June 16, 2016

Mr. Aaren Fiedler
VCP Site Manager
Washington State Department of Ecology
P.O. Box 47775
Olympia, WA 98504-7775

RE: Amendment to NFA Request
Holt's Quik Chek
400 North Pacific Avenue
Kelso, Washington 98626-3516
Ecology VCP# SW1445

Dear Mr. Fiedler:

On behalf of the property owner of the above-referenced address, Associated Environmental Group, LLC (AEG) is pleased to submit this amendment to our original No Further Action (NFA) Request, dated January 7, 2016. This amendment was drafted in response to the Washington State Department of Ecology (Ecology) opinion letter, dated March 17, 2016, and a follow-up meeting between AEG and Ecology conducted on April 22, 2016. During the April 22, 2016 meeting, AEG and Ecology agreed on the following items:

1. Upon discussion and clarification of the Site hydrogeology and gradient, it was agreed that MW-5 was a sufficient downgradient well, and that installation of another well was not necessary. AEG agreed to modify the document to provide further clarity on the Site hydrogeology, and the disconnect between MW-6 and the remainder of the Site wells.
2. Cross sections and Site Maps were to be updated to illustrate the extent of contamination. In addition, the figures would be modified to include all historical sampling locations, the locations of potential off-Site upgradient sources, addition of elevation data next to the wells on contour maps, and removal of red color coding unless showing exceedances.
3. Based on a presentation of the data collected from available chromatograms, additional sampling for Table 830-1 constituents was not needed.
4. AEG was to include all historical sampling data into the data tables.
5. AEG was to include a disproportionate cost analysis (DCA) to justify closure with institutional controls and long-term monitoring.

For item #1 above, AEG has included a revised groundwater contour map from the most recent sampling event (Figure 4), which illustrates a more representative depiction of the hydrogeologic conditions beneath the Site. This figure also more accurately supports AEG's original overview of the Site's hydrogeology presented in the January 7, 2016 NFA Request. Further, revised cross section A-A' (Figure 6) more clearly illustrates the relationship of the siltstone encountered in MW-6 with the remaining Site wells.

Site figures were updated per item #2 above. Figure 1 illustrates the location of the former Cowlitz County Motor Pool site noted in AEG's NFA Request as a potential upgradient source for benzene in MW-6. Figures 2, 3, and 5 show all historical sample locations (and a color change for the wells from red to blue). Figure 4 includes the water level elevations adjacent to the wells used in calculation of groundwater contours. Figures 5, 6, and 7 have been updated to clearly illustrate the extent of contamination in soil in both plan view and cross section. The cross sections in Figures 6 and 7 have also been revised to more clearly illustrate geologic contacts.

Tables 1 and 2 have been modified to include all soil and groundwater data collected from the Site to date, and include MTCA Table 830-1 parameters where available.

AEG has completed a DCA, which is summarized in the enclosed Tables 4 and 5, and in the bar chart. Taking into account the nature and extent of contamination, as well as Site-specific conditions, a screening of technologies resulted in an evaluation of excavation (Alternative 2) and soil vapor extraction (Alternative 3) as the most feasible alternative options to closure, alongside institutional controls and long-term monitoring (Alternative 1). As illustrated in Table 5 and the bar chart, an evaluation of cost vs. benefit favors Alternative 1 (closure with institutional controls and long-term monitoring) as the most feasible and preferred option, particularly given the actions already performed to date.

In addition to addressing items 1-5 noted above, AEG would also like to provide additional information regarding the vertical distribution of residual soil impacts, and also further address the soil-to-vapor pathway. During the latest round of soil sampling performed by AEG in June 2015, gasoline-range petroleum hydrocarbons (TPH), ethylbenzene, xylenes, and naphthalene were detected above Model Toxics Control Act (MTCA) cleanup levels at 10 feet below ground surface (bgs) in boring B-1. However, none of the soil samples collected shallower than 10 feet bgs from any of the borings were submitted for laboratory analysis. According to the boring logs presented in AEG's July 31, 2015 Subsurface Investigation Report, no sheen or odor were noted by field personnel at depths shallower than 10 feet bgs. However, photoionization detector (PID) readings suggest impacts may have been present around the 5 foot depth. With that said, even if it is assumed impacts are present at this depth, it does not change the preferred remedy. These

areas are capped by asphalt or Site structures, and would not be available to the direct contact pathway as long as an environmental covenant is in place to document the institutional controls required for the Site.

Likewise, during the latest round of sampling performed by AEG in June 2015, gasoline-range TPH was detected above MTCA cleanup levels at 25 feet bgs in borings B-1 and B-3. However, none of the soil samples collected deeper than 25 feet bgs from any of the borings were submitted for laboratory analysis. According to the boring logs presented in AEG's Subsurface Investigation Report, dated July 31, 2015, no sheen or odor were noted by field personnel at depths deeper than 25 feet bgs, and PID readings were 5.7 in B-1 and 0.0 in the other borings. The depth to groundwater beneath the Site typically fluctuates between 22 to 25 feet bgs, suggesting the field screening and laboratory-analyzed data is consistent with historic smear zone impacts. Further, soils at 25 feet bgs are typically within the saturated zone, and the groundwater data collected to date has empirically shown that these soil impacts (and any potentially deeper impacts) are not impacting groundwater. Long-term monitoring of the groundwater as part of institutional controls for the Site will continue to monitor any potential exposure to human health and the environment via the leaching pathway.

Based on an evaluation of Site conditions and data collected to date, it is not likely volatile constituents are present within 6 feet vertical separation distance of the on-Site convenience store building, and it is AEG's professional opinion that the soil-to-vapor pathway remains incomplete. During the latest round of sampling performed by AEG in June 2015, no benzene was detected in any of the soil samples collected from the Site. However, none of the soil samples collected shallower than 10 feet bgs were submitted for laboratory analysis. As such, it is possible residual volatile constituents are present within 6 feet vertical separation distance of the on-Site convenience store building. With that said, it is AEG's opinion that no further evaluation of the soil-to-vapor pathway is warranted for the following reasons:

- The highest concentration of gasoline-range TPH detected in the June 2015 samples was 3,800 milligrams per kilogram (mg/kg) at 10 feet bgs in B-1. No benzene was detected in this sample. The PID reading for this sample during sample collection was 2542, and the reading at 5 feet bgs in B-1 was 1149. Given this correlation, it is not likely benzene would be present in the shallower sample.
- The lack of benzene in the samples where gasoline-range TPH was detected (or in any of the samples for that matter) suggests the air sparging and soil vapor extraction activities performed by Farallon circa 2003-2005 were successful in removing the volatile components of the TPH mixture from the subsurface.

- The Site is an operating gasoline station, which increases the potential for background interference in any samples collected to evaluate indoor air.
- AEG understands benzene is not the only VOC that could be a potential threat to indoor air. Ethylbenzene, xylenes, and naphthalene were also detected in soil. For comparison purposes, at a similar project in Napavine where impacted soil was left in place adjacent to the building following tank removal, a soil sample collected at 5 feet bgs in July 2015 had the following results: gasoline-range TPH (4,600 mg/kg), benzene (0.78 mg/kg), ethylbenzene (31 mg/kg), m,p-xylenes (112 mg/kg), o-xylene (3.5 mg/kg), and naphthalenes (6.6 mg/kg). An indoor air sample collected inside the building within 10 feet of this boring location in February 2016 yielded the following results (Method B cleanup levels in parenthesis): benzene at 0.66 micrograms per cubic meter (µg/m^3) (0.321 µg/m^3); ethylbenzene at 0.22 µg/m^3 (457 µg/m^3); m,p-xylenes at 0.80 µg/m^3 (45.7 µg/m^3); and o-xylene at 0.29 µg/m^3 (45.7 µg/m^3). Naphthalene (0.0735 µg/m^3) and air-phase hydrocarbons (140 to 2,700 µg/m^3) were non-detect. While benzene was present in indoor air, the other constituents were either non-detect or well below their respective indoor air Method B cleanup levels. The chart below provides a comparison of data from the two similar sites:

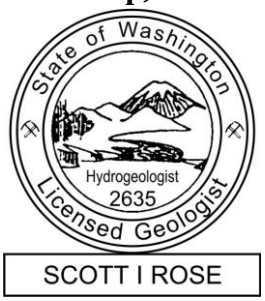
Constituent	Method B Indoor Air CUL (µg/m^3)	Napavine Indoor Air (µg/m^3)	Napavine Soil (mg/kg) B1-10	Holts Quik Chek Soil B1-10 (mg/kg)
TPH	na	na	**4600**	**3800**
Benzene	0.321	**0.66**	**0.78**	<0.02
Ethylbenzene	457	**0.22**	**31**	**13**
m,p xylenes	45.7	**0.8**	**112**	**230**
o-xylene	45.7	**0.29**	**3.5**	**73**
Naphthalene	0.0735	nd	**6.6**	**6.3**
APH	140 - 2700	nd	--	--

Based on the information presented in this amendment, as well as information provided to date, AEG recommends a Likely NFA determination be issued for this Site. Following the filing of an environmental covenant and long-term monitoring plan with Cowlitz County, AEG would request a Site NFA determination. The environmental covenant would restrict land use to prevent any exposure to residual contamination in the subsurface, providing assurance that the Site will continue to be protective and meet cleanup standards. A draft environmental covenant was attached to the original January 7, 2016 NFA Request for Ecology review. As part of the institutional controls for the Site, AEG would perform long-term groundwater monitoring to ensure containment and protectiveness. Due to a lack of any noticeable trends in the existing groundwater data, AEG recommends performing monitoring on an 18-month frequency.

If you have any questions or concerns regarding this application, please feel free to contact our office at (360) 352-9835.

Sincerely,

Associated Environmental Group, LLC



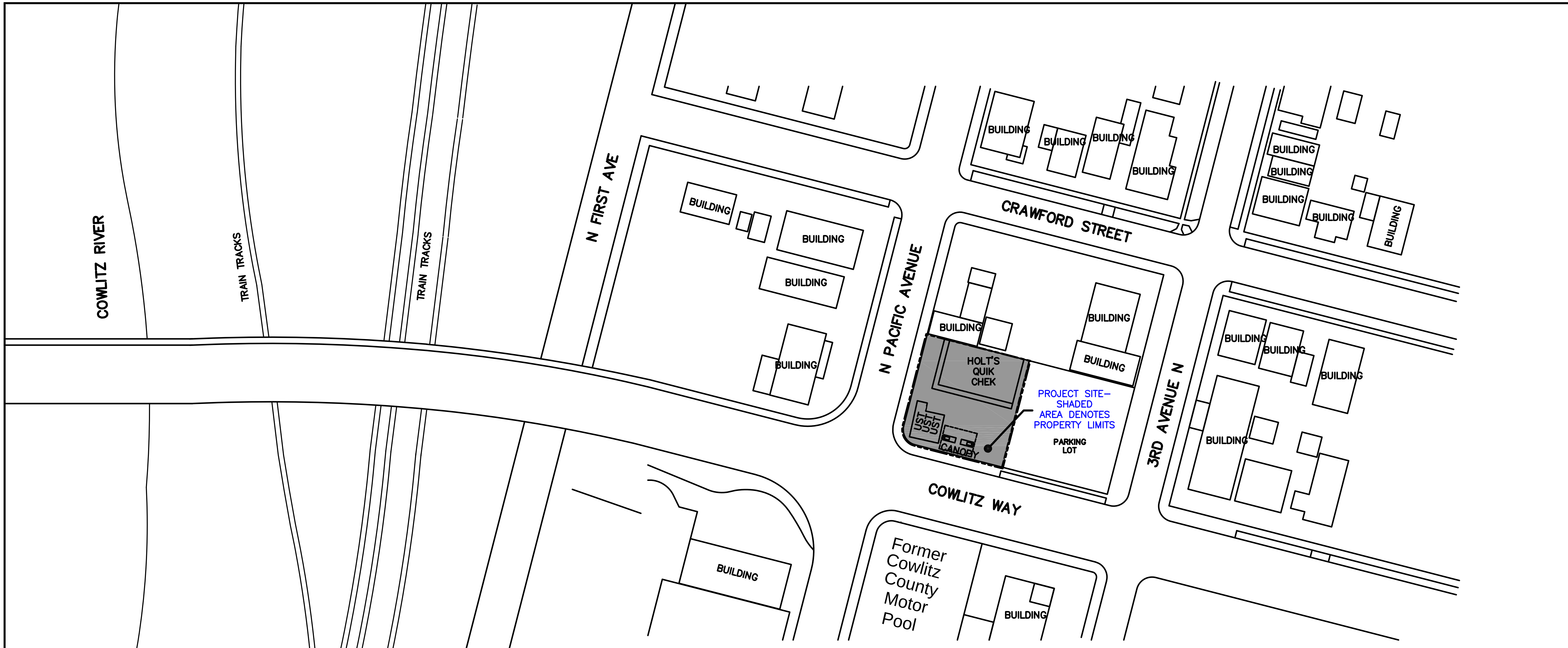
Scott Rose, L.H.G.
Senior Hydrogeologist

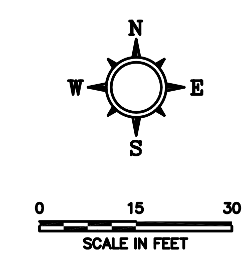
cc: Mr. Han Kim

Enclosures:
Figure 1, *Vicinity Map*
Figure 2, *Site Map*
Figure 3, *Boring and Well Location Map*
Figure 4, *October 2015 Groundwater Contour Map*
Figure 5, *Locations of Cross Sections*
Figure 6, *Geologic Cross Section A-A'*
Figure 7, *Geologic Cross Section B-B'*
Table 1, *Summary of Soil Analytical Results*
Table 2, *Summary of Groundwater Analytical Results*
Table 3, *Summary of Groundwater Elevations*
Table 4, *Identification and Screening of Response Actions and Remediation Technologies*
Table 5, *Remedial Alternatives Evaluation / Disproportionate Cost Analysis*
Bar Chart - Disproportionate Cost Analysis

FIGURES

605 11th Ave. SE, Suite 201 • Olympia, WA • 98501
Phone: 360-352-9835 • Fax: 360-352-8164 • Email: admin@aegwa.com





NOTES

1. THE LOCATIONS OF ALL FEATURES SHOWN ARE APPROXIMATE.
2. THIS DRAWING IS FOR INFORMATION PURPOSES. IT IS INTENDED TO ASSIST IN SHOWING FEATURES DISCUSSED IN AN ATTACHED DOCUMENT.

REFERENCE

DRAWING CREATED FROM AERIAL PHOTOGRAPH AND NOTES PROVIDED BY AEG, LLC.
VICINITY IMAGE SOURCE: U.S. GEOLOGICAL SURVEY– 2013, 7.5 MINUTE QUADRANGLE MAP
KELSO, WASHINGTON

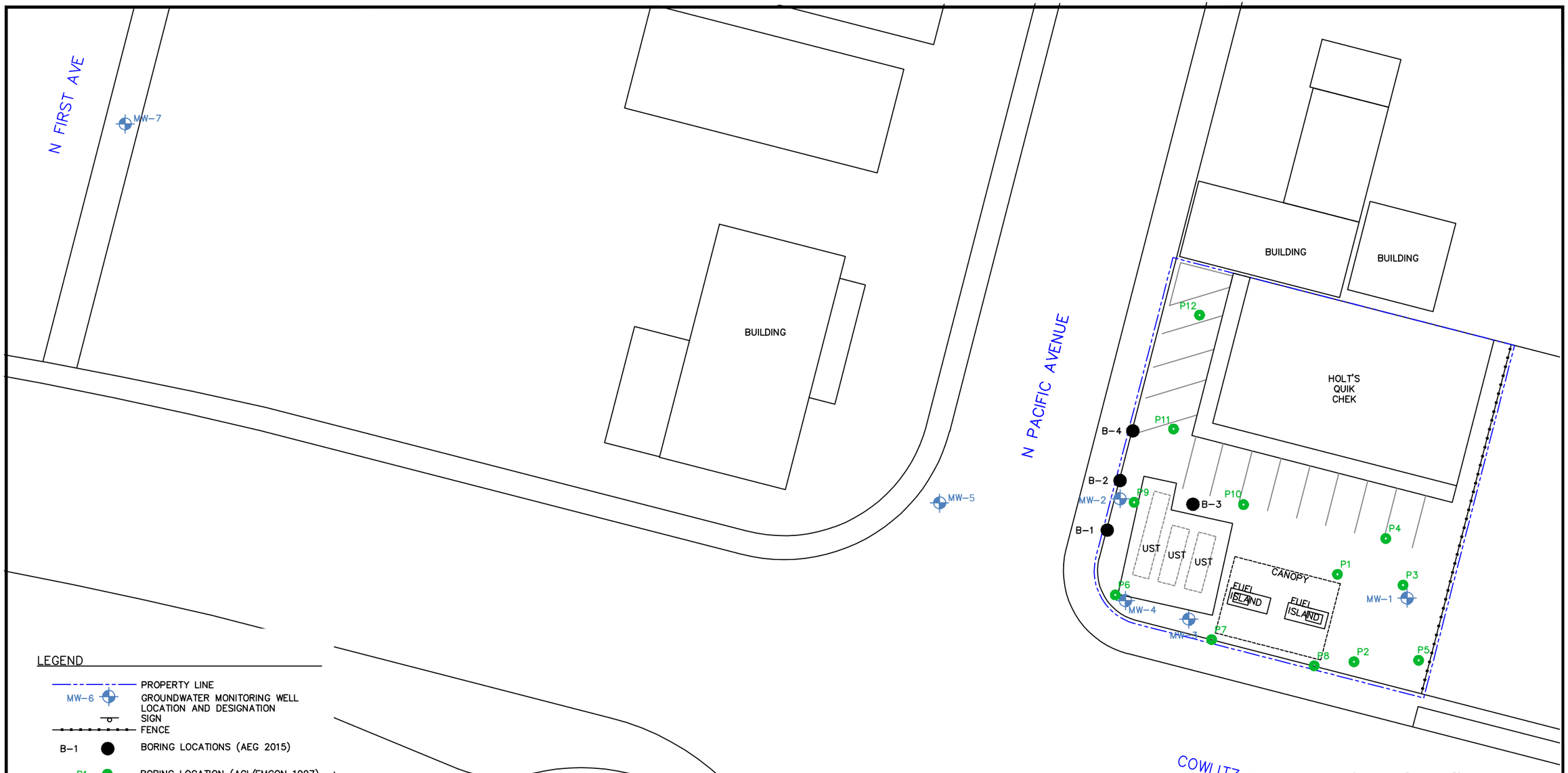
PROJECT LOCATION

VICINITY MAP

ASSOCIATED ENVIRONMENTAL GROUP, LLC

FIGURE 1
VICINITY MAP

HOLT'S QUIK CHEK
400 NORTH PACIFIC AVENUE
KELSO, WASHINGTON



LEGEND

- PROPERTY LINE
- MW-6 — GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
- SIGN
- FENCE
- B-1 — BORING LOCATIONS (AEG 2015)
- P1 — BORING LOCATION (AGI/EMCON 1997)

NOTES

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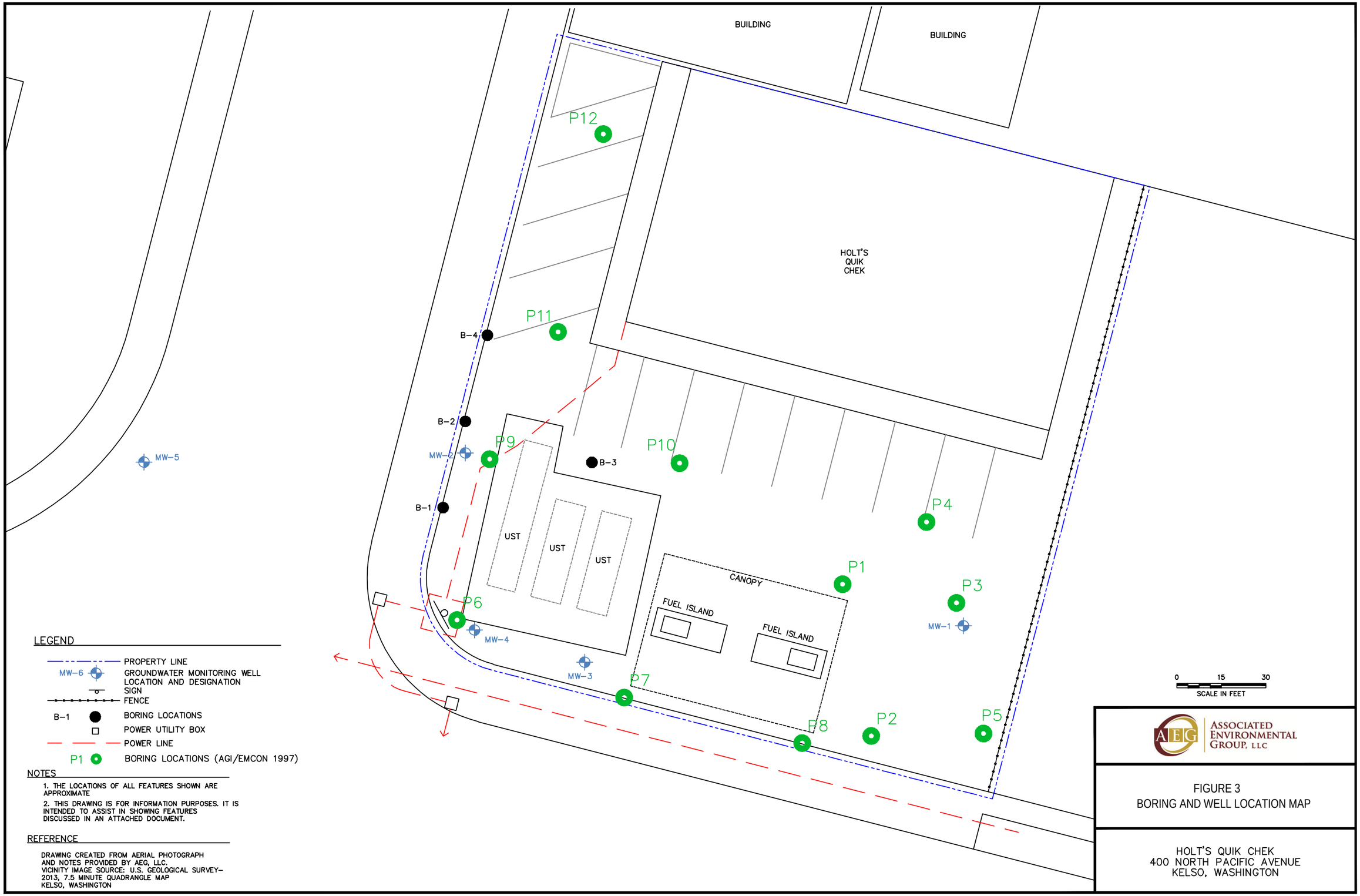
VICINITY IMAGE SOURCE: U.S. GEOLOGICAL SURVEY–2013, 7.5 MINUTE QUADRANGLE MAP
KELSO, WASHINGTON

ASSOCIATED ENVIRONMENTAL GROUP, LLC

FIGURE 2
SITE MAP

HOLT'S QUIK CHEK
400 NORTH PACIFIC AVENUE
KELSO, WASHINGTON



LEGEND

- PROPERTY LINE
- MW-6 — GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
- SIGN
- FENCE
- B-1 — BORING LOCATIONS
- POWER UTILITY BOX
- POWER LINE
- P1 — BORING LOCATIONS (AGI/EMCON 1997)

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VICINITY IMAGE SOURCE: U.S. GEOLOGICAL SURVEY–2013, 7.5 MINUTE QUADRANGLE MAP KELSO, WASHINGTON

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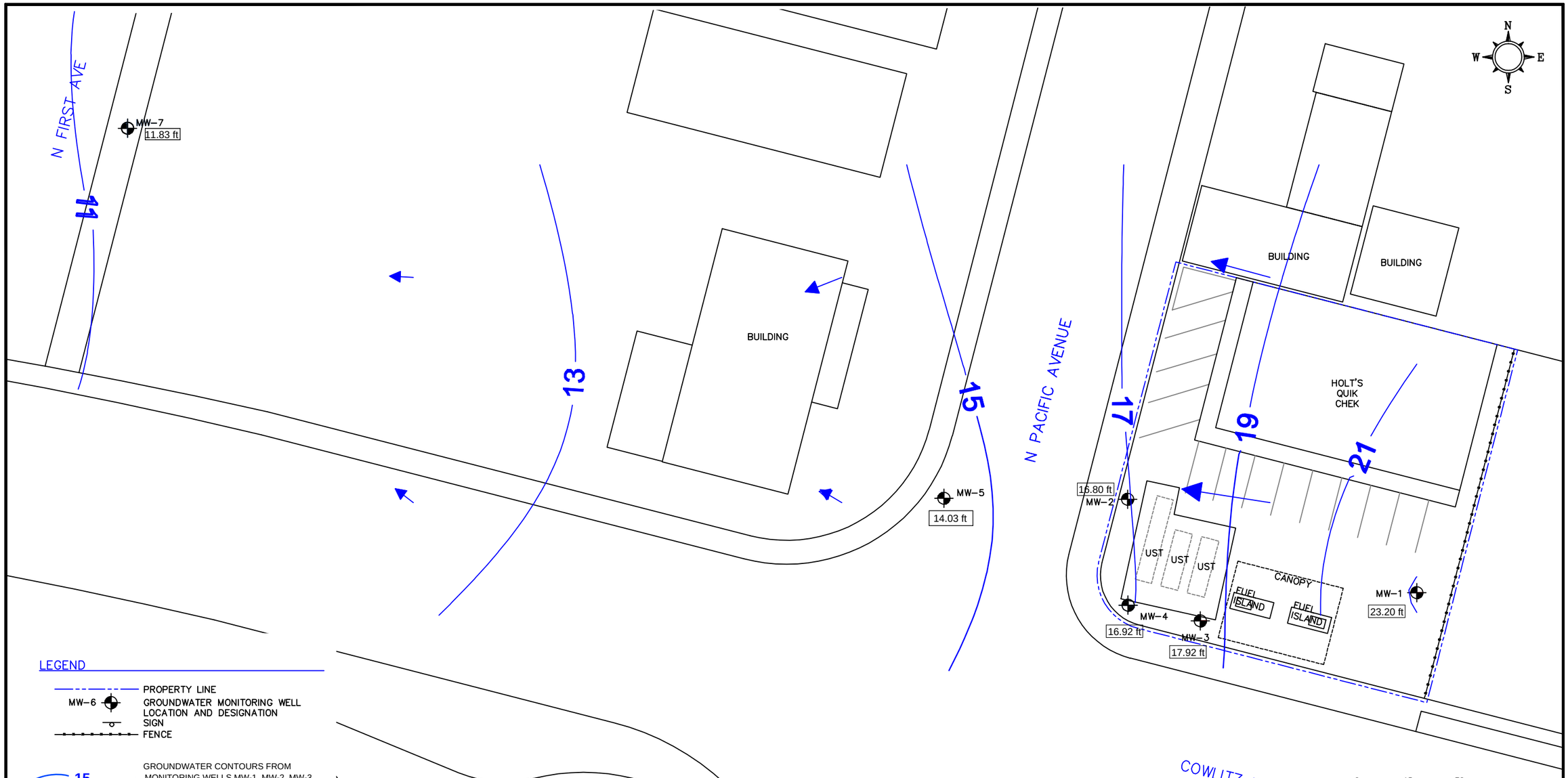
FIGURE 3
BORING AND WELL LOCATION MAP

HOLT'S QUIK CHEK
400 NORTH PACIFIC AVENUE
KELSO, WASHINGTON



LEGEND

- PROPERTY LINE
- MW–6 — GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
- SIGN
- FENCE
- 15 — GROUNDWATER CONTOURS FROM MONITORING WELLS MW-1, MW-2, MW-3, MW-4, MW-5, MW-7.
- 11.83 ft — GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL

NOTES

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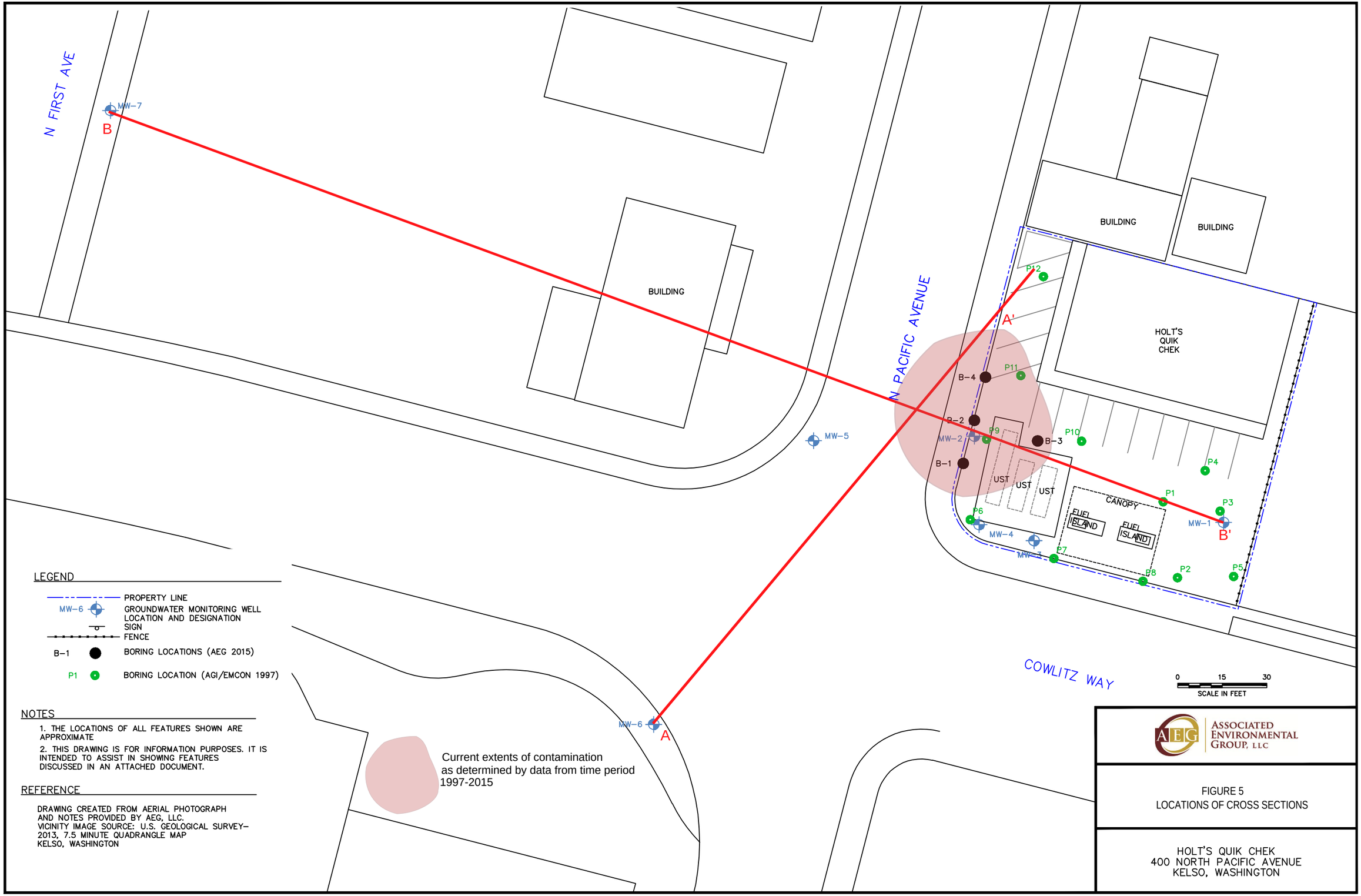
REFERENCE

DRAWING CREATED FROM AERIAL PHOTOGRAPH AND NOTES PROVIDED BY AEG, LLC.

ASSOCIATED ENVIRONMENTAL GROUP, LLC

FIGURE 4
OCTOBER 2015
GROUNDWATER CONTOUR MAP

HOLT'S QUIK CHEK
400 NORTH PACIFIC AVENUE
KELSO, WASHINGTON



LEGEND

- PROPERTY LINE
- MW-6 — GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION
- SIGN
- FENCE
- B-1 — BORING LOCATIONS (AEG 2015)
- P1 — BORING LOCATION (AGI/EMCON 1997)

NOTES

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KELSO, WASHINGTON

ASSOCIATED ENVIRONMENTAL GROUP, LLC

FIGURE 5
LOCATIONS OF CROSS SECTIONS

HOLT'S QUIK CHEK
400 NORTH PACIFIC AVENUE
KELSO, WASHINGTON

FILENAME	DRAWN BY	CHECKED BY	APPROVED BY	PROJECT NUMBER
14-174_XSECTIONS.DWG	ICD 12/19/2015	NP 12/19/2015	NP 12/19/2015	14-174

SOUTHWEST

A

NORTHEAST

A'

B–B' LINE

Holts Quik Chek Store

N PACIFIC AVENUE

SIDEWALK

MW–6

ASPHALT AND ASSUMED ROADBASE

SIDEWALK

MW–5 20 FEET WEST

B–1 25 FEET EAST

MW–2 20 FEET EAST

B–2 18 FEET EAST

B–4 8 FEET EAST

P-11 12 FEET EAST

P-12

DEPTH BELOW GROUND SURFACE (FEET)

0

10

20

30

40

SP

SM

SP

SILTSTONE

SP/SM

SP

ML

SM

SW

SILTSTONE

SP

ML

B1-10 3,800 mg/kg

SB-5-14.5 (1997*) <12 mg/kg

B2-15 65 mg/kg

B4-15 2,700 mg/kg

B4-20 <10 mg/kg

P12-12 (1997*) <5 mg/kg

B1-25 800 mg/kg

B2-25, 37 mg/kg

P11-24 (1997*) <5 mg/kg

P12-24 (1997*) <5 mg/kg

LEGEND

B–1 MW–3 – WELL, SOIL BORING

– GROUNDWATER LEVEL FROM 10/20/15

B1-15 100 mg/kg – GASOLINE-RANGE TPH (MG/KG) 2015

– MAXIMUM DEPTH EXPLORED

– SOIL CONTACT

ML — INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS, WITH SLIGHT PLASTICITY

SP — POORLY–GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES

SM — SILTY–SANDS, SAND–SILT MIXTURES

SW — WELL–GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES

SILTSTONE REPORTED IN EMCON 1997 BORING LOGS

Current extents of contamination as determined by data from time period 1997-2015

0 10 20 HORIZONTAL SCALE

0 5 10 VERTICAL SCALE

* Note- Non detect values from EMCON 1997 are included to help bound contamination. Detected 1997 values are not thought to be currently representative due to subsequent remediation that occurred at the Site. Because detection limits are not available, non detect values reported at lowest reported detected concentration.

ASSOCIATED ENVIRONMENTAL GROUP, LLC

FIGURE 6

GEOLOGIC CROSS SECTION A-A'

HOLT'S QUIK CHEK
400 NORTH PACIFIC AVENUE
KELSO, WASHINGTON

FILENAME	DRAWN BY	CHECKED BY	APPROVED BY	PROJECT NUMBER
14-174_XSECTIONS_1.DWG	ICD 12/30/2015	NP 12/30/2015	NP 12/30/2015	14-174

NORTHWEST

B

SOUTHEAST

B'

A–A' LINE

BUILDING

N PACIFIC AVENUE

Holts Quik Chek Store

SIDEWALK

SIDEWALK

MW-5
20 FEET SOUTH

B-2
5 FEET NORTH

MW-2

P9

B-3
8 FEET NORTH

P10

P1

P3

MW-1

MW-7

CONCRETE

CURRENT UST PIT

SP

SP/SM

ML

SM

SP

SP

ML

SILTSTONE

SM

B3-10
<10 mg/kg

P3-12*
<5 mg/kg

MW-1-14*
<12 mg/kg

SB-5-14.5*
<12 mg/kg

B2-15
65 mg/kg

P10-24*
<5 mg/kg

P1-22*
<5 mg/kg

B2-25
37 mg/kg

B3-10
620 mg/kg

P9-28*
<5 mg/kg

RELATIVE ELEVATION (FEET)

0
10
20
30
40

LEGEND

B–1 — WELL, SOIL BORING

MW–2 — WELL, SOIL BORING

▼ — GROUNDWATER LEVEL FROM 10/20/15

100 — GASOLINE-RANGE TPH CONCENTRATION (MG/KG)

— MAXIMUM DEPTH EXPLORED

ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS, WITH SLIGHT PLASTICITY
SP	POORLY–GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
SM	SILTY–SANDS, SAND–SILT MIXTURES
	SILTSTONE REPORTED IN 1997 EMCON BORINGS

Current extents of contamination as determined by data from time period 1997-2005.

0 15 30
HORIZONTAL SCALE

0 5 10
VERTICAL SCALE

* Non detect values from EMCON 1997 are included to help bound contamination. Detected 1997 values are not thought to be currently representative due to subsequent remediation that occurred at the Site from 2003-2005. Because 1997 detection limits are not available, non detect values from initial investigation are reported at lowest reported detected concentration.

ASSOCIATED ENVIRONMENTAL GROUP, LLC

FIGURE 7

GEOLOGIC CROSS SECTION B-B'

HOLT'S QUIK CHEK
400 NORTH PACIFIC AVENUE
KELSO, WASHINGTON

TABLES

605 11th Ave. SE, Suite 201 • Olympia, WA • 98501
Phone: 360-352-9835 • Fax: 360-352-8164 • Email: admin@aegwa.com

Table 1 - Summary of Soil Analytical Results
Holt's Quik Chek
Kelso, Washington

Sample Number	Depth Collected (feet)	Sampled By	Date Collected	Volatile Organic Compounds								Total Petroleum Hydrocarbons			Lead
				Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	EDC	EDB	Naphthalene	Gasoline	Diesel	Heavy Oil	
P1-22	22.0	AGI	3/27/1997	<0.05	<0.1	<0.1	<0.1	--	--	--	--	<5	--	--	--
P2-18	18.0	AGI	3/27/1997	<0.05	<0.1	<0.1	<0.1	--	--	--	--	<5	--	--	--
P3-12	12.0	AGI	3/27/1997	<0.05	<0.1	<0.1	<0.1	--	--	--	--	<5	--	--	--
P4-18	18.0	AGI	3/27/1997	<0.05	<0.1	<0.1	<0.1	--	--	--	--	<5	--	--	--
P5-12	12.0	AGI	3/27/1997	<0.05	<0.1	<0.1	<0.1	--	--	--	--	<5	--	--	--
P6-20	20.0	AGI	3/27/1997	<0.05	<0.1	**1.2**	<8	--	--	--	--	**1900**	--	--	--
P6-25	25.0	AGI	3/27/1997	<0.05	<0.1	<0.1	<0.1	--	--	--	--	<5	--	--	--
P7-12	12.0	AGI	3/27/1997	<0.05	<0.1	<0.1	<0.1	--	--	--	--	<5	--	--	--
P7-20	20.0	AGI	3/27/1997	<0.05	<0.1	<0.1	<0.1	--	--	--	--	<5	--	--	--
P8-16	16.0	AGI	3/28/1997	<0.05	**0.1**	**0.4**	**8.4**	--	--	--	--	**250**	--	--	--
P8-20	20.0	AGI	3/28/1997	<0.05	**0.2**	**0.4**	**7.8**	--	--	--	--	**200**	--	--	--
P8-24	24.0	AGI	3/28/1997	<0.05	<0.1	<0.1	<0.1	--	--	--	--	<5	--	--	--
P9-12	12.0	AGI	3/28/1997	<0.05	<0.1	**1.5**	**3.7**	--	--	--	--	**710**	--	--	--
P9-28	28.0	AGI	3/28/1997	<0.05	<0.1	<0.1	<0.1	--	--	--	--	<5	--	--	--
P10-12	12.0	AGI	3/28/1997	<0.05	<0.1	<0.1	<0.1	--	--	--	--	<5	--	--	--
P10-24	24.0	AGI	3/28/1997	<0.05	<0.1	<0.1	<0.1	--	--	--	--	<5	--	--	--
P11-16	16.0	AGI	3/28/1997	**8.7**	**220**	**110**	**760**	--	--	--	--	**12,000**	--	--	--
P11-24	24.0	AGI	3/28/1997	<0.05	<0.1	<0.1	<0.1	--	--	--	--	<5	--	--	--
P12-12	12.0	AGI	3/28/1997	<0.05	<0.1	<0.1	<0.1	--	--	--	--	<5	--	--	--
P12-20	20.0	AGI	3/28/1997	<0.05	<0.1	<0.1	<0.1	--	--	--	--	<5	--	--	--
MW-1-14	14-15.5	EMCON	6/24/1997	ND	ND	ND	ND	--	--	--	--	ND	ND	ND	ND
MW-2-9.5	9.5-11	EMCON	6/24/1997	**2.4**	**6.7**	**25**	**23**	--	--	--	--	**5760**	**334****	ND	ND
MW-2-27	27-27.5	EMCON	6/24/1997	ND	ND	**0.8**	ND	--	--	--	--	**436**	ND	ND	ND
MW-3-19	19-20.5	EMCON	6/25/1997	ND	ND	ND	ND	--	--	--	--	ND	ND	ND	ND
MW-4-19	19-20.5	EMCON	6/25/1997	ND	**0.3**	**0.5**	**2**	--	--	--	--	**1280**	**209****	ND	ND
MW-4-21.5	21.5-23	EMCON	6/25/1997	ND	ND	ND	ND	--	--	--	--	**12**	ND	ND	ND
MW-5-14.5	14-15.5	EMCON	9/26/1997	ND	ND	ND	ND	--	--	--	--	ND	ND	ND	ND
MW-6-7	7.0	EMCON	9/26/1997	**1.21**	**1.92**	**9.09**	**4.97**	--	--	--	--	**2270**	**37.2****	ND	ND
MW-6-19.5	19.5-20	EMCON	9/26/1997	ND	ND	ND	ND	--	--	--	--	ND	ND	ND	ND
MW-7-15	15.0	AEG	6/17/2015	<0.02	<0.05	<0.05	<0.15	<0.05	<0.01	<0.05	<0.05	<10	<50	<100	--
B1-10	10.0	AEG	6/17/2015	<0.02	**1.6**	**54**	**300**	<0.05	<0.01	<0.05	**6.3**	**3800**	<50	<100	--
B1-25	25.0	AEG	6/17/2015	<0.02	<0.05	**0.17**	**1.1**	<0.05	<0.01	<0.05	**5**	**800**	<50	<100	--
B2-15	15.0	AEG	6/17/2015	<0.02	<0.05	**0.11**	**0.53**	<0.05	<0.01	<0.05	**2.9**	**65**	<50	<100	--
B2-25	25.0	AEG	6/17/2015	<0.02	<0.05	<0.05	**0.27**	<0.05	<0.01	<0.05	**0.78**	**37**	<50	<100	--
B3-10	10.0	AEG	6/17/2015	<0.02	<0.05	<0.05	<0.15	<0.05	<0.01	<0.05	<0.05	<10	<50	<100	--
B3-25	25.0	AEG	6/17/2015	<0.02	<0.05	<0.05	<0.15	<0.05	<0.01	<0.05	<0.05	**620**	<50	<100	--
B4-15	15.0	AEG	6/17/2015	<0.02	**0.53**	**13**	**96**	<0.05	<0.01	<0.05	**0.78**	**2700**	<50	<100	--
B4-20	20.0	AEG	6/17/2015	<0.02	<0.05	<0.05	<0.15	<0.05	<0.01	<0.05	<0.05	<10	<50	<100	--
PQL (mg/kg)				0.02	0.05	0.05	0.15	0.05	0.01	0.05	0.05	10	50	100	5
MTCA Method A Cleanup Levels (mg/kg)				0.03	7	6	9	0.1	NL	0.005	5	100*	2,000	2,000	250

Notes:
All results are in milligrams per kilogram (mg/kg)
-- = Not analyzed for constituent
< = Not detected at the listed laboratory detection limits
Red Bold indicates the detected concentration exceeds Ecology MTCA Method A cleanup level
Bold indicates the detected concentration is below Ecology MTCA Method A cleanup levels
* TPH-Gasoline Cleanup Level with no presence of Benzene anywhere at the Site
EDB = Ethylene Dibromide
EDC = 1,2-Dichloroethane
MTBE = Methyl Tert-Butyl Ether
PQL = Practical Quantitation Limit (laboratory detection limit)
NL = No Method A cleanup level is listed.
ND = Not Detected (detection limits unavailable)
**According to EMCON, detected hydrocarbons in the diesel range appear to be due to the overlap from the gasoline range.

Table 2 - Summary of Groundwater Analytical Results
Holt's Quik Chek
Kelso, Washington

Sample Number	Date Collected	Volatile Organic Compounds (µg/L)								Total Petroleum Hydrocarbons (µg/L)			Total Lead	Dissolved Lead
		Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	EDC	EDB[1]	Naphthalene	Gasoline	Diesel	Heavy Oil		
MW-1	6/27/1997	<0.50	<0.50	<0.50	<1.0	--	--	--	--	<80	<250	<500	--	--
	9/26/1997	<0.50	<0.50	<0.50	<1.0	--	--	--	--	<80	<250	<500	**1.5**	ND
	12/15/1997	<0.50	<0.50	<0.50	<1.0	--	--	--	--	<80	<250	<500	--	--
	3/13/1998	<0.50	<0.50	<0.50	<1.0	--	--	--	--	<80	<250	<500	--	--
	6/11/1998	<0.50	<0.50	<0.50	<1.0	--	--	--	--	<80	<250	<500	--	--
	12/23/2004	<0.50	<0.50	<0.50	<1.0	--	--	--	--	<80	--	--	--	--
	3/17/2005	<0.50	<0.50	<0.50	<1.0	--	--	--	--	<80	--	--	--	--
	6/28/2005	<0.50	<0.50	<0.50	<1.0	--	--	--	--	<80	--	--	--	--
	10/7/2014	<1.0	<1.0	<1.0	<3.0	--	--	--	--	<100	--	--	--	--
	1/20/2015	<1.0	<1.0	<1.0	<3.0	--	--	--	--	**160**	--	--	--	--
	4/22/2015	<1.0	<1.0	<1.0	<3.0	--	--	--	--	<100	--	--	--	--
	7/16/2015	<1.0	<1.0	<1.0	<3.0	--	--	--	--	<100	--	--	--	--
	10/20/2015	<1.0	**1.3**	**3.7**	**26**	<1.0	<0.5	<0.1	<1.0	**740**	<250	<500	--	--
MW-2	6/27/1997	**20.8**	**15.7**	**142**	**287**	--	--	--	--	**4,880**	**268**	<500	--	--
	9/26/1997	**25.5**	**22.3**	**174**	**372**	--	--	--	--	**7,750**	<250	<500	**2.1**	**1.8**
	12/15/1997	**33.3**	**20.5**	**238**	**461**	--	--	--	--	**8,650**	<250	<500	--	--
	3/13/1998	**3.32**	**6.46**	**103**	**202**	--	--	--	--	**3,100**	<250	<500	--	--
	6/11/1998	**6.06**	**9.4**	**117**	**195**	--	--	--	--	**4,560**	**291**	<500	--	--
	3/13/2004	**12.20**	**1.89**	**15.1**	**7.47**	--	--	--	--	**2,560**	--	--	--	--
	8/19/2004	**4.40**	**1.56**	**7.45**	**4.06**	--	--	--	--	**1,110**	--	--	--	--
	12/23/2004	**4.54**	**0.51**	**1.56**	**1.15**	--	--	--	--	**678**	--	--	--	--
	3/17/2005	**2.25**	<0.50	**1.62**	<1.0	--	--	--	--	**506**	--	--	--	--
	6/28/2005	**7.00**	<0.50	**0.866**	<1.0	--	--	--	--	**940**	--	--	--	--
	9/28/2005	**11.50**	<1.0	**5.06**	<3.0	--	--	--	--	**1060**	--	--	--	--
	12/29/2005	**0.91**	<0.50	<0.50	<1.0	--	--	--	--	**108**	--	--	--	--
	3/24/2006	**3.54**	<0.50	<0.50	<1.0	--	--	--	--	**362**	--	--	--	--
	6/29/2006	<0.50	<0.50	<0.50	<1.0	--	--	--	--	**219**	--	--	--	--
	9/21/2006	**2.95**	<0.50	<0.50	<1.0	--	--	--	--	**248**	--	--	--	--
	10/7/2014	<1.0	<1.0	<1.0	<3.0	--	--	--	--	<100	--	--	--	--
	1/20/2015	<1.0	<1.0	<1.0	<3.0	--	--	--	--	<100	--	--	--	--
	4/22/2015	<1.0	<1.0	<1.0	<3.0	--	--	--	--	**140**	--	--	--	--
	7/16/2015	<1.0	<1.0	<1.0	<3.0	--	--	--	--	<100	--	--	--	--
	10/20/2015	<1.0	<1.0	<1.0	<3.0	<1.0	<0.5	<0.1	<1.0	**720**	<250	<500	--	--
MW-3	6/27/1997	**0.8**	<0.50	<0.50	<1.0	--	--	--	--	**90.7**	<250	<500	--	--
	9/26/1997	<0.50	<0.50	<0.50	<1.0	--	--	--	--	<80	<250	<500	**3.8**	ND
	12/15/1997	**1.3**	<0.50	<0.50	<1.0	--	--	--	--	<80	<250	<500	--	--
	3/13/1998	<0.50	<0.50	**2.82**	**5.18**	--	--	--	--	**143**	<250	<500	--	--
	6/11/1998	<0.50	<0.50	<0.50	<1.0	--	--	--	--	<80	<250	<500	--	--
	3/13/2004	<0.50	<0.50	<0.50	<1.0	--	--	--	--	<50	--	--	--	--
	12/23/2004	<0.50	<0.50	<0.50	<1.0	--	--	--	--	<50	--	--	--	--
	3/17/2005	<0.50	<0.50	<0.50	<1.0	--	--	--	--	<80	--	--	--	--
	6/28/2005	<0.50	<0.50	<0.50	<1.0	--	--	--	--	<50	--	--	--	--
	9/28/2005	<1.0	<1.0	<1.0	<1.0	--	--	--	--	<100	--	--	--	--
	12/29/2005	<0.50	<0.50	<0.50	<1.0	--	--	--	--	<50	--	--	--	--
	3/24/2006	<0.50	<0.50	<0.50	<1.0	--	--	--	--	<50	--	--	--	--
	10/7/2014	<1.0	<1.0	<1.0	<3.0	--	--	--	--	<100	--	--	--	--
	1/20/2015	<1.0	<1.0	<1.0	<3.0	--	--	--	--	<100	--	--	--	--
	4/22/2015	<1.0	<1.0	<1.0	<3.0	--	--	--	--	<100	--	--	--	--
	7/16/2015	<1.0	<1.0	<1.0	<3.0	--	--	--	--	<100	--	--	--	--
	10/20/2015	<1.0	<1.0	**2.8**	**19**	<1.0	<0.5	<0.1	<1.0	**110**	<250	<500	--	--
MW-4	6/27/1997	**1.6**	<0.50	**0.67**	<1.0	--	--	--	--	**691**	<250	<500	--	--
	9/26/1997	<0.50	<0.50	<0.50	<1.0	--	--	--	--	**255**	<250	<500	**3.5**	ND
	12/15/1997	**3.78**	<0.50	<0.50	<1.0	--	--	--	--	**331**	<250	**545**	--	--
	3/13/1998	<0.50	<0.50	**1.74**	**3.26**	--	--	--	--	**124**	<250	<500	--	--
	6/11/1998	<0.50	<0.50	<0.50	<1.0	--	--	--	--	**205**	<250	<500	--	--
	12/23/2004	<0.50	<0.50	<0.50	<1.0	--	--	--	--	<50	--	--	--	--
	3/17/2005	<0.50	<0.50	<0.50	<1.0	--	--	--	--	<50	--	--	--	--
	6/28/2005	<0.50	<0.50	<0.50	<1.0	--	--	--	--	<50	--	--	--	--
	9/28/2005	<1.0	<1.0	<1.0	<1.0	--	--	--	--	<100	--	--	--	--
	12/29/2005	<0.50	<0.50	<0.50	<1.0	--	--	--	--	<50	--	--	--	--
	3/24/2006	<0.50	<0.50	<0.50	<1.0	--	--	--	--	<50	--	--	--	--
	9/21/2006	<0.50	<0.50	<0.50	<1.0	--	--	--	--	<50	--	--	--	--
	10/7/2014	<1.0	<1.0	<1.0	<3.0	--	--	--	--	<100	--	--	--	--
	1/20/2015	<1.0	<1.0	<1.0	<3.0	--	--	--	--	<100	--	--	--	--
	4/22/2015	<1.0	<1.0	<1.0	<3.0	--	--	--	--	<100	--	--	--	--
	7/16/2015	<1.0	<1.0	<1.0	<3.0	--	--	--	--	<100	--	--	--	--
	10/20/2015	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<0.1	<1.0	<100	<250	<500	--	--
MW-5	9/26/1997	**14.5**	**1.07**	**20.8**	**17.7**	--	--	--	--	**2,740**	<250	<500	**8.3**	ND
	12/15/1997	**22.7**	**3.06**	**0.93**	<1.0	--	--	--	--	**2,510**	<250	<500	--	--
	3/13/1998	**4.48**	<0.50	**9.03**	**1.47**	--	--	--	--	**1,080**	<250	<500	--	--
	6/11/1998	**12.1**	**0.66**	**3.18**	<1.0	--	--	--	--	**1,730**	<250	<500	--	--
	3/17/2005	**7.48**	**0.983**	**1.77**	**3.65**	--	--	--	--	**1,190**	--	--	--	--
	6/28/2005	**4.67**	<0.50	**12.3**	**3.18**	--	--	--	--	**2,140**	--	--	--	--
	9/28/2005	**2.19**	<1.0	<1.0	<3.0	--	--	--	--	<100	--	--	--	--
	12/29/2005	<5.0	<5.0	**145**	**55**	--	--	--	--	**3,530**	--	--	--	--
	3/24/2006	**2.91**	<0.50	**0.92**	**1.27**	--	--	--	--	**373**	--	--	--	--
	6/29/2006	<0.50	**0.576**	<0.50	<1.0	--	--	--	--	**710**	--	--	--	--
	9/21/2006	**1.11**	**0.831**	**1.9**	<1.0	--	--	--	--	**180**	--	--	--	--
	10/7/2014	<1.0	<1.0	<1.0	<3.0	--	--	--	--	<100	--	--	--	--
	1/20/2015	<1.0	<1.0	<1.0	<3.0	--	--	--	--	**180**	--	--	--	--
	4/22/2015	<1.0	<1.0	<1.0	<3.0	--	--	--	--	<100	--	--	--	--
	7/16/2015	<1.0	<1.0	<1.0	<3.0	--	--	--	--	<100	--	--	--	--
	10/20/2015	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	9/26/1997	**31.1**	**2.42**	**14**	**9.55**	--	--	--	--	**2,070**	<250	<500	ND	ND
	12/15/1997	**210**	**6.32**	<1.0	**3.38**	--	--	--	--	**416**	<250	<500		
	3/13/1998	**244**	<2.50	**4.76**	<5.0	--	--	--	--	<400	**284**	<500		
	6/11/1998	**500**	**8.35**	**26**	<5.0	--	--	--	--	**750**	**354**	<500		
	8/19/2004	**3.13**	**0.693**	<0.50	<1.0	--	--	--	--	<50	--	--		
	12/23/2004	**13**	**0.695**	<0.50	<1.0	--	--	--	--	<50	--	--		
	7/16/2015	**45**	**3.1**	<1.0	<3.0	--	--	--	--	**180**	--	--	--	--
	10/20/2015	**42**	**2.6**	**1.1**	**8**	<1.0	<0.5	<0.1	<1.0	**430**	<250	<500	--	--
MW-7	6/17/2015	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<0.1	<1.0	<100	<250	<500	--	--
	7/16/2015	<1.0	<1.0	<1.0	<1.0	--	--	--	--	<100	--	--	--	--
	10/20/2015	<1.0	<1.0	<1.0	**3.6**	<1.0	<0.5	<0.1	<1.0	<100	<250	<500	--	--
B-1	6/17/2015	<1.0	**2.5**	**36**	**160**	<1.0	<0.5	<0.1	**4.5**	**1,400**	<250	<500	--	--
B-2	6/17/2015	<1.0	<1.0	<1.0	<3.0	<1.0	<0.5	<0.1	<1.0	<100	**540**	<500	--	--
B-3	6/17/2015	<1.0	<1.0	<1.0	<3.0	<1.0	<0.5	<0.1	<1.0	<100	**1,100**	<500	--	--
B-4	6/17/2015	<1.0	<1.0	**2.6**	<3.0	<1.0	<0.5	<0.1	<1.0	<100	<250	<500	--	--
MTCA Method A Cleanup Levels (µg/L)		5.0	1,000	700	1,000	20	5	0.01	160	1,000*	500	500	15	15

Notes:
All results in micrograms per liter (µg/L)
-- = Not analyzed for constituent
< = Not detected at the listed laboratory detection limits
[1]While the detection limit is greater than the cleanup level, it should be noted that no EDB was detected in soil.
Red Bold indicates the detected concentration exceeds Ecology MTCA Method A cleanup level
Bold indicates the detected concentration is below Ecology MTCA Method A cleanup levels
* TPH-Gasoline Cleanup Level with no presence of Benzene anywhere at the Site

EDB = Ethylene Dibromide
EDC = 1,2-Dichloroethane
MTBE = Methyl Tert-Butyl Ether
PQL = Practical Quantification Limit (laboratory detection limit)
ND = Not Detected (detection limits unavailable)

Table 3 - Summary of Groundwater Elevations
Holt's Quik Chek
Kelso, Washington

Well No./ TOC Elevation (feet)	Date	Depth to Water (feet)	Depth to Free Product (feet)	Free Product Thickness (feet)	Actual Groundwater Elevation (feet)	Change in Elevation (feet)
MW-1	10/7/2014	17.67	--	--	23.51	--
41.18	1/20/2015	14.75	--	--	26.43	2.92
	4/22/2015	16.09	--	--	25.09	-1.34
	7/16/2015	17.30	--	--	23.88	-1.21
	10/20/2015	17.98	--	--	23.20	-0.68
MW-2	10/7/2014	23.36	--	--	17.33	--
40.69	1/20/2015	22.02	--	--	18.67	1.34
	4/22/2015	22.00	--	--	18.69	0.02
	7/16/2015	23.15	--	--	17.54	-1.15
	10/20/2015	23.89	--	--	16.80	-0.74
MW-3	10/7/2014	22.49	--	--	18.41	--
40.9	1/20/2015	21.28	--	--	19.62	1.21
	4/22/2015	21.31	--	--	19.59	-0.03
	7/16/2015	22.28	--	--	18.62	-0.97
	10/20/2015	22.98	--	--	17.92	-0.70
MW-4	10/7/2014	23.36	--	--	17.50	--
40.86	1/20/2015	22.02	--	--	18.84	1.34
	4/22/2015	21.98	--	--	18.88	0.04
	7/16/2015	23.17	--	--	17.69	-1.19
	10/20/2015	23.94	--	--	16.92	-0.77
MW-5	10/7/2014	25.75	--	--	14.50	--
40.25	1/20/2015	24.31	--	--	15.94	1.44
	4/22/2015	24.08	--	--	16.17	0.23
	7/16/2015	25.46	--	--	14.79	-1.38
	10/20/2015	26.22	--	--	14.03	-0.76
MW-6	7/16/2015	11.37	--	--	29.37	--
40.74	10/20/2015	12.97	--	--	27.77	-1.60
MW-7	7/16/2015	17.83	--	--	12.46	--
30.29	10/20/2015	18.46	--	--	11.83	-0.63

Notes:
TOC = Top of casing elevation relative to assigned benchmark.
-- = Not measured, not available, or not applicable

Table 4 - Identification and Screening of Response Actions and Remediation Technologies, Holts Quik Chek, Kelso, WA

General Response Action	Technology/Options	Process Description	Applicability to Site Conditions	Effectiveness	Implementability	Relative Cost	Retain for Further Consideration	Reasons for Screening Decision
No Action	None	--	Not applicable. Contamination exceeds MTCA Method A cleanup levels	Unable to achieve RAOs. Not effective.	Not implementable	Low	Not retained	RAOs not achievable.
Institutional Controls	Site access and use restrictions	Legal Restrictions/environmental covenant limiting exposure to contamination. Deed restrictions to control soil excavation or access to groundwater.	Applicable	Effective at limiting exposure pathways to remaining contamination above CULs on-property, where disproportionate cost analysis demonstrates additional remediation not cost-effective.	Implementable	Low, with future monitoring requirements.	**Retained**	Environmental Covenant may be appropriate.
Monitored Natural Attenuation	Long term monitoring of affected media at Site	Actively and regularly monitor ongoing natural processes acting to reduce contaminant concentrations in affected media. Enhancement of natural attenuation processes possible through injection of chemicals or microbes to increase the rate of attenuation.	Not applicable	Effective on petroleum hydrocarbons where natural conditions determined to be conducive to attenuation.	Not implementable	Low, with possible future monitoring requirements.	Not retained	Insufficient groundwater contamination to monitor.
Containment	Vertical Barriers	Impermeable subsurface slurry wall or dike constructed to prevent migration of contamination.	Not applicable	Can be effective for preventing lateral migration of contaminants. Not effective in reducing LNAPL or dissolved phase contamination.	Not implementable	High	Not retained	Spill is almost 20 years since detection, longer since occurrence. Residual contamination not migrating. Utilities and street prevent implementation.
	Hydraulic Containment	Groundwater pumping.	Not applicable	Gsite monitoring wells do not detect contamination.	Not implementable	High	Not retained	Would not be effective for Site.
	Capping	Impervious concrete or asphalt surfaces over contamination, limiting exposure pathways at Site.	Applicable	Effective at limiting exposure pathways to remaining contamination above CULs.	Implementable	Low (Existing)	**Retained**	Site is currently capped with impermeable surfaces. Could be part of an effective remedial solution when memorialized with Environmental Covenant.
Removal	Soil Excavation	Excavation and removal of contaminated soil.	Applicable	Effective at removing PCS where accessible.	Implementable	High	**Retained**	Contaminated soil excavation may provide one method for quickly reducing contamination levels in areas of the Site where access is possible.
	LNAPL Recovery	Extraction of LNAPL from groundwater table by pumping or skimming.	Not applicable	Effective at reducing LNAPL sources.	Implementable	Moderate	Not retained	LNAPL not present at Site
	Groundwater Extraction	Pumping groundwater from extraction wells to ex-situ treatment system	Not applicable	Effective at removing dissolved phase contamination from groundwater.	Implementable	High	Not retained	Groundwater in Site monitoring wells not contaminated above regulatory standards.
Ex-Situ Treatment-Soil	Excavated soil treatment	Treatment and on-site reuse of contaminated soil.	Not applicable	Effective at reducing soil contamination levels.	Not implementable.	High, depending on methods of access and treatment.	Not retained	Not likely implementable at this Site. Possible permitting issues. Would require areas on the property to properly contain and treat contaminated soil.
Ex-Situ Treatment-Groundwater	Activated Carbon Adsorption	Contaminated groundwater is passed through granular activated carbon (GAC) filters to absorb contaminants. Treated water may be discharged or reinjected.	Not applicable	Effective for reducing dissolved phase contamination in groundwater.	Implementable	Moderate	Not retained	Dissolved phase contamination in groundwater beow cleanup levels.
	Air Stripping	Extract groundwater to volatilize through air stripper.	Not Applicable	Effective for reducing dissolved phase contamination in groundwater.	Implementable	Moderate	Not retained	Dissolved phase contamination in groundwater beow cleanup levels.
	Chemical Oxidation	Injection of chemical oxidants such as ozone or hydrogen peroxide into extracted groundwater.	Not applicable	Effective for reducing dissolved phase contamination in groundwater.	Implementable	High	Not retained	Dissolved phase contamination in groundwater beow cleanup levels.
	Air/Ozone Sparging	Air or ozone injection into the subsurface to volatilize contamination and provide oxygen for enhanced aerobic biodegradation.	Applicable	Effective for reducing dissolved phase contamination in groundwater.	Implementable	Moderate	Not retained	Two years of sparging already at Site. Minimal benefits expected for additional sparging. Dissolved phase contamination in groundwater beow cleanup levels.

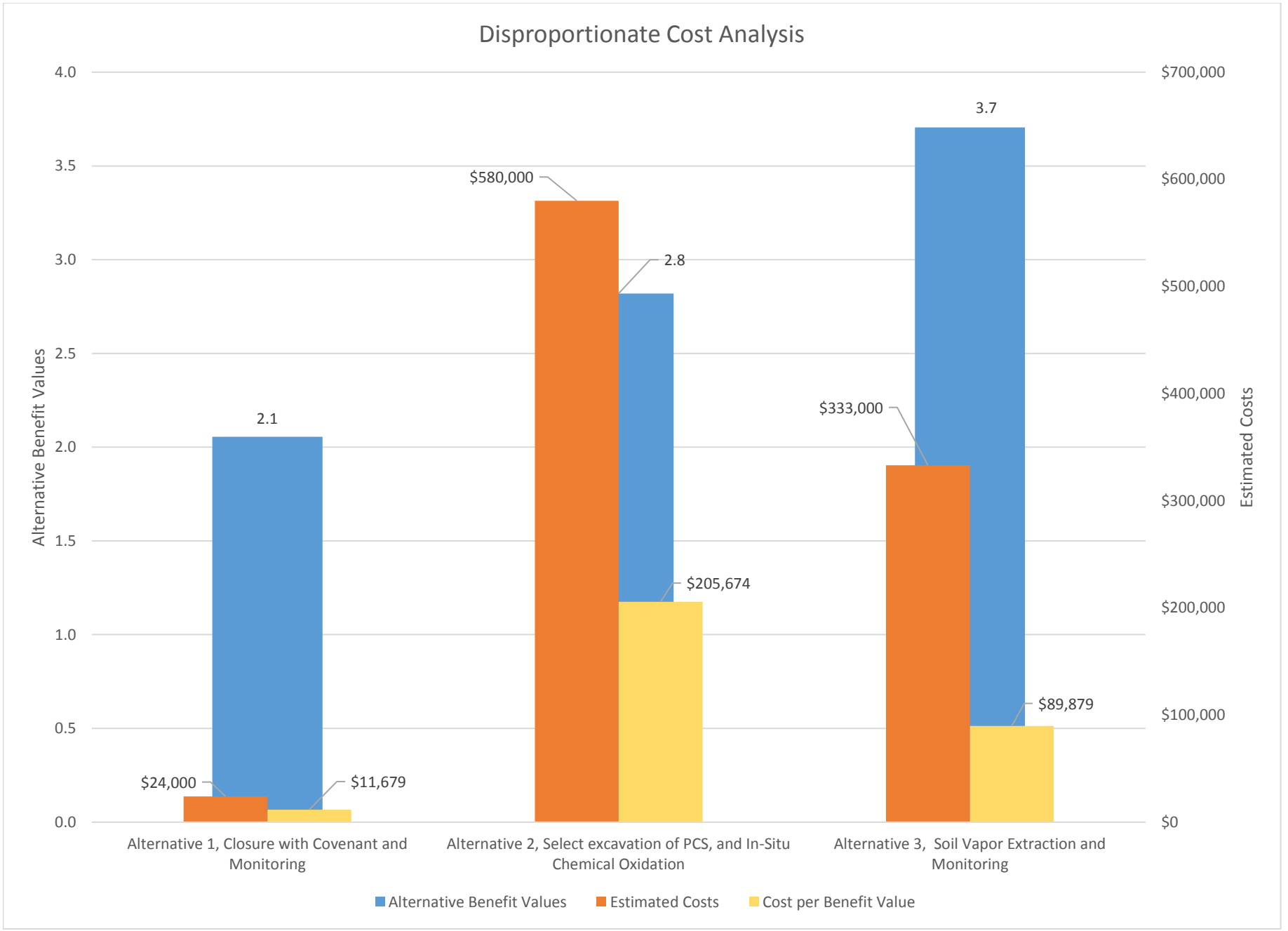
Table 4 - Identification and Screening of Response Actions and Remediation Technologies, Holts Quik Chek, Kelso, WA

General Response Action	Technology/Options	Process Description	Applicability to Site Conditions	Effectiveness	Implementability	Relative Cost	Retain for Further Consideration	Reasons for Screening Decision
In-Situ Treatment, Soil and Groundwater	Soil Vapor Extraction	Extract volatile contaminants by applying a vacuum to subsurface. Collected gasses would require additional treatment in vapor phase-GAC filter or through thermal treatment prior to discharge.	Applicable	Could be effective technology for residual contamination in soil.	Implementable	Moderate	**Retained**	Could be used to treat soil contamination at Site. Would require pilot test to determine if effective.
	In-Situ Chemical Injection	Injection of chemicals and substances promoting degradation of contamination into the subsurface.	Applicable	Effective for reducing dissolved phase contamination.	Not implementable	Moderate	Not Retained	Dissolved phase contamination in groundwater beow cleanup levels. Would require addition of liquid in vadose zone, which could contaminate groundwater.
	Enhanced Bioremediation	Injection of hydrocarbon-degrading microbes along with other substances to provide additional biodegradation in the subsurface	Applicable	Effective for reducing contamination.	Not implementable	Moderate	Not Retained	Residual contamination of old release-enhanced bio not thought to be effective.
	Electrical Resistance Heating	Heat subsurface by heated water, steam or electrical resistance to volatilize contamination.	Applicable	Effective for reducing contamination.	Not implementable	High	Not Retained	Would require significant addition of liquids, which may cause residual soil contamination to enter groundwater.

Table 5 - Remedial Alternatives Evaluation / Disproportionate Cost Analysis, Holts Quik Chek, Kelso, Washington

	Alternative 1		Alternative 2		Alternative 3	
Description of Alternative.	File environmental covenant. Regularly monitor downgradient well MW-2 on Property and downgradient well MW-5 off Property for contaminants of concern. Alternative includes 6 additional sampling events for MW-2 and MW-5 at 18 month intervals ($4,000 / event). Provide groundwater monitoring reports to Ecology for review. If contaminants of concern are detected at MW-2 or MW-5 at concentrations exceeding MTCA Method A cleanup levels, monitor all Site wells and provide report to Ecology with results.		Removal of concrete sidewalks and asphalt along North Pacific Avenue. Exposure by air knife and removal of high voltage power utility boxes and high voltage buried power lines along North Pacific Avenue and Cowlitz Way. Removal of an estimated 1000 cubic yards of PCS along the roadway and into the North Pacific Avenue ROW to the extent practicable to 25 feet bgs adjacent to the locations of soil borings B-4 (to 20 feet bgs), B-2 (to 15 feet bgs), B-1 (to below 25 feet bgs), and B-3 (to below 25 feet bgs). Transport of soil to appropriate waste landfill for disposal. Shoring UST pit and Holts Quik Chek store during excavation. Application of ORC-A® to excavation pit. Backfill with clean fill, restore utilities, road base, roadway and sidewalks. Pump and treat excavation groundwater with water storage tank and GAC treatment system. Treated groundwater would be discharged locally with permit. Install groundwater monitoring wells to replace MW-2, MW-3, and MW-4. Monitor wells for 4 quarters. Budgeted costs based on recent similar Sites.		Soil Vapor Exctraction to remove vadose zone contamination. Based upon the silty sands/ sandy silts contamination was detected in, assumes 1400 square foot area of contamination and 25 feet bgs. Includes pilot test ($15,000), installing 20 soil vapor extraction wells ($36,000), new 200 cfm air handling system, ($22,000), piping and connections ($40,000), and operating SVE system for 5 years ($3,000/month, including $900/ month for electricity). Also includes annual groundwater monitoring of Site wells ($5,000 / event) and confirmational soil sampling at end of SVE operation($15,000).	
		SCORE		***SCORE***		***SCORE***
Protectiveness						
Overall protectiveness	*Not as protective when complete*	*1*	*More protective when complete*	*4*	*More protective when complete*	4
Reduces existing risks	*Reduces risks when implemented*	*2*	*Reduces risks when implemented*	*4*	*Reduces risks when implemented*	4
Time required to reduce risk	*Longer duration required with less certainty*	*1*	*Shortest duration to reduce risks*	*4*	*Medium duration to reduce risks*	3
On-Site risks	*Reduces risk with lower level of certainty*	*1*	*Reduces risks with the most level of certainty where accessible*	*3*	*Reduces risks with a moderate level of certainty*	4
Off-Site risks	*Reduces risk with lower level of certainty*	*1*	*Reduces risks with the most level of certainty where accessible*	*3*	*Reduces risks with a moderate level of certainty*	4
Improvement in environmental quality	*Low level of improvement*	*2*	*Moderate to high level of improvement*	*4*	*Moderate to high level of improvement*	4
Criterion Score x weighting factor (average 0.30)*		***0.4***		***1.1***		***1.2***
Permanence						
Reduces toxicity, mobility, and volume	*Longer term reduction*	*1*	*Reduces toxicity, mobility, and volume rapidly. Leaves some toxicity in place*	*3*	*Reduces toxicity, mobility, and volume rapidly*	4
Degree of irreversibility	*Can be reversed*	*1*	*Irreversible. Waste removed from Site, and also treated in-situ.*	*5*	*Irreversible. Waste treated in-situ.*	4
Waste characteristics	*No waste generated from action. Some waste from monitoring.*	*4*	*Removal of soil generates solid waste. Some waste from monitoring.*	*1*	*Generates minor solid waste.*	4
Criterion Score x weighting factor (average 0.25)*		***0.5***		***0.8***		***1.0***
Long-Term Effectiveness						
Degree of Certainty	*Less certain*	*1*	*Moderately certain. Leaves some waste in place.*	*3*	*Moderately certain*	4
Reliability	*Less reliable*	*1*	*More reliable and proven*	*4*	*Reliable and proven*	3
Residual Risk	*High*	*1*	*Low*	*1*	*Moderate*	3
Technology hierarchy	*Moderate rank - treats in-situ*	*4*	*Lowest rank - Disposal to landfill*	*1*	*High rank - treats in-situ*	4
Criterion Score x weighting factor (average 0.20)*		***0.35***		***0.45***		***0.7***
Short-Term Risk Management						
During construction	*Low risk*	*5*	*Moderate risks associated with ROW uilities, dewatering complexity and disposal option*	*2*	*Moderate risks associated with ROW utilities*	3
Effectiveness of risk management	*Effective*	*4*	*Effective*	*4*	*Effective*	4
Criterion Score x weighting factor (average 0.05)*		***0.2***		***0.2***		***0.2***
Implementability						
Technically possible	*Possible, demonstrated at similar sites*	*5*	*Possible, shoring of road, UST pit and building, utilities removal*	*1*	*Possible, demonstrated at similar sites.*	4
Access	*Easily accessible*	*5*	*Difficult to access*	*1*	*Easily accessible*	2
Availability of necessary resources	*Readily available*	*5*	*Readily available*	*3*	*Readily available*	3
Monitoring requirements	*Moderate*	*3*	*High*	*1*	*High*	1
Integration with existing features	*No changes required*	*5*	*Large changes during construction*	*1*	*Some changes during construction*	3
Criterion Score x weighting factor (average 0.05)*		***0.23***		***0.07***		***0.13***
Public Concerns						
Public Concerns	*Leaves contamination in place. No changes to area.*	*3.0*	*Large construction project.*	*1.0*	*Treats contamination in place without large construction project.*	*4.0*
Criterion Score x weighting factor (average 0.10)*		***0.3***		***0.1***		***0.4***
Restoration Time Frame						
Restoration Time Frame	*Long time frame (15-20 years)*	*1.0*	*Short time frame (2-2.5 years)*	*4.0*	*Medium time frame (5-10 years)*	*3.0*
Criterion Score x weighting factor (average 0.05)*		***0.1***		***0.2***		***0.2***
Alternative Benefit Value	*2.055*		*2.820*		*3.705*	
Estimated Alternative Cost**	$24,000		$580,000		$333,000	
Cost per Benefit Value	$11,678.83		$205,673.76		$89,878.54	

* Alternative Benefit Values are determined by multiplying criterion scores by weighting factors. **Alternative costs based on order of magnitude estimates.


Disproportionate Cost Analysis
Alternative Benefit Values
Estimated Costs
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
$700,000
$600,000
$500,000
$400,000
$300,000
$200,000
$100,000
$0
2.1
3.7
2.8
$580,000
$333,000
$205,674
$89,879
$24,000
$11,679
Alternative 1, Closure with Covenant and Monitoring
Alternative 2, Select excavation of PCS, and In-Situ Chemical Oxidation
Alternative 3, Soil Vapor Extraction and Monitoring
Alternative Benefit Values
Estimated Costs
Cost per Benefit Value