objection to the decision or itemized statement.

b. The Parties' project coordinators shall then confer in an effort to resolve the dispute. If the project coordinators cannot resolve the dispute within fourteen (14) days, Ecology's project coordinator shall issue a written decision.

c. The PLP may then request regional management review of the decision. This request shall be submitted in writing to the Northwest Region Toxics Cleanup Section Manager within seven (7) days of receipt of Ecology's project coordinator's written decision.

d. The Section Manager shall conduct a review of the dispute and shall endeavor to issue a written decision regarding the dispute within thirty (30) days of the PLP's request for review. The Section Manager's decision shall be Ecology's final decision on the disputed matter.

2. The Parties agree to only utilize the dispute resolution process in good faith and agree to expedite, to the extent possible, the dispute resolution process whenever it is used.

3. Implementation of these dispute resolution procedures shall not provide a basis for delay of any activities required in this Order, unless Ecology agrees in writing to a schedule extension.

K. Extension of Schedule

1. An extension of schedule shall be granted only when a request for an extension is submitted in a timely fashion, generally at least thirty (30) days prior to expiration of the deadline for which the extension is requested, and good cause exists for granting the extension. All extensions shall be requested in writing. The request shall specify:

a. The deadline that is sought to be extended;

b. The length of the extension sought;

c. The reason(s) for the extension; and

d. Any related deadline or schedule that would be affected if the extension were granted.

2. The burden shall be on the PLP to demonstrate to the satisfaction of Ecology that the request for such extension has been submitted in a timely fashion and that good cause exists for granting the extension. Good cause may include, but may not be limited to:

a. Circumstances beyond the reasonable control and despite the due diligence of the PLP including delays caused by unrelated third parties or Ecology, such as (but not limited to) delays by Ecology in reviewing, approving, or modifying documents submitted by the PLP;

b. Acts of God, including fire, flood, blizzard, extreme temperatures, storm, or other unavoidable casualty; or

c. Endangerment as described in Section VIII. M (Endangerment).

However, neither increased costs of performance of the terms of this Order nor changed economic circumstances shall be considered circumstances beyond the reasonable control of the PLP.

3. Ecology shall act upon any written request for extension in a timely fashion. Ecology shall give the PLP written notification of any extensions granted pursuant to this Order. A requested extension shall not be effective until approved by Ecology. Unless the extension is a substantial change, it shall not be necessary to amend this Order pursuant to Section VIII. L (Amendment of Order) when a schedule extension is granted.

4. An extension shall only be granted for such period of time as Ecology determines is reasonable under the circumstances. Ecology may grant schedule extensions exceeding ninety (90) days only as a result of:

a. Delays in the issuance of a necessary permit which was applied for in a timely manner;

b. Other circumstances deemed exceptional or extraordinary by Ecology; or

c. Endangerment as described in Section VIII. M (Endangerment).

L. Amendment of Order

The project coordinators may verbally agree to minor changes to the work to be performed without formally amending this Order. Minor changes will be documented in writing by Ecology within seven (7) days of verbal agreement.

Except as provided in Section VIII. N (Reservation of Rights), substantial changes to the work to be performed shall require formal amendment of this Order. This Order may only be formally amended by the written consent of both Ecology and the PLP. The PLP shall submit a written request for amendment to Ecology for approval. Ecology shall indicate its approval or disapproval in writing and in a timely manner after the written request for amendment is received. If the amendment to this Order represents a substantial change, Ecology will provide public notice and opportunity to comment. Reasons for the disapproval of a proposed amendment to this Order shall be stated in writing. If Ecology does not agree to a proposed amendment, the disagreement may be addressed through the dispute resolution procedures described in Section VIII. J (Resolution of Disputes).

M. Endangerment

In the event Ecology determines that any activity being performed at the Site is creating or has the potential to create a danger to human health or the environment on or surrounding the Site, Ecology may direct the PLP to cease such activities for such period of time as it deems necessary to abate the danger. The PLP shall immediately comply with such direction.

In the event the PLP determines that any activity being performed at the Site is creating or has the potential to create a danger to human health or the environment, the PLP may cease such activities. The PLP shall notify Ecology's project coordinator as soon as possible, but no later than twenty-four (24) hours after making such determination or ceasing such activities. Upon Ecology's direction the PLP shall provide Ecology with documentation of the basis for the determination or cessation of such activities. If Ecology disagrees with the PLP's cessation of activities, it may direct the PLP to resume such activities.

If Ecology concurs with or orders a work stoppage pursuant to Section VIII. M (Endangerment), the PLP's obligations with respect to the ceased activities shall be suspended

until Ecology determines the danger is abated, and the time for performance of such activities, as well as the time for any other work dependent upon such activities, shall be extended in accordance with Section VIII. K (Extension of Schedule) for such period of time as Ecology determines is reasonable under the circumstances.

Nothing in this Order shall limit the authority of Ecology, its employees, agents, or contractors to take or require appropriate action in the event of an emergency.

N. Reservation of Rights

This Order is not a settlement under Chapter 70.105D RCW. Ecology's signature on this Order in no way constitutes a covenant not to sue or a compromise of any of Ecology's rights or authority. Ecology will not, however, bring an action against the PLP to recover remedial action costs paid to and received by Ecology under this Order. In addition, Ecology will not take additional enforcement actions against the PLP regarding remedial actions required by this Order, provided the PLP complies with this Order.

Ecology nevertheless reserves its rights under Chapter 70.105D RCW, including the right to require additional or different remedial actions at the Site should it deem such actions necessary to protect human health and the environment, and to issue orders requiring such remedial actions. Ecology also reserves all rights regarding the injury to, destruction of, or loss of natural resources resulting from the release or threatened release of hazardous substances at the Site.

O. Transfer of Interest in Property

No voluntary conveyance or relinquishment of title, easement, leasehold, or other interest in any portion of the Site shall be consummated by the PLP without provision for continued implementation of all requirements of this Order and implementation of any remedial actions found to be necessary as a result of this Order.

Prior to the PLP's transfer of any interest in all or any portion of the Site, and during the effective period of this Order, the PLP shall provide a copy of this Order to any prospective purchaser, lessee, transferee, assignee, or other successor in said interest; and, at least thirty (30) days prior to any transfer, the PLP shall notify Ecology of said transfer. Upon transfer of any

interest, the PLP shall restrict uses and activities to those consistent with this Order and notify all transferees of the restrictions on the use of the property.

P. Compliance with Applicable Laws

1. All actions carried out by the PLP pursuant to this Order shall be done in accordance with all applicable federal, state, and local requirements, including requirements to obtain necessary permits, except as provided in RCW 70.105D.090. At this time, no federal, state or local requirements have been identified as being applicable to the actions required by this Order.

2. Pursuant to RCW 70.105D.090(1), the PLP is exempt from the procedural requirements of Chapters 70.94, 70.95, 70.105, 77.55, 90.48, and 90.58 RCW and of any laws requiring or authorizing local government permits or approvals. However, the PLP shall comply with the substantive requirements of such permits or approvals. At this time, no state or local permits or approvals have been identified as being applicable but procedurally exempt under this Section.

The PLP has a continuing obligation to determine whether additional permits or approvals addressed in RCW 70.105D.090(1) would otherwise be required for the remedial action under this Order. In the event either Ecology or the PLP determines that additional permits or approvals addressed in RCW 70.105D.090(1) would otherwise be required for the remedial action under this Order, it shall promptly notify the other party of its determination. Ecology shall determine whether Ecology or the PLP shall be responsible to contact the appropriate state and/or local agencies. If Ecology so requires, the PLP shall promptly consult with the appropriate state and/or local agencies and provide Ecology with written documentation from those agencies of the substantive requirements those agencies believe are applicable to the remedial action. Ecology shall make the final determination on the additional substantive requirements that must be met by the PLP and on how the PLP must meet those requirements. Ecology shall inform the PLP in writing of these requirements. Once established by Ecology, the additional requirements shall be enforceable requirements of this Order. The PLP shall not

begin or continue the remedial action potentially subject to the additional requirements until Ecology makes its final determination.

3. Pursuant to RCW 70.105D.090(2), in the event Ecology determines that the exemption from complying with the procedural requirements of the laws referenced in RCW 70.105D.090(1) would result in the loss of approval from a federal agency that is necessary for the State to administer any federal law, the exemption shall not apply and the PLP shall comply with both the procedural and substantive requirements of the laws referenced in RCW 70.105D.090(1), including any requirements to obtain permits.

Q. Indemnification

The PLP agrees to indemnify and save and hold the State of Washington, its employees, and agents harmless from any and all claims or causes of action for death or injuries to persons or for loss or damage to property to the extent arising from or on account of acts or omissions of the PLP, its officers, employees, agents, or contractors in entering into and implementing this Order. However, the PLP shall not indemnify the State of Washington nor save nor hold its employees and agents harmless from any claims or causes of action to the extent arising out of the negligent acts or omissions of the State of Washington, or the employees or agents of the State, in entering into or implementing this Order.

IX. SATISFACTION OF ORDER

The provisions of this Order shall be deemed satisfied upon the PLP's receipt of written notification from Ecology that the PLP has completed the remedial activity required by this Order, as amended by any modifications, and that the PLP has complied with all other provisions of this Agreed Order.

X. ENFORCEMENT

Pursuant to RCW 70.105D.050, this Order may be enforced as follows:

A. The Attorney General may bring an action to enforce this Order in a state or federal court.

B. The Attorney General may seek, by filing an action, if necessary, to recover amounts spent by Ecology for investigative and remedial actions and orders related to the Site.

C. In the event the PLP refuses, without sufficient cause, to comply with any term of this Order, the PLP will be liable for:

a. Up to three (3) times the amount of any costs incurred by the State of Washington as a result of its refusal to comply; and

b. Civil penalties of up to twenty-five thousand dollars ($25,000) per day for each day it refuses to comply.

D. This Order is not appealable to the Washington Pollution Control Hearings Board. This Order may be reviewed only as provided under RCW 70.105D.060.

Effective date of this Order: FEBRUARY 3, 2009

CITY OF BOTHELL, WA

Robert S. Stowe
City Manager
City of Bothell
18305 101st Avenue NE
Bothell, WA 98011
(425) 486-3256

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

Robert W. Warren, P.Hg., MBA
Section Manager
Toxics Cleanup Program
Northwest Regional Office
(425) 649-7054

Agreed Order No. 6295
Exhibit A

EXHIBIT A

SITE DIAGRAM

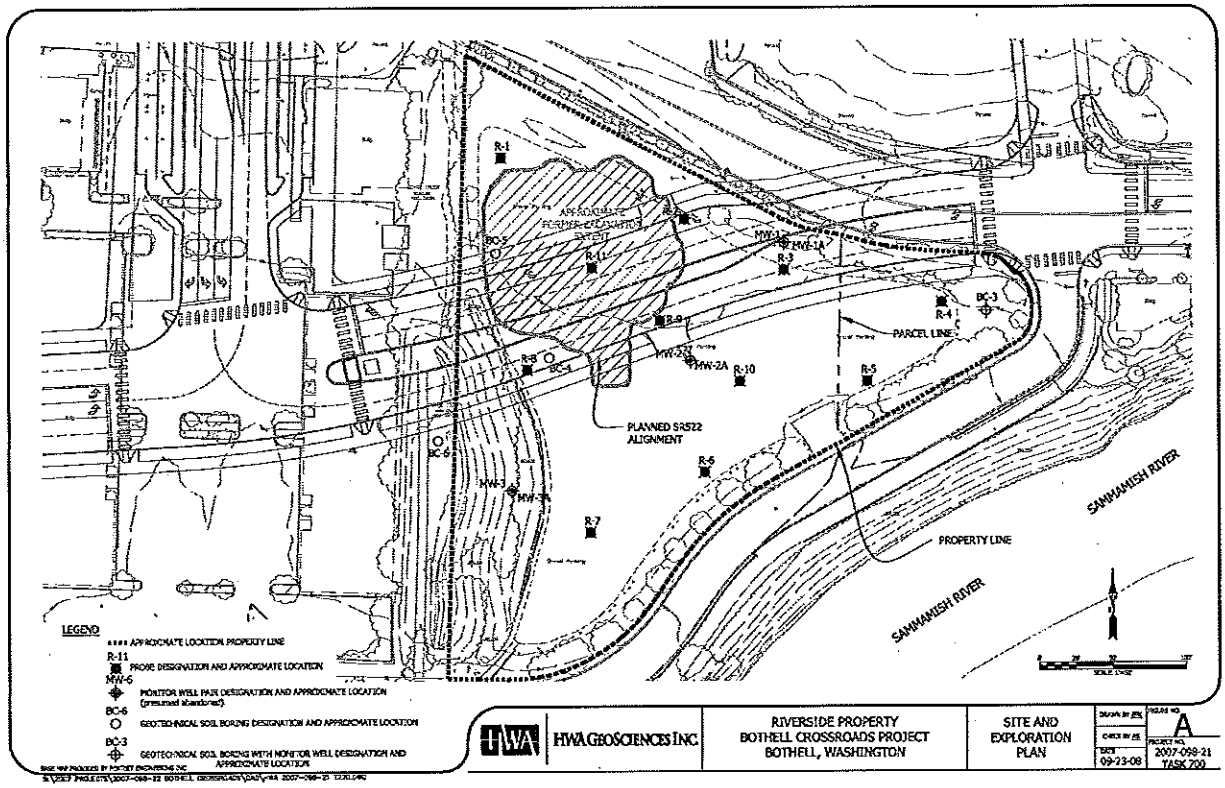


EXHIBIT B

Scope of Work

Bothell Riverside Site

The Potentially Liable Persons (PLPs) shall take the following remedial actions per the Schedule detailed in Exhibit C of this Agreed Order (Order) for conducting a remedial investigation and feasibility study (RI/FS), conducting interim remedial actions, and preparing a draft cleanup action plan (CAP). The PLPs will work cooperatively with Ecology to support public participation in the scoping and implementation of the work performed under this Agreed Order in accordance with Section VIII.H of the Agreed Order. All deliverables will adhere to Ecology Executive Policy 1-81 (Establishing Plain Talk at Ecology).

This Scope of Work is to investigate contamination at the Bothell Riverside Site (Site) located at Woodinville Drive (SR 522) and NE 180th Street, Bothell, Washington. This Scope of Work is to be used by the potentially liable person (PLP) to develop Work Plans in order to complete a Remedial Investigation/Feasibility Study (RI/FS) at the Site as required by the Model Toxics Control Act Cleanup Regulation (Chapter 173-340 WAC).

The RI is to supplement existing data and determine the nature and extent of contamination at the Site. The FS will evaluate remedial alternatives that are applicable for the Site. The information and data gathered during the RI/FS will be used to identify if additional data need to be collected and determine an appropriate remedial action. The PLP will furnish all personnel, materials, and services necessary for, or incidental to, performing the Remedial Investigation and Feasibility Study at the Site.

The RI/FS work must include the following tasks:

Task I: RI/FS Project Plan

A. RI/FS Work Plan

A Work Plan is to be prepared outlining procedures for the Remedial Investigation and Feasibility Study (RI/FS). The Work Plan shall be based on the state of knowledge regarding known or suspected contamination at the facility as described in the report prepared under Deliverable 1 (Exhibit C). An RI/FS Work Plan will be prepared to compile and analyze past investigation results, reports, and remedial actions undertaken at the Bothell Riverside Site. The RI/FS Work Plan will also identify data gaps and specify a scope of work necessary to complete the RI/FS. The purpose of the RI/FS is to collect, develop, and evaluate sufficient information regarding the Bothell Riverside Site to select a cleanup action under Chapters 173-340-350 through 173-340-390 of the Washington Administrative Code. The Work Plan shall include the following information:

1. Evaluation of existing data including but not limited to the planning for monitoring wells, soil borings, test pits, and additional data objectives.

2. Description of Tasks II and III RI/FS implementation, including:

    a. Sampling and Analysis Plan
    b. Quality Assurance Project Plan
    c. Health and Safety Plan
    d. Public Participation Support

3. Project Management - Project team, roles, and responsibilities.

4. Deliverables and schedule for Tasks II - IV.

The work plan shall not be implemented until approved by Ecology. Once approved by Ecology, the PLPs will implement the work plan according to the schedule contained in Exhibit C unless schedules contained or revised in the work plan are approved by Ecology, in which case the revised schedules shall govern. The PLPs shall prepare an adequate number of copies of the Draft RI/FS work plan and submit

them, including one electronic copy each in Word (.doc) and Adobe (.pdf) formats, to Ecology for review and comment. After addressing Ecology's comments on the draft work plan and after Ecology approval, the PLPs shall prepare an adequate number of copies of the final work plan and submit them, including one electronic copy each in Word (.doc) and Adobe (.pdf) formats, to Ecology for distribution.

B. Sampling and Analysis Plan

The PLP must prepare an initial Sampling and Analysis Plan (SAP) for use during all Site characterization studies. Additional investigative plans may be required by Ecology. All SAP's prepared for the Site must contain:

1. Field Investigations, Sampling, and Testing – The field sampling and testing component of the SAP will describe in detail the rationale for data collection, including sampling, testing, and data gathering methods, locations, frequency and other field study procedures that will be used for obtaining data required to complete the RI/FS. This component will include but not be limited to the following:

    a. Proposed number and location of monitoring wells, soil borings, test pits and other investigative activities.

    b. Types of media to be sampled and the number of samples of each.

    c. Sampling locations and designations, including access considerations.

    d. Discussion of data objectives and linkage to conceptual site model.

    e. Specific sampling methods, including number and type of Quality Assurance/Quality Control (QA/QC) samples.

    f. Schedule and task assignments.

    g. Supplies and equipment.

    h. Monitoring well construction requirements.

i. Analytical procedures, methods, and detection limits.

j. Shipping and handling arrangements

2. Preliminary analysis and presentation of Applicable, Relevant and Appropriate Requirements (ARARs) in support of data quality objectives determination (e.g., analytical detection limits).

3. Quality Assurance Project Plan (QAPP)

a. Field QA/QC methods.

b. Chain of custody procedures.

c. Decontamination procedures.

d. Laboratory analyses and QA/QC methods.

e. Sample custody procedures, including holding times, containers, and preservation.

4. Health and Safety Plan

a. Level of protection.

b. Hazard evaluation.

c. Waste characteristics.

d. Special considerations and emergency information.

C. Public Participation

Ecology will prepare a Public Participation Plan in accordance with WAC 173-340-600. The PLP will be provided an opportunity to provide feedback about the Plan and participate in the implementation. Ecology will provide public notice and comment opportunities for the results of the remedial investigation and Feasibility Study.

Task II: Remedial Investigation

The purpose of the Remedial Investigation (RI) is to obtain the information necessary to understand site conditions in relationship to known or suspected releases of contaminants. Specifically, new and existing information will be used to characterize the Site, identify known and potential contaminant sources, and establish the nature and extent of contamination present to sufficiently complete a Feasibility Study and select an appropriate remedial action. The RI data must meet the criteria set out in the QAPP and be of sufficient quality to support the development of an appropriate remedial action for the Site. The investigation will meet the requirements stated in WAC 173-340-350 and, more specifically, must include the following elements:

A. Site Characterization

Collect analytical data on groundwater and soils contamination in the vicinity of the Site. Considering information on historical operations and hydrogeology, the data must be sufficient to delineate the type, depth, concentration and areal extent of contaminants, along with information that addresses the rate and direction of contaminant movement.

1. Collect background information from previous environmental investigations, other Ecology information, and any other historical data.

2. Hydrogeology

An investigation of the regional and Site-specific geologic and hydrogeologic characteristics affecting groundwater flow through the Site:

a. Evaluate and monitor all existing monitoring wells that comply with the requirements of 173-160 WAC.

b. Install new groundwater monitoring wells and soil borings where needed.

c. Characterize site-specific stratigraphy and lithology based on well logs, maps, and any other information available, including identification of major aquifer and aquitard units.

d. Estimate or measure hydraulic conductivity and porosity based on well logs, samples, aquifer tests, and other general information available.

e. Prepare maps showing water levels and regional/Site hydrogeology, and inferred direction of groundwater flow.

3. Soils

a. Drill soil borings and/or excavate test pits, where needed. Collect and analyze surface and subsurface soil samples, as appropriate, to support characterization of vadose zone conditions and support contaminant fate and transport analyses.

b. Characterize soil samples using the Unified Soil Classification System (USCS).

c. Prepare boring logs for each boring.

B. Source and Contamination Characterization

1. Identify known or potential sources of contamination based on past facility practices, reported spills or releases. Evaluate possible facility areas where hazardous substance use, storage or release may have occurred using appropriate intrusive or non-intrusive methods of investigation.

2. Sampling locations will be selected to characterize the contamination including the nature and extent along with fate & transport.

3. Analytical data collected must help describe the nature, extent, and the existing and potential sources of contamination.

4. Investigation of surface and subsurface contamination at the site will include surface water bodies such as Horse Creek.

C. Potential Receptor Information

Collect data to permit the evaluation of appropriate human and ecological cleanup standards (WAC 173-340-700 through 760). This may include:

1. Public Use/Site Access – Potential uses of the affected properties, including zoning and land use. The presence or absence of controls on Site access.

2. Potential Groundwater/Surface Water Uses – Any consumptive, recreational, or other use of groundwater and surface water in the area, and used by which populations.

3. Potential air and soil-gas pathways – Any basements or other spaces that are below grade.

4. Environmental Receptors – Information on ecological environments at the site, including the presence of endangered or threatened species.

Task III: Feasibility Study

The purpose of the Feasibility Study is to evaluate potential remedial technologies and approaches to enable selection of an appropriate remedial action for the Site. The selected remedy will be established by Ecology with the Draft Cleanup Action Plan (DCAP), to be developed following completion and approval of the final RI/FS Report. Ecology will provide an evaluation of preliminary cleanup standards for the Site, as appropriate, to guide cleanup alternatives development. The Feasibility Study must meet the requirements stated in WAC 173-340-350(8).

Progress Reports

The PLPs shall submit progress reports every three months or as appropriately scheduled with Ecology. Progress reports shall be submitted to Ecology until satisfaction of the AO in accordance with Section IX of the AO. At a minimum, progress reports shall contain the following information regarding the preceding reporting period:

- A description of the actions which have been taken to comply with the AO.
- Summaries of sampling and testing reports and other data reports received by the PLPs
- Summaries of deviations from approved work plans
- Summaries of contacts with representatives of the local community, public interest groups, press, and federal, state, or tribal governments
- Summaries of deviations, problems or anticipated problems in meeting the schedule or objectives set forth in the SOW and Work Plan
- Summaries of solutions developed and implemented or planned to address any actual or anticipated problems or delays
- Changes in key personnel
- A description of work planned for the next reporting period

Task IV: RI/FS Report

The PLP will complete a report documenting the Remedial Investigation/Feasibility Study as required by WAC 173-340-350(7) and (8). This report will include the following elements:

A. Remedial Investigation

1. Background Information

a. Site History.

b. Previous Studies.

2. Nature and Extent of Contamination

The PLP will prepare an assessment and description of the degree and extent of contamination. This should include:

a. Data Analysis – Analyze all data collected during previous Tasks and prepare supporting maps and tables.

b. Lab reports, previous investigations, well and boring logs, and any other documentation of characterization activities must be included.

c. Presentation of conceptual site models.

3. Applicable Relevant and Appropriate Requirements (ARARs) Analysis

Identify Applicable State and Federal Laws for cleanup of the Site in accordance with WAC 173-340-710.

4. Cleanup Levels/Risk Assessment Analysis

Perform a baseline Model Toxics Cleanup Act (MTCA) cleanup levels analysis/baseline risk assessment characterizing the current and potential threats to public health and the environment that may be posed by hazardous substances at the facility. The assessment will integrate cleanup standards and risk assessment as required by WAC 173-340-357 and WAC 173-340-708.

5. Discussion and Recommendations

a. Interpret and discuss data to determine the nature and extent of the contamination and to support final recommendations for the Site.

b. A summary of all possible and suspected source areas of contamination based on the data collected will be included.

c. Any known or potential risks to the public health, welfare, and the environment should be discussed.

d. Recommendations should be provided identifying additional data requirements.

B. Feasibility Study

a. Identification of contamination to be remediated.

b. Identification and initial screening of treatment technologies.

c. Proposed remedial alternatives and evaluation with respect to MTCA criteria.

d. Recommended alternative.

The PLPs shall prepare an adequate number of copies of the draft RI/FS report and submit them, including one electronic copy each in Word (.doc) and Adobe (.pdf) formats, to Ecology for review and comment. After addressing Ecology's comments on the draft RI/FS report and after Ecology approval, the PLPs shall prepare an adequate number of copies of the final RI/FS report and submit them, including one electronic copy each in Word (.doc) and Adobe (.pdf) formats, to Ecology for distribution and public comment.

Task V: Draft Cleanup Action Plan

The PLPs will submit a draft Cleanup Action Plan (CAP) for Ecology's review and approval. The CAP will include, but not be limited to, the information listed under WAC 173-340-380. After receiving Ecology's comments on the draft CAP, if any, the PLPs shall revise the plan to address Ecology's comments and resubmit the plan.

EXHIBIT C

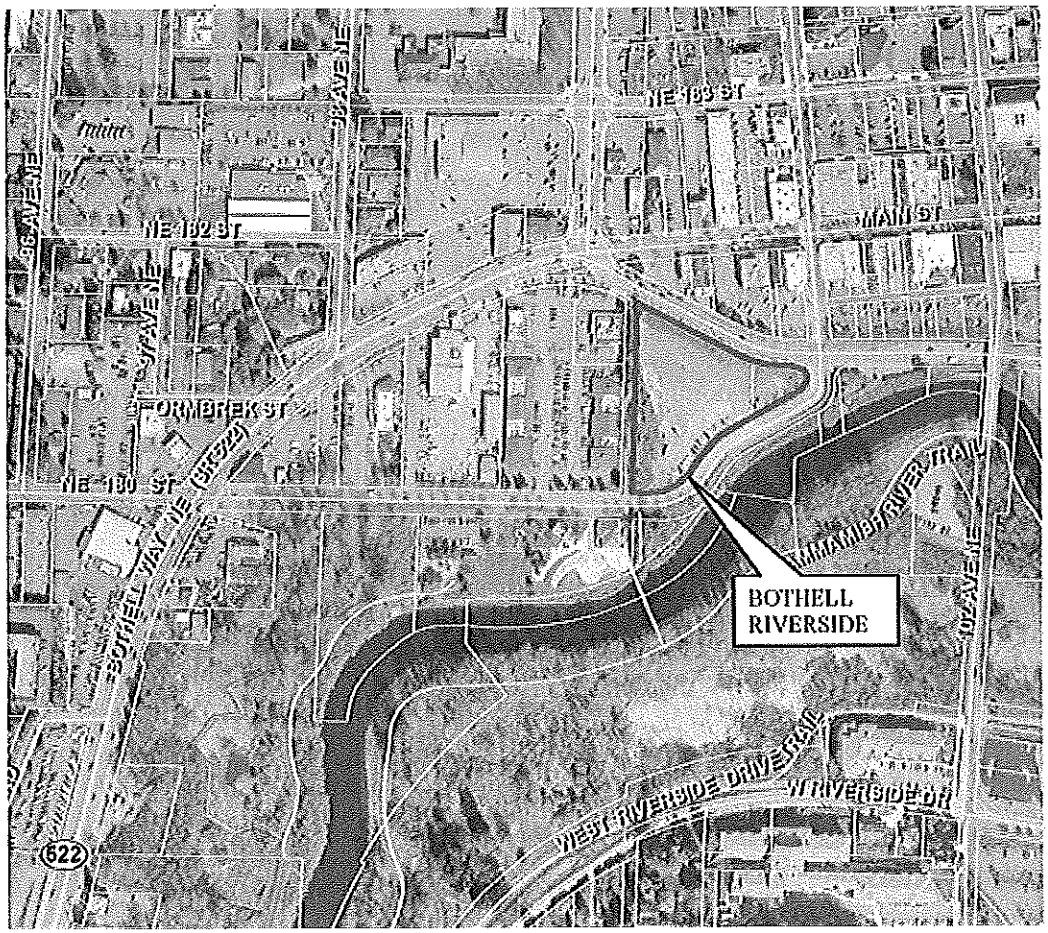
Schedule of Deliverables

Deliverables. Refer to Exhibit B (Scope of Work) for Key Components.	**Date Due**
1. PLP to Submit Draft RI/FS Work Plan, Sampling and Analysis Plan, Health and Safety Plan, and Schedule of Work to be Performed	30 days after Effective date
2. PLP to Submit Final RI/FS Work Plan, Sampling and Analysis Plan, Health and Safety Plan, Preliminary ARARs Analysis, and Schedule of Work to be Performed	30 days after PLP receives Ecology comments on the Draft Work Plan Sampling and Analysis Plan, Health and Safety Plan, and Schedule of Work and approval to proceed
3. PLP to begin implementation of RI and FS as described by Work Plan Schedule of Work to be Performed	30 days after PLP receives approval of final Task I plans from Ecology
4. Progress Reports	Every 3 months or as appropriate
5. PLP to submit Draft RI/FS Report(s)	As established in the approved RI/FS Work Plan
6. PLP to submit Final RI/FS Report(s)	30 days after PLP receives Ecology comments/modifications on the Draft RI/FS Report(s)
7. PLP to submit draft Cleanup Action Plan for Ecology review and approval	30 days after completion of draft RI/FS report.

DEPARTMENT OF
ECOLOGY
State of Washington

EXHIBIT D

Bothell Riverside Site
Public Participation Plan



2008

Prepared by
Washington State Department of Ecology
3190 160th Avenue SE
Bellevue, WA 98008-5452

TABLE OF CONTENTS

1.0 INTRODUCTION

The Washington State Department of Ecology (Ecology) has developed this public participation plan pursuant to the **Model Toxics Control Act (MTCA)**, to promote meaningful community involvement prior to implementation of remedial action at the Bothell Riverside site, located at Woodinville Drive (SR 522) and NE 180th Street, Bothell, Washington (King County Tax Parcels No. 082605-9120, 082605-9284, and 082605-9031). This site is listed in Ecology's known and suspected contaminated sites list **Facility Site number** 53578168.

This plan outlines and describes the tools and approaches that Ecology uses to inform the public about site activities and identifies opportunities for the community to become involved. This plan aims at addressing potential community concerns regarding the remedial action and defines the types of public participation activities that will take place as a part of the cleanup process. It is based on Ecology's Model Toxic's Control Act (MCTA) regulations (WAC 173-340-600 Public Participation). Ecology is committed to an open dialogue with the community to ensure that interested parties receive information as well as provide input during the decision-making process.

Ecology and the city of Bothell (Bothell) have negotiated a legal agreement called an **Agreed Order** that formally describes their working relationship and outlines the scope of work. The city of Bothell will complete the remedial action outlined in the Agreed Order. The remedial action tasks at this Site are to complete the **Remedial Investigation** (RI), to develop a **Feasibility Study** (FS), and prepare a **Draft Cleanup Action Plan** (DCAP) for the site.

Following the completion of the draft RI/FS and draft CAP, additional public involvement activities will be scheduled. The public involvement activities will be tailored based on public comments received for this site and MTCA requirements. This will include public notification and public comment period when appropriate.

Steps in the Cleanup Process

The MTCA rules detail each step in the cleanup process to ensure that cleanups are thorough and protective of human health and the environment. The chart below defines these steps and how they apply to the project site. Legal documents such as "**Agreed Orders**" or "**Consent Decrees**" further define some of the steps and associated time frames. The cleanup process is complex. During the process, issues often arise that need more scrutiny or evaluation, and may lead to changes in the scope or timing of the project. At the same time, it is in everyone's interest to complete a cleanup as quickly as possible.

1. Site Discovery and Initial Investigation: Sites may be discovered in a variety of ways including reports from the owner, an employee, or concerned citizens. Following discovery, an initial investigation is conducted to determine whether or not a site warrants further investigation.

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2. Site Hazard Assessment and Hazard Ranking: This assessment is conducted to confirm the presence of hazardous substances and to determine the relative threat the site poses to human health and the environment. Sites then are ranked from 1 (highest) to 5 (lowest).

↓

Ecology and this Site are currently at this phase of the process

3. Remedial Investigation: A Remedial Investigation is a study to define the nature, extent, and magnitude of contamination at a site. Before a remedial investigation can be conducted, a detailed work plan must be prepared which describes how the investigation work will be done.

←

4. Feasibility Study: The Feasibility Study takes the information from the Remedial Investigation and identifies and analyzes the cleanup alternatives available. As with the Remedial Investigation, a work plan will be prepared which describes how the study will be done.

↓

5. Cleanup Action Plan: A Cleanup Action Plan is developed using information gathered in the Remedial Investigations and Feasibility Study. The plan specifies cleanup standards and identifies cleanup methods. It will describe the steps to be taken, including any additional environmental monitoring required during and after the cleanup, and will describe the schedule for cleanup activities.

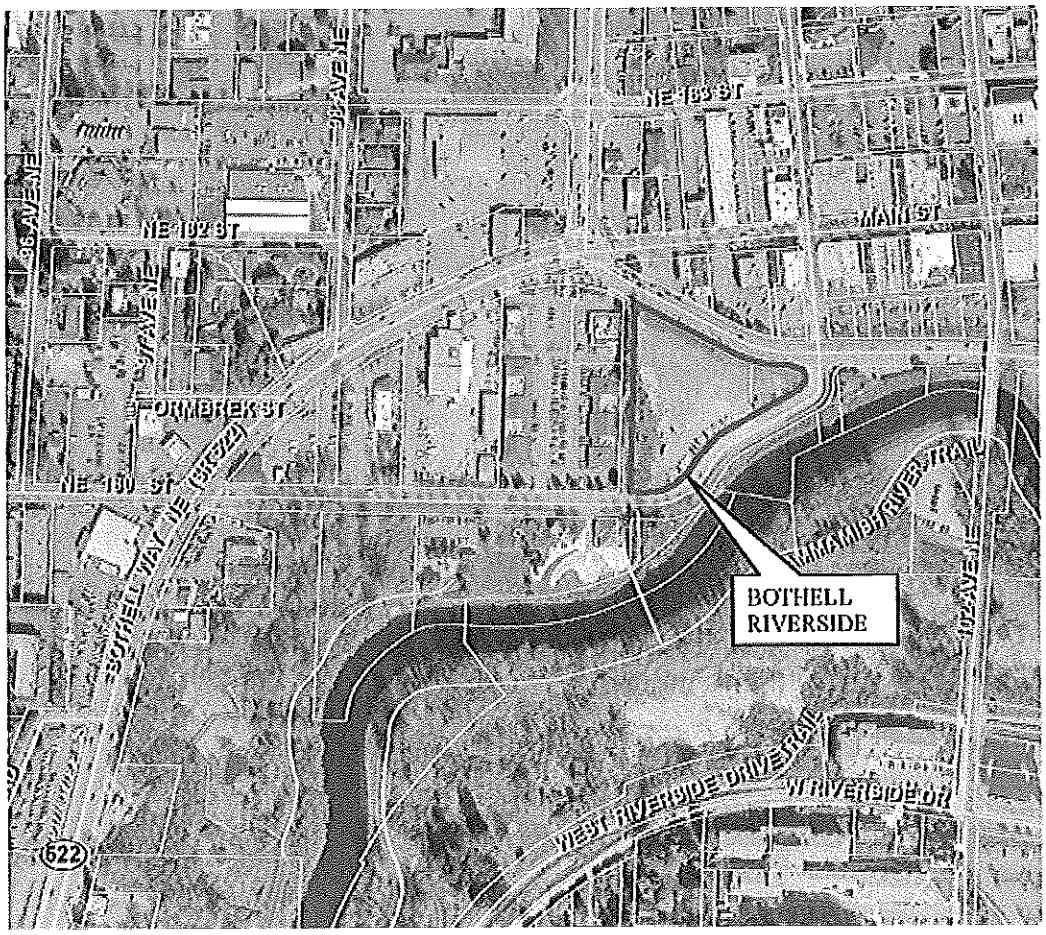
→

6. Cleanup: Implementation of the Cleanup Action Plan includes design, construction, operations, and monitoring.

Schedule and Sequence of Public Involvement Activities

Activity	Public Participation/ Communications Activity
Agreed Order prepared for public notice December 2008	• Community/interest group briefings if necessary • Fact sheet mailed – target week of 12/15/08
30 Day Public Comment Period	• Public comment period – draft Agreed Order including Public Participation Plan (PPP) Jan. 2-Feb. 2, 2009 Review and evaluate public comments • Prepare a responsiveness summary if necessary • Revise Agreed Order and PPP if recommended
Updates/Public Notifications	• As needed.
30 Day Public Comment Period	• Fact Sheet for Draft Remedial Investigation and Draft Feasibility Study Report and Draft Cleanup Action Plan. • Prepare a responsiveness summary if necessary • Revise the RI/FS and CAP if recommended.

Site Background and Map



The City of Bothell (Bothell) owns the property at Woodinville Drive (SR 522) and NE 180th Street, Bothell (King County Tax Parcel No. 082605-9120, 082605-9284, and 082605-9031). Bothell acquired the property from Bestern Inn in 1990. The site is currently used for parking and storage of City materials.

The site contained a former gasoline service station. Petroleum impacted soil and ground water were found on-site. Solid waste including discarded containers of motor oil, anti-freeze, and transmission fluid were also found. Approximately 4,500 yards of petroleum impacted soil were excavated, treated on-site, and returned to the excavation in the early 1990s.

Based on an environmental site assessment conducted in 2008, petroleum concentrations in some of this soil may still exceed some MTCA cleanup levels. The 1991 remediation also included three months of pumping and treating ground water from the excavation, and then returning the treated water to the excavation. The 2008 environmental assessment documented the presence of petroleum contaminants in the soil as well as chlorinated solvents in the ground water at concentrations of potential regulatory concern.

Cleanup Work to be Performed

The proposed work tasks under this Agreed Order are to prepare a work plan to complete the remedial investigation (RI) and Feasibility Study (FS) and prepare the Draft Cleanup Action Plan (DCAP). These documents will be reviewed and revised if necessary for approval by Ecology. With Ecology's approval, the next step is public review of the RI/FS report and draft DCAP. Future actions may include a new proposed legal agreement for implementing the CAP.

2.0 CONTAMINANTS OF CONCERN

Petroleum hydrocarbons in soil and groundwater, and chlorinated solvents in ground water are the primary contaminants of concern at this time. The Remedial Investigation will provide additional information to identify the nature and extent of contamination at the site.

3.0 PUBLIC PARTICIPATION ACTIVITIES AND RESPONSIBILITY

The purpose of this Public Participation Plan is to promote public understanding and participation in the cleanup process for this site. This section addresses how Ecology will keep the public informed about site activity and provide opportunities for being involved in the cleanup.

Ecology will continue to use a variety of tools to facilitate public participation in the planning and cleanup of this site. These tools are:

- Formal comment periods and responsiveness summaries.
- Fact sheets.
- Public meetings (if requested by 10 or more persons).
- Information repositories.
- Site register notices.
- Web tools including a web-based Events calendar.

Ecology will consider and implement constructive input provided by the community whenever possible.

Ecology urges the public to become involved in the remedial action process. Information will be provided regularly to provide many opportunities to review materials and provide comments. This plan is intended to be a flexible working document that will be updated as community concerns emerge and/or more information becomes available during the cleanup process. To arrange for a briefing with project staff, ask questions or provide comments on the plan or other aspects of the cleanup, please contact one of the persons

listed below. This public participation plan will be a working document as the project processes.

For technical questions, please contact:

Jerome Cruz, Site Manager
Washington State Department of Ecology
Toxics Cleanup Program – Northwest Regional Office
3190 160th Ave SE
Bellevue, WA 98008
Phone: 425-649-7094
E-mail: jcru461@ecy.wa.gov

For Community Involvement questions, please contact:

Nancy Lui, Community Outreach
Washington State Department of Ecology
Toxics Cleanup Program – Northwest Regional Office
3190 160th Ave SE
Bellevue, WA 98008
Phone: 425-649-7117
E-mail: nlui461@ecy.wa.gov

For Community Involvement questions for City of Bothell, please contact:

Joyce Goedeke - Public Information Officer
City of Bothell
18305 101st Ave. NE
Bothell, WA 98011
Phone: 425-486-3256
E-mail: joyce.goedeke@ci.bothell.wa.us

Goal of this Public Participation Plan

MCTA states that public participation plans are intended to encourage coordinated and effective public involvement tailored to the public's needs at a particular site. The goals of this plan are:

- To identify people and organizations with an interest or potential interest in the site.
- To promote public understanding and to identify community concerns related to the:

  - Agreed Order
  - Remedial Investigation
  - Feasibility Study
  - Draft Cleanup Action Plan
- To encourage interactive communication and collaboration between Ecology, the City of Bothell, and the community.
- To meet the public participation requirements under MCTA.

Roles and Responsibilities

Ecology maintains overall responsibility and approval authority for the activities outlined in this plan in accordance with MTCA requirements. Ecology conducts public comment periods as required by MTCA, which include receiving comments, making decisions, and preparing responsiveness summaries if necessary.

Public Outreach Activities

A 30-day public comment period will be scheduled for each major phase of the project. A formal public notice for each of the comment periods include the following:

- A fact sheet will be distributed to the impacted community and surrounding areas.
- A newspaper advertisement will be placed in the local area newspaper.
- A notice will be published in Ecology's Site Register and Ecology's Public Calendar.
- All public documents will be available on Ecology's website for public review.
- A public meeting will be held if 10 or more people request a meeting during the public comment period.

Formal Public Comment Period

Comment periods are the primary method Ecology uses to get feedback from the public on proposed cleanup decisions, which Ecology presents as draft documents. Comment periods usually last for 30 days and are required at key points during the investigation and cleanup process before final decisions are made.

During a comment period, the public can comment in writing through letters or email. Verbal comments are taken if a public hearing is held. After a formal comment period,

Ecology reviews all comments received and may respond in a document called a Responsiveness Summary.

During the public comment period, please send your written comments to:

Jerome Cruz, Site Manager
Washington State Department of Ecology
Toxics Cleanup Program – Northwest Regional Office
3190 160th Ave SE
Bellevue, WA 98008
Phone: 425-649-7094
E-mail: jcru461@ecy.wa.gov

Ecology will consider the need for changes or revisions to draft documents based on input from the public comments. If significant changes are made, then a second comment period may be held. If no significant changes are made, then the draft document(s) will be finalized.

Public Meetings and Hearings

Public meetings may be held at key points during the cleanup process. Ecology may also offer public meetings for actions expected to be of particular interest to the community. If ten or more people request a public meeting or hearing during the 30 day comment period, Ecology will hold a public meeting for the purpose of taking oral comments on draft documents.

Information Repositories

Information repositories are convenient places where the public can go to read and review site information (see below). The information repositories are often at libraries or community sites to which the public has access. During the comment period, the site documents will be available for review at each repository that is listed below. Documents remain at the repositories for the entire duration of the project.

The entire site file is available for review at Ecology's Northwest Regional Office by appointment. For special accommodations or translation assistance, please contact Nancy Lui at nlui461@ecy.wa.gov or at 425-649-4259 (TDD) and please indicate you would like assistance with the "Bothell Riverside" site.

The information repositories will be located at:

Bothell City Hall
18305 101st Ave. NE
Bothell, WA 98011
Monday- Friday 8 am- 5pm

King County Bothell Regional Library
18215 98th Ave. NE
Bothell, WA 98011
Monday-Thursday 10 am-9 pm
Friday 10 am-6 pm
Saturday 10 am-5 pm
Sunday Noon-8 pm

Washington State Department of Ecology
3190 160th Ave. S.E.
Bellevue, WA 98008
Call for an appointment: Sally Perkins
425-649-7190
425-649-4450 FAX
E-mail: sper461@ecy.wa.gov
Hours: Tuesday – Thursday, 8 am–Noon and 1–4:30 pm

Site Register and Public Events Calendar

Ecology's Toxics Cleanup Program uses its bimonthly Site Register and web-based Public Involvement Calendar to announce all of its public meetings and comment periods as well as additional site activities. To receive the Site Register in electronic or hard copy format, contact Linda Thompson at 360-407-6069 or by email at ltho461@ecy.wa.gov. The Public Involvement Calendar is available on Ecology's website at http://apps.ecy.wa.gov/pubcalendar/calendar.asp

Mailing List

Ecology has compiled and maintains a list of interested parties, organizations and residents living near the cleanup site. This list will be used to disseminate information via mail (fact sheets, site updates, public notices, etc.). If you are not on the mailing list for this site and wish to be added, please contact Nancy Lui at nlui461@ecy.wa.gov or at 425-649-7117. In the subject line, please indicate "Bothell Riverside Site" mailing list.

Ecology Website

Information on the cleanup is available online at Ecology's Website:

http://www.ecy.wa.gov/programs/tcp/sites/bothellRiv/bothellRiv_hp.html

4.0 PUBLIC PARTICIPATION GRANTS AND TECHNICAL ASSISTANCE

Additionally, citizen groups living near contaminated sites may apply for public participation grants during open application periods. These grants help citizens receive technical assistance in understanding the cleanup process and create additional avenues for public participation.

NOTE: Ecology currently does not have a citizen technical advisor for providing technical assistance to citizens on issues related to the investigation and cleanup of the Site.

5.0 PUBLIC PARTICIPATION PLAN AMENDMENTS

The Plan was developed by Ecology and complies with the MCTA regulations (Chapter 173-340 WAC). It will be reviewed as cleanup progresses and may be amended if necessary. Amendments may be submitted to Ecology's site manager, Jerome Cruz, for review and consideration. Ecology will determine final approval of the Plan as well as any amendments.

APPENDIX A – GLOSSARY

Cleanup: The implementation of a cleanup action, or interim action.

Cleanup Action: Any remedial action, except interim actions, taken at a site to eliminate, render less toxic, stabilize, contain, immobilize, isolate, treat, destroy, or remove a hazardous substance that complies with WAC 173-340-350 through 173-340-390.

Chemicals of Concern (COCs): Hazardous substances that are of particular concern at this site.

Comment Period: A time period during which the public can review and comment on various documents and proposed actions. For example, a comment period may be provided to allow community members to review and comment on proposed cleanup action alternatives and proposed plans.

Consent Decree: A legal document approved and issued by a court which formalizes an agreement reached between the state and potentially liable persons (PLPs) on the actions needed at a site. A decree is subject to public comment. If a decree is substantially changed, an additional comment period is provided.

Containment: A container, vessel, barrier, or structure, whether natural or constructed, which confines a hazardous substance within a defined boundary and prevents or minimizes its release into the environment.

Contaminant: Any hazardous substance that does not occur naturally or occurs at greater than natural background levels.

Environment: Any plant, animal, natural resource, surface water (including underlying sediments), ground water, drinking water supply, land surface (including tidelands and shorelands) or subsurface strata, or ambient air within the state of Washington.

Facility: Any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly-owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, vessel, or aircraft; or any site or area where a hazardous substance, other than a consumer product in consumer use, has been deposited, stored, disposed or, placed, or otherwise come to be located.

Facility Site ID #: Site specific number assigned by Ecology for the Ecology known and suspected contaminated sites database.

Feasibility Study: The Feasibility Study takes the information from the Remedial Investigation and identifies and analyzes the cleanup alternatives available. As with the Remedial Investigation, a workplan will be prepared which describes how the study will be done.

Interim Action: Any remedial action that partially addresses the cleanup of a site. It is an action that is technically necessary to reduce a threat to human health or the environment by eliminating or substantially reducing one or more pathways for exposure to a hazardous substance at a facility; an action that corrects a problem that may become substantially worse or cost substantially more to address if the action is delayed; an action needed to provide for completion of a site hazard assessment, state remedial investigation/feasibility study, or design of a cleanup action.

Model Toxics Control Act (MTCA): Refers to RCW 70.105D approved by voters in the state of Washington in November 1988. The implementing regulation is WAC 173-340 and was amended in 2001.

Public Notice: At a minimum, adequate notice mailed to all persons who have made a timely request to Ecology and notice to persons residing in the potentially affected vicinity of the proposed action; mailed to appropriate news media; published in the local (city or county) newspaper of largest circulation; and the opportunity for interested persons to comment.

Public Participation Plan: A plan prepared under the authority of WAC 173-340-600 to encourage coordinated and effective public involvement tailored to the public's needs at a particular site.

Remedial Investigation: A Remedial Investigation is a study to define the nature, extent, and magnitude of contamination at a site. Before a remedial investigation can be conducted, a detailed workplan must be prepared which describes how the investigation work will be done.

Responsiveness Summary: A compilation of all questions and comments into a document open for public comment and their respective answers/replies by Ecology. The responsiveness summary is mailed, at a minimum, to those who provided comments, and its availability is published in the Site Register.

Site Discovery and Initial Investigation: Sites may be discovered in a variety of ways including reports from the owner, and employee, or concerned citizens. Following discovery, an initial investigation is conducted to determine whether or not a site warrants further investigation.

Site Hazard Assessment and Hazard Ranking: This assessment is conducted to confirm the presence of hazardous substances and to determine the relative threat the site poses to human health and the environment. Sites then are ranked from 1 (highest) to 5 (lowest).

Site Register: Publication issued every two weeks of major activities conducted statewide related to the study and cleanup of hazardous waste sites under the Model Toxics Control Act. To receive this publication, please call (360) 407-7200.

Underground Storage Tank (UST) area: An area at a property that contains underground storage tank or tanks and connected underground piping for the storage and containment of liquids and are defined in the rules adopted under Chapter 90.76 RCW.

APPENDIX B

Sampling and Analysis Plan

REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
SAMPLING & ANALYSIS PLAN
RIVERSIDE PROPERTY
BOTHELL, WASHINGTON

Project No. 2007-098-700

Prepared for
City of Bothell

July 8, 2009

Prepared by:

HWA GeoSciences Inc.
- Geotechnical Engineering
- Hydrogeology
- Geoenvironmental Services
- Inspection & Testing

Compiled and Produced by:

Parametrix

TABLE OF CONTENTS

1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) provides the scope and rationale for Parametrix's field sampling efforts associated with a Remedial Investigation and Feasibility Study (RI/FS) conducted for the City of Bothell at the Riverside property in Bothell, Washington (subject property). A RI/FS is planned as part of an Agreed Order number DE 6295 between the City of Bothell and the Washington State Department of Ecology (Ecology).

HWA GeoSciences Inc. prepared this plan in accordance with the Agreed Order and our understanding of Chapter 173-340-820 WAC in the Washington State Model Toxics Control Act (MTCA) Cleanup Regulation. The main body of this plan outlines our field investigation and laboratory analytical methods.

1.1 PURPOSE AND OBJECTIVES

The objective of the RI/FS is to meet the requirements of the Agreed Order by completing an RI/FS as described in the Model Toxics Control Act (MTCA) Cleanup Regulation (Washington Administrative Code [WAC] 173-340). The RI is designed to characterize site conditions in order to complete a FS and select a cleanup action as described in WAC 173-340-360 through 173-340-390.

1.2 PROJECT ORGANIZATION

Personnel involved with this project and roles are listed below:

- Jerome Cruz, Washington State Department of Ecology project manager (425) 649-7094
- Steven Morikawa, P.E., Capital Program Manager, (425) 486-2768, ext. 4443
- Nduta Mbuthia, City of Bothell Project Manager (425) 486-2768, ext. 6829
- Scott Elkind, Parametrix Site Manager (360) 850-5318
- Lara Linde, Health and Safety Officer
- Drilling Contractor – to be determined
- Analytical Laboratory – to be determined

1.3 PROJECT SCHEDULE

A proposed project schedule is provided in Table 6-1 of the Work Plan, assuming no delays due to site access issues:

1.4 SITE LOCATION

The Riverside property is located at about 10005 Woodinville Drive, Bothell, Washington. The two-parcel property is approximately two acres in size and has King County Tax Parcel Numbers 0826059120, 082605-9031, and 0826059284. The property is bordered on the north by Woodinville Drive, on the south and east by 180th Street NE, and on the west by a public walkway.

2.0 FIELD AND LABORATORY INVESTIGATION TASKS

There are three major field and laboratory investigation tasks in the RI work plan. These are:

1. Investigation and characterization of ground water flow system properties.
2. Investigation and characterization of soil contamination.
3. Investigation and characterization of ground water contamination.

Field and laboratory investigation methodologies to accomplish these major tasks are presented in the following subsections.

2.1 GROUND WATER FLOW SYSTEM PROPERTIES

This major investigation task consists of installing ground water monitoring wells, collecting and physical property testing of soil samples, time series water level measurements, aquifer testing, and time series surface water elevation measurements.

2.1.1 Ground Water Monitoring Well Installation

Seven wells will be installed at the locations shown on Figure 5-1 of the Work Plan. These wells will be installed to obtain representative groundwater samples and data on hydrogeologic conditions. This section specifies the designs, procedures, and materials that will be used to construct the wells. The procedures are designed to avoid contamination of the water-bearing zone by drilling equipment, and cross-contamination of wells during the drilling process. All borings and wells will be drilled and installed according to Ecology Minimum Standards for Construction and Maintenance of Wells (Chapter 173-160 WAC).

All borings will be drilled using a hollow-stem auger drilling rig equipped with minimum 8-inch outer diameter hollow stem augers. Monitoring well completion depths will be determined in the field based on the boring location, conditions encountered during drilling such as site stratigraphy, and available depth to water data. In general, the wells will be completed to a depth of about 25 feet with 10 feet of screen. One well (MW-10) will be drilled to a maximum depth of 50 feet, and screened in a lower aquifer, if present. However, screen depths may change based on borehole stratigraphy.

If refusal is met during drilling, the borehole will be abandoned. Following abandonment of the original location, drilling will be initiated at a new location a minimum of 5 feet from the original location to avoid impacts from the bentonite plug in the adjacent abandoned hole. The new boring location and reason for repositioning will be noted in the field logbook.

Upon completion of a boring, the well will be constructed by placing 2-inch diameter Schedule 40 #10 slot PVC well screen and riser pipe at the selected depth interval. The bottom of the PVC screen will be fitted with a flush threaded bottom cap. A sand pack consisting of #10-#20 sand extending from the base of the borehole to 1 foot above the screen will be added to the borehole annulus as the augers are removed. This sand pack will be partially developed by surging prior to

placement of the well seal. The surging will create a more stable and uniform sand pack after the seal is installed. A well seal consisting of bentonite chips will be installed on top of the sand pack to approximately 2 feet below grade. A cement seal will extend from 2 feet below grade to ground surface. The surface completion of wells will consist of flush mounted traffic-rated monuments set in the concrete.

The wells will be developed after construction using a combination of pumping, bailing, and surging depending on the transmissivity of the formation. Well development will begin no sooner than 24 hours after well completion. Wells will be develop until a minimum of 10 casing volumes is removed from the well, three consecutive water quality parameter readings have stabilized, and the discharge water is relatively free of sediment. If the well is pumped dry before 10 casing volumes have been removed then the well will be considered developed. The following water quality parameters will be monitored during development:

- Temperature
- pH
- Specific Conductance

Underground Utilities/Site Access

Parametrix will attempt to locate underground utilities by calling the Utilities Underground Location Center before drilling. Parametrix will also subcontract a private locating service to attempt to locate and mark underground utilities at proposed boring locations. PVC and concrete utilities can not be located.

Horizontal and Vertical Coordinate Survey

Washington State Plane coordinates of every well will be surveyed by a licensed Washington State Land Surveyor. Ground and top of well casing elevations will be surveyed to the nearest 0.01 foot using the NAD 1988 vertical datum.

Drill Cuttings Disposal

Drill cuttings that are discharged from around the auger will be removed as the boring is advanced. A member of the drilling crew will shovel cuttings into Department of Transportation-approved, 55-gallon steel drums equipped with locking rings. The drums will be stored prior to transport and disposal at a temporary fenced storage location on the property.

Equipment Decontamination

To prevent potential cross-contamination of samples, Parametrix will maintain appropriate decontamination procedures. Between sampling intervals in each boring all sampling devices will be washed in a detergent solution, rinse with tap water and then rinse again with deionized water. Drillers will steam clean all augers and other downhole tooling between boring locations.

2.1.2 Soil Sample Logging, Collection, and Physical Property Testing

Soil samples will be collected using a split spoon sampler. Split spoon samples are collected by removing the center plug or internal bit from the auger string and inserting the split-spoon sampler into the auger string to the bottom of the boring. The sampler will be can be inserted to the bottom of the augers using rigid threaded pipe. Sample material is collected by driving the sampler with a 140 pound hammer falling 30 inches. The sampler is then retrieved to the surface where the soil is removed.

To retrieve soil samples for physical property testing and chemical laboratory analysis, either a 2.5-inch-diameter by 18-inch-long split-spoon sampler or 3-inch-diameter by 2-foot-long continuous split-spoon sampler will be used. While the sampler is being driven, hammer blows will be counted and recorded on boring log forms. The blow counts will be used along with other field and laboratory tests to assign densities based on ASTM D1586-67 for a standard penetration test.

At each sampling interval, Parametrix will log the soil samples and obtain and record pertinent information including soil sample depths, stratigraphy, ground water occurrence, and any visual or olfactory observations regarding the presence of contamination. Parametrix will log the sample for lithology and field screen the samples for organic vapors by headspace analysis using a photoionization detector (PID). Samples with elevated PID head space readings or discernible visual/olfactory contamination may be selected for laboratory chemical analysis, described in Section 2.2.

Soil samples selected for physical property testing will be collected. Selected soil samples will be collected for physical property testing using a split spoon sampler equipped with brass rings. Each selected sample may be tested for one or more of the following test methods:

- Particle size analysis
- Atterberg limits
- Bulk density
- Porosity
- Total organic carbon

2.1.3 Time Series Ground Water Level Measurements

Water levels will be measured using a graduated electric water level meter equipped with a stainless steel probe. Water levels will be measured to the nearest 0.01 foot. To alleviate potential errors, previous water level data should be used for comparison during field activities. Water levels will be measured by slowly lowering the decontaminated probe into the monitoring well until the indicator (light, sound, and/or meter) shows water contact. At this time, the precise measurement will be determined by repeatedly raising and lowering the tape or cable to converge on the exact measurement. The tape and probe will be decontaminated between wells using distilled water. If non-aqueous phase liquid (NAPL) is suspected, NAPL thickness will be

measured using a NAPL interface probe, low resistance clear bailer, or other means specific to the type of NAPL and well conditions.

2.1.4 Aquifer Testing

Slug tests will be conducted at every well. Slug tests are a single-well test used to determine approximate hydraulic conductivity values for formation materials immediately surrounding a well, and include rate-of-fall (falling head) and rate-of-rise (rising head) tests. Falling head tests entail placing a solid "slug", made of PVC, "instantaneously" below the water table and measuring the well response over time. After the well recovers to static conditions, "instantaneously" removing the slug from the water provides the rising head test. Water levels will be measured with transducers and back-up manual measurements. Tests where the water level crosses a change in effective well diameter (e.g., across the bentonite seal) are not valid and will not be used. Analysis of results will be described in the RI report. Slug tests will be conducted using the following steps:

1. Insert the transducer probe in the well approximately 0.5 feet off the bottom of the well. Secure the probe cable and turn on the data logger. Calibrate the data logger reading to an equivalent static-water level depth equal to that measured manually. Program the frequency of measurements and the density of the fluid into the data logger.
2. Start the logging program and take a final depth-to-water measurement just prior to starting the test. Note the measurement and clock time in the field notes. Start the test by smoothly removing or inserting the slug to avoid excessive water level oscillations and disturbing the transducer. A new section of cord will be used to lower the slug at each well. Make note of the start time in the field notes.
3. Measure water levels with a water level meter periodically and record time and value of measurement on the field notes. Monitor transducer readings to see if the initial water level or data logger reading is being approached and to correlate with manual measurements. Stop the test when at least 90 percent of the initial water displacement has recovered if several hours have elapsed since starting the test.
4. Decontaminate slug between wells by washing with a detergent solution followed by a tap water and distilled water rinse.

2.1.5 Time Series Surface Water Level Measurements

The surface water elevation of Horse Creek will be measured on the same days as ground water elevation measurements are collected. The measuring point for Horse Creek will be at the storm drain invert outfall where Horse Creek emerges from the storm drain.

2.2 SOIL CHEMICAL SAMPLING

This major investigation task consists of collecting soil samples for chemical analysis from hollow stem auger borings and direct push (i.e. Geoprobe) borings. Sample retrieval from hollow stem auger borings is described in Section 2.1. Sample retrieval from direct push borings is described in this section.

Direct Push Borings. Twelve direct push borings are proposed in the area of the former soil excavation, as shown on Figure 5-1 of the Work Plan. These borings will be pushed to a depth of 4 feet below ground, the approximate depth of the base of treated soil. One direct push boring is proposed adjacent to Horse Creek. This boring will be pushed to a depth of 10 to 15 feet, depending on ground water conditions.

At each sampling interval soil samples will be logged to obtain and record pertinent information including soil sample depths, stratigraphy, ground water occurrence, and any visual or olfactory observations regarding the presence of contamination. Samples will be logged for lithology and field screen the samples for organic vapors by headspace analysis using a photoionization detector (PID). At each hollow stem auger boring samples with the highest level of organic vapors and/or most discernible visual/olfactory contamination may be shipped to the laboratory for chemical analysis. In the absence of field screening indications, the sample immediately above ground water will be submitted for analysis. At direct push borings one soil sample will be collected at the depth interval of 2 to 4 feet below ground. Direct push boring soil samples from 0 to 2 feet below ground will be collected if field screening indications of contamination are present.

2.2.1 Field Screening

Soil samples will be screened by photoionization detector (PID) headspace analysis. Although the PID is not capable of quantifying or identifying specific organic compounds, this instrument is capable of measuring relative concentrations of a variety of organic vapors. The geologist/engineer collecting samples will place approximately two to sixteen ounces of soil in a resealable (i.e. ziplock) plastic bag with ample air headspace. After a minimum of five minutes at ambient temperature, the sampler will agitate the sample for ten seconds, insert the PID probe through a small opening in the plastic bag, and record the highest reading within ten seconds.

For soil samples in areas of potential future redevelopment (not under future roadways or in future park areas), PID headspace analysis will be augmented by chemical-specific colorimetric tube testing in samples with elevated PID headspace readings. Colorimetric tubes (e.g., Draeger or Sensidyne, or equivalent) for PCE, TCE, and vinyl chloride will be used.

2.2.2 Soil Analysis

Soil samples will be submitted to a Washington Department of Ecology-accredited analytical laboratory for analyses for one or more of the following analytes by using the following test methods:

- Diesel and Oil-Range Hydrocarbons – Washington State Method NWTPH-Dx
- Gasoline-Range Hydrocarbons + BTEX – Washington State Method NWTPH-Gx/BTEX

Specific analytical testing will be based on visual and field screening results. Analytical testing will also be in general accordance with MTCA, Chapter 173-360 WAC, Table 830-1, Required Testing for Petroleum Releases.

Samples will be submitted for standard turnaround time analysis (5-10 days). Follow-up analyses, based on initial analytical results may result in a total turnaround time of up to 4 weeks.

Field staff will determine the number, depth and location of samples in the field, based on field screening results. The sample bottle requirements are as follows:

Bottle Type	Method	Holding Time
VOAs – see below	NWTPH-Gx VOCs	see below
4 oz. Glass	NWTPH-Dx	14 days

After collection, the samples will be labeled, placed in a cooler with ice, and shipped to the analytical laboratory for analysis.

Method 5035A for Collection of VOC Soil Samples

Bottle Type	Method	Holding Time
(1) tared VOA (non-preserved)*	NWTPH-G / 5035A	14 days
(1) tared VOA (non-preserved) (2) tared VOAs w/stir bar (low level)** (1) 4 oz. glass jar (moisture)	VOCs / 5035A	48 hrs @4^0C then 14 days freeze at lab

* - if sample containers can not be delivered to lab within 48 hours, the lab will provide methanol-preserved vials

** - if sample containers can not be delivered to lab within 48 hours, the lab will provide sodium bisulphate-preserved vials

<u>VOAs are pre-weighed (tared) at the lab</u>

- Do not add any labels, tape, etc.
- Keep the same cap with each VOA
- Minimize methanol loss: check cap tightness, minimize open times, etc.
- Weigh VOAs on day of sampling (field or office)
- Visual check for methanol loss - check all VOAs prior to sampling for consistency, reference marks when full
- Discard any suspect VOAs, note weights (w/o soil) on COC, methanol levels, etc. in field notebook

Collect Core Sample

- Split spoon - core immediately after opening split spoon, if using liners, core from middle liner or inside end of outer liners (top one is usually slough)

Soil types:

- Cohesive granular - use core
- Cemented (e.g. till) - break up with stainless steel spoon, place in VOA & cap as soon as possible
- Non cohesive (won't stay in core) - place in VOA & cap as soon as possible

Extrude core into VOA

- Wipe threads with clean tissue or dry wipe
- Cap VOA
- Label - ball point pen (e.g., write in the rain) only, no markers

Note in field notebook:

- Soil type, moisture
- Any bias e.g., gravels, organics (avoid both in core sample)
- Weather (temp, humidity, wind)
- Coring method used
- Preservation and storage method used

Note on COC:

- Empty vial weight

Health and Safety issues - Methanol is toxic and flammable

- Skin contact (use gloves), inhalation hazards (ensure adequate ventilation)
- Check shipping restrictions

Cross contamination: Methanol has a high affinity for VOCs (hence its use as a preservative and extraction solvent) and will adsorb VOCs from other sources, e.g., exhaust fumes, spray paint, sharpie, markers, etc.

2.3 GROUND WATER SAMPLING

Ground water samples will be collected from all existing and planned monitoring wells. Ground water will be sampled using low-flow purging methods. Sampling staff will measure groundwater levels to the nearest 0.01-foot using a decontaminated electronic well probe prior to collection of samples. The volume pumped will be determined in the field based on stabilization of field parameters: specific conductance, dissolved oxygen, and pH. Sampling points will be purged by very slowly lowering semi-rigid polyethylene tubing to a depth corresponding to roughly the midpoint of the screen, securing the tubing to prevent vertical movement, connecting it to a peristaltic pump, and then pumping at a rate not to exceed 0.5 liters/minute (0.13 gallons/minute). At a minimum, two pump and tubing volumes will be purged (1/2" I.D. tubing = 0.010 gallon/lineal foot, 0.17" I.D. tubing = 0.001 gallon/lineal foot = 5 ml/lineal foot). Samples will be

collected once the parameter values have stabilized over the course of three sets of measurements as follows:

specific conductance	10 μS/cm
dissolved oxygen	2 mg/L
pH	0.1

When filling the sample bottles, the following procedures and precautions will be adhered to:

1. Sample bottles will be filled directly from the bailer, dedicated pump, or filter apparatus, with minimal air contact.
2. Bottle caps will be removed carefully so that the inside of the cap is not touched. Caps must never be put on the ground. Caps for volatile organic compound (VOC) vials will contain a Teflon-lined septum. The Teflon side of the septum must be facing the sample to prevent contamination of the sample through the septum.
3. The sampling team will wear appropriate nonpowdered latex or nitrile gloves (PVC or vinyl gloves can leave trace levels of phthalate or vinyl chloride). Gloves will be changed between wells or more often.
4. Tubing or hoses from the sampling systems must not touch or be placed in the sample bottles.
5. VOC vials must be filled so that they are headspace-free. These sample bottles therefore need to be slightly overfilled (water tension will maintain a convex water surface in the bottle). The caps for these bottles will be replaced gently, to eliminate air bubbles in the sample. The bottles must then be checked by inverting them and tapping them sharply with a finger. If air bubbles appear, open the bottle, add more water, and repeat the process until all air bubbles are gone. Do not empty the bottle and refill it, as VOC bottles already contain preservatives.
6. Sample bottles, caps, or septums that fall on the ground before filling will be discarded.
7. Metals sampling will be conducted with "clean technique." Bottles will be bagged in plastic and the cap placed in the bag during sampling.

Samples collected for dissolved constituent analysis will be filtered through a 0.45-micron filter. The filters will attach directly to the discharge tube of the sampling pump. The filter will be changed between sample points, or more frequently if clogging occurs. Where in-line filtration is not possible, prefiltration bottles may be used to collect the samples. Prefiltration bottles must be obtained from the laboratory with the sample coolers and identified with the bottle request. Prefiltration bottles, used for vacuum or pressure filtering, will not be used for more than one well. The use of prefiltration bottles must be noted on the Chain-of-Custody form in the comments section. Samples that have been field-filtered or that require laboratory filtering must be noted on the Chain-of-Custody forms in the comments section. The laboratory will note which samples require filtering on the individual bottle labels.

If a monitoring well is pumped dry prior to reaching the desired purge volume, it will be allowed to recover prior to sampling, using the minimum time between purging and sampling that would allow collection of sufficient sample volume. Samples will be pumped directly into the appropriate containers, as provided by the laboratory. A Field Data Sampling Sheet (provided in Appendix A) will be filled out for each sample. New tubing will be used at each location.

2.3.1 Ground Water Analysis

Ground water samples will be submitted to the analytical laboratory for the following analyses:

- Diesel and Oil-Range Hydrocarbons – Washington State Method NWTPH-Dx
- Gasoline-Range Hydrocarbons + BTEX – Washington State Method NWTPH-Gx/BTEX
- Dissolved Arsenic* - EPA Method #6010/#7470A
- Halogenated Volatile Organic Compounds (HVOCs) - EPA Method #8260

* Although arsenic is not a contaminant of concern at this site, selected samples may be analyzed for this element as part of background concentration studies for other nearby sites.

The sample bottle requirements are as follows:

Bottle Type	Analytes	Preservative	Holding Time
1 liter amber glass	NWTPH-Dx		7 days
(2) 40 ml VOA	NWTPH-Gx	HCl to pH<2	14 days
(2) 40 ml VOA	HVOCs	HCl to pH<2	14 days
(1) 250 ml ploy	Metals	HNO3 to pH<2	6 months

After collection, the samples will be labeled, chilled in a cooler, and shipped to the laboratory for analysis. Samples will be submitted for standard laboratory turnaround time (5-10 days).

2.4 QUALITY ASSURANCE/QUALITY CONTROL

Samples will be collected and analyzed with sufficient quality assurance/quality control (QA/QC) to ensure representative and reliable results. The overall QA objective for this investigation is to ensure that all laboratory and field data on which decisions are based are technically sound, statistically valid, and properly documented. There are two parts to the QA/QC program for this project: field and laboratory.

Field QA/QC includes proper documentation of field activities and sampling/handling procedures. Field QA/QC samples will consist of the following:

SOIL

- 1 equipment blank at a minimum frequency of 5% of soil samples collected.
- 1 matrix spike/matrix spike duplicate (MS/MSD) at a minimum frequency of 5% of soil samples collected. MS/MSD samples will be selected by the field geologist and three times the normal sample volume will be collected to accommodate the extra sample required to perform the MS/MSD analysis.
- 1 trip blank per cooler of samples (analysis for TPH-Gas/BTEX or VOCs only).

GROUND WATER

- 1 field duplicate at a minimum frequency of 5% of water samples collected.
- 1 matrix spike/matrix spike duplicate (MS/MSD) at a minimum frequency of 5% of water samples collected. MS/MSD samples will be selected by the field geologist and three times the normal sample volume will be collected to accommodate the extra sample required to perform the MS/MSD analysis.
- 1 trip blank per cooler of samples (analysis for TPH-Gas/BTEX or VOCs only)

Field Duplicates are used to confirm analytical results from a given sample point. Duplicate samples are collected in the field using a matching set of laboratory-supplied bottles and sampling from the selected well, as requested. Each duplicate should be sampled by alternating between the regular and the duplicate sample bottles, proceeding in the designated sampling order (VOCs first). The location where the duplicate is collected must be identified on the field sampling data sheet. All duplicates shall be blind-labeled (i.e., the well designation is not listed on the sample bottle or Chain-of-Custody form). Once a duplicate is collected, it is handled and shipped in the same manner as the rest of the samples. Duplicate results will be reported in the laboratory results as separate samples, using the designation DUP-(#).

Trip blanks are used to detect contamination that may be introduced in bottle preparation, in transit to or from the sampling site, or in the field. Trip blanks are samples of volatile-organic-free, laboratory-quality water (Type II reagent grade) that are prepared at the laboratory. They remain with the sample bottles while in transit to the site, during sampling, and during the return trip to the laboratory. Trip blank sample bottles are not opened at any time during this process. Trip blanks are to be reported in the laboratory results as separate samples, using the designation TB-(#). Each sample cooler that includes bottles for VOC analysis must include a trip blank, whether it was requested or not.

Equipment blanks are used to detect residue from decontaminated equipment. Equipment blanks are to be reported in the laboratory results as separate samples, using the designation EB-(#).

Laboratory QA/QC analyses provide information about accuracy, precision, and detection limits. Method-specific QA/QC samples may include the following, depending on the analysis:

- Method blanks
- Duplicates
- Instrument calibration verification standards
- Laboratory control samples
- Surrogate spiked samples
- Performance evaluation QC check samples

2.4.1 Data Evaluation

Data evaluation will include checking holding times, method blank results, surrogate recovery results, field and laboratory duplicate results, completeness, detection limits, laboratory control sample results, and Chain-of-Custody forms.

2.5 EQUIPMENT DECONTAMINATION

To prevent potential cross-contamination of samples, Parametrix will maintain appropriate decontamination procedures. Between sampling intervals, we will wash all non-dedicated sampling devices in a detergent solution, rinse with tap water and then rinse again with deionized water.

2.6 FIELD DOCUMENTATION AND CHAIN-OF-CUSTODY

The following sections describe the recording system for documenting all site field activities, and the sample chain-of-custody program.

2.6.1 Field Log Book

An accurate chronological recording of all field activities is vital to the documentation of any environmental investigation. To accomplish this, field team members will maintain field log books providing a daily record of significant events, observations, deviations from the sampling plan and measurements collected during the field activities.

2.6.2 Sample Identification

Following sample collection, field personnel will affix labels to each sample container. Samplers will use waterproof ink, plastic bags, or clear tape to ensure labels remain legible even when wet. Samplers will record the following information on the labels:

- Project name and number
- Sample identification number
- Date and time of collection
- Required test methods
- Name of sample collector

2.6.3 Chain-Of-Custody Record

The objective of the chain-of-custody program is to allow the tracking of possession and handling of individual samples from the time of field collection through laboratory analysis. Once a sample is collected, it becomes part of the chain-of-custody process. A sample is "in custody" when (1) it is in someone's possession, (2) it is within visual proximity of that person, (3) it is in that person's possession, but locked up and sealed (e.g., during transport), or (4) it is in a designated secure sample storage area. Sampling staff will complete a chain-of-custody record (Appendix A) which will accompany each batch of samples. The record will contain the following information:

- Project name and number
- Names of sampling team members
- Requested testing program
- Required turnaround time
- Sample number
- Date and time collected
- Sample type
- Number of containers
- Special Instructions
- Signatures of persons involved in the chain of possession

When sample custody is transferred to another individual, the samples must be relinquished by the present custodian and received by the new custodian. This will be recorded at the bottom of the chain-of-custody report where the persons involved will sign, date and note the time of transfer.

Sampling team members will keep sample coolers in locked vehicles while not in active use or visual range. If couriers are used to transport samples, chain of custody seals will be affixed to sample coolers.

2.6.4 Photographic Records

The field team leader will determine situations requiring photographic documentation. The field logbook will include the following information for each site photograph:

- Date, time, location photograph was taken
- Description of photograph taken
- Reason photograph was taken
- Sequential number of the photograph
- Direction of photographic view

2.7 PRELIMINARY ARAR'S AND DETECTION LIMITS

Applicable state and federal laws include legally applicable requirements and those requirements that are relevant and appropriate. According to MTCA (WAC-340-710), legally applicable requirements are cleanup standards, standards of control, and other environmental protection requirements, criteria, or limitations adopted under state or federal law that specifically address a hazardous substance, cleanup action, location or other circumstances at the site.

Relevant and appropriate requirements are those cleanup standards, standards of control, and other environmental requirements, criteria, or limitations established under state or federal law that, while not legally applicable to the hazardous substance, cleanup action, location, or other circumstance at a site, address problems or situations sufficiently similar to those encountered at the site that their use is well suited to the particular site.

Table 2-1 summarizes potential Applicable or Relevant and Appropriate Requirements (ARARs) identified for the Riverside Property. These ARARs are chosen based on a knowledge of site contaminants, potential exposure pathways, and potentially applicable state and federal laws and rules. The table includes method detection and practical quantitation limits for the relevant chemicals. Final determination of site specific ARARs will occur during RI/FS report preparation.

Table 2-1
Potential ARARs & Laboratory Reporting Limits

Compound	Ground Water ARAR - Federal Primary Maximum Contaminant Level (MCL) (mg/L)	Ground Water ARAR - State Primary Maximum Contaminant Level (MCL) (mg/L)	Surface Water ARAR - Human Health – Fresh Water – Clean Water Act §304 (mg/L)	Surface Water ARAR - Human Health – Fresh Water – National Toxics Rule, 40 CFR 131 (mg/L)	Soil, Method A, Unrestricted Land Use, Table Value (mg/kg)	Soil, Method B, Carcinogen, Standard Formula Value, Direct Contact (ingestion only), Unrestricted land use (mg/kg)	Soil, Method B, Non-carcinogen, Standard Formula Value, Direct Contact (ingestion only), Unrestricted land use (mg/kg)	Method Detection Limit (soil - mg/kg)	Laboratory Reporting Limit (soil - mg/kg)	Method Detection Limit (water - mg/L)	Laboratory Reporting Limit (water - mg/L)
Benzene	5.0E-03	5.0E-03	2.2E-03	1.2E-03	3.0E-02	1.8E+01	3.2E+02	2.20E-03	2.00E-02	6.28E-05	1.00E-03
Tetrachloroethylene	5.0E-03	5.0E-03	6.9E-04	8.0E-04	5.0E-02	1.9E+00	8.0E+02	3.30E-04	1.00E-03	1.50E-04	2.00E-04
TPH, Diesel Range Organics	NV	NV	NV	NV	2.0E+03	NV	NV	5.74E+00	2.50E+01	5.09E-02	2.50E-01
TPH, Heavy Oils	NV	NV	NV	NV	2.0E+03	NV	NV	1.13E+01	5.00E+01	9.87E-02	4.00E-01
TPH: Gasoline Range Organics, Benzene Present	NV	NV	NV	NV	3.0E+01	NV	NV	9.15E-01	5.00E+00	1.55E-02	1.00E-01
TPH: Gasoline Range Organics, No Benzene	NV	NV	NV	NV	1.0E+02	NV	NV	9.15E-01	5.00E+00	1.55E-02	1.00E-01
Trichloroethylene	5.0E-03	5.0E-03	2.5E-03	2.7E-03	3.0E-02	1.1E+01	2.4E+01	3.55E-04	1.00E-03	1.44E-04	2.00E-04
Vinyl Chloride	2.0E-03	2.0E-03	2.5E-05	2.0E-03	NV	6.7E-01	2.4E+02	5.88E-04	1.00E-03	1.83E-04	2.00E-04

Note:
MDL and RL values for TPH Gasoline are for PID instrument detector
NV – No established value

3.0 QUALITY ASSURANCE PROJECT PLAN

The purpose of this Quality Assurance Project Plan (QAPP) is to ensure that all necessary steps are taken to acquire data of the type and quality needed. To accomplish this purpose the QAPP will contain the following elements:

- Field QA/QC
- Chain of custody procedures
- Decontamination procedures
- Laboratory analysis and QA/QC methods
- Sample custody procedures including holding times, containers, and preservation

3.1 Field QA/QC Methods

Field QA/QC methods include the collection of equipment blanks, MS/MSD samples, and trip blanks for soil samples. For ground water samples these methods include the collection of field duplicates, MS/MSD samples, and trip blanks. A detailed description of these samples is provided in Section 2.4.

3.2 Chain of Custody Procedures

Chain-of-custody procedures allow the tracking of possession and handling of individual samples from the time of field collection through laboratory analysis. Detailed chain of custody handling procedures are described in Section 2.8.

3.3 Decontamination Procedures

In order to mitigate the potential for cross-contamination, all sample-contacting, and downhole equipment used in the collection and sampling processes will be decontaminated before sample collection.

The following steps will constitute the decontamination procedure:

1. Wash items in a solution of non-phosphate (e.g., Alconox) detergent and tap water
2. Rinse with tap water
3. Rinse with deionized water
4. Air dry in a clean environment

Decontaminated equipment will be stored and transported in clean containers or wrapping.

3.4 Laboratory Analysis and QA/QC Methods

Laboratory QA/QC samples will consist of the following:

- One matrix spike (MS) per sampling batch
- One matrix spike duplicate (MSD) per sampling batch

Method-specific QA/QC samples may include the following:

- Method blanks
- Duplicates
- Instrument calibration verification standards
- Laboratory control samples
- Surrogate spiked samples
- Performance evaluation QC check samples

3.5 Sample Custody Procedures

Sample custody procedures for soil and water samples are described in Sections 2.2 and 2.3 respectively.

4.0 HEALTH AND SAFETY

Parametrix personnel conducting this field program are required to follow the health and safety protocol presented in the Parametrix site specific Health and Safety Plan. Subcontractors and other authorized visitors to the site are responsible for their own health and safety. The Health and Safety Plan will be made available to subcontractors and other site visitors who request it. Health and Safety precautions will be communicated to subcontractors by Parametrix personnel in site safety briefings at the beginning of each field day. To acknowledge review and comprehension of this plan, Parametrix personnel must sign the appropriate section included in the back of the document. The Health and Safety Plan is provided as a separate document.

APPENDIX A

CHAIN OF CUSTODY FORM
FIELD SAMPLING DATA SHEET

HWA GEOSCIENCES INC.
19730 64th Ave. W., Suite 200, Lynnwood, WA 98036 (425)774-0106
4500 Kruse Way, Suite 300, Lake Oswego, OR 97035 (503)675-2424

Chain of Custody and Laboratory Analysis Request

DATE: _____
PAGE: _____ of _____

PROJECT NAME: _____ #: _____
SITE CODE: _____
SAMPLERS NAME: _____ PHONE: _____
SAMPLERS SIGNATURE: _____
HWA CONTACT: _____ PHONE: _____

HWA SAMPLE ID	DATE	TIME	MATRIX	LAB ID	# OF BOTTLE	ANALYSIS REQUESTED	REMARKS

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

HWA GEOSCIENCES INC.
19730 64th Avenue West, Suite 200 Lynnwood, WA 98036
Tel: 425-774-0106 / Fax: 425-774-2714 / E-Mail: hwa@hongwest.com

FIELD SAMPLING DATA SHEET

Project Name: _____ Well Number: _____
Project Number: _____ Sample Number: _____
Project Location: _____ Weather: _____
Client/Contact: _____ Date: _____

WELL MONITORING:

Time	Well Depth	Depth to Water	Measuring Point (TOC?)	Measuring Point Elevation	Water Level Elevation	Gallons in Well (Pore Volume)

(2" case = 0.163 gal/ft)
(4" case = 0.653 gal/ft)

WELL PURGING:

Time	Method	Gallons	Pore Volumes	pH	Conductivity	Temperature		

WELL SAMPLING:

Time	Sampling Method	Sample Analysis	Container Number	Container Volume	Container Type	Field Filtered (Y/N)	Preservative	Iced (Y/N)

COMMENTS/NOTES:

(Include equipment used: Bailers, Filters, Well Probe, pH/Conductivity Meter, etc.)

Total # of Bottles: _____ Sampler: _____ Signature: _____

APPENDIX C

Quality Assurance Project Plan

To be provided soon.

APPENDIX D

Health and Safety Plan

To be provided soon.