STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
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May 18, 2015

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

Re: Opinion pursuant to WAC 173-340-515(5) on Proposed Remedial Action for the following Hazardous Waste Site:

- **Name:** Simon & Son Fine Drycleaning
- **Address:** 18107 Bothell Way NE, Bothell, Washington
- **Facility/Site No.:** 33215922
- **VCP No.:** NW2946
- **Cleanup Site ID No.:** 427

Dear Mr. Stowe:

Thank you for submitting documents regarding your proposed remedial action for the **Simon & Son Fine Drycleaning** facility (Site) for review by the Washington State Department of Ecology (Ecology) under the Voluntary Cleanup Program (VCP). Ecology appreciates your initiative in pursuing this administrative option for cleaning up hazardous waste sites under the Model Toxics Control Act (MTCA), Chapter 70.105D RCW.

This letter constitutes an advisory opinion regarding a review of submitted documents/reports pursuant to requirements of MTCA and its implementing regulations, Chapter 70.105D RCW and Chapter 173-340 WAC, for characterizing and addressing the following release(s) at the Site:

- Tetrachloroethylene (PCE), trichloroethylene (TCE), cis-1,2-dichloroethylene (cis-1,2-DCE) and vinyl chloride (VC) in Soil and Ground Water

Ecology is providing this advisory opinion under the specific authority of RCW 70.105D.030(1)(i) and WAC 173-340-515(5).

This opinion does not resolve a person's liability to the state under MTCA or protect a person from contribution claims by third parties for matters addressed by the opinion. The state does not have the authority to settle with any person potentially liable under MTCA except in accordance with RCW 70.105D.040(4). The opinion is advisory only and not binding on Ecology.

Ecology's Toxics Cleanup Program has reviewed the following information regarding your proposed remedial actions:

1. ERM, 2001. *Interim Site Characterization Summary, Bothell Service Center, 18107 Bothell Way Northeast, Bothell, Washington.* October 17.

2. ERM, 2002. *Interim Site Remediation Summary Report, Bothell Service Center, 18107 Bothell Way Northeast, Bothell, Washington.* March 25.

3. HWA, Inc., 2006. *Ground Water Sampling Report, Former Al's Auto Store & Bothell Service Center, 18107 and 18125 Bothell Way Northeast, Bothell, Washington.* January 6.

4. Farallon Consulting, L.L.C, 2008. *Cleanup Action Progress Report, June 2006 through June 2007, Bothell Service Center, 18107 Bothell Way Northeast, Bothell, Washington.* March 12.

5. Farallon Consulting, L.L.C, 2009. *Interim Action Status Report, November 2007 through August 2008, Bothell Service Center, 18107 Bothell Way Northeast, Bothell, Washington.* November 4.

6. Farallon Consulting, L.L.C, 2011. *Project Status Summary, Bothell Service Center Associates Property, 18107 Bothell Way Northeast, Bothell, Washington.* January 6.

7. HWA, Inc., 2015. *Remedial Investigation/Feasibility Study Work Plan, Bothell Service Center Site, Bothell, Washington.* January 19.

The reports listed above will be kept in the Central Files of the Northwest Regional Office of Ecology (NWRO) for review by appointment only. Appointments can be made by calling the NWRO resource contact at (425) 649-7235 or sending an email to: nwro_public_request@ecy.wa.gov.

The Site is defined by the extent of contamination caused by the following releases:

- PCE, TCE, cis-1,2-DCE and VC into the Soil and Ground Water

The Site is more particularly described in Enclosure A to this letter, which includes detailed Site diagrams. The description of the Site is based solely on the information contained in the documents listed above.

Based on a review of supporting documentation listed above, pursuant to **requirements contained in MTCA and its implementing regulations, Chapter 70.105D RCW and Chapter 173-340 WAC, for characterizing and addressing the releases at the Site, Ecology has determined:**

- The objectives of the Remedial Investigation/Feasibility Study (RI/FS) work plan (Section 1.2) should be more specific. Once the objectives have been identified, the elements of the work plan should be presented in a way that demonstrates how the objectives will be met.

- The work plan should include a map view figure or figures showing the known extent of soil contamination with sampling data collected to date. Sampling intervals of the proposed angled borings should be shown on a copy of the figure to demonstrate that the proposed sampling locations are in areas with data gaps.

- A recommended RI outline is included in Enclosure B.

- The hydrogeology section (Section 2.2; page 6) only discusses the shallow water bearing zone. Characterization and occurrence of the intermediate and deep water-bearing zones also need to be described.

- Page 10 of the Work Plan states that the soil vapor extraction (SVE) is 'presumably still in operation'. The current status of the SVE system needs to be assessed and incorporated in the RI/FS. An evaluation of the performance and effectiveness of the system over time should be made to determine if mass removal is still occurring.

- The proposed angled borings and hand-drilled borings for areas under the building described in the work plan will likely provide some additional characterization data for the Site. The screened intervals installed in the angled borings should be based on the results of field screening of ground water samples. If possible, the lower screened intervals should be at the lower sand-silty sand interface to assess the presence of DNAPL at that horizon under the building.

- After the additional Site characterization work proposed in the work plan is complete, Ecology would like to meet with the Property owner and the City of Bothell (VCP Customer) to discuss a path forward for the cleanup of the Property.

This opinion does not represent a determination by Ecology that a proposed remedial action will be sufficient to characterize and address the specified contamination at the Site or that no further remedial action will be required at the Site upon completion of the proposed remedial action. To obtain either of these opinions, you must submit appropriate

documentation to Ecology and request such an opinion under the VCP. **This letter also does not provide an opinion regarding the sufficiency of any other remedial action proposed for or conducted at the Site.**

Please note that this opinion is based solely on the information contained in the documents listed above. Therefore, if any of the information contained in those documents is materially false or misleading, then this opinion will automatically be rendered null and void.

The state, Ecology, and its officers and employees make no guarantees or assurances by providing this opinion, and no cause of action against the state, Ecology, its officers or employees may arise from any act or omission in providing this opinion.

Again, Ecology appreciates your initiative in conducting independent remedial action and requesting technical consultation under the VCP. As the cleanup of the Site progresses, you may request additional consultative services under the VCP, including assistance in identifying applicable regulatory requirements and opinions regarding whether remedial actions proposed for or conducted at the Site meet those requirements.

If you have any questions regarding this opinion, please contact me at (425) 649-7064 or hvic461@ecy.wa.gov.

Sincerely,

Heather Vick

Heather Vick, LHg
NWRO Toxics Cleanup Program

Enclosures: (2) A Site Diagrams and Description
B Remedial Investigation Outline

cc: Norm Olsen, Bothell Service Center
Arnie Sugar, HWA Geosciences, Inc.
Sonia Fernandez, VCP Coordinator, Ecology

Enclosure A

Description and Diagrams of the Site

Site Description

This section provides Ecology's understanding and interpretation of Site conditions, and is the basis for the opinions expressed in the body of the letter.

Site: The Site is defined as tetrachloroethylene (PCE) and related degradation products trichloroethylene (TCE), cis-1,2-dichloroethylene (cis-1,2-DCE) and vinyl chloride (VC) in soil and ground water at 18107 Bothell Way NE in Bothell, Washington (Property). The Property is the location of the Bothell Service Center, a retail strip mall where a former dry cleaning facility, Simon & Son Fine Drycleaning, was located in the westernmost tenant space (see Site Diagrams). Releases of PCE to soil and ground water at the Property are attributed to dry cleaning operations from approximately 1989 to 1999. Simon & Son Fine Drycleaning used one dry cleaning machine located in the northwest portion of the tenant space.

Area and Property Description: The Property is located on the northeast corner of the intersection of 98th Avenue Northeast and Bothell Way Northeast. The Property, which is 0.62 acre in size, is developed with a 8,410-square foot, one-story masonry building constructed in 1988. The building is occupied by the Bothell Service Center which has five tenant spaces. The elevation of the Property is approximately 40 feet above mean sea level. The topography of the Property and vicinity slopes generally from north to south towards the Sammamish River.

Property History and Current Use: The Property is shown as rural residential property in a 1936 aerial photograph on King County IMAP. The Property was commercially developed in 1962 when an automobile dealership, Erickson Motor Company, operated until the Property was redeveloped as the Bothell Service Center in 1988.

Sources of Contamination: The source of contamination on the Site is the release of dry cleaning solvent (PCE) during operations of the former dry cleaning facility, Simon & Son Fine Drycleaning. PCE in the environment has degraded resulting in daughter products that include TCE, cis-1,2-DCE and VC.

Physiographic Setting: The Site is located in the Horse Creek valley on the Bothell Upland physiographic subdivision of the Puget Sound Lowland physiographic province. The Bothell Upland is located between the Swamp Creek and North Creek channels which both flow generally south towards the Sammamish River. Horse Creek is a south flowing tributary to the Sammamish River to the south.

Surface/Storm Water System: A small underground, channelized creek (Horse Creek) is located approximately 600 east of the Property. Horse Creek flows south and discharges to the Sammamish River.

Ecological Setting: The Site and the surrounding area provide limited terrestrial ecological habitat because it is has been mostly developed with buildings and areas paved with concrete and asphalt. Land use at the Site and surrounding area makes substantial wildlife exposure unlikely.

Geology: The Site is directly underlain by sand and gravel fill to depths of up to 10 feet bgs. Discontinuous, interbedded silt, silty sand and sand layers are present to approximately 50 feet bgs where a silty sand layer was encountered.

Ground Water: Ground water is encountered at depths of 4 to 6 feet bgs. Ground water occurs as shallow, intermediate and deep water-bearing zones.

Water Supply: Bothell's drinking water is obtained primarily from the South Fork Tolt River Watershed. According to Ecology's well log database, there are no private drinking water wells within 1 mile of the Property.

Release and Extent of Soil and Ground Water Contamination:

Soil: Three hand-auger borings, HA-1, HA-2 and HA-3, were advanced in December 1999 to assess soil conditions beneath the former dry cleaning equipment. A soil sample collected from each boring at depths of 1 to 2 feet bgs was analyzed for halogenated volatile organic compounds (HVOCs). PCE was detected at concentrations ranging from 0.283 to 6.75 mg/kg, with 2 of the three samples exceeding the Method A cleanup level of 0.5 mg/kg. This data indicated a release of PCE had occurred at the Site.

In June 2000, eight direct push borings (B-4 through B-11) were advanced inside the building after the dry cleaning equipment had been removed and soil samples were collected.

Ground Water: In July 2000, ground water screening samples were collected from borings GP-1, GP-2 and GP-3. GP-3, just west of the former dry cleaner, contained PCE at 31,900 µg/L, which was the highest concentration in ground water measured at that time.

Monitoring wells MW-1 through MW-3 were installed in March 2001. In April 2001, shallow and deep ground water samples were collected from nine direct push borings (SP-2 through SP-12); no soil samples were collected. Results of the above ground water screening samples (up to 31,900 µg/L PCE) were used to site monitoring wells MW-4 through MW-7. Monitoring wells MW-4 through MW-7 were installed in June 2001 in the southeast part of the parking lot. Monitoring wells MW-8 and MW-9 were installed in 2002.

Two monitoring wells, MW-11 and MW-12, were installed in November 2007, screened from 25 to 33 feet bgs. Six injection wells, MW-13 through MW-18, were also installed in pairs at that time. The paired injection wells were installed adjacent to and immediately upgradient of the Property building and the former dry cleaner tenant space. The well pairs included one well in the deep water-bearing zone and one in the intermediate water-bearing zone.

Ground water elevations measured in the wells indicated an east to east-southeast gradient direction.

PCE, TCE, cis-1,2-DCE and VC have been detected in Site monitoring wells at concentrations exceeding Method A cleanup levels and form a contaminant plume that moves off the Property to the east-southeast. The plume has migrated across a City of Bothell right of way and as far as the City-owned Al's Auto Bothell Wexler property and the Bothell former Hertz facility parcel.

As of October 2014, Site ground water contained PCE up to 16,000 µg/L, TCE up to 630 µg/L, cis-1,2-DCE up to 5,300 µg/L and VC up to 860 µg/L.

Remedial Actions: In early 2001, in-situ chemical oxidation (ISCO) of soil was conducted by applying a potassium permanganate solution directly to soil exposed in the former dry cleaner tenant space by a removal of a section of floor. Ground water treatment with ISCO was also conducted using 11 soil borings completed in the parking lot on the south side of the building.

An soil vapor extraction (SVE) system was installed and began operating in September 2004. The system consisted of two SVE wells VE-1 and VE-2 and horizontal SVE well HVE-1.

Two dye tracer injection tests were conducted at the Site in early 2005 to determine ground water migration pathways in preparation for the chemical oxidation installation. The results indicated that there may be leaks in the sewer line directly beneath the building that could affect Site soil and ground water.

An injection of hydrogen peroxide in May 2005 resulted in a temporary increase in PCE concentrations in ground water on the Site. Ground water sampling results in 2006 and 2007 indicated that the PCE levels decreased to similar to pre-hydrogen peroxide injection concentrations.

PCE as a dense non-aqueous phase liquid or DNAPL was discovered in the bottom of monitoring well MW-9 in August 2005. Approximately 500 milliliters of DNAPL PCE were removed from MW-9 in 2005 and 2006 using a peristaltic pump and dedicated tubing.

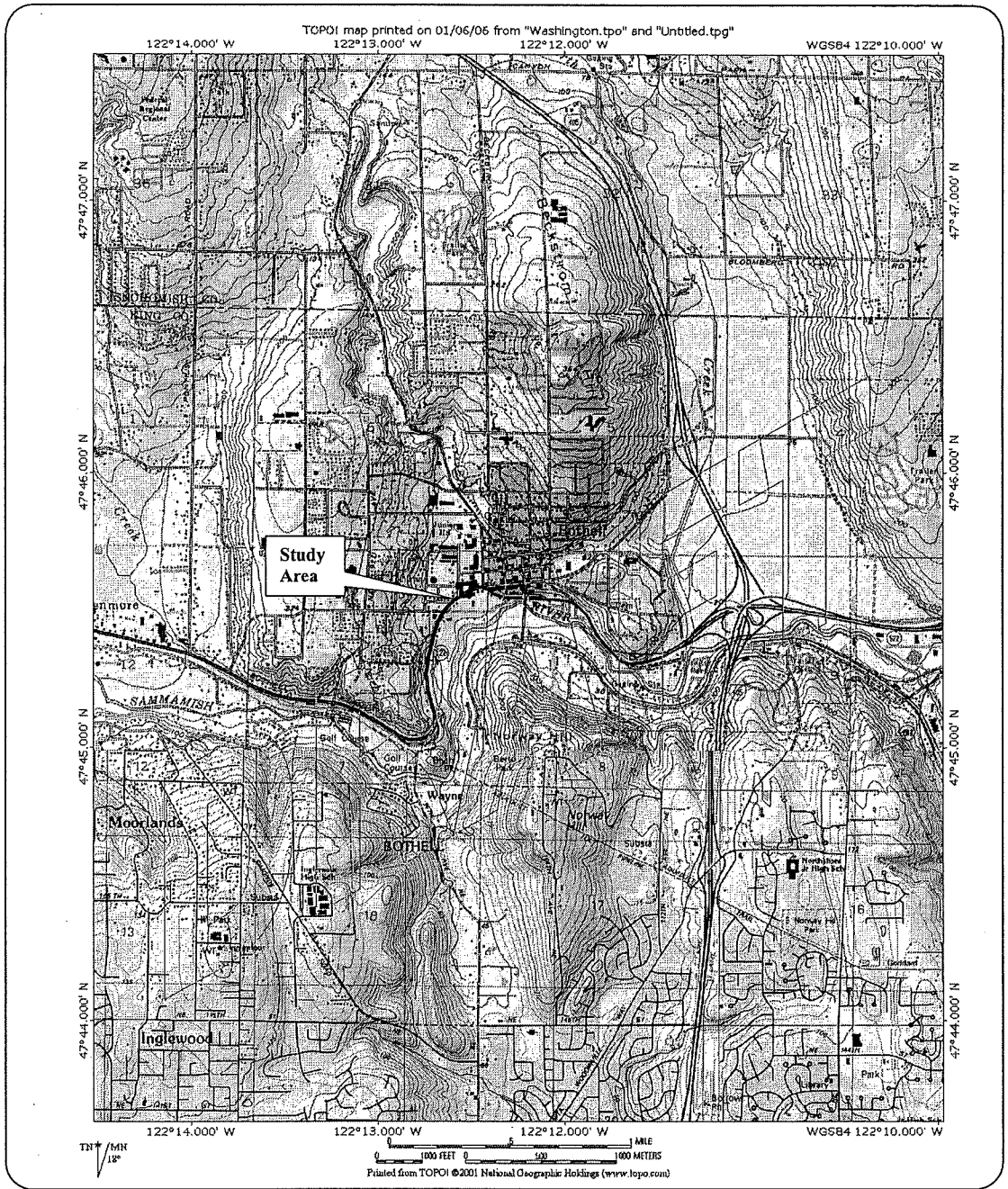
Use of sodium persulfate with chelated iron in monitoring wells was implemented in 2006 and 2007.

Injection of an emulsified oil substrate (EOS) of soybean oil as a bioremediation solution was conducted in February 2008 using the six injection wells and eight temporary borings. The injections using borings were intended to act as a barrier to ground water contamination related to the Site moving further downgradient. A bioaugmentation using a natural microbial culture was injected into the six injection wells in July 2008. Following the injections, spikes in PCE concentrations were noted in several monitoring wells near the source area.

In 2010, the EOS injections were repeated. Since that time, concentrations of PCE and related

degradation products have decreased but are still well above Method A cleanup levels. Concentrations of cis-1,2,-DCE have increased at some locations indicating more degradation of PCE may be occurring.

Site Diagrams



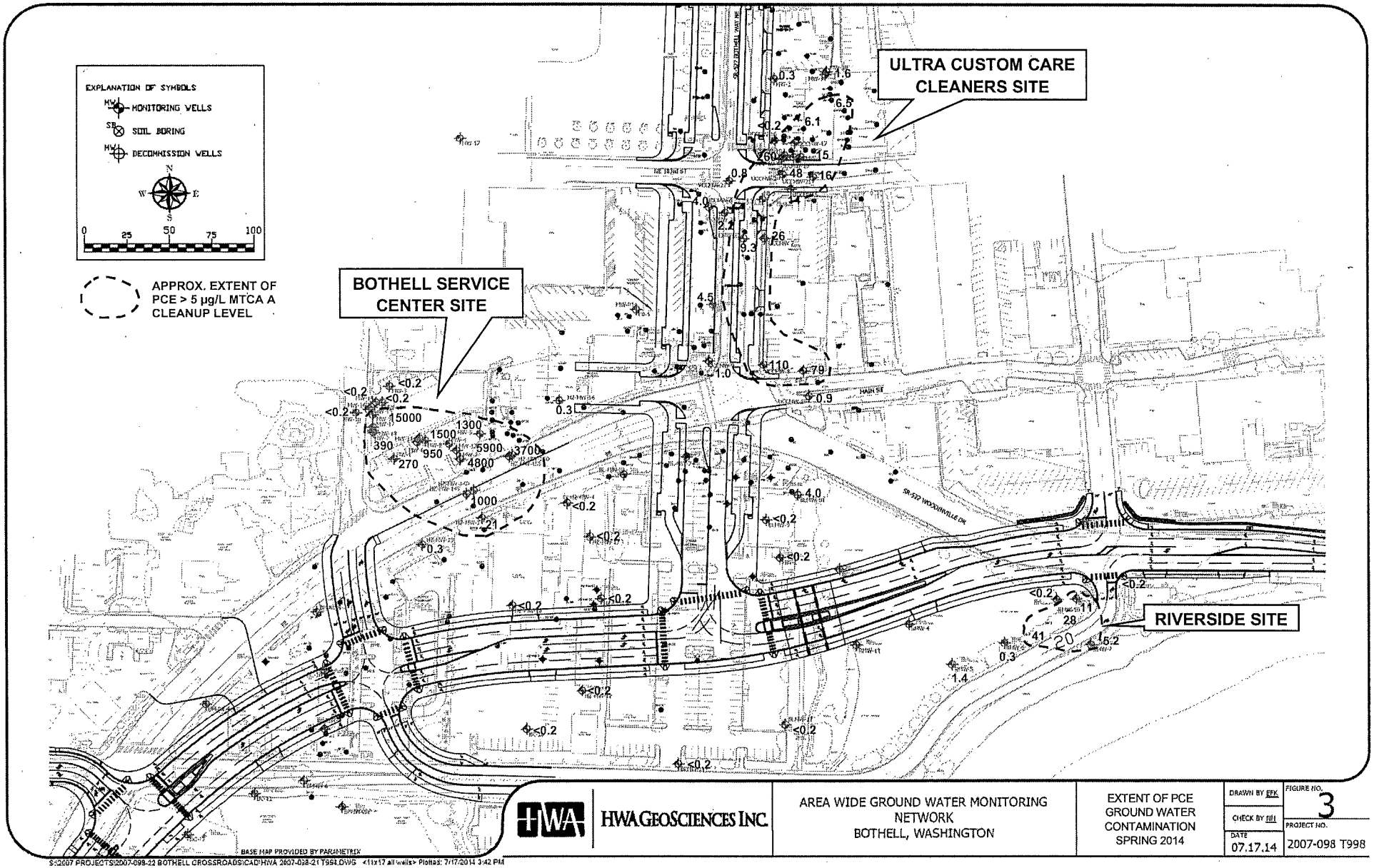
SITE VICINITY

BOTHELL SERVICE CENTER
REMEDIAL INVESTIGATION WORK PLAN
BOTHELL, WASHINGTON

HWA GEOSCIENCES INC.

FIGURE NO.
1

PROJECT NO.
2007-098



HWA GEOSCIENCES INC.

AREA WIDE GROUND WATER MONITORING NETWORK
BOTHELL, WASHINGTON

EXTENT OF PCE GROUND WATER CONTAMINATION SPRING 2014

DRAWN BY EFK	FIGURE NO. 3
CHECK BY [illegible]	PROJECT NO. 2007-098 T998
DATE 07.17.14	

S:\2007 PROJECTS\2007-098-22 BOTHELL CROSSROADS\CAD\HWA 2007-098-21 T998.DWG <11x17 all wells> Plotted: 7/17/2014 3:42 PM

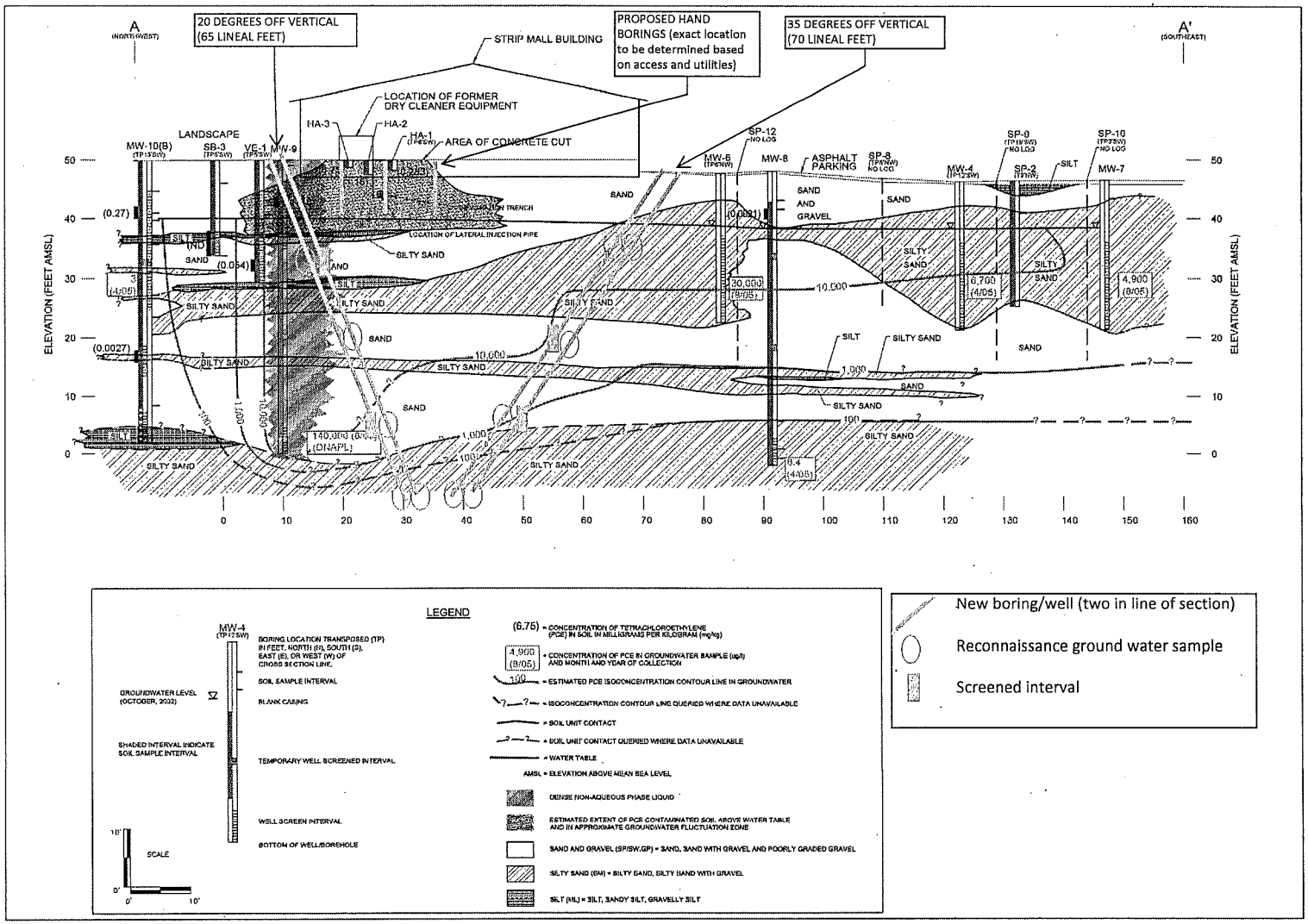


Figure Source: Farallon, 2011

HWA GeoSciences Inc.

CROSS SECTION A-A'

BOTHELL SERVICE CENTER
REMEDIAL INVESTIGATION WORK PLAN
BOTHELL, WASHINGTO

PROJECT NO.
2007-098-2022

FIGURE NO.
7

Enclosure B

Remedial Investigation Outline

DEPARTMENT OF ECOLOGY
NORTHWEST REGIONAL OFFICE
REMEDIAL INVESTIGATION OUTLINE
MTCA VCP SITES

The following annotated outline is a suggested schematic for elements to be included in a Remedial Investigation report. It is not intended to replace MTCA's specific requirements as presented in 173-340-350(7) WAC.

The main purpose of the outline is to facilitate the preparation of a document that is clear, comprehensive, and to the point. A secondary, but important, purpose is to make document preparation and review more efficient.

INTRODUCTION *(Concise, bulleted if possible)*

- **Site name, VCP number, Name, address, and phone number of project consultant, Current owner/operator**
- **Purpose of document** *(very brief restatement of what an RI is for, reference the WAC)*

SITE IDENTIFICATION AND LOCATION *(Focus on defining the site in the context of its location)*

- **Site discovery and regulatory status** *(describe how the site was identified and where it is in the MTCA process)*
- **Site and property location/definition** *(define actual MTCA site location relative to property or study area)*
- **Neighborhood setting**

Figure – Vicinity Map *(preferably with topography)* Figure – Property/Site Map *(preferably with topography)* Appendix – Legal description of property, present owner and operator, chronological listing of past owners and operators

ENVIRONMENTAL INVESTIGATION/INTERIM ACTION SUMMARY *(Concise summary presentation of the investigations that have been done at the site, along with prior remedial actions. Focused mostly on figures and tables. Details of and methods used in former investigations and remediation in appendices)*

- **Constituents of Concern** *(brief discussion about which specific compounds were chosen for analysis and why)*
- **Soil**
- **Surface water**
- **Ground water**
- **Sediment**
- **Air/soil vapor**
- **Natural resources/wildlife**
- **Cultural history/archeology**
- **Interim actions** *(brief intro to prior remediation activities)*

Figure – Soil investigation data points *(show potential source areas)*
Figure – Surface water/groundwater investigation data points *(show potential source areas)*
Figure – Air investigation data points *(show potential source areas)*
Figure – Prior remediation activities

Table – Exploration Summary
Table – Analytical Schedule per media *(include analytical methods and reporting limits, as possible)*

Appendix – Previous Investigations *(detailed discussion goes here)*
Appendix - Exploration and sampling methodology *(may combine with Previous Investigations)*
Appendix – Boring / Well logs
Appendix - Prior Interim Actions

PROPERTY DEVELOPMENT AND HISTORY *(This section focuses on the built environment, both current and historical, and presents the sources of contamination and release mechanisms.)*

- **Past site uses and facilities**
- **Current site use and facilities**
- **Proposed or potential future site uses**
- **Zoning** *(if appropriate)*
- **Transportation/roads**
- **Utilities, water supply**
- **Potential sources of site contamination**
- **Potential sources of contamination from neighboring properties** *(discuss nearby sources if known)*

Figure – Historical site features *(may be combined with Figure 2)*
Figure – Potential contaminant sources
Figure – Utilities *(may be combined with Figure 2)*

Table – Potential Contaminants

NATURAL CONDITIONS

- **Physiographic setting/topography**
- **Geology** *(focus on interpretation)*

    - Regional Setting *(brief)*
    - Property Geologic Conditions *(synthesis, not a copy of boring logs, provide cross sections)*
    - Physical Properties *(unlikely to need this section, but in some cases may be useful to present data on soil adsorptive capacity, organic content, strength, etc.)*

    Figure – Plan view of geologic unit distribution *(if helpful)*
    Figure - Cross section A-A' *(show borings, wells, screened intervals, water levels)*
    Figure – Cross section B-B' *(if necessary)*

- **Surface Water** *(brief description of the surface water system)*

    - Property drainage
    - Area surface water/floodplain issues
    - Regulatory classifications, if any *(e.g. surface water classification)*

    Figure – Surface water Conditions *(only if information not already in a prior figure)*

- **Ground Water** *(focus on interpretation, show on cross sections)*

    - Occurrence *(aquifers, water levels, confinement, geometry, continuity, physical properties)*
    - Movement *(directions, gradient if important, seasonal fluctuations, tidal influence)*
    - Discharge
    - Recharge *(if significant for site)*
    - Regulatory classifications, if any *(e.g. sole source aquifer)*

    Figure – Cross section with ground water information *(if not already included above)*
    Figure – Water table/potentiometric surface maps *(for various seasons or tidal conditions, show surface water)*

    Appendix – Ground water elevation data *(a table)*

- **Natural Resources and Ecological Receptors** *(preparatory to a Terrestrial Ecological Evaluation)*

- Greenbelts and other natural habitat
- Wildlife
- Other Information required to conduct evaluations under WAC 173-340 -7491, -7492, or if necessary -7493

Figure – showing natural areas, as appropriate

CONTAMINANT OCCURRENCE AND MOVEMENT *(Very little text, mostly figures and tables, main point is to provide easy-to-understand figures showing the depth and breadth of contamination.)*

- **Waste Material** *(sludges, fluids, stockpiles)*
- **Soil**
- **Surface Water**
- **Ground Water**
- **Sediment**
- **Air/Soil Vapor**

Figures – Cross sections showing soil contamination with depth Figures – Plan views showing soil contamination across site *(relative to releases if known)* Figures – Cross section showing ground water contamination with depth *(if appropriate)* Figures – Plan views showing ground water contamination in each aquifer *(relative to soil contamination and P-head map)* Figures – XY plots of specific contaminants with time *(as appropriate)* Figures – Others as appropriate to show the distribution of surface water, ground water, or air data Tables – All of the analytical data against final cleanup levels *(exceedances highlighted, no need to develop screening levels)* Tables – Summary of exceedances *(if helpful)* Appendix – QA report Appendix – Analytical lab reports

CONCEPTUAL MODEL *(Putting the whole story together, graphic illustrations are best.)*

- **Contaminant release/fate and transport/potential or actual receptors**
- **Data gaps** (*is anything missing)*

CLEANUP STANDARDS *(Developing appropriate cleanup standards based on receptors and pathways.)*

- **Soil**
    - Reasonable maximum exposure

- Cleanup levels protective of direct contact, ground water, inhalation, terrestrial species, surface water, sediment
- Points of compliance
- Regulatory classifications *(classification of soil as dangerous or solid waste)*

- **Ground Water**

  - Highest beneficial use/reasonable maximum exposure
  - Cleanup levels protective of potable use, inhalation, surface water, sediment
  - Points of compliance

- **Other Media as appropriate**

  - Cleanup levels protective of ....
  - Points of compliance

Table – Cleanup Levels *(all potentially applicable values with final selected cleanup level noted)*

AREAS REQUIRING CLEANUP *(The final story detailing where the contamination exceeds an applicable cleanup standard, brief text, mostly tables, figures.)*

- **Constitutuents of Concern** *(a brief summary of compounds that exceed cleanup levels or "indicator hazardous substances" under MTCA. For most service station sites, the COCs should be the same)*
- **Soil – vertical and lateral**
- **Ground water – vertical and lateral**
- **Sediment**
- **Surface Water**
- **Soil Vapor/air**

Figures – Plan view and vertical sections of areas requiring cleanup

REFERENCES