Letter Health Consultation

FORMER FASHION CARE CLEANERS

2213 WEST MERCURY BOULEVARD

HAMPTON, VIRGINIA

Prepared by
Virginia Department of Health

AUGUST 21, 2012

Prepared under a Cooperative Agreement with the
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Agency for Toxic Substances and Disease Registry
Division of Community Health Investigations
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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LETTER HEALTH CONSULTATION

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Dear Mr. Schellenberg:

This letter is in response to your request for the Virginia Department of Health (VDH) to evaluate if future private drinking and irrigation wells near the former Fashion Care Cleaners site in Hampton, VA pose a health risk. Through a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR), we have completed an evaluation of the groundwater sampling information you provided to VDH on October 20, 2011, along with environmental reports submitted by the Virginia Department of Environmental Quality (DEQ) and Professional Service Industries, Inc. (PSI). On review of the available data, VDH has identified other potential exposure pathways that include inhalation of volatile organic compounds (VOC) on and off site.

BACKGROUND

Site Description and History

The site, formerly known as Fashion Care Cleaners, is located in the Mercury Plaza Shopping Center at 2213 West Mercury Boulevard in Hampton, VA. The shopping center occupies 30 acres of land and in the past was the site of two strip malls (1,2). The main strip mall was located on the southern edge of the shopping center and consisted of three buildings facing north toward West Mercury Blvd. The first building, furthest east and adjacent to Power Plant Parkway, was occupied by HQ and Circuit City and has since been demolished; the middle building still operates as Burlington Coat Factory; and the western most building was a Rose's Department Store, which has been demolished. A smaller strip mall extended from the north side of Rose's Department Store eastward toward West Mercury Boulevard. This smaller strip mall was occupied by Fashion Care Cleaners, Petland, Farm Fresh Supermarket, and a United Virginia Bank building. The former Fashion Care Cleaners site was occupied by various dry cleaners for over 30 years. As of 2000, all buildings on the smaller strip mall were removed. In 2002, Professional Service Industries (PSI), the contractor working for the mall property owner, submitted a preliminary site characterization report to DEQ (3). The site was accepted into DEQ's Voluntary Remediation Program (VRP) on September 5, 2002.

Current Land Use

The Mercury Plaza Shopping Center is bordered by West Mercury Boulevard to the north, Power Plant Parkway to the east, and Marketplace Drive on the western and southern end of the shopping center (See Attachment). There are several active businesses that operate in the shopping center. Commercial buildings, from west to east on West Mercury Boulevard, include Firestone Car Care Center, Chick-fil-A, Texas Steakhouse, and a Cracker Barrel Old Country Store. Commercial buildings south of the Cracker Barrel along Power Plant Parkway include Wells Fargo Bank and Lens Crafter. Burlington Coat Factory is located at the southern end of the shopping center along Marketplace Drive. There is an L-shaped section overgrown with grass in the southwestern corner of the shopping center. This is the site of the former smaller strip mall where Fashion Care Cleaners was located. The property owner plans to develop this area for commercial use and reportedly intends to build nine parcels for business (4).

The VRP boundary covers approximately 4.8 acres and measures approximately 650 feet by 450 feet at its longest and widest points, respectively. The site is bordered by Marketplace Drive to the west and an unnamed tributary of the New Market creek on the other side of Marketplace Drive. There is an overgrowth of vegetation and some sections of fencing separating the site from the creek. On the other side of the creek, there is a residential neighborhood consisting of approximately 50 residences. Four backyards (of residences) are adjacent to the creek. The site is bordered on the north by a Firestone Car Care Center and a Chick-fil-A parking lot. The east side of the site is bordered by the Chick-fil-A parking lot, a larger parking lot, and a grass field. The south side of the site is bordered by Marketplace Drive. A steel fence over 6 feet high runs along Marketplace Drive and separates the shopping center and the adjacent neighborhood to the south. This neighborhood consists of over 100 homes with the backside of one home bordering the southern perimeter of the site.

Across the creek from the southwest corner of the VRP boundary is the northeast corner of Aberdeen Park. Adjacent to the park to the southwest is Aberdeen Elementary School. The school is less than a quarter of a mile from the VRP boundary (See Attachment).

PSI conducted a review of well records at the City of Hampton Health Department on February 14, 2002 and a survey of the surrounding adjoining properties for potable water wells (5,6). The closest identified private drinking well is 4.5 miles to the north of the site. Irrigation wells identified near the site would not be considered potable water sources (2,7). The intake for the public water supply system serving all businesses and residence within a mile of the site is located more than seven miles away to the north (Personal Communication, Dixon Tucker, April 16, 2012).

The creek along the west and the fence along the southern perimeter limit access to the site from the surrounding neighborhoods. However, the site is easily accessible from within the plaza and there are no signs or fences limiting access from the shopping center.

Site Geology and Hydrogeology

The soil stratigraphy at the site is relatively consistent between soil borings. Borings indicate that the site upper layer is clayey with silty fine to medium sand, followed by a layer of very soft, dark gray clayey silt 10-23 feet below the ground surface. Based on its lithological characteristics, the clayey silt layer is considered an aquitard (i.e., a layer of earth material that inhibits groundwater movement). This aquitard separates the unconfined shallow aquifer from underlying aquifers. According to United States Geological Survey Map of the "Newport News North, Virginia" quadrangle map, this aquitard is laterally extensive throughout the study area. Shallow aquifer water table contours indicate that the groundwater flow at the site is to the southwest. Groundwater has been reported to range from 4.76 to 12.65 feet below ground surface throughout most of the site with seasonal fluctuations (1).

A creek approximately 160 feet to the west of the site flows south between Lynnhaven Lake and Newmarket Creek. The creek is 9-10 feet below the surrounding grade and, from observations and an elevation survey, it is expected that shallow groundwater from the site would discharge into this creek. The hydraulic gradient for the site was considered low with an increase in velocity proximal to the creek. On the north side of the former Rose's Department Store building is a storm water sewer line that discharges into the creek. The gravel bed that surrounds the sewer line could intercept the groundwater plume and possibly facilitate the migration of contaminants in the direction of the creek (1).

Environmental Activities

PSI was contracted by the property owner to determine what impact any VOCs used by the former dry cleaners might have on redeveloping the site for commercial space. PSI's preliminary site investigation conducted in December 2001 revealed the presence of VOCs impacting soil and groundwater at the site (Table 1) (3). A Geoprobe investigation completed in 2003 confirmed the presence of a groundwater plume contaminated with VOCs (5). The plume was located in the southwest corner and measures 600 feet long by 350 feet wide (2).

Soil sampling was done at 1 1/2 foot intervals to depths of up to 21 feet. The vertical extent of the impacted soil was determined to extend down to the water table (10 feet below surface) with the highest concentration found 2-4 feet below surface at the northwest corner of the dry cleaner's pad and at 6-10 feet below surface along the northern edge of the former dry cleaner's building. VOCs in groundwater at this depth have the potential to pass through permeable soil and volatilize into the air above. The potential exists for these VOCs to collect in any future building on site without a vapor intrusion barrier. The horizontal extent of the impacted soil was limited to a rectangular area around the former dry cleaners pad measuring approximately 0.4 acres (1, 3).

Table 1: Multi-year On-site (Soil and Groundwater) and Off-site (Surface Water and Sediment) Environmental Sampling Results*

	On-Site					Off-Site			
Chemical	**Soil**		**Groundwater**			**Surface water**		**Sediment**	
	2002	**2005†**	**2002**	**2006**	**2011**	**2003**	**2011**	**2003**	**2011**
1,1-Dichloroethene	NR	< 270	**2,500**	< 20	1.2	NR	< 1	NR	NR
cis-1,2-Dichloroethene	**8,500**	**4,100**	**250,000**	**3,200**	**1,200**	95	82	NR	NR
trans-1,2-Dichloroethene	NR	< 270	**1700**	44	23	NR	1.2	NR	NR
Tetrachloroethylene	**2,900,000**	**86,000**	**4,7000**	**1,200**	**240**	**91**	**38**	NR	NR
Trichloroethylene	**73,000**	**4,000**	**16,000**	**1,300**	**770**	62	36	NR	NR
Vinyl Chloride	< 57	< 270	**30,000**	**360**	**140**	7.2	5.9	NR	11
Methyl *tert*-butyl ether	NR	< 270	**2,500**	NR	**21**	50	7.8	12	12
Diisopropyl ether	NR	< 270	NR	NR	2.7	8.7	14	9.5	NR
1,4-Dichlorobenzene	NR	NR	NR	NR	<1	NR	NR	NR	NR

*All concentrations are in µg/L. Results are the highest detected value from multiple samples collected. **NR** = Not Reported. † Soil sample collected post soil removal and potassium permanganate injections. **Bold face** concentrations exceeded current DEQ Tier II Screening Levels.

Additional sampling off site included surface water and sediment samples taken from a creek near the site (2,8). VOCs and other chemicals were detected in the surface water and sediment from the creek. PSI compared on-site and off-site levels to DEQ's site remediation Tier II Screening Levels. Only tetrachloroethylene (PCE) exceeded screening levels off site in surface water. DEQ's Tier II levels are based on the assumption of residential exposure and are obtained from published sources including the United States Environmental Protection Agency (EPA) Region III Screening Levels (9).

Environmental Activities Timeline

July 2002 –PCE and its breakdown products, trichloroethylene (TCE), *cis*-1,2-dichloroethene (*cis*-1,2 DCE), *trans*-1,2-dichloroethene (*trans*-1,2 DCE), and vinyl chloride (VC) were detected in soil and groundwater on site

September 2002 –site accepted into DEQs VRP

August 2003 –surface water and sediment from off-site creek on the western property boundary sampled; DEQ's Tier II screening levels were not exceeded

March 2005 –10,000 tons of chlorinated solvent-impacted soil removed from site (approximately 8 feet deep and approximately 14,500 square feet) and back filled with uncontaminated soil (10)

July-September 2005 –on-site groundwater treated with sodium permanganate

September 2009 –groundwater sampling conducted on and off site

September 2011 –groundwater sampling conducted on and off site

December 2011 –surface water from off-site creek on the western property boundary sampled; DEQ's Tier II screening levels were not exceeded

DISCUSSION

Exposure Pathway Analysis

VDH determines exposure to environmental contamination by identifying exposure pathways. A completed exposure pathway consists of five elements: a source of contamination, an environmental medium (e.g., air, water and soil), a point of exposure, a route of exposure, and a receptor population (e.g., workers, community members and individual household members). A *complete pathway* exists when all five elements of a pathway are present. A *potential pathway* exists when one or more of the elements are not present, but the element(s) cannot be eliminated because of insufficient information. An *eliminated pathway* exists when one or more of the elements is not present. Once a *completed pathway* has been identified, it is evaluated further to determine the health risk to the exposed population

VDH reviewed two potential exposure pathways requested by the Hampton City Health Department: groundwater contamination in private drinking wells and irrigation wells off site. VDH has determined that there is no current completed groundwater exposure pathway associated with this site because there are no data available which suggest that the contaminated groundwater has reached any private drinking or irrigation wells off site. Also, the closest private well according to the survey conducted by PSI is 4.5 miles away.

- *Completed exposure pathways* – No pathways containing all five elements to complete a pathway have been identified.

- *Eliminated exposure pathways* – Ingestion of groundwater contaminated with chemicals of concern from the site have been eliminated.

    - *On-site groundwater* – This exposure pathway was eliminated from consideration because there is no current use or likely future use of groundwater under this site. The Groundwater Assessment Report submitted to DEQ recommended that the owner establish an institutional control for the site, which prevents use of groundwater beneath the site for any purpose (11).

    - *Off-site private well water* – The closest drinking wells identified in February 2002 are located approximately 4.5 miles to the north of the site on Woods Lane in Hampton. These wells are up-gradient from the site. The surrounding area is residentially developed and all the residences within 1.0 mile of the site are on municipal water. It is unlikely that a new development or residence would be constructed within 1.0 mile of the site that would not use municipal water (1).

    - *Up-gradient off-site irrigation well water* – The Hampton City Health Department has identified two businesses north of West Mercury Boulevard that have irrigation wells. The irrigations wells are at 2302 West Mercury Boulevard and 1824 Todds Lane and are approximately 350 and 550 yards from the site, respectively. Given the known direction of the groundwater and the location of these irrigation wells, which are up-gradient, it is unlikely that irrigation wells could become contaminated with chemicals from the site (7). In general, water

from irrigation wells is not used for cooking, bathing, or drinking, thus further eliminating the potential for exposure.

- *On-site soil* – This pathway is eliminated because the contaminated on-site soil was removed and replaced with clean soil.

- <u>*Potential Exposure Pathways*</u> **–** The following section lists potential human exposure pathways for this site.

  - *Down-gradient off-site irrigation well water* – PSI reported that the location of the nearest irrigation well is believed to be at an adjacent private residence located at the southern border of the site (2). The Hampton City Health Department does not have any records that an irrigation well is on this property. The Hampton City Health Department did not begin collecting irrigation well records until 1992 (7). However, VDH believes that because contaminants were found in MW-42, which is located off site to the south, the potential exists for groundwater to the south to be contaminated. Therefore, if an irrigation well does exist on the property where MW-42 is located, a potential exposure pathway exists.

  - *On-site vapor intrusion* – Since the depth of the contaminated groundwater is shallow (2-4 feet below surface), VOCs may volatilize and collect in any future above-ground structure on site.

  - *Off-site vapor intrusion* – Since the depth of the contaminated groundwater is shallow (2-4 feet below surface), VOCs may volatilize and collect in any structure off site if the plume migrates beyond the site boundary.

Chemical Evaluation

The Virginia Department of Health compares the concentrations of contaminants found in groundwater to ATSDR's and other comparison values. If a contaminant concentration exceeds the comparison value it is selected for further evaluation. Contaminant concentrations below comparison values (CV) are considered safe and are not evaluated further. Concentrations above CVs are not necessarily a health concern. Site specific exposure scenarios are part of the evaluation.

Comparison values used to screen contaminants in groundwater at this site include:

- ATSDR Environmental Media Evaluation Guides (EMEGs)
- EPA Maximum Contaminant Levels (MCLs)
- EPA Regional Screening Levels (RSL)

Table 2: 2009 and 2011 Off-site Monitoring Well Contaminant Concentrations and Comparison Values.*

Chemical	MW-42		MW-43		MW-44		CV		CV Source
	2011	2009	2011	2009	2011	2009	Child	Adult	
Depth of wells (ft)	8.3	9.6	8.3	9.8	9.0	10			
1,1-Dichloroethene	<1	<1	<1	<1	<1	<1	90	300	EMEG
cis-1,2-Dichloroethene	10	8.4	<1	<1	<1	<1	70		MCL
trans-1,2-Dichloroethene	<1	<1	<1	<1	<1	<1	100		MCL
Tetrachloroethylene	4.6	1.4	<1	<1	<1	<1	5		MCL
Trichloroethylene	1.8	1.3	<1	<1	<1	<1	5		MCL
Vinyl Chloride	<1	<1	<1	<1	<1	<1	30	100	EMEG
Methyl *tert*-butyl ether	19	150	<1	2.6	<1	<1	3,000	10,000	EMEG
Diisopropyl ether	5.5	56	<1	1.1	<1	<1	1,500		RSL
1,4-Dichlorobenzene	<1	<1	<1	<1	1.7	2.5	700	2,000	EMEG

* All concentrations are in µg/L. EPA MCLs and RSLs were used as comparison values if ATSDR did not provide one.

The potential for exposure to chemicals is limited to groundwater down-gradient off-site. Comparing the concentrations of chemicals in off-site monitoring wells (Table 2) to ATSDR and EPA screening guidelines showed contaminants did not exceed comparison values off site. Only one well off site (MW-42) had detectable levels of contaminants. Because these levels were below comparison values, these results were not evaluated further. At levels below the comparison values, it is unlikely that chemical exposure will result in any adverse health effects.

On comparing the off-site 2009 and 2011 well water results, the 2011 results were about the same as the 2009 results and did not show a trend of increasing or decreasing during this period. These include PCE, TCE, *cis*-1, 2 DCE, *tran*-1, 2 DCE, and VC. MTBE and DIPE are fuel additives and are not used for dry cleaning purposes. The presence of fuel additives in the off-site groundwater may be due to another source such as a leaking underground petroleum storage tank, fuel spill, or illegal dumping of petroleum products.

CONCLUSIONS

- Currently, contaminated groundwater on site is not harming people's health because no one is drinking it.

- Off-site groundwater is also not likely to harm people's health at this time. Contaminants at low levels have been found near the site, but levels are below screening values and no one is drinking the water. Contaminants include fuel additives that were found off site and are not related to the dry cleaner.

- There is potential for vapor intrusion on site unless a vapor barrier is installed during new construction. The potential for vapor intrusion exists in off-site commercial and residential buildings if the plume migrates beyond the site boundary.

RECOMMENDATIONS

- VDH supports DEQ's recommendation that the natural attenuation of the remaining plume be monitored on at least an annual basis.

- In the future, no wells should be permitted down-gradient of the site.

- VDH supports DEQ's recommendation that any building constructed on site must have a designed and engineered vapor mitigation system that includes a vapor barrier and active vapor extraction system.

- The homeowner adjacent to the site should be made aware of the sampling results from MW-42.

- Soil vapor intrusion sampling at off-site residential and commercial buildings should be conducted if the concentrations of off-site contaminants increase.

Thank you for allowing us time to address your concerns. If you have additional questions, please contact the VDH Division of Environmental Epidemiology at (804)-864-8182 or at 109 Governor Street, Richmond, VA 23219.

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Cc: S. William Berg, MD, MPH District Director, Hampton Health District

REFERENCES

1. PSI Service Industries Inc, Delineation report, December 2004.

2. PSI Service Industries Inc, Risk assessment report, October 2007.

3. PSI Service Industries Inc, Preliminary site characterization report, June 2002.

4. PSI Service Industries Inc, Limited groundwater assessment report, November 2011.

5. PSI Service Industries Inc, Geoprobe investigation report, December 2003.

6. PSI Service Industries Inc. Interim Groundwater Remedial Action Work Plan, June 2005.

7. Personal communication with John Schellenberg, Environmental Health Manager, Hampton Health Department. Dec 20th 2011.

8. ESI Lab Science Inc, Surface water report summary, December 2011.

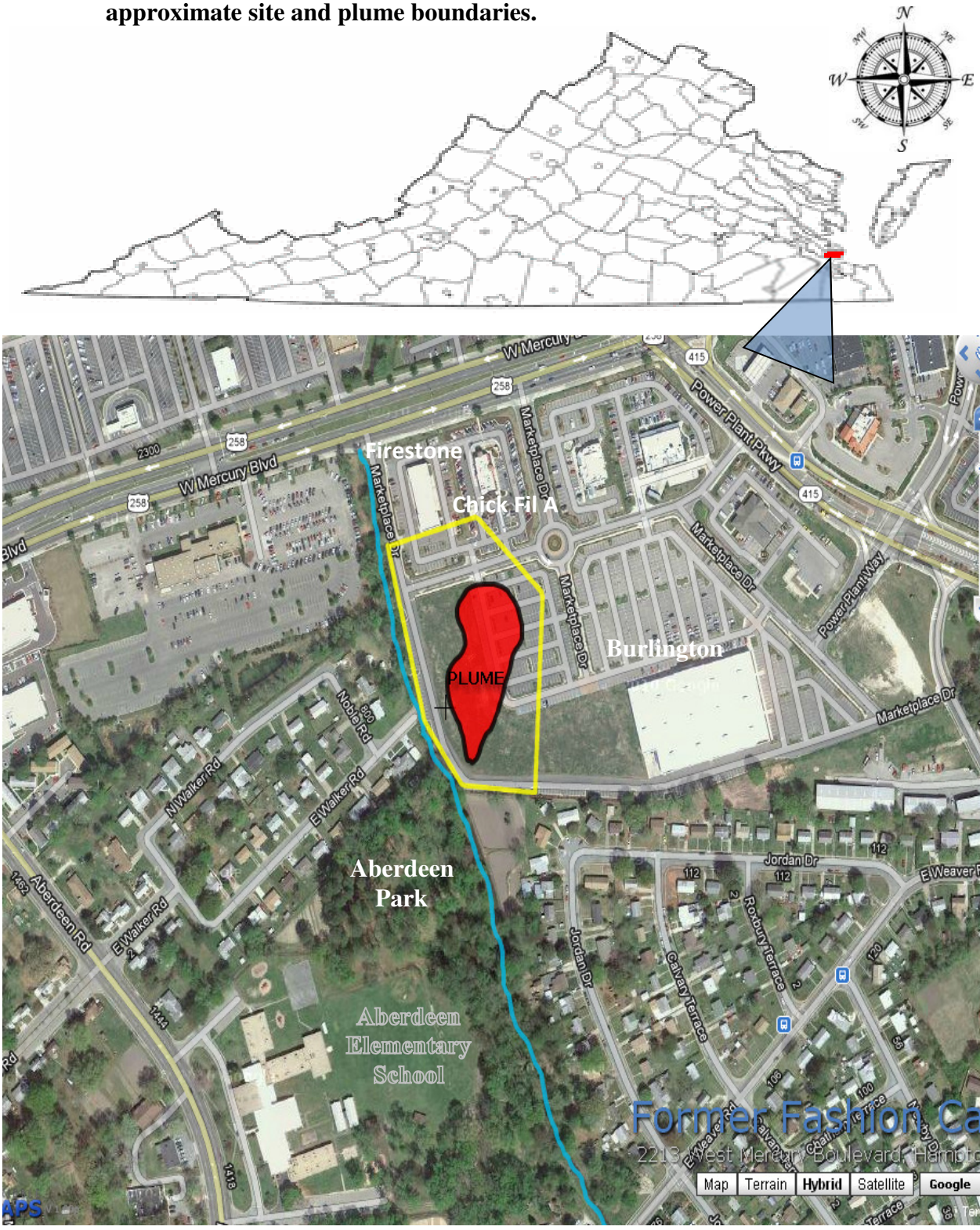
9. Virginia Department of Environmental Quality website. Voluntary remediation program risk assessment guidance accessed Dec 2012. http://www.deq.state.va.us/vrprisk/raguide.html#24

10. PSI Service Industries Inc, Initial Remedial Action - Source Removal Report, May 2005.

11. PSI Service Industries Inc, Groundwater assessment report, November 2009.

ATTACHMENTS

2011 Location of Former Fashion Care Facility and surrounding area with approximate site and plume boundaries.

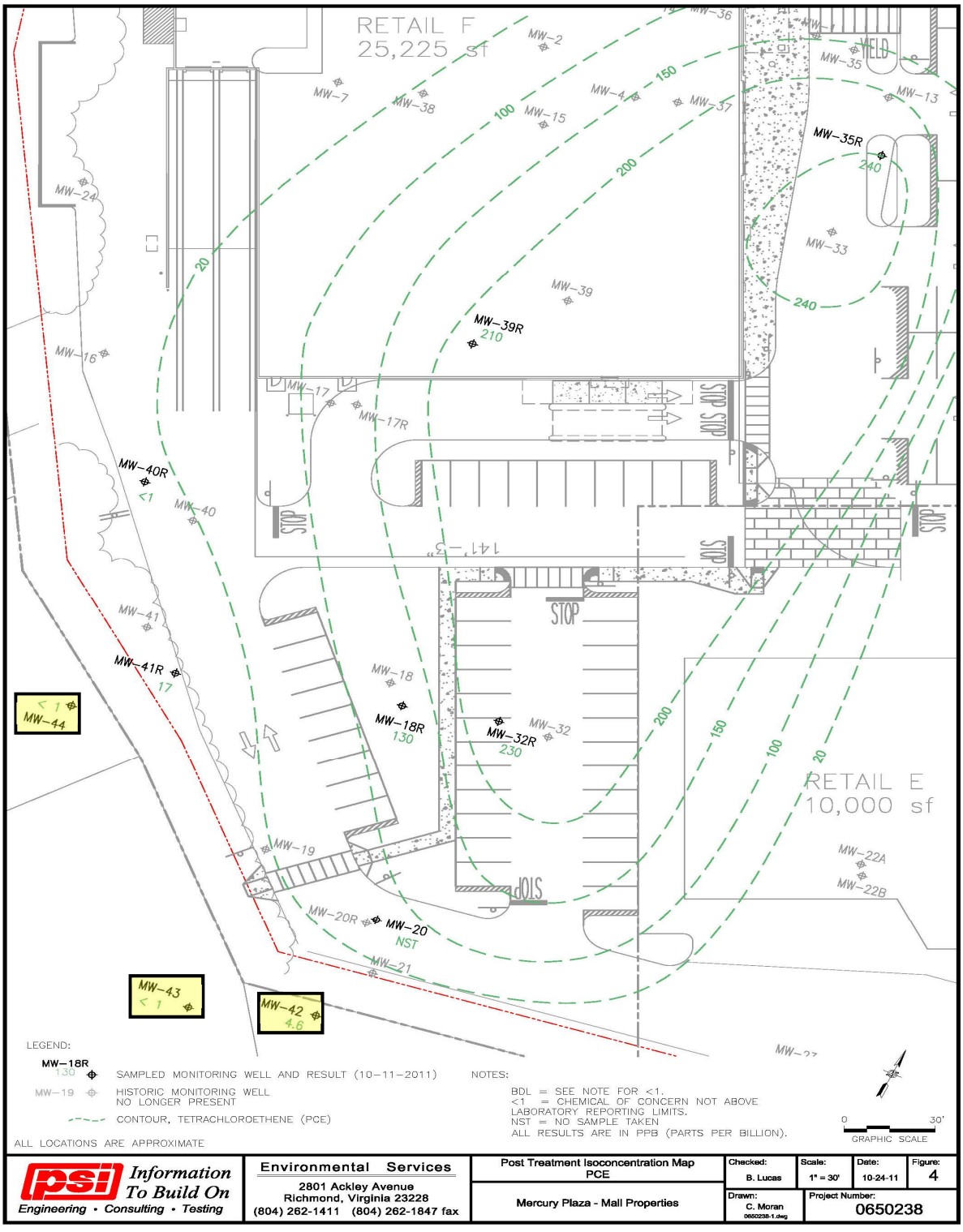


Creek

VRP Boundary

Plume Area

Off-Site Groundwater Sampling locations on Former Fashion Care Facility.



Off-Site Monitoring Wells

REPORT PREPARATION

This Letter Health Consultation for the Fashion Care Cleaners Site was prepared by the Virginia Department of Health under a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with the approved agency methods, policies, procedures existing at the date of publication. Editorial review was completed by the cooperative agreement partner. ATSDR has reviewed this document and concurs with its findings based on the information presented.

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