STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
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April 25, 2017

Mr. Paul Fairbairn
STANTEC, Inc.
11130 NE 33rd Place
Suite 200
Bellevue, WA 98004

Re: No Further Action at the following Site:

- **Site Name:** Jem Locke 7 Eleven 27482
- **Site Address:** 14201 Interurban Avenue South, Tukwila, WA 98168
- **Facility/Site No.:** 54824185
- **Cleanup Site ID No.:** 6264
- **VCP Project No.:** NW2552

Dear Mr. Fairbairn:

The Washington State Department of Ecology (Ecology) received your request for an opinion on your independent cleanup of the **Jem Locke 7 Eleven 27482** 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?

NO. Ecology has determined that no 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 it's 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:

- Gasoline-range total petroleum hydrocarbons (TPH-G), diesel-range total petroleum hydrocarbons (TPH-D), oil-range total petroleum hydrocarbons (TPH-O), benzene, ethylbenzene, toluene, total xylenes (BTEX), lead, and carcinogenic polycyclic aromatic hydrocarbons (cPAHs) into the Soil

- TPH-G, TPH-D, TPH-O, and benzene into the Ground Water

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

Please note a parcel of real property can be affected by multiple sites. At this time, we have no information that the parcel associated with this Site is affected by other sites.

Basis for the Opinion

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

1. Stantec Consulting Services, *Email from P, Fairbairn to G. Carrosino; A2.2 Worksheets with Groundwater Analytical Results; Updated Table – Method B Groundwater Concentrations; 14225 Interurban Avenue South, Tukwila, WA;* dated January 6, 2017.

2. Stantec Consulting Services, *7-Eleven Store 27482 Cleanup Action Report; 14225 Interurban Avenue South, Tukwila, WA;* dated November 10, 2015.

3. Stantec Consulting, Inc., *Work Plan for Additional Site Assessment, Jem Locke 7 Eleven 27482 Facility; 14225 Interurban Avenue South, Tukwila, Washington;* dated January 16, 2014.

4. Stantec Consulting, Inc., *Ground Water Monitoring Well Installation Report, 7-Eleven Facility Number 27482; 14225 Interurban Avenue South, Tukwila, Washington*, dated July 31, 2007.

5. Stantec Consulting, Inc., *Final Cleanup Report; Jem Locke 7 Eleven 27482 Facility; 14225 Interurban Avenue South, Tukwila, WA;* dated November 8, 2011.

6. SECOR International, Inc., *Ground Water Monitoring Well Installation Report, 7-Eleven Facility Number 27482; 14225 Interurban Avenue South, Tukwila, Washington*, dated June 15, 2004.

7. SECOR International, Inc., *Final Work plan for Remedial Excavation and Additional Site Assessment; Jem Locke 7 Eleven 27482 Facility; 14225 Interurban Avenue South, Tukwila, WA;* dated February 3, 2004.

Those documents are kept in the Central Files of the Northwest Regional Office of Ecology (NWRO) for review by appointment only. You can make an appointment by calling the NWRO resource contact at (425) 649-7235, or via email at NWRO_public_request@ecy.wa.gov.

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 **no 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 sufficient to establish cleanup standards and select a cleanup action. The Site is described above and in **Enclosure A.**

The lateral and vertical extent of petroleum-impacted soil and ground water have been adequately defined and remediated upon the completion of several investigations, cleanup actions, confirmation soil sampling and ground water monitoring. Soil analytical results of confirmation samples collected from six soil boring locations near the 2004 excavation and in the southeast section of the Property were below MTCA Method B cleanup levels for TPH-G, TPH-D, TPH-O, BTEX and lead. Additional soil data was collected, with the focus on locations as close as possible to historical data gaps. Ground water in the seven Site monitoring wells has been determined to be in compliance with both MTCA Method A and Method B cleanup levels for TPH-G, TPH-D, TPH-O, and benzene. Ground water monitoring wells were installed on-site in 2004, and were sampled quarterly for seven years until 2011. It was concluded that dissolved concentrations of petroleum hydrocarbons exceeding MTCA Method A cleanup levels initially detected in ground water have attenuated over time after the source area was removed in 2004. Results of the third quarter 2011 sampling event confirmed that petroleum hydrocarbons had remained below MTCA Method A cleanup levels in all wells for more than four consecutive quarters.

2. Establishment of cleanup standards.

Ecology has determined the cleanup levels and points of compliance you established for the Site meet the substantive requirements of MTCA.

Soil
Cleanup Levels:

The Site does not meet the MTCA definition of an industrial property; therefore soil cleanup levels suitable for unrestricted land use are appropriate. Soil cleanup levels based on leaching (protection of ground water), and protection of direct contact are appropriate. The calculated MTCA Method B cleanup levels for TPH-G, TPH-D, TPH-O, BTEX and lead are considered appropriate for soil at the Site and are protective of human health and the environment.

Soil cleanup levels protective of terrestrial ecological receptors are not necessary because the Site meets the simplified Terrestrial Ecological Evaluation (TEE) exclusion criteria (Table 749-1 of WAC 173-340-7491(1)(a) and (b)). The land use at the Property and surrounding area makes substantial wildlife exposure unlikely. Also, there are less than 1.5 acres of contiguous undeveloped land on or within 500 feet of any area of the Site.

Point of Compliance: For soil cleanup levels based on the protection of ground water, the point of compliance is defined as Site-wide throughout the soil profile and may extend below the water table. This is the appropriate point of compliance for the Site.

Ground Water
Cleanup Levels:

MTCA Method B cleanup levels for TPH-G, TPH-D, TPH-O, and benzene are the applicable ground water cleanup levels necessary for this Site.

Point of Compliance: The standard point of compliance for ground water is throughout the Site from the uppermost level of the saturated zone extending vertically to the lowest depth which could potentially be affected.

3. Selection of cleanup action.

Ecology has determined the cleanup action you selected for the Site **meets** the substantive requirements of MTCA.

The cleanup selected consisted of excavation and off-Site removal of petroleum-impacted soil screened to the MTCA Method B soil cleanup levels for TPH-G TPH-D, TPH-O, BTEX and lead; the evaluation and monitoring of ground water in selected Site monitoring wells (monitoring wells MW-1 through MW-7); and an evaluation (soil and ground water) of highest historical concentrations with results below soil MTCA Method B cleanup levels and below ground water MTCA Method B cleanup levels for Constituents of Concern (COCs) confirmed. The selected cleanup action meets applicable minimum requirements for cleanup actions stipulated in WAC 173-340-360: protect human health and the environment, comply with cleanup standards, use permanent solutions, and provide for reasonable restoration times.

4. Cleanup.

Ecology has determined the cleanup you performed meets the cleanup standards established for the Site.

A soil removal action was conducted at the Site in 2004. Confirmation soil samples were collected from the limits of the remedial excavation, and all vadose-zone soils with concentrations greater than MTCA Method B soil cleanup levels were removed from the Site. In 2014, additional soil characterization was conducted. Six soil samples were analyzed for VPH and EPH to establish MTCA Method B cleanup levels for total petroleum hydrocarbons. In 2004, hydrocarbon constituents were detected at concentrations greater than MTCA Method A cleanup levels in ground water. As a result, ground water monitoring wells were installed on the Site and sampled quarterly for seven years. It was concluded that dissolved concentrations of petroleum hydrocarbons have attenuated over time after the source area was removed in 2004. Results of the third quarter 2011 sampling event confirmed that petroleum hydrocarbons have remained below MTCA Method A cleanup levels in all wells for more than six consecutive quarters.

Ground water monitoring sample events were also conducted in 2014 and 2015: the results of the first quarter 2014 sampling event and the first quarter 2015 sampling event confirmed that petroleum hydrocarbons have remained below MTCA Method A and below MTCA Method B cleanup levels in all wells. An empirical demonstration of soil cleanup levels for ground water protection was conducted since it was determined that the horizontal and vertical migration of ground water in contact with impacted soil on Site has not resulted in groundwater concentrations above MTCA Method A cleanup levels in any of the on-site or off-site monitoring wells since 2010. It was also determined through a 2015 soil and ground water collection and VPH/EPH assessment that the horizontal and vertical migration of ground water in contact with impacted soil on Site has not resulted in groundwater concentrations above MTCA Method B cleanup

levels.

The data determined that the cleanup action resulted in soil and ground water cleanup standards being met in a reasonable timeframe.

Listing of the Site

Based on this opinion, Ecology will remove the Site from our Confirmed and Suspected Contaminated Sites List and Leaking Underground Storage Tank List.

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).

Termination of Agreement

Thank you for cleaning up the Site under the Voluntary Cleanup Program (VCP). This opinion terminates the VCP Agreement governing this project (VCP # NW2552).

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 or the termination of the Agreement, please contact me by phone at 425-649-4422 or e-mail at gcar461@ecy.wa.gov.

Sincerely,

Glynis A. Carrosino, Project Manager
Toxics Cleanup Program

BY CERTIFIED MAIL: [9171 9690 0935 0132 1878 74]

Enclosure: (1) A – Description and Diagrams of the Site

cc: Jose Rios, Environmental Manager, 7 –Eleven, Inc.
Sonia Fernandez, VCP Coordinator, Ecology
Matt Alexander, VCP Financial Manager, Ecology

Enclosure A

Description and Diagrams of the Site

Site Description

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

Site Definition: The Site is defined by the extent of releases to soil and ground water of gasoline-range total petroleum hydrocarbons (TPH-G), diesel-range total petroleum hydrocarbons (TPH-D), oil-range total petroleum hydrocarbons (TPH-O), benzene, ethylbenzene, toluene, total xylenes (BTEX), lead, and carcinogenic polycyclic aromatic hydrocarbons (cPAHs) associated with a 7-Eleven-owned property. The Property consists of a restaurant (Galliano Cucina) and associated asphalt parking with prior commercial activity at 14225 Interurban Avenue South in Tukwila, Washington. The Property and the Site are shown on the attached Site Diagrams.

Area Description: The Property is located on the west side of Interurban Avenue South in a mixed commercial and residential area of Tukwila. The Property is bordered to the west by residential properties, Interurban Avenue South borders the property to the east, beyond which lies commercial properties. The Property is bordered to the south by Normandy Court Apartments, a commercial development. The Property is comprised of King County parcel number 336590-1470, and occupies 0.287 acres. The one-story restaurant building covers approximately 3008 square feet.

Property History and Current Use: The Property was used as a fuel facility from the early to the mid-twentieth century. A residential home, grocery store and an automotive repair facility were constructed on the property in 1946. The Property was then developed as a gas station in approximately 1947 when the buildings were remodeled. The underground storage tanks (USTs) were installed. The USTs were replaced in 1972 and removed from the Site in 1988. In 1986, Jem and Lilly Locke sold the Property to the Southland Corporation (7-Eleven, Inc.) but there is no record of 7-Eleven ever having sold fuel on the Property. In 1987, all buildings on the Property were demolished. In 1990, permanent closure documentation of the Site USTs was conducted. A checklist for the in-place closure identified two premium unleaded gasoline tanks between 1,000 to 5,000 gallons in size that were still on the Property. Also present on the Property were also one regular gasoline tank between 10,000 and 20,000 gallons, and one unleaded gasoline tank between 10,000 and 20,000 gallons. These four USTs had all been removed in late 1988. No new tanks replaced the removed tanks. In 2003, 7-Eleven, Inc. sold the Property to Mario Galliano, LLC. The one-story restaurant with an associated asphalt parking lot, constructed in 2004 is the current use of the Property.

Contaminant Sources and History of Releases: Four gasoline USTs were removed from the Property by 1988. An initial product release was reported in 2003 following excavation for subsurface facilities. The UST tightness test results suggested releases from the former gasoline USTs, product piping and dispensers at a depth of 4 to 20 feet bgs had occurred. A soil removal action was conducted in 2004. Soil samples were collected from the limits of the remedial excavation, and all vadose-zone soils with concentrations greater than MTCA Method B soil cleanup levels were removed from the Site. Also in 2003, hydrocarbon constituents were

detected at concentrations greater than MTCA Method A cleanup levels in ground water. As a result, ground water monitoring wells were installed on the Site in 2004, and were sampled quarterly for seven years. Contaminant of concern concentrations were below MTCA Method A cleanup levels for more than four consecutive quarters of ground water monitoring. In 2014, additional soil characterization was conducted. Six soil samples were analyzed for VPH and EPH to calculate MTCA Method B cleanup levels for petroleum hydrocarbons.

Physiographic Setting: The Site is located within the Puget Sound Lowland Physiographic Province which consists primarily of glacially-deposited sediments. The Puget Lowland is underlain by tertiary volcanic and sedimentary bedrock, and has been filled to the present day land surface with Pleistocene glacial and non-glacial sediments.

The ground surface elevation at the Site is approximately 40-feet above mean sea level. The topography is relatively flat.

Storm Water/Surface Water: The closest body of water to the Site is the Duwamish River, which is located approximately 500 feet northeast of the Site. The Duwamish River flows north in the vicinity of the Site, discharging into Elliott Bay in Puget Sound, approximately 10.5 miles north of the Site. Catch basins located on the Site connect into the City of Tukwila storm water drain system. Surface waters of the Property drain in a northwesterly direction.

Ecological Setting: The Property is paved with asphalt. The Site and surrounding area are developed as residential and commercial properties. Little undeveloped land or terrestrial habitat exists immediately around the Site, in the immediate vicinity of the Property.

Geology: The Site is located within the Puget Sound Lowland Physiographic Province. The regional sediments consist primarily of Vashon glacial till and younger Holocene alluvium deposits. The geology of the Site consists predominately of dense glacial deposits composed of silt with some course gravel on top of black alluvium sand of volcanic origins. The Site is covered with 2 inches of asphalt followed by 12 feet of gravelly sandy fill material (2004 excavation). The layer of fill is underlain by approximately 8 feet of dense gray clayey silt with some course gravel.

Ground Water: Regional ground water occurs in the Puget-Willamette Trough Lowland regional aquifer between the Cascade and Olympic mountain ranges. The depth to perched ground water fluctuates at the Site and ranges from approximately 5 to 18 feet bgs. Based on 7 years of ground water elevations measured during Site investigations, the predominant ground water flow direction is to the north-northeast toward the Duwamish River.

Release and Extent of Contamination - Soil: Petroleum hydrocarbons in the gasoline range (TPH-G), diesel range (TPH-D), oil range (TPH-O), BTEX, CPAHs, and lead were the known contaminants present in soil at the Site. A total of 76 confirmation soil samples were collected during advancement of the 2011 soil probes. 1,400 cubic yard of petroleum-impacted soil was excavated and removed from the Site during the remedial action. Site data indicated that

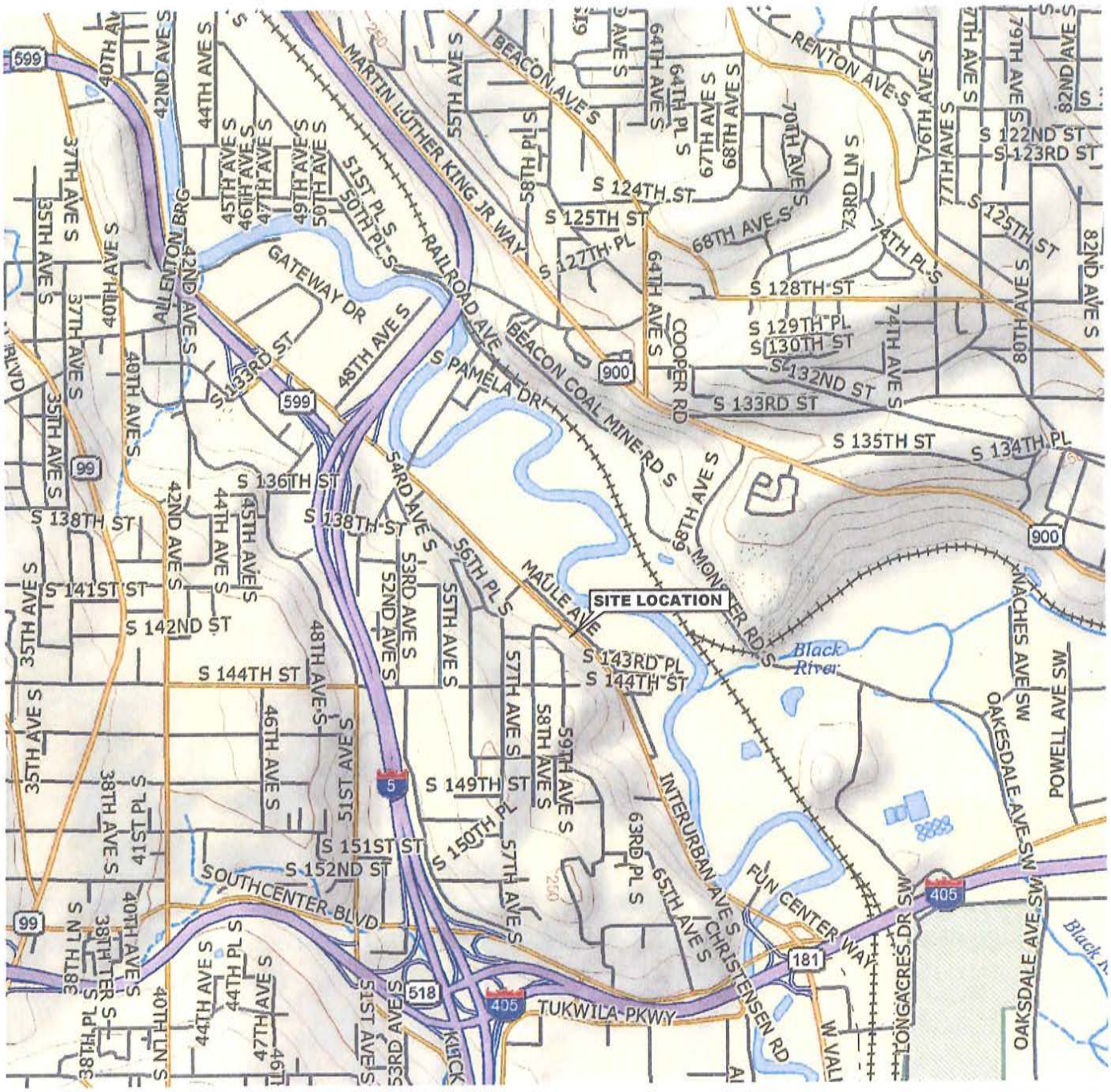
contamination in soil above MTCA Method B cleanup levels was at a maximum depth of approximately 10 feet bgs.

In 2014, additional soil characterization was conducted. Six soil samples were analyzed for VPH and EPH to establish MTCA Method B cleanup levels for total petroleum hydrocarbons. An evaluation (soil and ground water) of highest historical concentrations with results below soil MTCA Method B cleanup levels and below ground water MTCA Method B cleanup levels for Constituents of Concern (COCs) were confirmed.

Release and Extent of Contamination – Ground Water: TPH-G, TPH-D, TPH-O, and benzene were the known contaminants present in ground water on the Site. In 2004, four ground water monitoring wells, MW-1 through MW-4, were installed in the south portion of the Site. The wells were installed to a depth of 20 feet bgs. The results of the initial groundwater sampling confirmed the presence of a dissolved petroleum plume exceeding MTCA Method A cleanup levels beneath the northern portion of the parking area. In 2006, three additional monitoring wells MW-5 through MW-7 were installed to a depth of 26 feet bgs downgradient of the Property to further assess the nature and extent of petroleum impact to soil and ground water at off-Site and downgradient locations. Petroleum constituents of concern were below MTCA Method A cleanup levels. The seven ground water monitoring wells were sampled quarterly for seven years. Four consecutive quarters of ground water monitoring results below COC MTCA Method A cleanup levels were achieved and documented in the third quarter of 2011.

Ground water monitoring sample events were also conducted in 2014 and 2015: the results of the first quarter 2014 sampling event and the first quarter 2015 sampling event confirmed that petroleum hydrocarbons have remained below MTCA Method A and below MTCA Method B cleanup levels in all wells. An empirical demonstration of soil cleanup levels for ground water protection was conducted since it was determined that the horizontal and vertical migration of ground water in contact with impacted soil on Site has not resulted in groundwater concentrations above MTCA Method A cleanup levels in any of the on-site or off-site monitoring wells since 2010. It was also determined through a 2015 soil and ground water collection and VPH/EPH assessment that the horizontal and vertical migration of ground water in contact with impacted soil on Site has not resulted in groundwater concentrations above MTCA Method B cleanup levels.

Site Diagrams



REFERENCE: USGS 7.5 MINUTE QUADRANGLE, DES MOINES, WASHINGTON

Stantec
11130 NE 33RD PLACE, SUITE 200
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FOR: 7-ELEVEN
FORMER FACILITY NO. 27482
14225 INTERURBAN AVENUE SOUTH
TUKWILA, WASHINGTON

SITE LOCATION MAP

FIGURE: 1

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
185750046	MDR	DH	PF	AUG 2014

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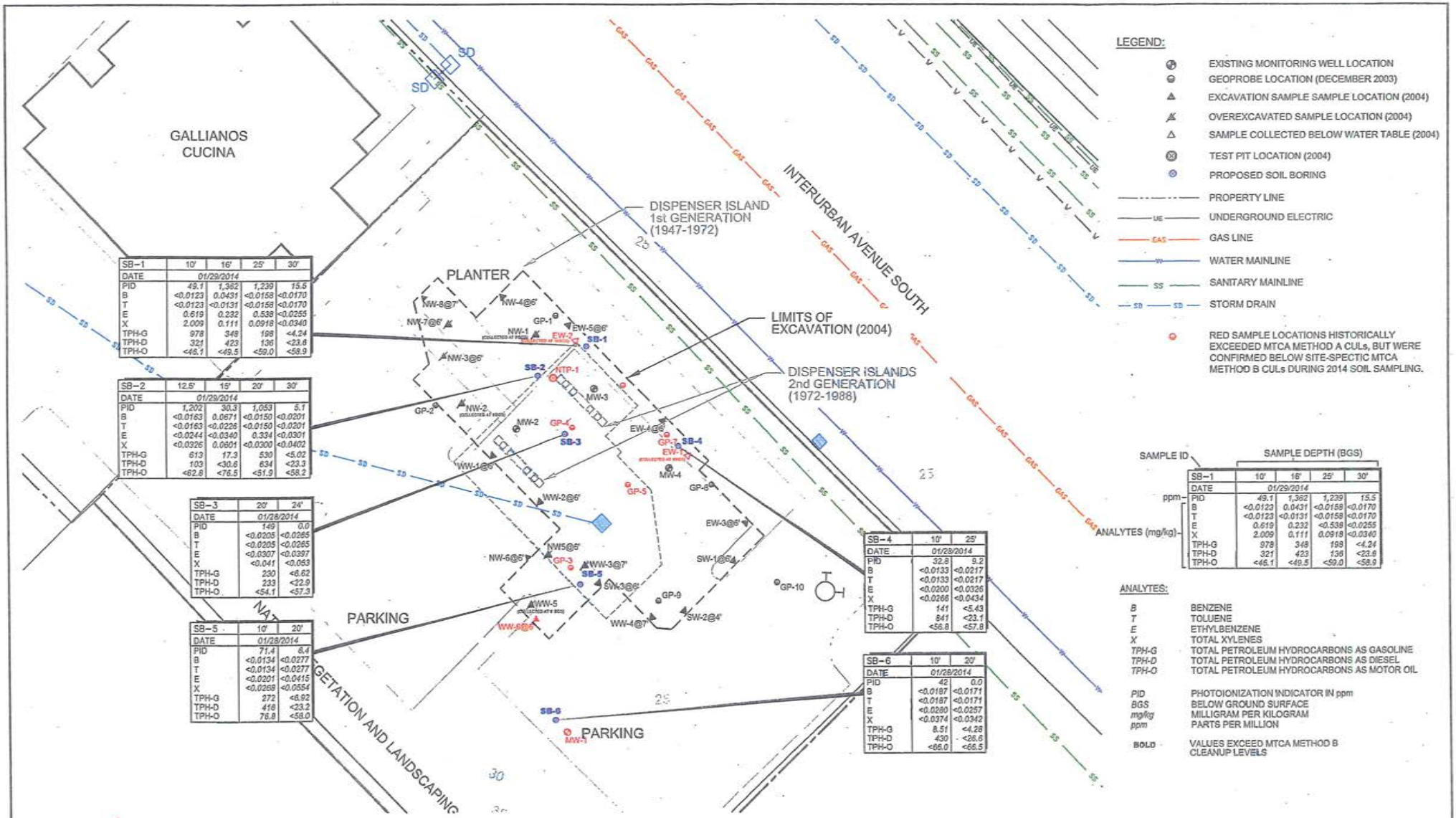

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TUKWILA, WASHINGTON

SITE PLAN WITH SOIL ANALYTICAL RESULTS JANUARY 28-29, 2014

FIGURE: 3

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
185750046	MDR	DH	PF	AUG 2014

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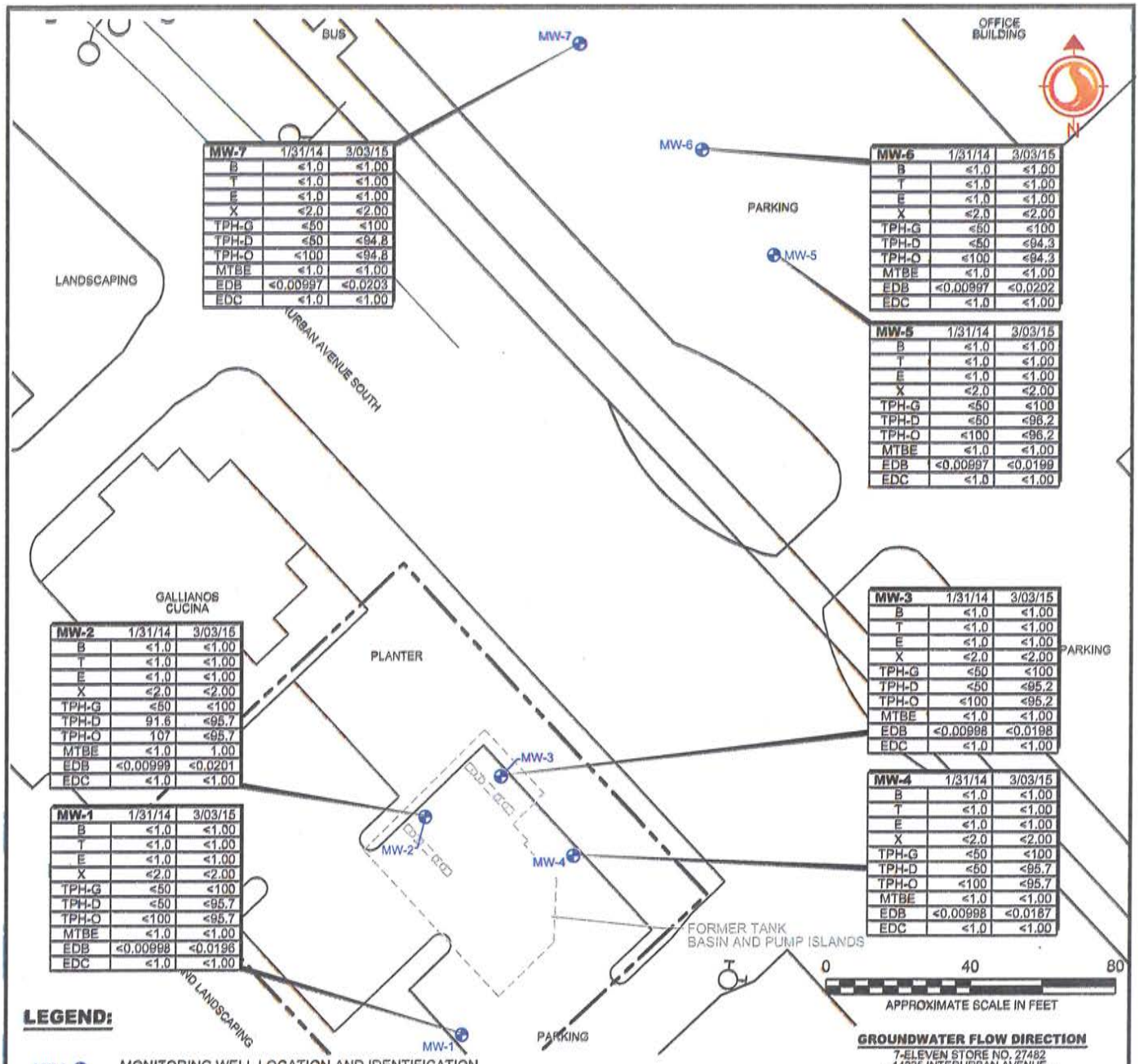


MW-7	1/31/14	3/03/15
B	≤1.0	≤1.00
T	≤1.0	≤1.00
E	≤1.0	≤1.00
X	≤2.0	≤2.00
TPH-G	≤50	≤100
TPH-D	≤50	≤94.8
TPH-O	≤100	≤94.8
MTBE	≤1.0	≤1.00
EDB	≤0.00997	≤0.0203
EDC	≤1.0	≤1.00

MW-6	1/31/14	3/03/15
B	≤1.0	≤1.00
T	≤1.0	≤1.00
E	≤1.0	≤1.00
X	≤2.0	≤2.00
TPH-G	≤50	≤100
TPH-D	≤50	≤94.3
TPH-O	≤100	≤94.3
MTBE	≤1.0	≤1.00
EDB	≤0.00997	≤0.0202
EDC	≤1.0	≤1.00

MW-5	1/31/14	3/03/15
B	≤1.0	≤1.00
T	≤1.0	≤1.00
E	≤1.0	≤1.00
X	≤2.0	≤2.00
TPH-G	≤50	≤100
TPH-D	≤50	≤96.2
TPH-O	≤100	≤96.2
MTBE	≤1.0	≤1.00
EDB	≤0.00997	≤0.0199
EDC	≤1.0	≤1.00

MW-2	1/31/14	3/03/15
B	≤1.0	≤1.00
T	≤1.0	≤1.00
E	≤1.0	≤1.00
X	≤2.0	≤2.00
TPH-G	≤50	≤100
TPH-D	91.6	≤95.7
TPH-O	107	≤95.7
MTBE	≤1.0	1.00
EDB	≤0.00999	≤0.0201
EDC	≤1.0	≤1.00

MW-3	1/31/14	3/03/15
B	≤1.0	≤1.00
T	≤1.0	≤1.00
E	≤1.0	≤1.00
X	≤2.0	≤2.00
TPH-G	≤50	≤100
TPH-D	≤50	≤95.2
TPH-O	≤100	≤95.2
MTBE	≤1.0	≤1.00
EDB	≤0.00998	≤0.0198
EDC	≤1.0	≤1.00

MW-1	1/31/14	3/03/15
B	≤1.0	≤1.00
T	≤1.0	≤1.00
E	≤1.0	≤1.00
X	≤2.0	≤2.00
TPH-G	≤50	≤100
TPH-D	≤50	≤95.7
TPH-O	≤100	≤95.7
MTBE	≤1.0	≤1.00
EDB	≤0.00998	≤0.0196
EDC	≤1.0	≤1.00

MW-4	1/31/14	3/03/15
B	≤1.0	≤1.00
T	≤1.0	≤1.00
E	≤1.0	≤1.00
X	≤2.0	≤2.00
TPH-G	≤50	≤100
TPH-D	≤50	≤95.7
TPH-O	≤100	≤95.7
MTBE	≤1.0	≤1.00
EDB	≤0.00998	≤0.0187
EDC	≤1.0	≤1.00

LEGEND:

MW-1 — MONITORING WELL LOCATION AND IDENTIFICATION

APPROXIMATE PROPERTY BOUNDARY

SAMPLE DATE

WELL ID: MW-2	1/31/14	3/03/15
B	≤1.0	≤1.00
T	≤1.0	≤1.00
E	≤1.0	≤1.00
X	≤2.0	≤2.00
TPH-G	≤50	≤100
TPH-D	91.6	≤95.7
TPH-O	107	≤95.7
MTBE	≤1.0	1.00
EDB	≤0.00999	≤0.0201
EDC	≤1.0	≤1.00

ANALYTE — µg/L

< NOT DETECTED AT OR ABOVE THE LABORATORY REPORTING LIMIT

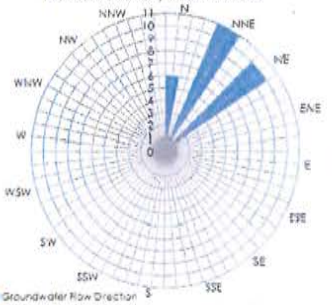
µg/L MICROGRAMS PER LITER

ANALYTES:

B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	TOTAL XYLENES
TPH-G	TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
TPH-D	TOTAL PETROLEUM HYDROCARBONS AS DIESEL
TPH-O	TOTAL PETROLEUM HYDROCARBONS AS MOTOR OIL
MTBE	METHYL TERTIARY BUTYL ETHER
EDB	1,2-DIBROMOETHANE
EDC	1,2-DICHLOROETHANE

GROUNDWATER FLOW DIRECTION

7-ELEVEN STORE NO. 27482
14225 INTERURBAN AVENUE
SOUTH TUKWILA, WASHINGTON



LEGEND: Groundwater flow direction
CONCENTRIC CIRCLES REPRESENT QUARTERLY MONITORING EVENTS FIRST QUARTER 2004 THROUGH CURRENT SAMPLING EVENT.
31 DATA POINTS SHOWN

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FOR: 7-ELEVEN

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GROUNDWATER ANALYTICAL RESULTS
JANUARY 31, 2014 AND MARCH 6, 2015

FIGURE: **5**

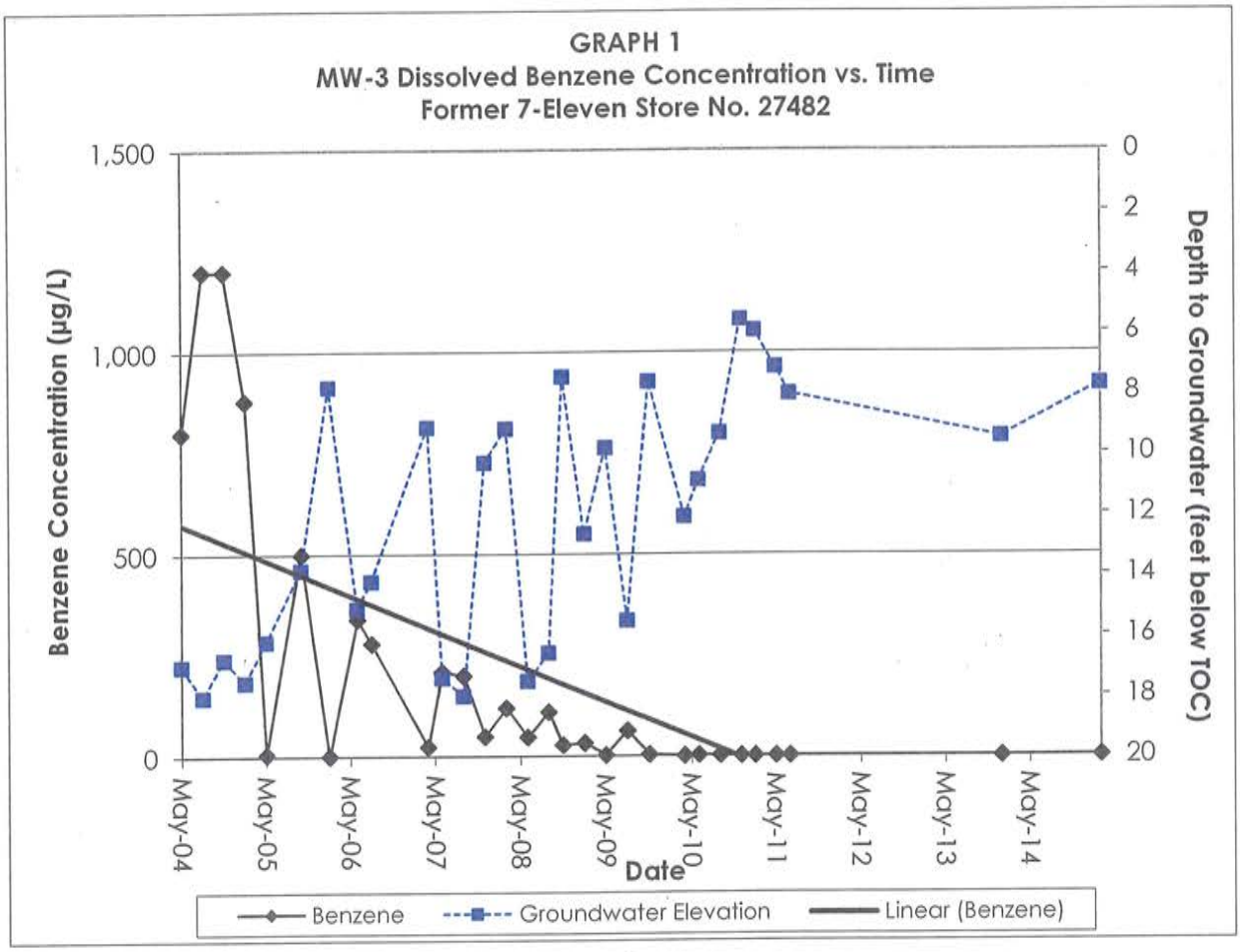
JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
185750046	MDR	DH	PF	JUNE 2015

M:_00 OTHER OFFICES\01-REDMOND\7-11\27482\DWG\2014\1st Qtr\7-11_27482_2014.dwg modified by mramirez on Sep 09, 2015 - 8:52

Enclosure B

Empirical Demonstration
Graphs and Tables

As presented in ***Table 2*** and ***Figure 5***, dissolved COCs in groundwater analytical concentrations measured during the first quarters of 2014 and 2015 did not exceed MTCA Method A CULs. The below graph demonstrates how the concentrations of benzene in well MW-3 have attenuated below CULs.



6.3 SURFACE WATER AND SEDIMENT

There has been no evidence of impact to surface water or sediment from historical petroleum hydrocarbons beneath the Site. No discussion of the occurrence or movement of contaminants in this medium is necessary.

8.0 CLEANUP STANDARDS

In accordance with MTCA, development of cleanup levels includes identifying potential exposure pathways for humans and environmental impacts based on planned land use. The Site is currently zoned for Regional Commercial Mixed Use, and future zoning is not anticipated to change. As noted previously, the Property was formerly used as two generations of retail petroleum stations. The second generation of USTs and dispensing system was removed in 1988 and the bulk of the source area soils were removed from the Site in 2004.

8.1 MTCA EXPOSURE PATHWAY ANALYSIS

The following potential exposure/risk pathways for residual COCs in subsurface soils at the Site were considered:

- Human health protection from direct soil contact pathway exposure;
- Human health protection from soil-to-groundwater pathway exposure;
- Human health protection from soil-to-air pathway exposure;
- Human health protection from soil-to-surface water pathway exposure; and,
- Terrestrial ecological protection.

Exposure Pathway	Pathway Complete or Incomplete	Supporting Evidence
Human health protection from direct soil contact	Incomplete	Soil concentrations are either below site specific Method B CULs for this pathway or below 15-ft bgs.
Human health protection from soil to groundwater (drinking water)	Incomplete	Groundwater has been below Method A CULs for at least six consecutive quarters on all on-Site wells.
Human health protection from soil to groundwater (direct contact)	Incomplete	Groundwater has been below Method A CULs for at least six consecutive quarters on all on-Site wells.
Human health protection from soil vapor inhalation	Incomplete	Soil concentrations are either below site specific Method B CULs for this pathway or below 15-ft bgs.
Human health protection from soil to surface water	Incomplete	The distance to any surface water bodies is far greater than the potential for contaminant migration.
Human health protection from groundwater to surface water	Incomplete	Groundwater has been below Method A CULs for at least six consecutive quarters on all on-Site wells.
Terrestrial ecological protection	Incomplete	The results of the simplified TEE

8.3.1 Empirical Demonstration

An empirical demonstration of soil cleanup levels for groundwater protection is possible because the horizontal and vertical migration of groundwater that has made contact with impacted soil on Site has not resulted in groundwater concentrations being above MTCA Method A CULs in any of the on-site or off-site monitoring wells since 2010.

8.3.1.1 Groundwater Velocity Calculation

Based on Ecology's Technical Memorandum – Empirical Demonstration of Soil Cleanup levels for Groundwater Protection, dated August 9, 2010, the groundwater velocity was calculated based on Site-specific data to demonstrate that a sufficient amount of time had passed for groundwater, in contact with impacted soil, to reach Site monitoring wells. The horizontal velocity of 0.44 feet per day (ft/day) was calculated using a conservative hydraulic conductivity value for the Site. Beausite gravelly sandy loam (K = 0.0009 cm/sec) was used to estimate the hydraulic conductivity (based on soil boring logs from the Site (***Appendix E***)) and the United States Department of Agriculture Natural Resources Conservation Service website that has local soil data information). See the groundwater velocity calculation in ***Appendix H***.

8.3.1.2 Horizontal Migration of Petroleum Impacts to Nearby Monitoring Wells

The horizontal distance from the impacted soils to nearby on-site monitoring wells can be used for the demonstration of compliance with the MTCA Method A CULs.

Horizontal Migration of Groundwater Through Impacted Soil to Nearby Wells

Start Point	End Point	Distance (feet)	Groundwater Gradient Direction	Estimated Travel Time (Days)	Estimated Travel Time (Years)
Soil Boring ID	Well #				
GP-4	MW-3	12	NE	27	0.074
SB-3	MW-3	14	NE	32	0.087
SB-5	MW-4	34	NE	77	0.211
SB-5	MW-5	200	NE	455	1.25
SB-5	MW-6	230	NE	523	1.43
SB-5	MW-7	260	NE	591	1.62

- Dissolved impacts near GP-4 would reach monitoring well MW-3 in approximately 27 days using the calculated groundwater velocity of 0.44 ft/day and the distance between boring GP-4 and well MW-3 of 12 feet. Therefore, sufficient time has elapsed to allow horizontal migration of dissolved impacts to the nearby monitoring well MW-3.

Summary of Site-Specific MTCA Method B Cleanup Levels For Direct Contact

(MTCA Cleanup Regulation, Chapter 173-340 WAC, Publication No. 94-06 Revised November 2007)

All analytical results reported in mg/kg

Media	TPH	Benzene	Toluene	Ethyl-benzene	Total Xylenes	Total Lead	cPAH's
Soil (mg/kg)	Method B 2,167	Method B 18	Method B 6,400	Method B 8,000	Method B 16,000	Method B N/A	Method B 0.137

MTCA Method B CULs for the Site were developed using the standard Cleanup Level and Risk Calculations (CLARC) values; except for TPH, which was calculated using the MTCATPH workbook. The MTCA Method B calculation tables for TPH are included in ***Appendix I***. Direct contact values were selected from the six soil samples to calculate a median TPH CUL at the Site. The median MTCA Method B CUL for TPH was calculated to be 2,167 mg/kg for the Site. Residual saturation screening levels are not applicable at the Site; however, TPH-G, TPH-D, and TPH-O concentrations remaining in soil are below the more conservative residual saturation value (1,000 mg/kg for weathered gasoline) and are also below the calculated MTCA Method B CUL. All of the 2014 soil analytical results for TPH-G, TPH-D, and TPH-O are below the calculated Method B CUL.

There are only two benzene detections in the 2014 soil samples and they are also below Method B CULs for benzene (18 mg/kg).

Soil Compliance Demonstration Table (BTEX, TPH-G, TPH-D, and TPH-O)

Historic Soil Samples Exceeding MTCA Method A Cleanup Levels in mg/kg						2014 Confirmation Samples and Analytical Results in mg/kg					
Soil Sample ID/year	Depth (feet bgs)	Benz	TPH-G	TPH-D	TPH-O	Soil Sample ID/year	Depth (feet bgs)	Benz	TPH-G	TPH-D	TPH-O
GP-3@12' 2003	12	<0.012	**130** [z]	150	430	SB-5@10' 2014	10	<0.0134	**272**	416	76.8
GP-4@12' 2003	12	**0.053**	**86** [z]	1,600	110	SB-3@20' 2014	20	<0.0205	**230**	233	<54.1
GP-6@12' 2003	12	**0.33**	23	37	<68	SB-1@10' 2014	10	<0.0123	**978**	321	<46.1
						SB-1@16' 2014	16	0.0431	**348**	423	<49.5
						SB-4@10' 2014	10	<0.0133	**141**	841	<56.8
NTP-1@12' 2004	12	**2.2**	**320**	<39	<77	SB-2@12.25' 2014	12.25	<0.0163	**613**	103	<62.8
NTP-1@14' 2004	14	**0.4**	**54**	<34	<68	SB-2@15' 2014	15	**0.0671**	**17.3**	<30.6	<76.5
NTP-1@16' 2004	16	**0.39**	**57**	<36	100	SB-2@15' 2014	15	**0.0671**	**17.3**	<30.6	<76.5
EW-1 2004	9	**0.9**	**2,500** [z]	3,400	<68	SB-4@10' 2014	10	<0.0133	**141**	841	<56.8
EW-2@10' 2004	10	**2.2**	**2,100** [z]	450	<62	SB-1@10' 2014	10	<0.0123	**978**	321	<46.1
WW-6@6' 2004	6	<0.013	<6.3	100	**4,800**	SB-5@10' 2014	10	<0.0134	**272**	416	76.8
MW-1@7.5' 2004	7.5	<0.014	**74** [z]	170	<68	SB-6@10' 2014	10	<0.0187	8.51	430	<66.0
MTCA Method A Soil Cleanup Levels		**0.03**	**30** [b]	**2,000**	**2,000**	—		**0.03**	**30** [b]	**2,000**	**2,000**
MTCA Method B Soil Cleanup Levels		**18**	**2,167**			—		**18**	**2,167**		

Table Notes

[a] = 2004 excavation soil sample locations are presented on the same horizontal line corresponding 2014 samples.

[b] = Gasoline mixtures without benzene and where the total of ethyl benzene, toluene, and total lylenes are less than 1% of the gasoline mixture have a cleanup level of 100 mg/kg.

[z] = The result is impacted by the presence of diesel fuels.

BOLD = Results exceed MTCA Method A Soil Cleanup Levels

BOLD = Results exceed MTCA Method B Soil Cleanup Levels

Based on the 2014 confirmation soil samples, benzene and TPH concentrations have attenuated at the Site and are no longer present above Site-specific cleanup levels.

Table 1C shows cPAH concentrations at the Site. The three sample locations (GP-3@8', GP-4@4', and GP-8@8') that historically exceeded MTCA Method B CULs for cPAH's were removed from the Site during the 2004 over-excavation. Soil samples collected following the over-excavation indicated that cPAH concentrations were below the MTCA Method B CUL (0.137 mg/kg) at samples collected from the limits of the excavation. Toxicity Equivalent Soil Concentrations

Enclosure C

A2.2 Worksheet Calculation Summary Table

A2.2 SUMMARY TABLE
Protective TPH Groundwater Concentration
Former 7-Eleven Store No. 27482
14201 Interurban Avenue South
All concentrations in micrograms per liter (µg/l)

Sample ID	Sample Depth (ft bgs)	Sample Date	Calculated Protective TPH Groundwater Concentration at DF = 20 [a] (µg/l)	Calculated Protective TPH Groundwater Concentration at DF = 1 [b] (µg/l)	Closest Groundwater Monitoring Well to Soil Sample Location	Measured TPH-G Groundwater Concentration at Closest Well [c] (µg/l)	Measured TPH-D Groundwater Concentration at Closest Well [c] (µg/l)	Measured TPH-O Groundwater Concentration at Closest Well [c] (µg/l)
SB-1@1D'	10	01/29/14	307	285	MW-3	<50	<50	<100
SB-1@16'	16	01/29/14	231	228	MW-3	<50	<50	<100
SB-2@12.25	12.25	01/29/14	243	242	MW-2	<50	91.6	107
SB-3@20'	20	01/28/14	274	273	MW-2	<50	91.6	107
SB-4@1D'	10	01/29/14	292	315	MW-4	<50	<50	<100
SB-5@1D'	10	01/28/14	242	224	MW-1	<50	<50	<100
MEDIAN PROTECTIVE TPH GROUNDWATER CONCENTRATION =			269	258	--	--	--	--

Explanation of Abbreviations:

DF	= Dilution Factor
MTCA	= Model Toxics Control Act
TPH	= Total Petroleum Hydrocarbons
NAPL	= Non-aqueous phase liquid
µg/l	= micrograms per liter
ft bgs	= feet below ground surface
HI	= Hazard Index

Notes:

[a] = Calculated using the MTCA Method B Workbook (A2.2 Worksheet) for each soil sample. The soil sample composition ratio was used to calculate the protective TPH groundwater concentration using a potable groundwater Hazard Index of 1 and default hydrogeological data (DF=20).

[b] = Calculated using the MTCA Method B Workbook (A2.2 Worksheet) for each soil sample. The soil sample composition ratio was used to calculate the protective TPH groundwater concentration using a potable groundwater Hazard Index of 1 and default hydrogeological data (DF=1).

[c] = The reported groundwater concentration is from the groundwater sampling event conducted on 1/31/2014. This sampling event was conducted two days after the nearby soil sampling investigation.