STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300

September 26, 2011

Mr. Joe Morrice
Aspect Consulting
401 Second Avenue, Suite 201
Seattle, Washington 98104

Re: Further Action at the following Site:

- **Site Name:** Morrells Dry Cleaning
- **Site Address:** 608 North 1st Street, Tacoma, Washington 98403
- **Facility/Site No.:** 18489568
- **VCP Project No.:** SW1039

Dear Mr. Morrice:

The Washington State Department of Ecology (Ecology) received your request for an opinion on your independent cleanup of the Morrells Dry Cleaning facility (Site). This letter provides our opinion. We are providing this opinion under the authority of the Model Toxics Control Act (MTCA), Chapter 70.105D RCW.

Issue Presented and Opinion

Is further remedial action necessary to clean up contamination at the Site?

YES. Ecology has determined that further remedial action is necessary to clean up contamination at the Site.

This opinion is based on an analysis of whether the remedial action meets the substantive requirements of MTCA, Chapter 70.105D RCW, and its implementing regulations, Chapter 173-340 WAC (collectively "substantive requirements of MTCA"). The analysis is provided below.

Description of the Site

This opinion applies only to the Site described below. The Site is defined by the nature and extent of contamination associated with the following releases:

- Volatile Organic Compounds (VOCs) into the Soil, Soil Vapor, and Groundwater.
- Metals into the Groundwater.

Enclosure A includes a detailed description and diagram of the Site, as currently known to Ecology.

Please note that parcel(s) of real property associated with this Site are also located within the projected boundaries of the Tacoma Smelter Plume facility (# 89267963) and the Bruce Titus Chevrolet facility (#

3427832). At this time, we have no information that those parcel(s) are actually affected. This opinion does not apply to any contamination associated with the Tacoma Smelter Plume facility or the Bruce Titus Chevrolet facility.

Basis for the Opinion

This opinion is based on the information contained in the following documents:

1. Aspect Consulting, LLC, **Groundwater Conditions Assessment and Recommendations,** dated October 28, 2008.

2. Aspect Consulting, LLC, **Sewer Evaluation Results and Work Plan for Additional Groundwater Investigation,** dated February 2, 2009.

3. Aspect Consulting, LLC, **Site Conditions Summary Former Walker Chevrolet Property, Tacoma, Washington,** dated July 14, 2009.

4. Aspect Consulting, LLC, **Remedial Investigation Report, Morrell's Dry Cleaners,** dated February 18, 2011.

Those documents are kept in the Central Files of the Southwest Regional Office of Ecology (SWRO) for review by appointment only. You can make an appointment by calling the SWRO resource contact at (360) 407-6365.

This opinion is void if any of the information contained in those documents is materially false or misleading.

Analysis of the Cleanup

Ecology has concluded that **further remedial action** is necessary to clean up contamination at the Site. That conclusion is based on the following analysis:

1. Characterization of the Site.

Ecology has determined your characterization of the Site is not sufficient to establish cleanup standards and select a cleanup action. The Site is described above and in **Enclosure A.**

The Site is located at 608 North 1st Street in Tacoma, Washington approximately 0.5 miles southwest of Commencement Bay. The dry cleaner is located on a 0.11-acre parcel at an elevation of approximately 272 feet above sea level. The Site contamination is confirmed on two tax parcels and likely impacts an additional two parcels located north of the dry cleaners. The Site has operated as a dry cleaner since at least 1929 (imagery from 1930 indicates the dry cleaner is housed in the original building) and tetrachloroethene (PCE) was used until 2009, when the current dry cleaner owner upgraded their operation to use non-PCE solvents. A 15-gallon PCE solvent dip tank was also used on the Site.

The 27-acre Wright Park, across Division Street and just south of the Site, is believed to be a source of groundwater recharge for the Site and may have a potentially large impact on the shallow groundwater hydrology. Quaternary glacial till (Vashon till) and advance outwash deposits underlie the Site. Underlying the outwash deposits are silt and silty sand that form a perched aquifer that lies approximately 65 feet below ground surface (bgs). The groundwater zone in the perched aquifer has an approximate thickness of 10 feet to 15 feet. Another saturated groundwater zone is present at approximately 112 feet bgs. The geology below approximately 145 feet bgs is not defined at the Site but is believed to be interbedded silt, silty sand and gravel, and sand (see Figure 4 and Figure 5). Just west and north of the dry cleaner, along North 1st Street and Tacoma Avenue, the confining layer at about 65 feet bgs appears to thin out, allowing groundwater and contaminants to reach the lower aquifer (see Figure 7). The groundwater data from the three deeper wells indicate the gradient is to the northwest in the lower aquifer. The groundwater gradient and groundwater flow is generally to the northeast in the shallow perched aquifer.

In 1994, Bison Environmental removed eight underground storage tanks (USTs) and a fuel dispenser island from the adjacent Bruce Titus Chevrolet facility (Titus). Metals and VOC soil contamination that exceeded the state cleanup standard was found during the soil investigation at the former paint booth location at the Chevrolet facility. Subsequent investigations indicate some of this contamination may have comingled with the Site contamination.

From August 2006 to April 2008, Stemen Environmental (Stemen) conducted soil, groundwater, and soil vapor investigations at the Site. These investigations were conducted simultaneously on the Titus parcel. The Stemen soil investigation found PCE at concentrations that exceeded the MTCA Method A Soil Cleanup Level (CUL) for unrestricted land uses at four locations beneath the dry cleaner Site. Trichloroethene (TCE) and cis-1,2-dichloroethene (DCE) were also found in one or more samples. TCE was above the applicable MTCA Method A CULs. DCE was above the DCE MTCA Method B CUL; however, MTCA does not allow for the mixing of Method A and Method B CULs and a state or federal groundwater applicable or relevant and appropriate requirements (ARAR) should be used instead. Lesser concentrations of the chlorinated solvents were also detected at the former paint booth location on the Titus parcel. The lower concentrations of these compounds at this location, up gradient of the dry cleaner Site, indicated this area was not likely to be the major the source of the Site PCE contamination.

Stemen installed eight groundwater-monitoring wells across the two sites. Monitoring Well MW-2 was the only well installed on the dry cleaner parcel; MW-8 was installed on the Titus parcel. The high concentrations of PCE and its daughter degradation products above their applicable MTCA Method A or ARAR Groundwater CUL in both MW-2 and MW-8 indicated a source beneath the dry cleaner (see Figure 2). Stemen also collected a groundwater sample from boring DCPLAS 2-W, which was adjacent to MW-2, for total lead. The analytical results indicated that total lead exceeded the MTCA Method A Groundwater CUL.

In May 2008, Stemen conducted a soil gas survey on the two parcels. On the dry cleaner parcel underneath the building slab, PCE, TCE, DCE, vinyl chloride, benzene, and toluene were detected above the applicable MTCA Method B Soil Gas Screening Level (SGSL) at locations GV-4 through GV-6. GV-6, located on the south wall of the dry cleaning building, had the

highest PCE concentration at 70 micrograms per liter (µg/L); the PCE MTCA Method B SGSL is 4.2 µg/L. Sub-slab conditions were reported as flooded and it was speculated that this flooding may have contributed to the MTCA SGSL exceedances (see Table EPA 8260).

In January 2009, Aspect Consulting, LLC (Aspect) conducted a soil gas survey of the sewer line from Morrell's Dry Cleaning to the sewer mainline connection located in North 1st Street. Aspect identified only PCE above the PCE MTCA SGSL. The analytical results indicated the PCE concentrations on the south side of the building were 0.2 µg/L, and 6.5 µg/L on the north side of the dry cleaning building. Soil gas analytical results indicated PCE concentrations near the sewer mainline connection were 0.4 µg/L.

From October 2008 to present, Aspect conducted groundwater sampling and analysis. In May 2009, Aspect installed four additional monitoring wells, MW-8D, MW-9, MW-10, and MW-11. MW-9 and MW-10 were installed to approximately 70 feet bgs and did not produce groundwater in sufficient quantities to collect groundwater samples for analysis. These two wells, along with MW-3, MW-4, and MW-6, appeared to locally define the northern and eastern limits of the perched aquifer (see Figure 7). MW-11 was installed to a depth of approximately 70 feet bgs on the Titus parcel, up gradient of the dry cleaner parcel. Groundwater was found at approximately 50 feet bgs in the perched aquifer. MW-8D was installed to a depth of approximately 116 feet bgs between MW-2 and MW-8. The well was installed through the confining layer and into the lower aquifer, where groundwater was found at approximately 112 feet bgs. The constituents of concern (COCs) were compared to their respective MTCA Method A (or Method B*) Groundwater Cleanup Level (CUL) and were identified as PCE, TCE, DCE*, vinyl chloride, and carbon tetrachloride. The highest concentrations of PCE, TCE, DCE*, and vinyl chloride were 2,900 µg/L, 1,100 µg/L, 7,100 µg/L*, and 19 µg/L, respectively, and were found in the groundwater from MW-2, indicating a potential source from beneath the dry cleaner. The MTCA Method A (or Method B*) Groundwater CULs are 5 µg/L, 5 µg/L, 16 µg/L*, and 0.2 µg/L, respectively. PCE and TCE were detected above their respective MTCA Method A CULs in MW-5 and MW-7. Carbon tetrachloride was also detected in MW-5, MW-7, MW-11, and in the deeper well MW-8D, all located up gradient from the Site on the Titus parcel at similar concentrations. No apparent source for this COC has yet been identified (see Figure 8 and Table 2).

In January 2010, Aspect conducted a soil gas survey at the Site using Gore® passive diffusion modules (PDFs) emplaced underneath the building floor slab, sidewalk, and parking lot. Analysis of the modules indicated that PCE, TCE, DCE, and trans-1,2-dichloroethene were present at elevated concentrations. Contoured results indicated areas of PCE mass near suspected sources of contamination (see Figure 9).

In October 2010, Aspect installed two more monitoring wells in Tacoma Avenue North, northwest of MW-9 and MW-10. The wells, MW-12D and MW-13D, were installed to investigate and delineate the VOC contamination in the deep aquifer north of the dry cleaner parcel. In November 2010, all network wells were monitored using passive diffusion bags; the analytical results were consistent with previous analytical results. Low concentrations of PCE, TCE, and DCE were detected above their respective MTCA CULs in both MW-12D and MW-13D (see Figure 8 and Table 2).

In October 2010, Aspect conducted soil sampling activities based on the Gore® PDF results. COCs detected were PCE, TCE, and DCE at concentrations exceeding their respective MTCA CULs. The soil analytical results were generally consistent with the Gore® PDF results, indicating potential source locations under the former PCE dry cleaning machine, solvent still, and filter storage area outside the door to the alley on the north side of the building (see Figure 10 and Table 3).

Based on a review of the available information, Ecology has the following comments:

1. The vertical extent of the PCE and TCE present in the Site soil has not been fully delineated. Soil contamination above the applicable MTCA Method A Soil CUL below 6 feet bgs is undefined. Naphthalene was detected above its MTCA CUL; the full horizontal extent of this contamination has not been delineated and no discussion on potential sources occurred in the February 2011 report. Total lead was detected in groundwater from DC PLAS-2-W (near MW-2); no analytical soil data for metals was presented for review and no discussion or speculation on potential sources was included in any previous report. The vertical and horizontal extent of soil contamination needs to be delineated. The soil COCs for further analysis are PCE, TCE, DCE, vinyl chloride, benzene, toluene, ethylbenzene, and total xylenes (BTEX), naphthalene, and metals (lead).

2. Ecology believes the perched aquifer has been fully defined. The lower aquifer contamination has yet to be fully delineated. Stemen found total lead in the groundwater near MW-2 in September 2008 and it has not been evaluated for since. Ecology recommends an additional deep well be installed at a down gradient location to better define the PCE plume. The COCs for groundwater will be PCE, TCE, DCE, vinyl chloride, benzene, toluene, ethylbenzene, and total xylenes (BTEX), naphthalene, and metals (total lead).

3. Soil vapor contamination above the MTCA Method B SGSL is present in the subsurface beneath the dry cleaner building. No off-parcel soil vapor data was collected; however, interpretation and extrapolation of the Gore® PDF results would suggest that indoor air on other parcels to the north of the dry cleaner building may also be affected and should be evaluated. Ecology recommends the soil vapor pathway be fully evaluated on the Site and Summa™-type canisters should be used in that evaluation. A Tier II indoor sampling assessment sampling plan should be developed and presented to Ecology for review and approval. The COCs for the soil vapor assessment are PCE, TCE, DCE, vinyl chloride, benzene, toluene, ethylbenzene, and total xylenes (BTEX), and naphthalene. Ecology's "Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action" can be found at: http://www.ecy.wa.gov/programs/tcp/policies/VaporIntrusion/vig.html.

4. Aspect has concluded that there is sufficient information to proceed with a Focused Feasibility Study (FFS) for a source control interim action. Ecology would concur that there is enough information available to conduct a FFS on the perched groundwater and shallow soil beneath the Site when comments 1 through 3 have been addressed or the information may be collected concurrently with the FSS. The lower aquifer soil and groundwater contamination still needs to be fully defined; however, based on the source identification and

contamination delineation completed in the perched aquifer, Ecology does not believe it is necessary to do so concurrent with conducting the FFS and could be tasked at a later date. Ecology recommends a FFS be developed and submitted to Ecology for review and approval.

5. In accordance with WAC 173-340-7490, a Terrestrial Ecological Evaluation (TEE) needs to be completed for the Site. Please fill out the TEE form and submit it (along with supporting information, as appropriate) to Ecology for review. The form can be found on our website at http://www.ecy.wa.gov/biblio/ecy090300.html.

6. In accordance with WAC 173-340-840(5) and Ecology Toxics Cleanup Program Policy 840 (Data Submittal Requirements), all data generated for Independent Remedial Actions shall be submitted simultaneously in both a written and electronic format. For additional information regarding electronic format requirements, see the website http://www.ecy.wa.gov/eim. Be advised that according to the policy, any reports containing sampling data that are submitted for Ecology review are considered incomplete until the electronic data has been entered. Please ensure that data generated during on-site activities is submitted pursuant to this policy. **Data must be submitted to Ecology in this format for Ecology to issue a No Further Action determination.** Please be sure to submit all soil and groundwater data collected to date, as well as any future data, in this format. Data collected prior to August 2005 (effective date of this policy) is not required to be submitted; however, you are encouraged to do so if it is available. Be advised that Ecology requires up to two weeks to process the data once it is received.

2. Establishment of cleanup standards.

Ecology has determined the cleanup levels and points of compliance you established for the Site do not meet the substantive requirements of MTCA.

Applicable MTCA Method A CULs for soil and groundwater, shall be used to characterize the Site. For compounds where no Method A CUL has been established, MTCA requires the use of existing ARARs; no mixing of MTCA Method A and Method B CULs in the same medium is allowed. Due to the elevated DCE concentrations in groundwater, the compound would be considered an "indicator hazardous substance" as provided for in WAC 173-340-720(3). As such, to use MTCA Method A CULs at the Site, the cleanup value for DCE would have to be the federal maximum contaminant level (70 µg/L) or practical quantitation limit. Otherwise, Method B CULs would need to be derived for all COCs and the additive risk could not exceed 10^{-5} or the cleanup values would need to be adjusted.

Standard points of compliance are being used for the Site. The point of compliance for protection of groundwater will be established in the soils throughout the Site. For soil cleanup levels based on human exposure via direct contact or other exposure pathways where contact with the soil is required to complete the pathway, the point of compliance shall be established in the soils throughout the Site from the ground surface to 15 feet bgs. In addition, the point of compliance for the groundwater is established throughout the Site from the uppermost level of the saturated zone extending vertically to the lowest most depth that could potentially be affected by the Site.

3. Selection of cleanup action.

Ecology has determined the cleanup action you selected for the Site does not meet the substantive requirements of MTCA.

No cleanup action has yet been proposed. The affected Site media must be fully characterized prior to selecting any final cleanup action. For a Site cleanup action to qualify for a no further action opinion, it must meet one or more of the minimum cleanup requirements in WAC 173-340-360(2). Once the full extent of the contamination has been defined, it will be necessary to develop a feasibility study based on the information collected in the characterization phase. The feasibility study should include all practicable methods of treatment in addressing the Site cleanup. Please note that monitored natural attenuation is a cleanup alternative that must be approved by Ecology before implementation.

4. Cleanup.

Ecology has determined the cleanup you performed does not meet any cleanup standards at the Site.

The Site has not been fully characterized. No cleanup actions have occurred on the Site.

Limitations of the Opinion

1. Opinion does not settle liability with the state.

Liable persons are strictly liable, jointly and severally, for all remedial action costs and for all natural resource damages resulting from the release or releases of hazardous substances at the Site. This opinion **does not**:

- Resolve or alter a person's liability to the state.
- Protect liable persons from contribution claims by third parties.

To settle liability with the state and obtain protection from contribution claims, a person must enter into a consent decree with Ecology under RCW 70.105D.040(4).

2. Opinion does not constitute a determination of substantial equivalence.

To recover remedial action costs from other liable persons under MTCA, one must demonstrate that the action is the substantial equivalent of an Ecology-conducted or Ecology-supervised action. This opinion does not determine whether the action you performed is substantially equivalent. Courts make that determination. *See* RCW 70.105D.080 and WAC 173-340-545.

3. State is immune from liability.

The state, Ecology, and its officers and employees are immune from all liability, and no cause of action of any nature may arise from any act or omission in providing this opinion. *See* RCW 70.105D.030(1)(i).

Contact Information

Thank you for choosing to clean up the Site under the Voluntary Cleanup Program (VCP). After you have addressed our concerns, you may request another review of your cleanup. Please do not hesitate to request additional services as your cleanup progresses. We look forward to working with you.

For more information about the VCP and the cleanup process, please visit our web site: www.ecy.wa.gov/programs/tcp/vcp/vcpmain.htm. If you have any questions about this opinion, please contact me by phone at (360) 407-7404 or e-mail at erad461@ecy.wa.gov.

Sincerely,

Eugene Radcliff, L.G.
Site Manager
SWRO Toxics Cleanup Program

GER/ksc:Morrells Dry Cleaners FA Opinion

Enclosures (11):

A – Description and Diagrams of the Site		
	Figure 1	Site Vicinity Map
	Figure 2	Well Location Plan
	Figure 4	Cross Section B-B'
	Figure 5	Cross Section C-C'
	Figure 7	Groundwater Elevation Contour Map, December 2010
	Figure 8	Groundwater Quality Data
	Figure 9	Gore® Module Results-PCE
	Figure 10	PCE Concentrations in Soil
	Table EPA 8260	Analysis of Soil Gas Vapors for Specific Halogenated Hydrocarbons (Stemen)
	Table 2	Groundwater Sampling Results
	Table 3	Soil Sampling Results

By certified mail: (7010 0780 0002 3400 7702)

cc: David C. and Barbara Shaw
Darrel E. and Lois J. Wickham Revocable Trust
Zona M. Wickham, c/o Todd Wickham
Ms. Sharon Bell, Pierce Co Health Dept
Scott Rose – Ecology
Dolores Mitchell – Ecology (without enclosures)

Enclosure A

Description and Diagrams of the Site

Site Description

Media of Concern: Soil and Groundwater

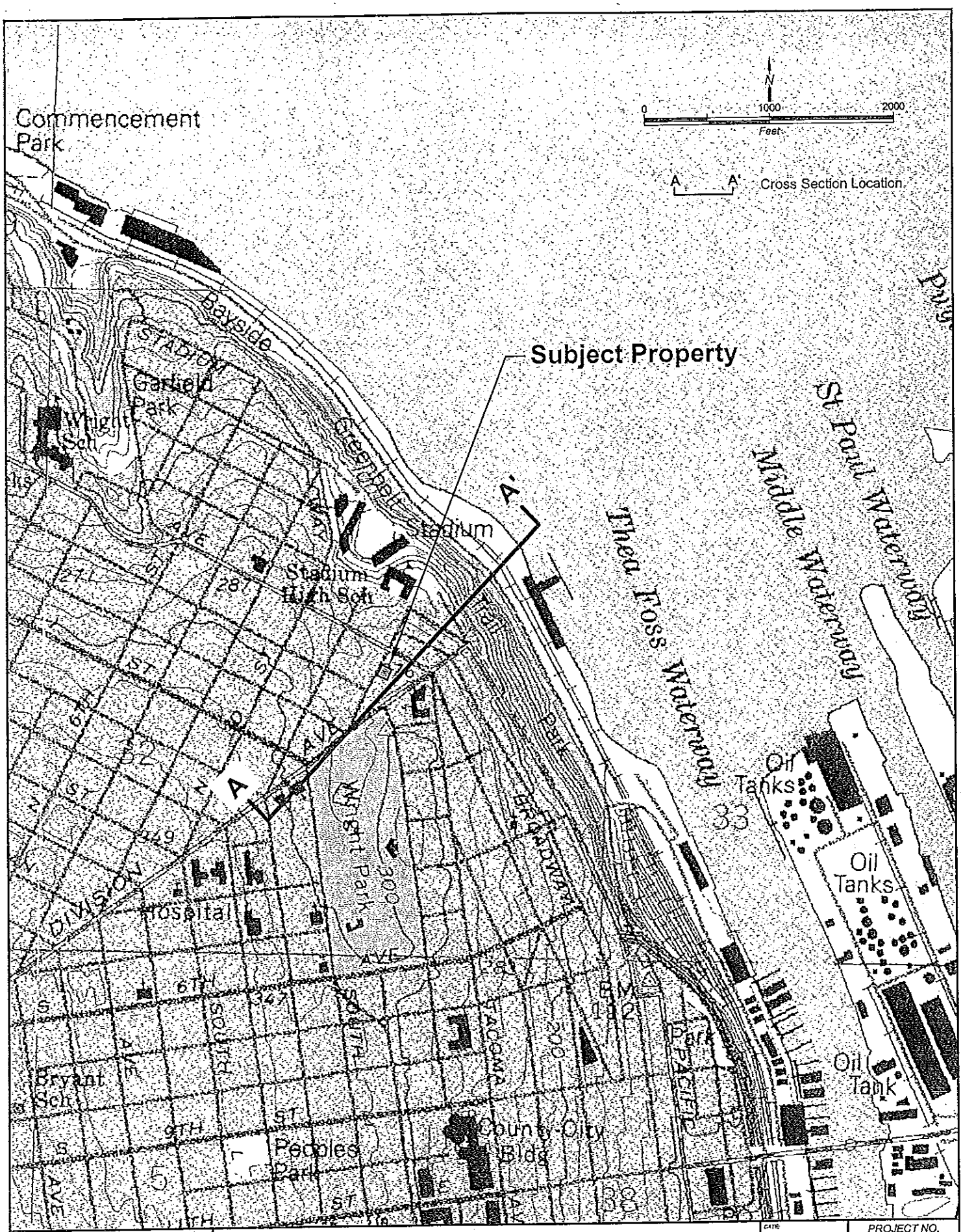
The Morrells Dry Cleaning (Site) is located at 608 North 1st Street in Tacoma, Pierce County, Washington (see Figure 1). The Site has been zoned for commercial purposes and has been used as a dry cleaner since at least the 1930s. The parcel on which the facility is located encompasses approximately 0.11 acres and contains one building used as a dry cleaner and a bakery. The parcel is in an urban growth area (UGA) and is a component of the County's Comprehensive Plan. Parcels within the UGA are designated as priority areas for development and an increased density of housing units. The Site is bordered on the north by commercial buildings, on the east by a paved parking lot, on the south by a commercial building (Thriftway), and on the West by North 1st Avenue. The Pierce County Assessor's office notes the Morrells Dry Cleaning Site has an assigned tax parcel number of 2030120030.

The Site lies in north Tacoma on top of ice-contact deposits; intermixed outwash, lacustrine beds, and till; brown and gray to lightly oxidized in color. Ice-contact deposits commonly occur as outwash with lenses and pods of till and lacustrine deposits. Above the Thea Foss waterway, this unit is as thick as 40 feet. Outwash deposits consist of stratified fluvial sand and gravel, commonly silty, with cobbles and boulders; generally medium to very dense and moderately to well sorted. Lacustrine deposits consist of interbedded fine sand and silt to laminated silt and clay; loose to medium dense. Glacial till consists of a diamict with sand, silt, and gravel lenses; loose to very dense. Till is silt-sand matrix-supported diamict of gravel with cobbles and boulders.

Groundwater is generally 110 to 140 feet below ground surface (bgs) in the upland area of north Tacoma; however, locally under the Site there is a perched water table with groundwater at approximately 50 feet bgs. Most of the area around the Site is well developed and covered with impervious surfaces with the notable exception of Wright Park one block south of the Site, which may be a source of groundwater recharge.

There are no known natural sensitive receptors in the area. The available data indicates the soil and groundwater contamination pathways are not complete and therefore present a low risk to the environment and to human health and safety; however, the soil vapor contamination pathway is potentially complete and more work needs to be completed to determine the whether vapor intrusion poses a serious risk.

Much of the information described in this opinion letter was collected simultaneously for both the Bruce Titus Chevrolet and Morrells Dry Cleaner Sites and some of the contamination may be comingled. At this time, both Sites are being reviewed as separate Sites but may be combined if comingling is confirmed.



Site Vicinity Map

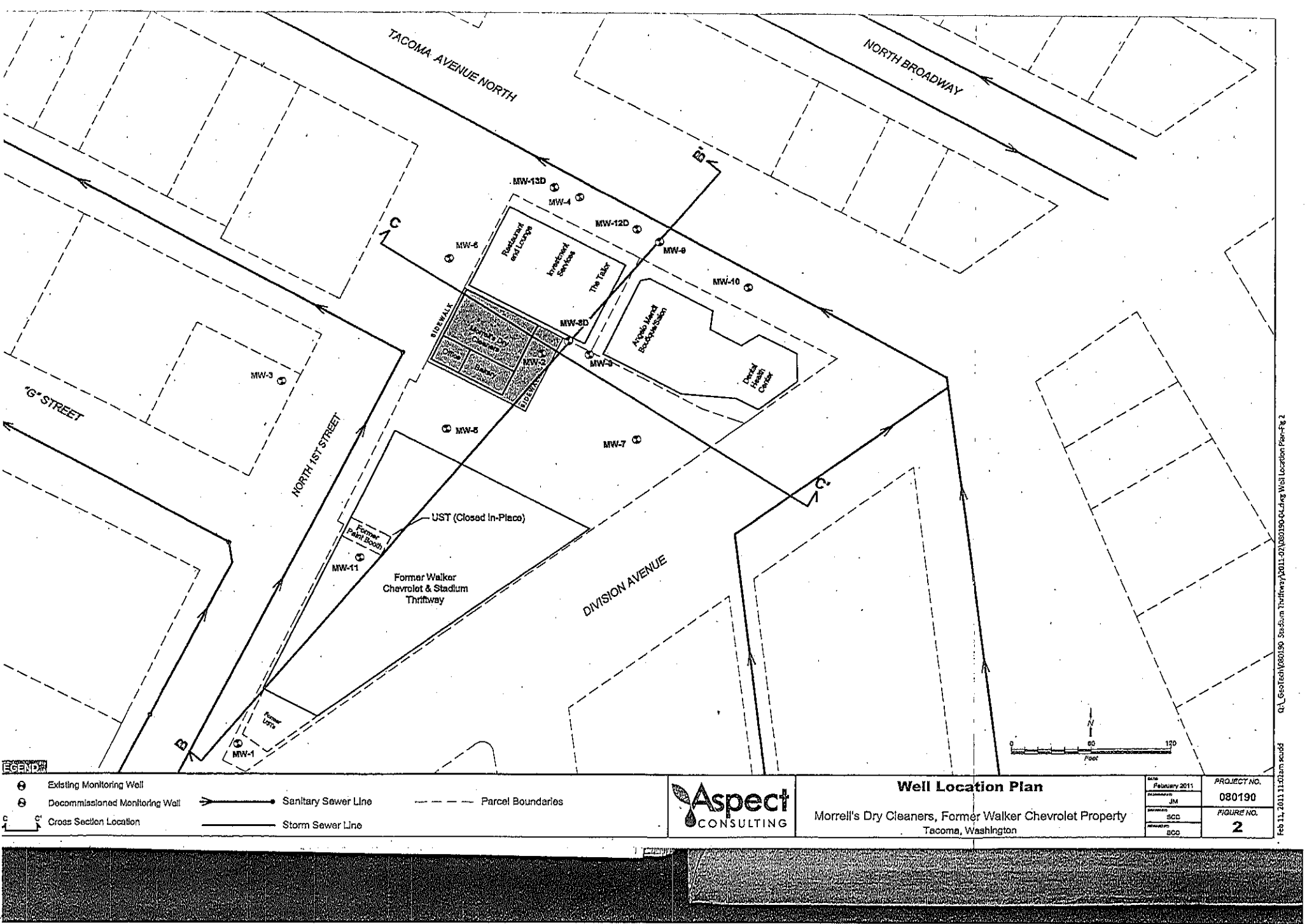
Morrell's Dry Cleaners, Former Walker Chevrolet Property
Tacoma, Washington

Aspect CONSULTING

DATE: February 2011	PROJECT NO. 080190
DESIGNED BY: SCC	
DRAWN BY: SCC	FIGURE NO. 1
REVISED BY: SCC	

Feb 11, 2011 10:58am scudd

Q:_GeoTech\080190 Stadium Thriftway\2011-02\080190-01.dwg Site Vicinity Map



EGEND

- Existing Monitoring Well
- Decommissioned Monitoring Well
- Cross Section Location
- Sanitary Sewer Line
- Storm Sewer Line
- Parcel Boundaries

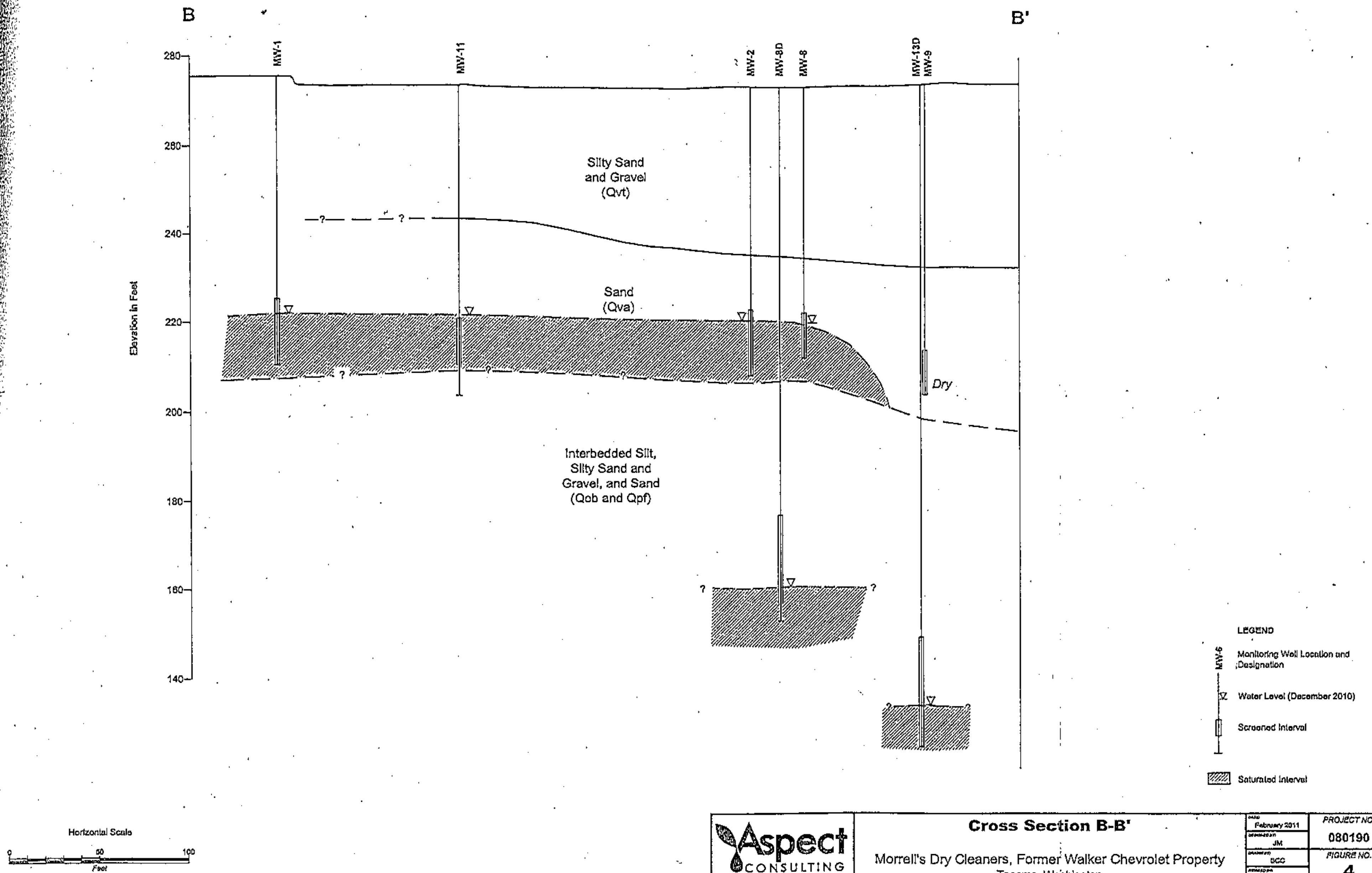
Aspect CONSULTING

Well Location Plan

Morrell's Dry Cleaners, Former Walker Chevrolet Property
Tacoma, Washington

DATE	PROJECT NO.
February 2011	080190
DESIGNED JM	FIGURE NO.
DRAWN SCC	2
REVIEWED BCO	

Q:_GeoTech\080190_Stadium Thriftway\2011-02\080190-04.dwg Well Location Plan-Fig 2
Feb 11, 2011 11:02am scudd



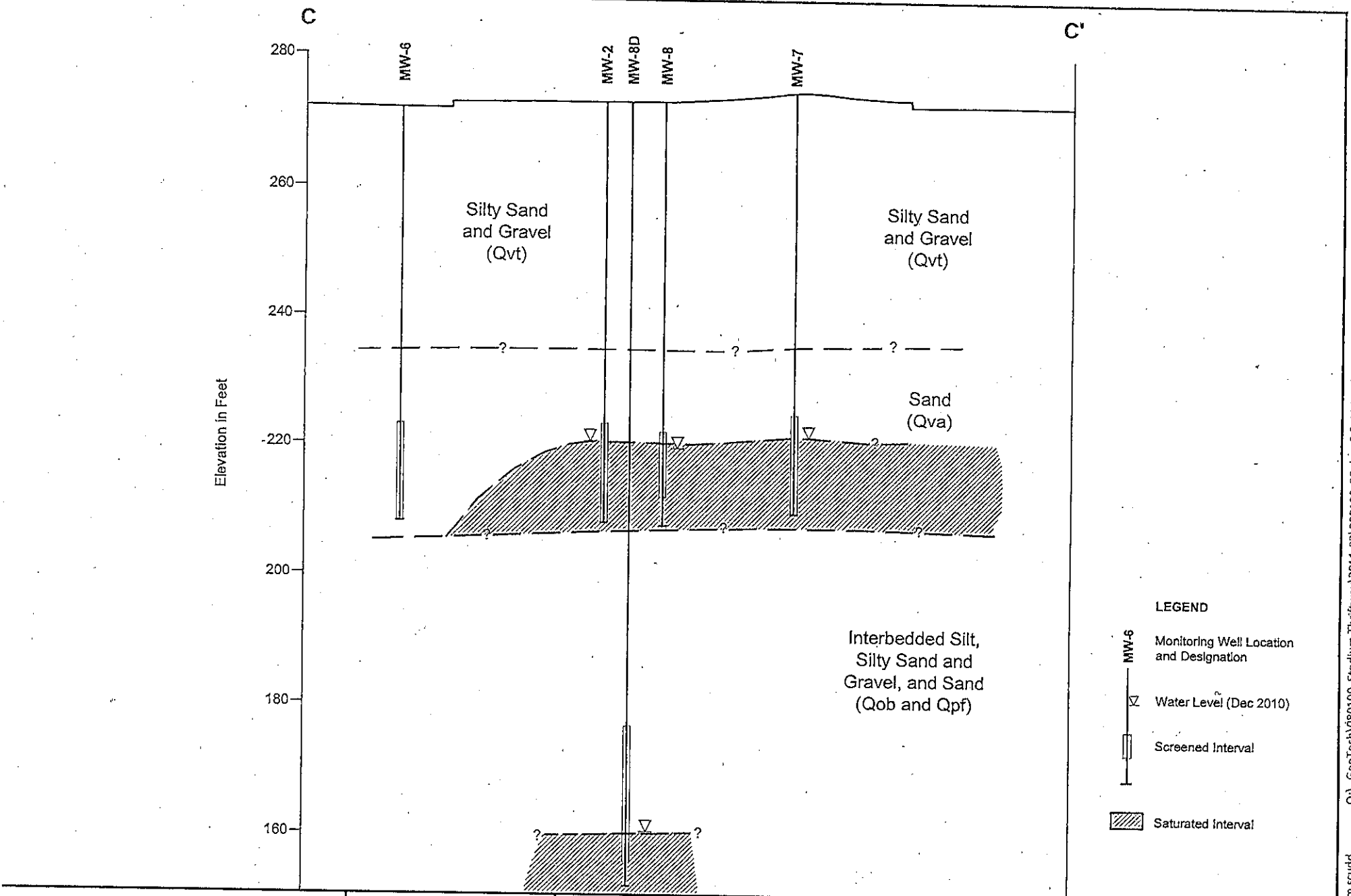
Aspect CONSULTING

Cross Section B-B'

Morrell's Dry Cleaners, Former Walker Chevrolet Property
Tacoma, Washington

DATE: February 2011	PROJECT NO. 080190
DESIGNED BY: JM	
DRAWN BY: SCC	FIGURE NO. 4
REVIEWED BY: SCC	

Feb 11, 2011 11:12am sonkd   Q:_GeoTech\080190 Stadium Thriftway\2011-02\080150-B8.dwg 11x17 Landscape



Horizontal Scale

0 50 100

Feet

Aspect CONSULTING

Cross Section C-C'

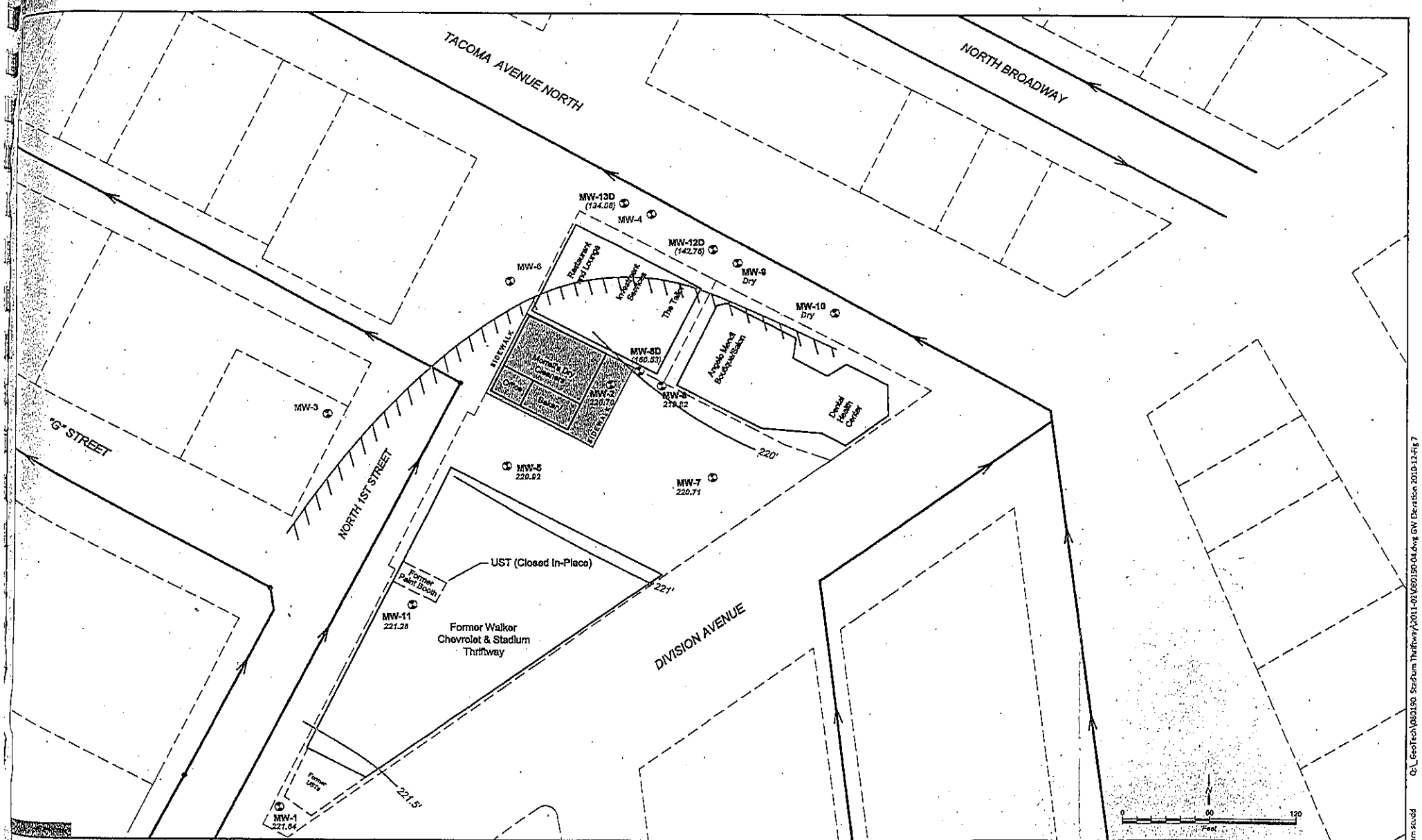
Morrell's Dry Cleaners, Former Walker Chevrolet Property

Tacoma, Washington

DATE: February 2011	PROJECT NO. 080190
DESIGNED BY: JM	
DRAWN BY: SCC	FIGURE NO. 5
REVISED BY:	

Q:_GeoTech\080190 Stadium Thriftway\2011-02\080190-CC.dwg 8.5x11 Landscape

Feb 11, 2011 11:13am scudd



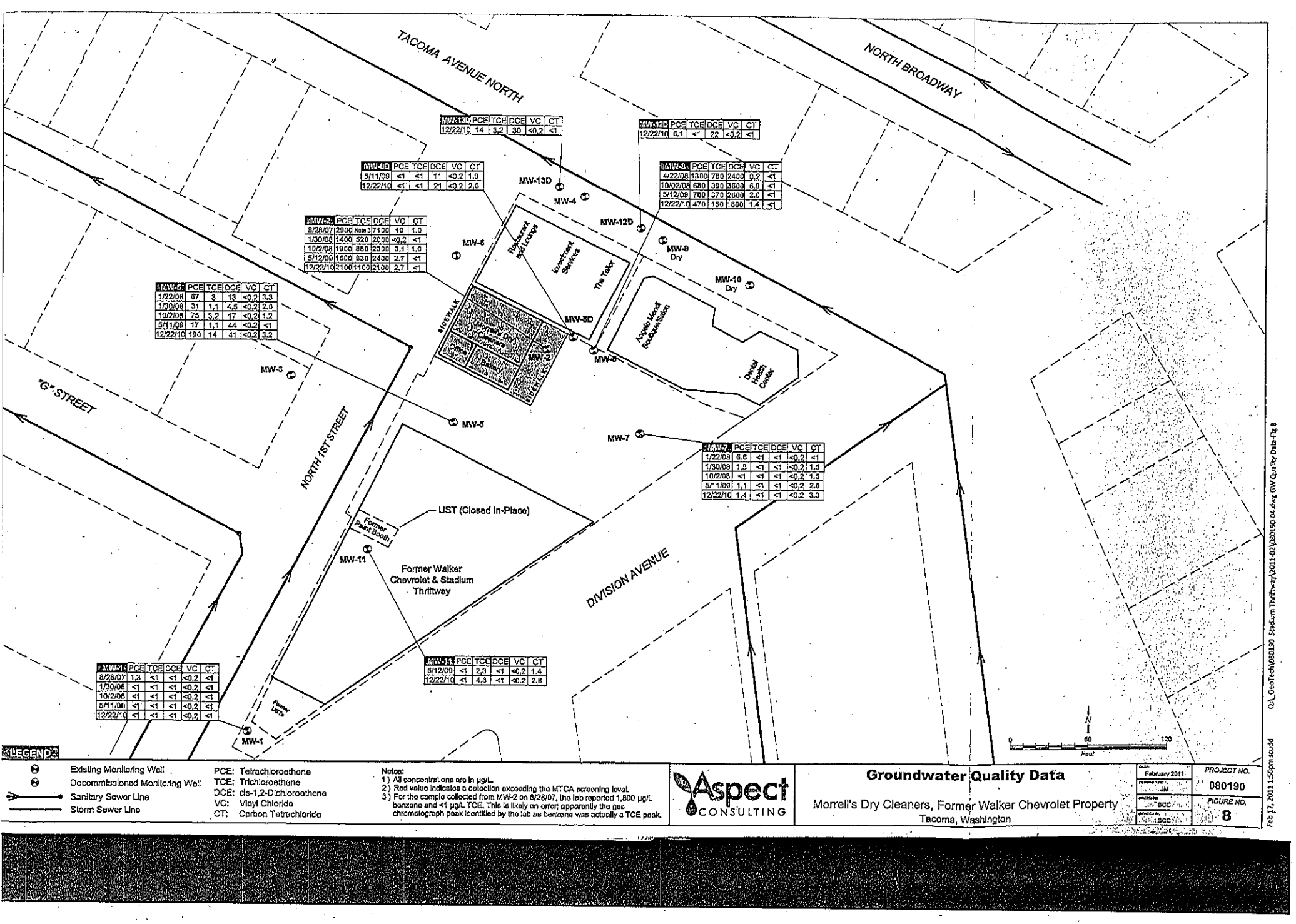
Existing Monitoring Well
Decommissioned Monitoring Well
Sanitary Sewer Line
Storm Sewer Line
Shallow Aquifer Groundwater Elevation Contour in Feet
Estimated Limit of Shallow Aquifer
220.85 Groundwater Elevation in Shallow Aquifer
(160.55) Groundwater Elevation in Deep Aquifer

Aspect CONSULTING

Groundwater Elevation Contour Map
December 2010
Morrell's Dry Cleaners, Former Walker Chevrolet Property
Tacoma, Washington

DATE	February 2011
DRAWN BY	JM
REVIEWED BY	SCC
APPROVED BY	SCC
PROJECT NO.	080190
FIGURE NO.	7

Feb 11, 2011 11:04am sc:dd G:_GeoTech\080190 Stadium Thriftway\2011-01\080190-04.dwg GW Elevation 2010-12-Fig 7



LEGEND

- Existing Monitoring Well
- Decommissioned Monitoring Well
- Sanitary Sewer Line
- Storm Sewer Line

PCE: Tetrachloroethene
TCE: Trichloroethene
DCE: cis-1,2-Dichloroethene
VC: Vinyl Chloride
CT: Carbon Tetrachloride

Notes:
1) All concentrations are in µg/L.
2) Red value indicates a detection exceeding the MTCA screening level.
3) For the sample collected from MW-2 on 8/28/07, the lab reported 1,800 µg/L benzene and <1 µg/L TCE. This is likely an error; apparently the gas chromatograph peak identified by the lab as benzene was actually a TCE peak.

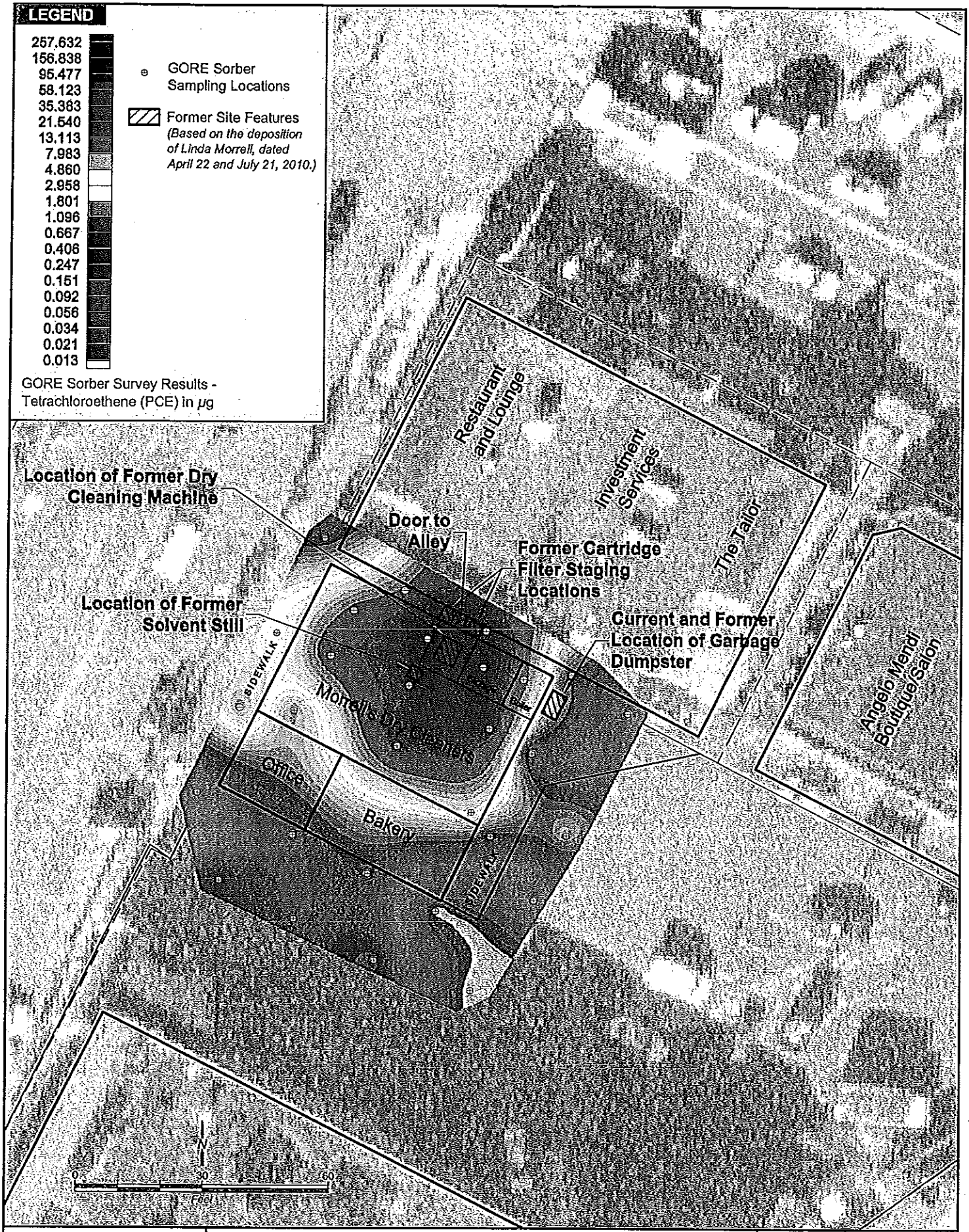
Aspect CONSULTING

Groundwater Quality Data

Morrell's Dry Cleaners, Former Walker Chevrolet Property
Tacoma, Washington

date: February 2011	PROJECT NO. 080190
drawn: JM	
checked: SCC	FIGURE NO. 8
approved: SCC	

Feb 17, 2011 1:50pm scottd G:_GeoTech\080190 Stadium Thriftway\2011-02\080190-04.dwg GW Quality Data-Fig 8



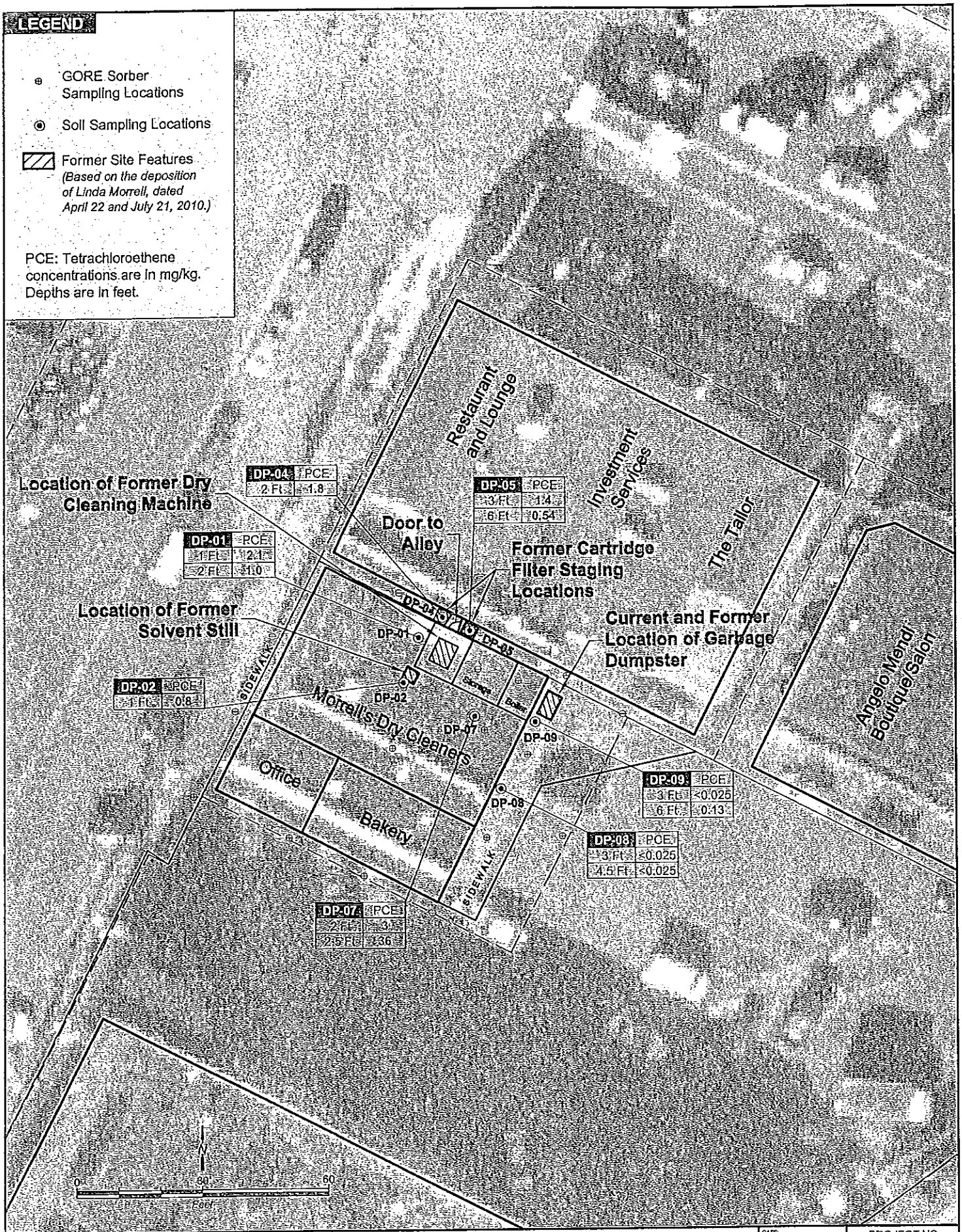
GORE® Module Results-PCE

Morrell's Dry Cleaners, Former Walker Chevrolet Property
Tacoma, Washington

Aspect CONSULTING

DATE: February 2011	PROJECT NO. 080190
DESIGNED BY: JM	
DRAWN BY: SCC	FIGURE NO. 9
REVISED BY:	

Q:_GeoTech\080190 Stadium Thriftway\2011-02\080190-05.dwg GORE Results
Feb 11, 2011 11:10am scudd



PCE Concentrations in Soil

Morrell's Dry Cleaners, Former Walker Chevrolet Property

Aspect

DATE: February 2011	PROJECT NO. 080190
DESIGNED BY: JM	FIGURE NO.
DRAWN BY: SCC	

Q:_GeoTech\080190 Stadium Thriftway\2011-02\080190-05.dwg PCE in Soil

11, 2011 11:09am scudd

$1\ m^3 = (100\ cm)^3 = 1{,}000{,}000\ cm^3 = 1{,}000\ L$

TITUS/THRIFTWAY

∴ multiply µg/L by 1,000 to get µg/m³.

ALYSES OF SOIL GAS VAPORS FOR SPECIFIC HALOGENATED
DROCARBONS BY EPA 8260

SAMPLE-NUMBER		GV-1	GV-2	GV-3	GV-4	GV-5	GV-6
SAMPLE DATE	SOIL GAS VAPORS REPORTING LIMITS	5/8/08	5/8/08	5/8/08	5/8/08	5/8/08	5/8/08
		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
DICHLORODIFLUOROMETHANE	0.1	ND	ND	ND	ND	ND	ND
CHLOROMETHANE	0.1	ND	ND	ND	ND	ND	ND
VINYL CHLORIDE	0.2	ND	ND	ND	0.54	ND	ND
BROMOMETHANE	0.1	ND	ND	ND	ND	ND	ND
CHLOROETHANE	0.1	ND	ND	ND	ND	ND	ND
TRICHLOROFLUOROMETHANE	0.1	ND	ND	ND	ND	ND	ND
ACETONE	.1	ND	ND	ND	ND	ND	ND
METHYLENE CHLORIDE	1	ND	ND	ND	ND	ND	ND
1,1 DICHLOROETHENE	0.1	ND	ND	ND	ND	ND	ND
METHYL-T-BUTYL ETHER (MTBE)	0.1	ND	ND	ND	ND	ND	ND
TRANS-1,2-DICHLOROETHENE	0.05	ND	ND	ND	ND	ND	ND
1,1 DICHLOROETHANE	0.1	ND	ND	ND	ND	ND	ND
2-BUTANONE (MEK)	0.1	ND	ND	ND	ND	ND	ND
CIS-1,2 DICHLOROETHENE	0.05	ND	ND	ND	16	0.32	2.5
2,2-DICHLOROPROPANE	0.1	ND	ND	ND	ND	ND	ND
CHLOROFORM	0.05	ND	ND	ND	ND	ND	ND
BROMOCHLOROMETHANE	0.1	ND	ND	ND	ND	ND	ND
1,1,1- TRICHLOROETHANE	0.1	ND	ND	ND	ND	ND	ND
1,2 DICHLOROETHANE (EDC)	0.1	ND	ND	ND	ND	ND	ND
1,1-DICHLOROPROPENE	0.1	ND	ND	ND	ND	ND	ND
CARBON TETRACHLORIDE	0.1	ND	ND	ND	ND	ND	ND
BENZENE	0.02	ND	ND	ND	0.14	0.39	0.23
TRICHLOROETHENE (TCE)	0.02	ND	ND	ND	ND	2.7	7.8
1,2-DICHLOROPROPANE	0.1	ND	ND	ND	ND	ND	ND
DIBROMOMETHANE	0.1	ND	ND	ND	ND	ND	ND
BROMODICHLOROMETHANE	0.1	ND	ND	ND	ND	ND	ND
4-METHYL-2-PENTANONE (MIBK)	0.1	ND	ND	ND	ND	ND	ND
CIS-1,3-DICHLOROPROPENE	0.1	ND	ND	ND	ND	ND	ND
TRANS-1,3-DICHLOROPROPENE	0.1	ND	ND	ND	ND	ND	ND
TOULENE	0.1	0.13	0.24	0.16	0.1	0.27	0.2
TRANS-1,3-DICHLOROPROPENE	0.1	ND	ND	ND	ND	ND	ND
1,1,2,-TRICHLOROETHANE	0.1	ND	ND	ND	ND	ND	ND
2-HEXANONE	0.1	ND	ND	ND	ND	ND	ND

ANALYSES OF SOIL GAS VAPORS FOR SPECIFIC HALOGENATED HYDROCARBONS BY EPA 8260

SAMPLE-NUMBER		GV-1	GV-2	GV-3	GV-4	GV-5	GV-6
SAMPLE DATE	SOIL GAS VAPORS REPORTING LIMITS	5/8/08	5/8/08	5/8/08	5/8/08	5/8/08	5/8/08
		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
1,3-DICHLOROPROPANE	0.1	ND	ND	ND	ND	ND	ND
DIBROMOCHLOROMETHANE	0.1	ND	ND	ND	ND	ND	ND
TETRACHLOROETHENE (PCE)	0.02	0.11	1	0.16	12	1.6	70
1,2-DIBROMOETHANE	0.1	ND	ND	ND	ND	ND	ND
CHLOROBENZENE	0.1	ND	ND	ND	ND	ND	ND
1,1,1,2-TETRACHLOROETHANE	0.1	ND	ND	ND	ND	ND	ND
ETHYLBENZENE	0.1	ND	ND	ND	ND	ND	ND
XYLENES	0.1	ND	0.15	0.23	ND	ND	ND
STYRENE	0.1	ND	ND	ND	ND	ND	ND
BROMOFORM	0.1	ND	ND	ND	ND	ND	ND
1,1,2,2-TETRACHLOROETHANE	0.1	ND	ND	ND	ND	ND	ND
ISOPROPYLBENZENE	0.1	ND	ND	ND	ND	ND	ND
2,3-TRICHCHLOROPROPANE	0.1	ND	ND	ND	ND	ND	ND
BROMOBENZENE	0.1	ND	ND	ND	ND	ND	ND
N-PROPYLBENZE	0.1	ND	ND	ND	ND	ND	ND
2-CHLOROTOLUENE	0.1	ND	ND	ND	ND	ND	ND
4-CHLORODOLUENE	0.1	ND	ND	ND	ND	ND	ND
1,3,5-TRIMETHYLBENZE	0.1	ND	ND	ND	ND	ND	ND
TERT-BUTYLBENZENE	0.1	ND	ND	ND	ND	ND	ND
1,2,4-TRIMETHYBENZENE	0.1	ND	ND	ND	ND	ND	ND
SEC-BUTYLBENZENE	0.1	ND	ND	ND	ND	ND	ND
1,3-DICHLOROBENZENE	0.1	ND	ND	ND	ND	ND	ND
1,4-DICHLOROBENZENE	0.1	ND	ND	ND	ND	ND	ND
ISOPROPYLTOULENE	0.1	ND	ND	ND	ND	ND	ND
1,2-DICHLOROBENZENE	0.1	ND	ND	ND	ND	ND	ND
N-BUTYLBENZENE	0.1	ND	ND	ND	ND	ND	ND
1,2-DIBROMO-3-CHLOROPROPANE	0.1	ND	ND	ND	ND	ND	ND
1,2,4-TRICHLOROBENZENE	0.1	ND	ND	ND	ND	ND	ND
NAPHTHALENE	0.1	ND	ND	ND	ND	ND	ND
HEXACHLORO-1,3-BUTADIENE	0.1	ND	ND	ND	ND	ND	ND
1,2,3-TRICHLOROBENZENE	0.1	ND	ND	ND	ND	ND	ND

Table 2 - Groundwater Sampling Results

Morrell's Dry Cleaner, Former Walker Chevrolet Property, Tacoma, Washington

Well ID	Date	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	Chloroethane	Chloroform	Carbon Tetrachloride	Acetone	Benzene
MW-1	08/28/07	1.3	<1	<1	<1	<0.2	<1	<1	<1	<10	2.2
	01/30/08	<1	<1	<1	<1	<0.2	<1	<1	<1	<10	<1
	10/02/08	<1	<1	<1	<1	<0.2	<1	<1	<1	<10	<1
	05/11/09	<1	<1	<1	<1	<0.2	<1	<1	<1	<10	<1
	12/22/10	<1	<1	<1	<1	<0.2	<1	<1	<1	14	<0.35
MW-2	08/28/07	2,900	(Note 1)	7,100	7.4	19	8.1	1	1.0	<10	(Note 1)
	01/30/08	1,400	520	2,000	3	<0.2	<1	2.5	<1	<10	<1
	10/02/08	1,900	880	2,300	5.3	3.1	1.0	3.5	1.0	<10	<1
	05/12/09	1,600	930	2,400	5.7	2.7	<1	4.0	<1	<10	<1
	12/22/10	2,100	1,100	2,100	4.8	2.7	<1	5.0	<1	16	<0.35
MW-5	01/22/08	67	3	13	<1	<0.2	<1	2.1	3.3	<10	<1
	01/30/08	31	1.1	4.5	<1	<0.2	<1	1.8	2.0	<10	<1
	10/02/08	75	3.2	17	<1	<0.2	<1	1.9	1.2	<10	<1
	05/11/09	17	1.1	44	<1	<0.2	<1	<1	<1	<10	<1
	12/22/10	190	14	41	<1	<0.2	<1	2.9	3.2	15	1.1
MW-7	01/22/08	6.6	<1	<1	<1	<0.2	<1	<1	<1	<10	<1
	01/30/08	1.5	<1	<1	<1	<0.2	<1	<1	1.5	<10	<1
	10/02/08	<1	<1	<1	<1	<0.2	<1	<1	1.5	<10	<1
	05/11/09	1.1	<1	<1	<1	<0.2	<1	<1	2.0	<10	<1
	12/22/10	1.4	<1	<1	<1	<0.2	<1	<1	3.3	11	<0.35
MW-8	04/22/08	1,300	780	2,400	6.3	0.2	<1	2.5	<1	<10	<1
	10/02/08	680	390	3,600	7.6	6.9	<1	2.5	<1	<10	<1
	05/12/09	780	370	2,600	3.7	2.0	<1	2.5	<1	<10	<1
	12/22/10	470	150	1,800	3.3	1.4	<1	2.2	<1	10	<0.35
MW-8D	05/11/09	<1	<1	11	<1	<0.2	<1	<1	1.9	<10	<1
	12/22/10	<1	<1	21	<1	<0.2	<1	<1	2.0	13	<0.35
MW-11	05/12/09	<1	2.3	<1	<1	<0.2	<1	1.9	1.4	<10	<1
	12/22/10	<1	4.6	<1	<1	<0.2	<1	2.0	2.8	12	<0.35
MW-12D	12/22/10	6.1	<1	22	<1	<0.2	<1	<1	<1	12	<0.35
MW-13D	12/22/2010	14	3.2	30	<1	<0.2	<1	<1	<1	18	<0.35

Notes:

1) For the sample collected from MW-2 on 8/28/07, the lab reported 1,800 µg/L benzene and <1 µg/L TCE. This is likely an error; apparently the gas chromatograph peak identified by the lab as benzene was actually a TCE peak.

PCE - tetrachloroethene

TCE - trichloroethene

cis-1,2-DCE - cis-1,2-dichloroethene

trans-1,2-DCE - trans-1,2-dichloroethene

BOLD signifies exceedence of groundwater screening levels (see Table 5)

Table 3 - Soil Sampling Results

Morrell's Dry Cleaner, Former Walker Chevrolet Property, Tacoma, Washington

Boring ID	Sample Depth (ft)	Date	PCE	TCE	cis-1,2-DCE	Total Xylenes	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	tert-Butylbenzene	sec-Butylbenzene	p-Isopropyltoluene	Naphthalene
DP-01	1	10/21/10	**2.1**	<0.03	<0.05	<0.15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	2	10/21/10	**1.0**	<0.03	<0.05	<0.15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DP-02	1	10/21/10	**0.8**	<0.03	<0.05	<0.15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DP-04	2	10/20/10	**1.8**	<0.03	<0.05	<0.15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DP-05	3	10/20/10	**1.4**	<0.03	<0.05	<0.15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	6	10/20/10	**0.54**	<0.03	<0.05	<0.15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DP-07	2	10/21/10	**3**	<0.03	<0.05	<0.15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	2.5	10/21/10	**36**	**0.14**	0.11	<0.15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DP-08	3	10/20/10	<0.025	<0.03	<0.05	1.16	76	26	0.43	1.8	12	**28**
	4.5	10/20/10	<0.025	<0.03	<0.05	<0.15	0.49	0.35	<0.05	0.14	0.10	0.22
DP-09	3	10/20/10	<0.025	<0.03	<0.05	<0.15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	6	10/20/2010	**0.13**	<0.03	<0.05	<0.15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Notes:
PCE - tetrachloroethene
TCE - trichloroethene
cis-1,2-DCE - cis-1,2-dichloroethene
trans-1,2-DCE - trans-1,2-dichloroethene
BOLD signifies exceedence of soil screening levels (see Table 4)