



STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

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February 25, 2013

COPY

Mr. Joel Ostroff  
Project Manager  
2101 4th Avenue, Suite 310  
Seattle, WA 98121

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

- Name: Spic N Span Cleaners Corp. Inc.
- Address: 652 South Dearborn Street, Seattle, WA
- Facility/Site No.: 54766547
- VCP No.: NW2564

Dear Mr. Ostroff:

Thank you for submitting documents regarding your proposed remedial action for the Spic N Span Cleaners 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 releases at the Site:

- Mineral Spirits (stoddard solvent) in Soil and Ground Water.
- PCE (tetrachloroethene) in Soil and Ground Water.  
Breakdown products: TCE (trichloroethene), Cis-1,2 DCE (dichloroethene), and VC (vinyl chloride) associated with the PCE.

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.

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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 action(s):

1. Aspect Consulting, Remedial Investigation, Feasibility Study, and Cleanup Action Plan, (RI/FS/CAP) Spic'n Span Cleaners, November 16, 2011.
2. Department of Ecology SWRO, Further Action Determination Letter, May 7, 2007. (Note: the above letter lists historical reports 1997-2006 previously reviewed by Ecology, which document UST removal, characterization, and interim cleanup actions at the Site.)

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](mailto:nwro_public_request@ecy.wa.gov).

The Site is defined by the extent of contamination caused by the following release(s):

- Mineral Spirits in Soil and Ground Water.
- PCE and associated breakdown products in Soil and Ground Water:

The Site is more particularly described in Enclosure A to this letter, which includes a detailed Site diagram. 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 following release(s) at the Site, Ecology has determined:

You requested Ecology's opinion on the RI/FS/CAP presented in Document 1 above and in particular, the selection of in-situ thermal remediation as the cleanup action.

1. Ecology considers that the Remedial Investigation for the Site is generally complete.

The Further Action (FA) Determination Letter (May 7, 2007) issued by Ecology (SWRO) stipulated that the requirements for an RI under MTCA 350(7) were not met: The groundwater flow direction had not been established properly, and monitoring well completion logs were not complete.

Maps and cross sections identifying the extents of the identified chemicals of concern above Method A screening levels in soil and groundwater were needed.

The soil vapor pathway had not been addressed. Since Ecology issued the FA opinion letter in 2007, significant additional work has been accomplished at the Site:

- A video camera survey was performed of accessible sanitary sewer lines at the Site in order to assess the possibility the lines had provided a preferred pathway for contaminant transport. Small cracks and a break were noted, and borings were located accordingly to test adjacent soil.
- Twenty two direct-push borings were completed to further characterize soil and groundwater. Soil samples were acquired at multiple depths, and according to the data presented (Tables 3 & 4), 39 soil samples were acquired. All were analyzed for VOCs and 21 samples were analyzed for mineral spirits (TPHg). Two soil samples were analyzed for petroleum fractions (VPH/ EPH). Twelve grab groundwater samples were acquired from the borings. All were analyzed for VOCs and seven for TPHg. Based on these data, three additional monitoring wells were installed. These wells were sampled as were six other established monitoring wells at the Site, and analyzed for TPHg and VOCs. A groundwater flow direction was determined at the Site (to the WSW) using elevations from the nine monitoring wells. Groundwater flow directions determined previously were more to the SW.
- The soil and groundwater data at the Site (acquired previously and as described above) were presented in plan view and in cross sections (Enclosure A). The data are sufficient to establish the horizontal and vertical extents of contamination in soil and groundwater throughout the source area at the Site. The full extent of the VC groundwater plume is not as well established given access issues and also the short well screens (5 ft.) utilized in the three most distal wells.
- To evaluate the vapor pathway, four soil gas samples were acquired from two borings (a shallow and deep sample from each boring) and analyzed for VOCs. One boring (B13) was located adjacent to the building above the groundwater plume nearest the source area at the dry cleaners (~100 ft. downgradient). Soil gas data from B13 indicated exceedences of screening levels for groundwater (VC), deep soil gas (VC, benzene), and shallow soil gas (benzene). The downgradient building is constructed on a slab and the shallow soil gas sample was considered representative of sub-slab conditions. The potential for benzene intrusion from sub-slab soil gas into indoor air above the cleanup level ( $0.32 \text{ ug/m}^3$ ) was evaluated utilizing the Johnson-Ettinger model. Results predicted a concentration for benzene of  $0.15 \text{ ug/m}^3$  inside the building. The Tier 1 analysis was adequate for purposes of the RI, and inside air samples were not acquired.

The other boring (B14) was located directly in the source area. Soil gas data from B14 in the source area adjacent to the dry-cleaners building indicated a high level of PCE in deep soil gas ( $1,800 \text{ ug/m}^3$ ), and very high level ( $190,000 \text{ ug/m}^3$ ) in shallow soil gas. The dry cleaners actively uses PCE (closed-loop machine), but it was considered that the contribution to PCE levels in the building from the soil gas would be relatively minimal. (Note following comment).

The actions described above and the additional information submitted completed the requirements for an RI stipulated as needed in Ecology's "Further Action" letter of May 7, 2007.

2. If not otherwise tested, it is recommended to evaluate the PCE levels in air inside the dry-cleaners building.

In parts per million, the PCE concentration in the shallow soil gas sample from B14 is 28 ppm, and it is unknown to what degree sub-surface structure attenuates the soil gas entering the adjacent building. There are potentially double sources for PCE in the indoor air of the building (dry-cleaner operations and the very high levels in shallow soil gas). As a precaution, the air inside the building should be checked in areas of continuous worker occupation to ensure that the WISHA required 8-hour TWA worker exposure limit for PCE of 25 ppm is not exceeded (Chapter 296-841-200 WAC).

3. The specific soil cleanup levels for the contaminants of concern presented in Table 6 are not acceptable.

The approach of using the most stringent of Method B cleanup levels for soil calculated as being (1) protective of the direct contact pathway and (2) protective of groundwater for drinking water beneficial use (soil leaching) is appropriate. However, the site-specific value for the fraction organic carbon (foc) parameter (0.39%) used in the Method B calculations to compute cleanup levels in soil protective of groundwater for volatile organics (Equation 747-1), and for mineral spirits (TPH fractionated analyses) was not derived correctly. The foc value (0.39%) for the Site was derived utilizing the geometric mean of total organic carbon analytical results from 10 soil samples. Eight of the soil samples were acquired within the area of the Site impacted by TPH/mineral spirits contamination, and showed higher percentages of organic carbon than the two samples acquired outside the TPH-impacted area. As per MTCA 747-(5)(b)(i), soil organic carbon measurements shall be based on uncontaminated soil.

An appropriate site-specific foc value utilizing additional soil samples outside the TPH-impacted soil (or the default value) should be utilized to recalculate the cleanup levels in soil that are protective of groundwater. Furthermore, the toxicity values of PCE and TCE have been revised, which affected Method B cleanup levels for these compounds in soil and groundwater. The values in Table 5 used to present the rationale for selecting soil cleanup levels should be adjusted. \*Note also, that air cleanup levels for PCE and TCE were also affected (increased), which changes the soil gas screening levels for these compounds. (Soil and groundwater cleanup levels were presented in the FS, but air cleanup levels were not).

4. Ecology agrees with the selection of in-situ thermal remediation utilizing electrical resistivity heating (ERH) as the most appropriate cleanup action to expeditiously continue remediation of the Site.

The priority need for further remediation of the Site is to expeditiously reduce contaminant levels of the chlorinated solvents and mineral spirits remaining in the source area. An in situ system utilizing air/ozone sparging and soil vapor extraction that previously operated in the area did not achieve complete remediation.

Two basic alternatives to cleanup (excavation and in situ thermal treatment) were considered as the only practicable methods able to achieve remediation in the source area within a reasonable restoration time frame. Excavation is the most certain method, and when combined with property development is the ideal cleanup scenario. Excavation of this Site would require demolition of the dry-cleaners building. Local requirements however reportedly prohibit demolition until a design for property development is in place, and this process could delay excavation for the foreseeable future. The in situ thermal treatment method could be implemented without significant delay and, although less certain (as are in situ methods in general), was selected as the preferred option to continue remediation.

In situ thermal treatment accomplished by electrical resistivity heating is a well established technology although not routinely utilized in this area. The technology has been implemented at some sites under Ecology's oversight however. The method appears particularly well suited to remediate the PCE, TCE and associated compounds in heterogeneous and low permeable soil conditions (as exist at the Site), but is somewhat less suited to remediate less volatile compounds such as mineral spirits. As documented, a bench test was done utilizing soil samples from the Site, which indicated the method would address the contamination from mineral spirits (although more energy and operating time would be required). The description provided of the design, construction, operation, and performance of the ERH in situ thermal treatment system was helpful to understand the considerations associated with implementing the system. Details and specifications regarding construction and operations of the ERH system are to be provided in an engineering design report (EDR). It is Ecology's expectation that the safety concerns inherent in applying this technology in the heavily-developed area of the Site will be a priority.

The proposed confirmation sampling to determine that air, soil, and groundwater cleanup levels have been achieved in the treatment area is acceptable at this time.

5. Ecology recommends that a supplemental CAP be prepared regarding possible cleanup / monitoring actions needed to address remaining contamination at the Site after the in situ ERH thermal treatment is complete.

Contingency actions were mentioned as possibly needed: (1) if cleanup levels were not achieved in the treated source area of the Site, and (2) if natural attenuation of the vinyl chloride contamination in groundwater downgradient from the source area was not sufficient to achieve cleanup levels in a reasonable restoration time. Once the thermal treatment has run its course, the ground has cooled, and sufficient monitoring is completed, any remaining contamination at the Site (in the source area and in downgradient groundwater) can accurately be assessed.

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At that time, the criteria for and nature of any needed contingency actions could be evaluated and described more completely.

**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.**

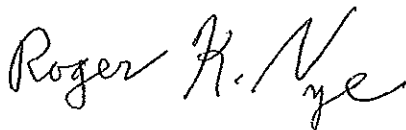
Please note that this opinion is based solely on the information contained in the documents listed above. Therefore, if any of the information contained in those documents is materially false or misleading, then this opinion will automatically be rendered null and void.

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) 649-7251 or email at [mye461@ecy.wa.gov](mailto:mye461@ecy.wa.gov).

Sincerely,



Roger K. Nye  
Toxics Cleanup Program

Enclosure: A – Description and Diagrams of the Site

By certified mail: 7011 0470 0003 3682 2321

cc: Jeremy Porter, Project Consultant, Aspect Consulting LLC  
Carrie Pederson, Ecology

## Enclosure A

### Site Description and Diagrams

The Site is located in the International District area of downtown Seattle in the vicinity of the intersection of South Dearborn Street and Maynard Avenue South (~1,500 ft. east of Safeco Field). The source of the contamination was a dry-cleaning facility located on Property at 652 South Dearborn Street. The dry cleaning facility was constructed in 1963 and is currently still operating.

Both stoddard solvent (mineral spirits) and PCE used in the dry-cleaning process were historically released from cleaning equipment and underground storage tanks at the facility. Soil and groundwater were impacted within the Property and extensively outside the Property. The extent of the contamination in soil and groundwater by mineral spirits and by PCE (and associated degradation products) comprises the Site.

The Site is located in an area of extensive mixed residential, commercial, and light industrial land use. The land surface is completely covered by streets, parking lots, and buildings. The Property containing the dry cleaning facility is 0.3 acres in size, paved, and the building housing the facility covers about half of the Property. The elevation of the Site is ~50 ft. above msl, and the land slopes gradually down towards Elliott Bay located ~2,600 ft. to the west.

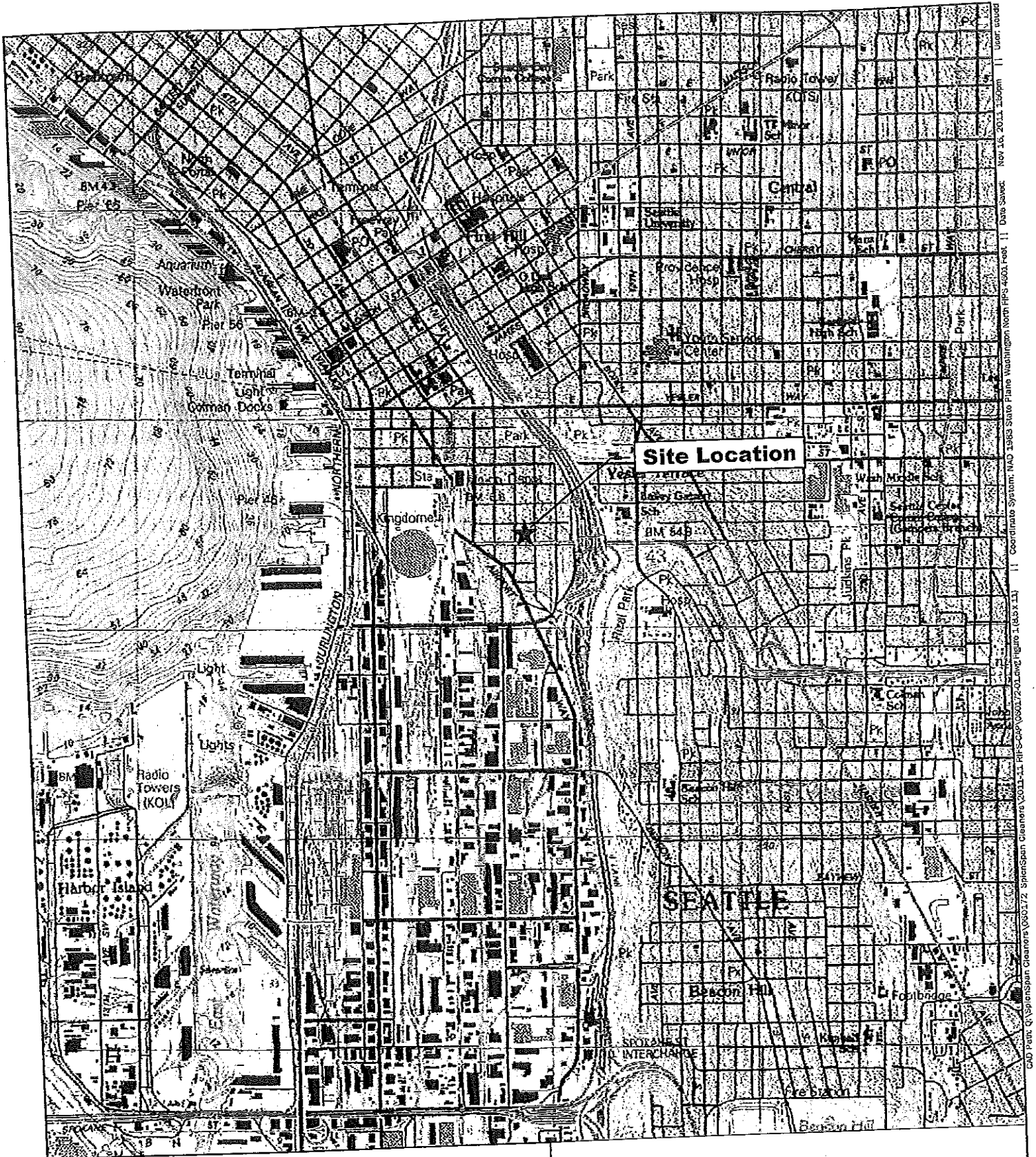
The geology at this Site consists of a surficial layer of gravelly sand fill material two or three feet thick underlain by an assemblage of sandy silt and silty sand units (interpreted as more fill material) extending down to roughly 20 ft. bgs. A sand deposit (tide flat deposit) is consistently encountered from about 20 to 25 ft. bgs. A very dense formation (silty sand with gravel) interpreted as till is encountered beneath the sand deposit to the depth of exploration (~35 ft. bgs). Groundwater is consistently encountered at ~20 ft. bgs with a flow direction to the west-southwest towards Elliott Bay and a typical gradient of .01 ft/ft.

A soil vapor extraction and air/ozone sparging system previously operated in the release (source) area of the Site (northwest portion of the Property). This system reduced the levels of contamination in soil and groundwater, but did not achieve complete remediation. The approximate horizontal extent of soil that requires further remediation is indicated in the attached Figure 8. The soil contamination extends vertically down to ~25 ft. bgs near the release (source) area. The soil contains PCE, TCE, cis-DCE, and TPH above cleanup levels. PCE impacted soil could extend deeper below the water table in the southern part of the source area.

Contamination remaining in groundwater above cleanup levels consists only of vinyl chloride (VC). The plume of VC contaminated groundwater extends to the west-southwest (groundwater flow direction) approximately 300 ft. from the source area. The maximum length of the plume in this direction has not been completely characterized. The width of the plume appears to be roughly 150 ft. Three monitoring wells (MWs 7, 8, 9) that define the downgradient limits of the plume were constructed with only five-foot screen intervals, and may not accurately delineate the edges of the plume.



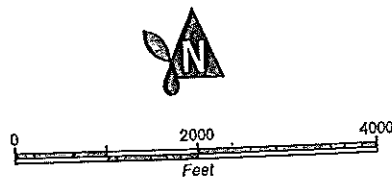




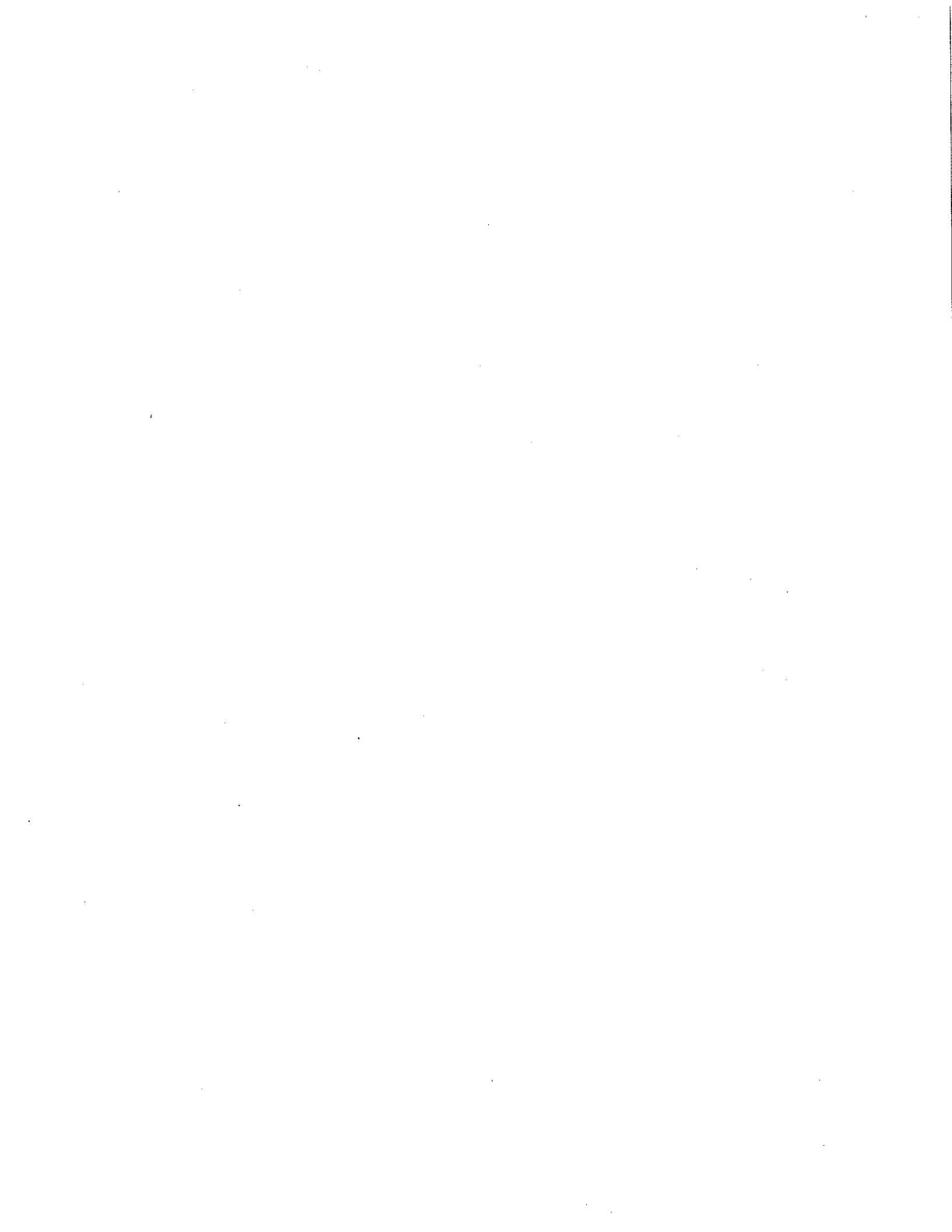
CAD File: Q:\SpicnSpan Cleaners\060172\_SpiceSpan Cleaners\060172.dwg Figure 1 (4/25/11) Coordinate System: NAD 1983 State Plane Washington North IP3 4603 Feet Date Saved: Nov 16, 2011 1:50pm User: tward

### Site Location Map

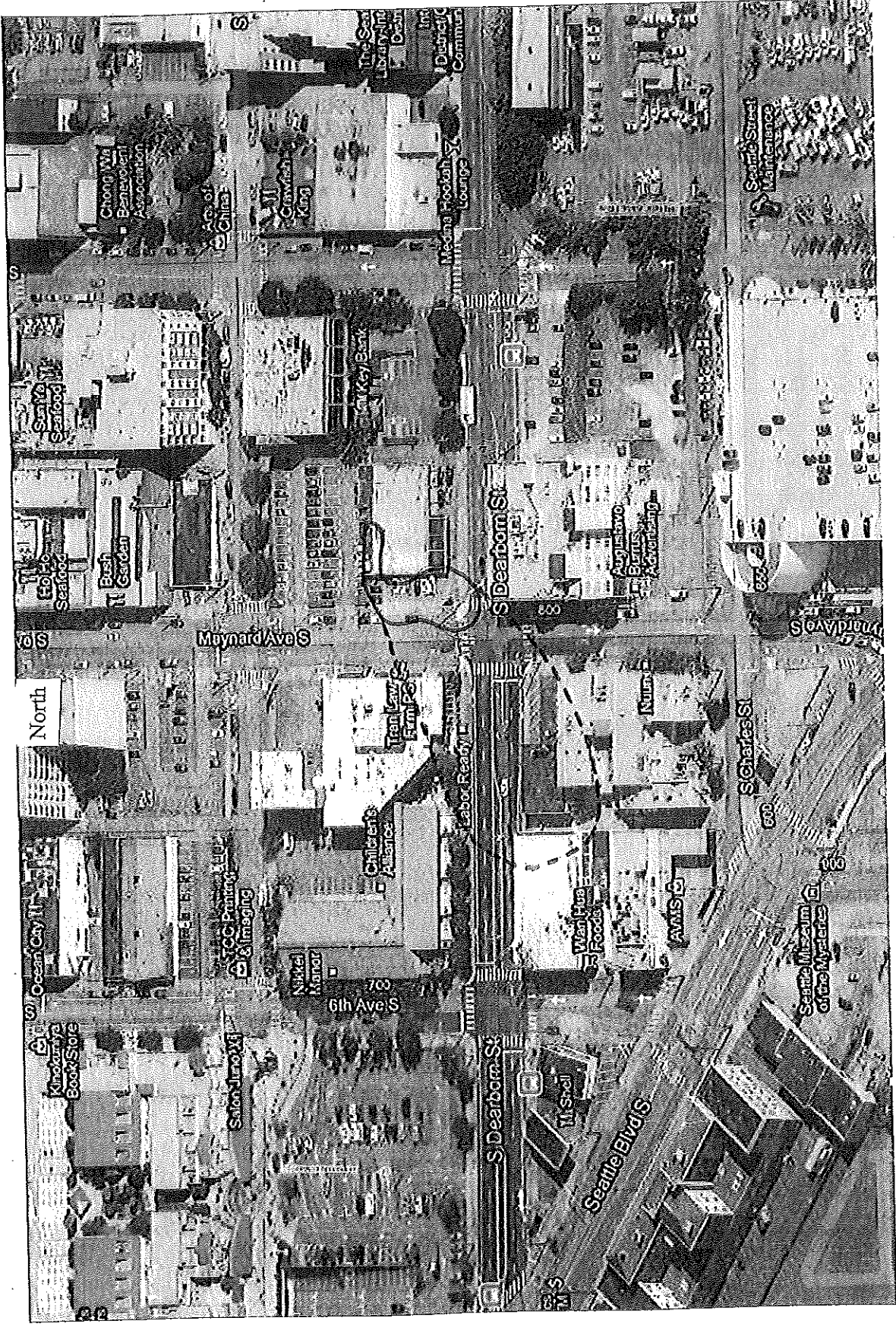
Spic 'n Span Cleaners Site  
 652 South Dearborn Street, Seattle, Washington



	NOV-2011	BY PMB	FIGURE NO. <b>1</b>
	PROJECT NO. 060172	REV BY: SCC	



Google 652 South Dearborn Street, Seattle, WA



Spic N Span Cleaners Corp.

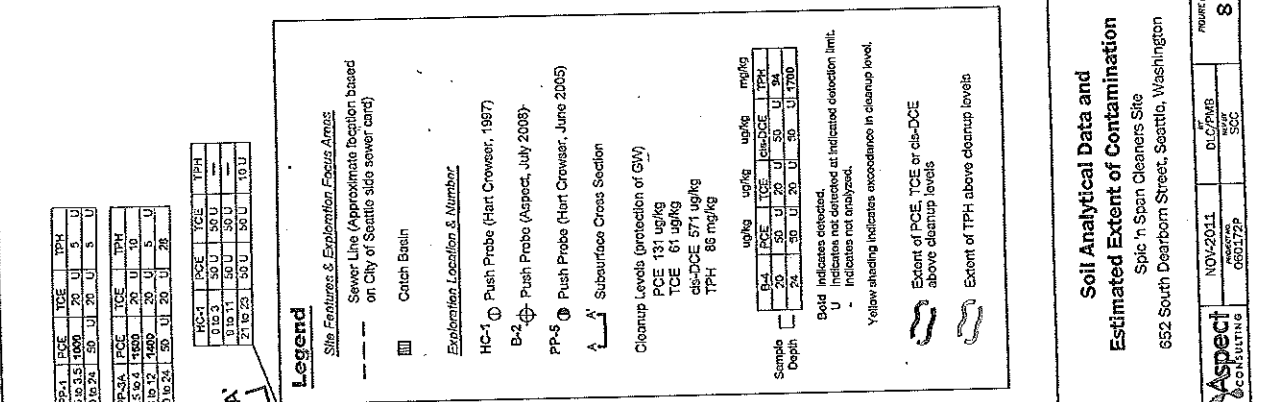
Approximate Extent of the Site

Soil and Groundwater Contamination

Vinyl Chloride in Groundwater

3/4/2013

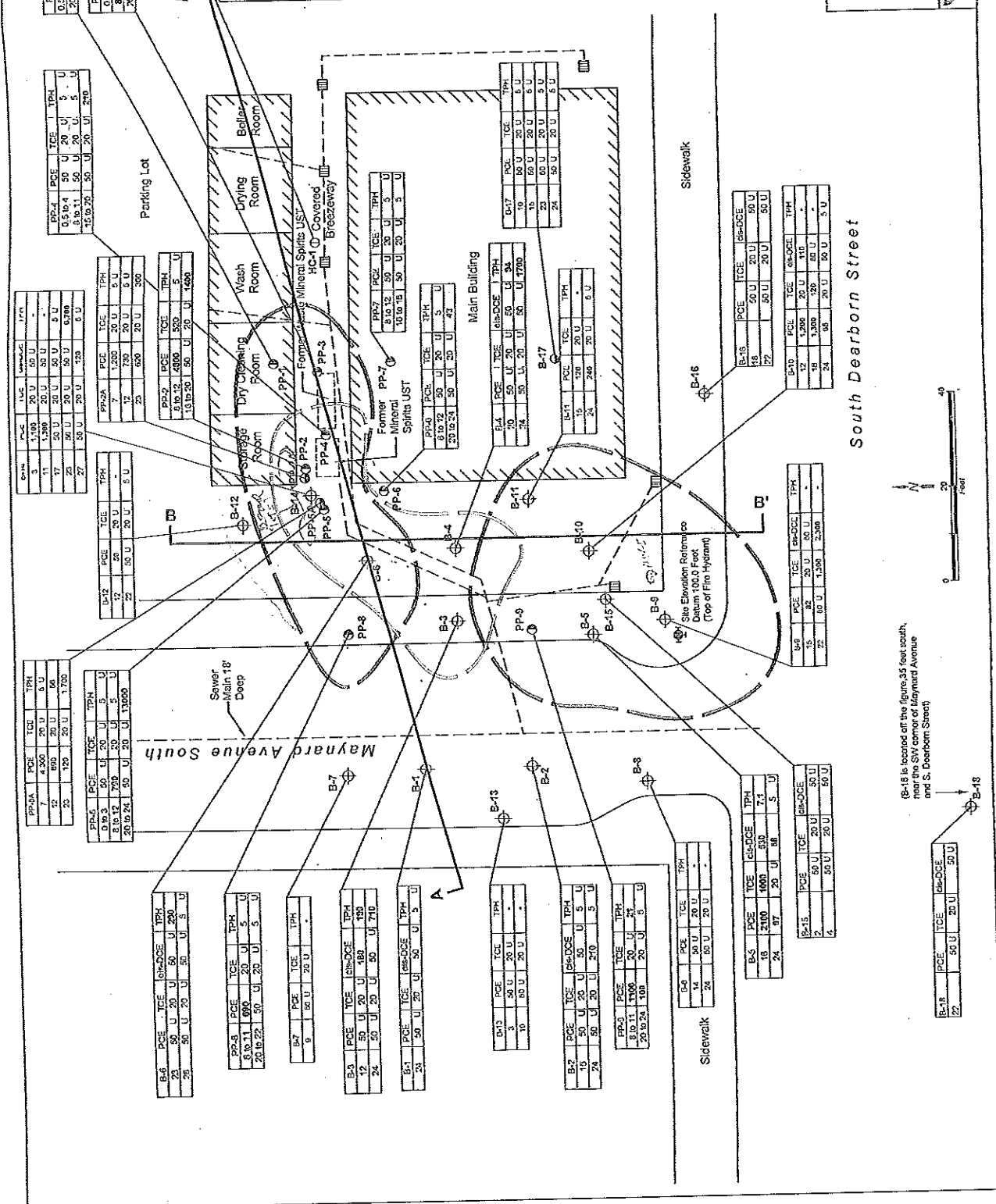




**Soil Analytical Data and Estimated Extent of Contamination**  
 Spic 'n Span Cleaners Site  
 652 South Dearborn Street, Seattle, Washington

**Aspect CONSULTING**  
 NOV-2011  
 PROJECT NO: 060172P

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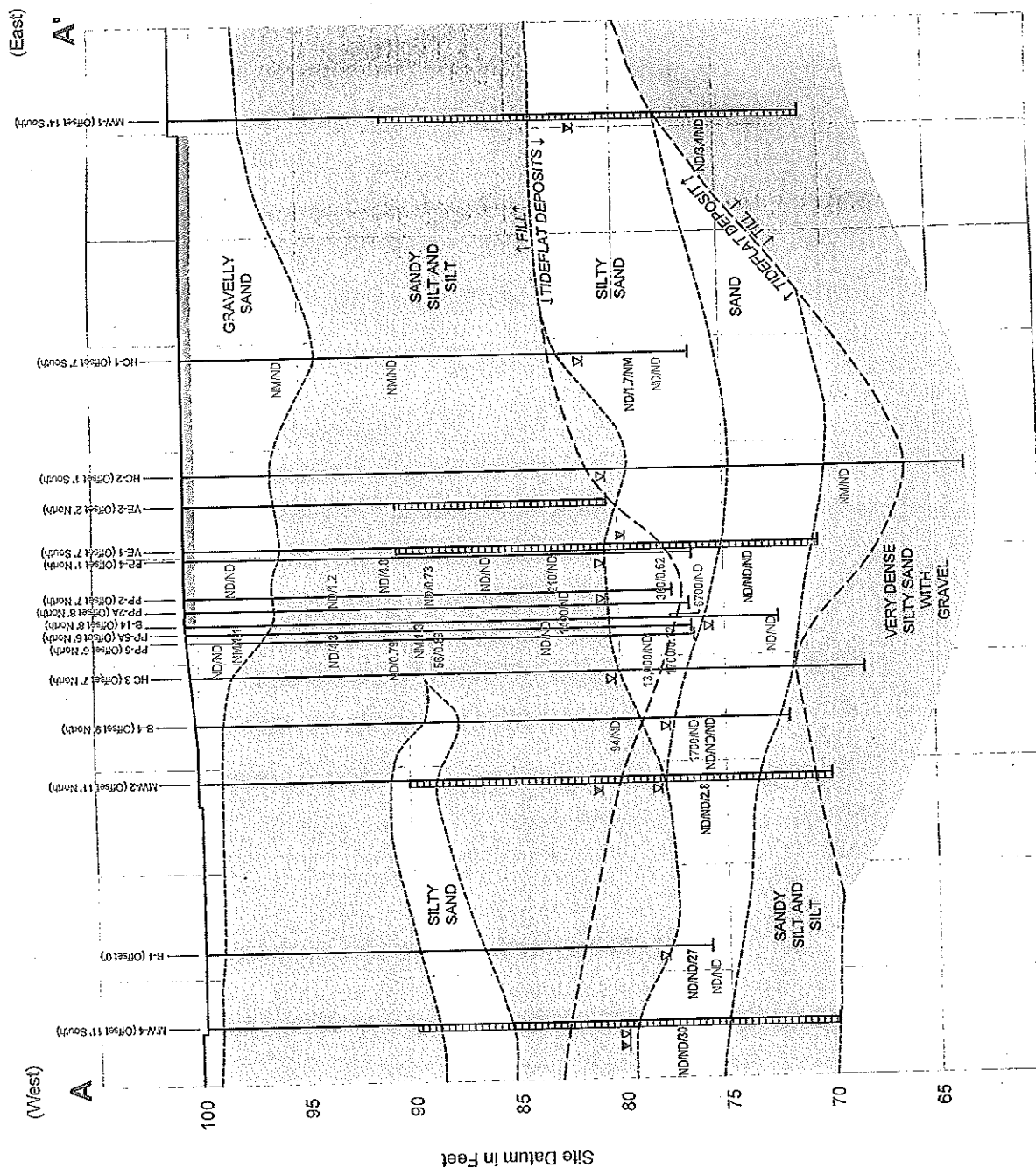


**Soil Analytical Data and Estimated Extent of Contamination**  
 Spic 'n Span Cleaners Site  
 652 South Dearborn Street, Seattle, Washington

**Aspect CONSULTING**  
 NOV-2011  
 PROJECT NO: 060172P

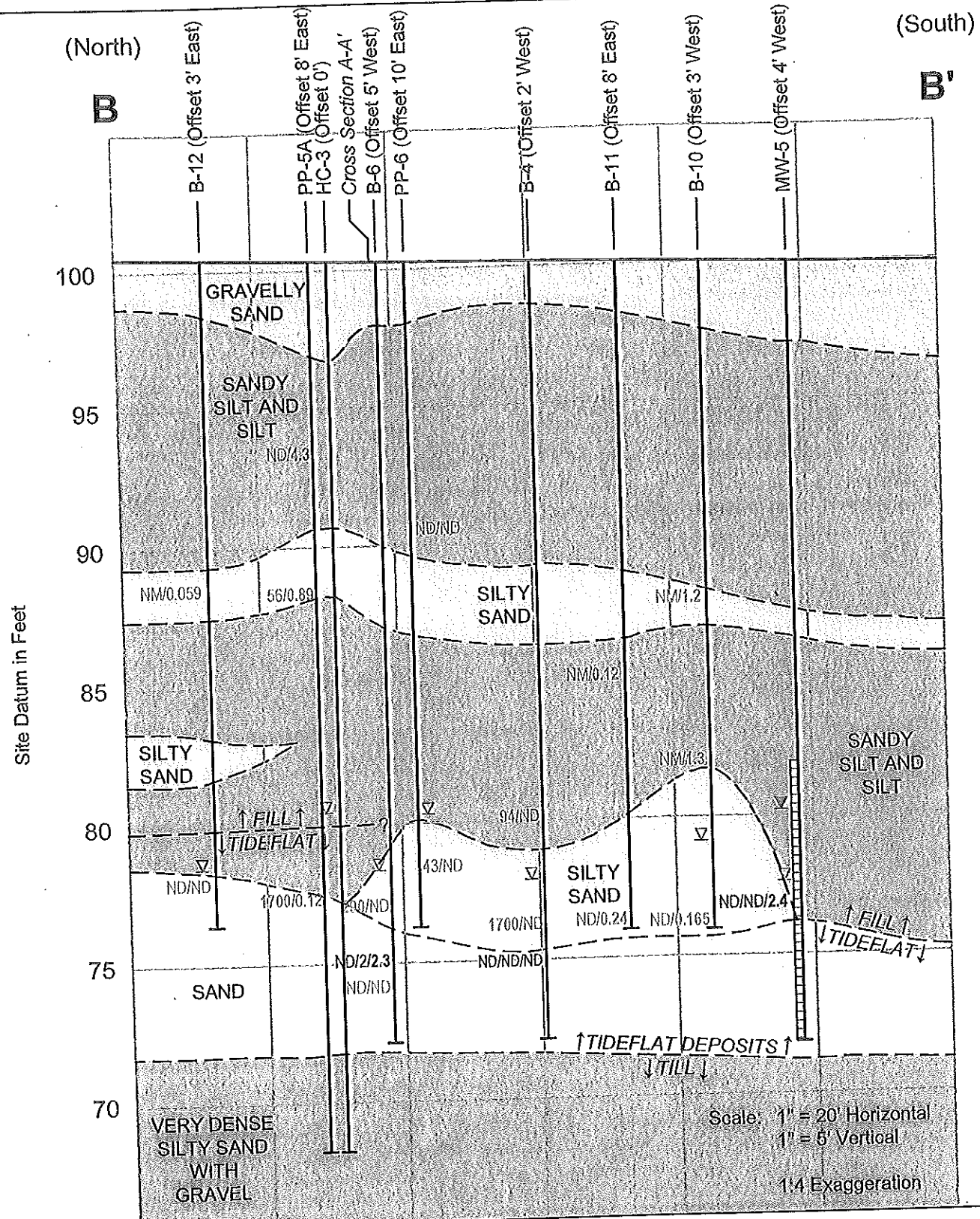
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-290/0.24	Mineral Spirits/PCE Concentrations in Soil (mg/Kg)
1310/0.02	Mineral Spirits/PCE/Vinyl Chloride Concentrations in Groundwater (µg/L)
NM	Not Measured
ND	Not Detected
<b>ND</b>	Indicates Detected Concentration Exceeds Cleanup Level
▽	Groundwater Level Measured on 3/4/2009
▽	Groundwater Level Observed at Time of Drilling
▬	Monitoring Well Screened Interval

### Cross Section B-B'

Spic 'n Span Cleaners Site  
652 South Dearborn Street, Seattle, Washington

	NOV-2011	BY DFR/SCC	FIGURE NO. <b>6</b>
	PROJECT NO 060172	REV BY SCC	



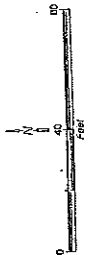
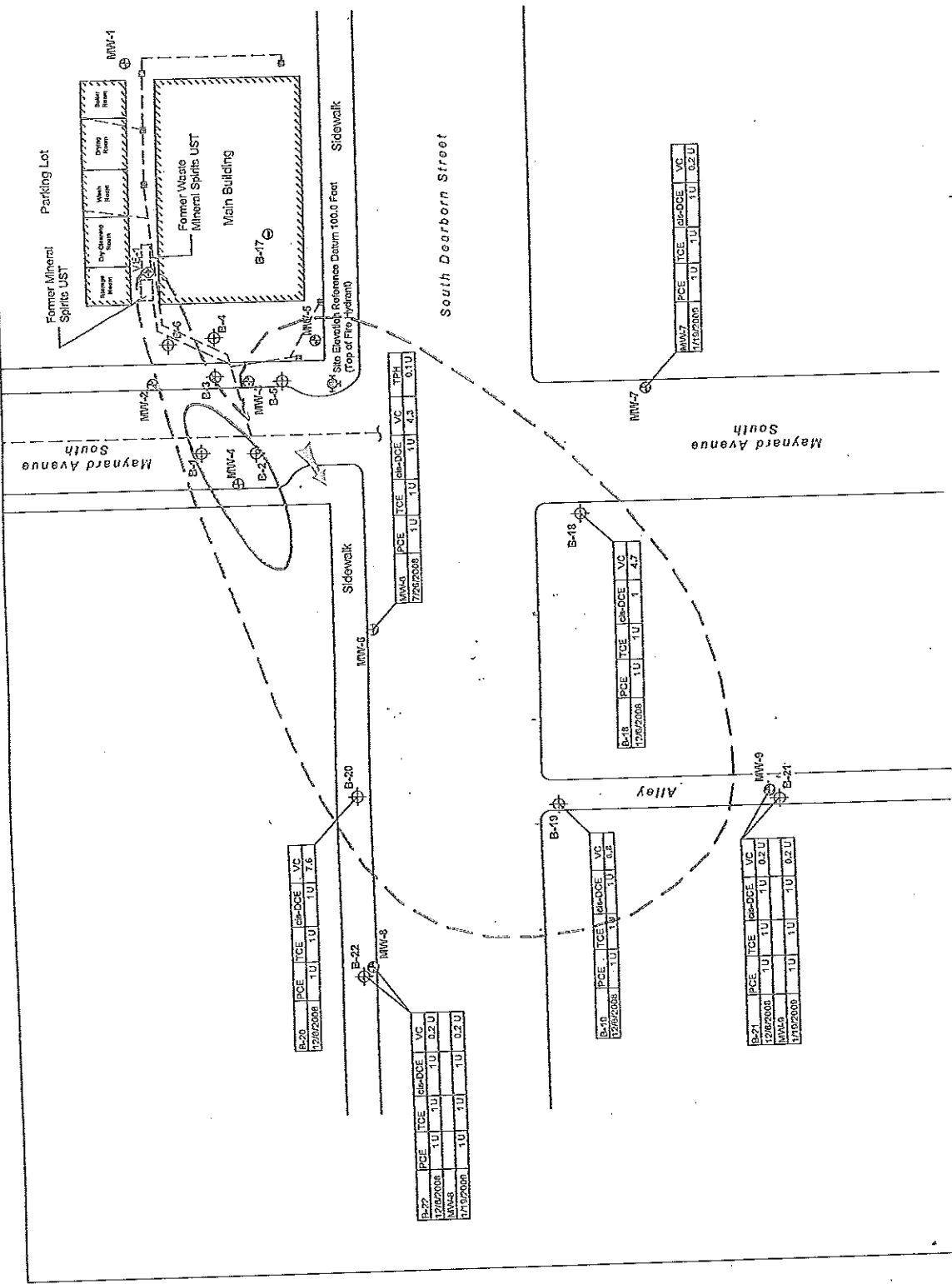
**Legend**

- Site Features & Exploration Points Areas**  
 Sewer Line (Approximate location based on City of Seattle city sewer card)  
 B-2 Push Probe (Aspect, July 2008)  
 MM-1 Monitoring Well  
 B-17 Push Probe (Aspect, June 2011)  
 Generalized Direction of Groundwater Flow
- Remediation System Well Location & Number**  
 VE-1

Well ID	uqL	uqL	uqL	uqL	uqL
B-16	PCE	TCE	Ch-DCE	VC	VC
12/6/2008	1.0	1.0	1.0	1.0	0.3

0 indicates detected values.  
 U indicates not detected at indicated detection limit.  
 Yellow shading indicates exceedance of cleanup level.  
 Estimated boundary of contamination above cleanup levels.  
 Estimated boundary of contamination >100x cleanup levels.

Cleanup Levels:  
 PCE 5 ug/L  
 TCE 5 ug/L  
 Ch - DCE 80 ug/L  
 VC 0.2 ug/L  
 TPH 1 mg/L



**Groundwater Analytical Data-Sitewide**

Spic 'n Span Cleaners Site  
 652 South Dearborn Street, Seattle, Washington

Aspect Consulting	NOV-2011	DLC/PHB	PROJECT NO.	10
	080172P	303		

