

**PROPOSED UNDERGROUND STORAGE TANK (UST)  
RELEASE CASE CLOSURE EVALUATION SUMMARY**

**LUST Case File # 5624.01-.03**  
**Facility ID # 0-010508**  
**Cochise County**

**Fuentes Auto Repair**  
**559 East 9<sup>th</sup> Street**  
**Douglas, Arizona 85607**

*Background:*

The Site is located at 559 East 9th Street in Douglas, Arizona, at the southwest corner of 9th Street and F Avenue. The Site is currently vacant but operated historically as an auto maintenance and repair shop. ADEQ's State Lead program, and its contractor Hydro Geo Chem, Inc. removed an unregistered UST system at the Site in August 2014. The UST system consisted of one 4,000-gallon UST, two 1,000-gallon USTs, and two dispensers. There is no known UST owner or UST operator. During UST permanent closure activities in August 2014, LUST release #5624.01 was assigned to the UST basin (UST #2, and #3), LUST release #5624.02 was assigned to gasoline dispenser location D1, and LUST release #5624.03 was assigned to gasoline dispenser location D2.

After the UST system removal, site characterization activities included drilling exploratory borings; drilling and installing groundwater monitoring wells; sampling and analyzing groundwater samples; and conducting a soil vapor survey. ADEQ's State Lead program contracted with Tetra Tech to conduct the work. The *Site Characterization Report* was approved in June 2020.

*Removal or control of the source of contamination:*

ADEQ contracted Tetra Tech to design, install, and operate a remediation system to decrease concentrations of contaminants of concern (COCs) in the soil and groundwater beneath the Site. The remediation system installation was completed between April and September 2017. The remediation system included four nested soil vapor extraction (SVE) and air sparging (AS) wells (VEAS-1 through VEAS-4) installed within the former UST and dispenser areas. Each nested well was installed to a depth of 70 feet below ground surface (bgs) and consisted of one vapor extraction well and two air sparging wells per borehole constructed with 2-inch diameter schedule 40 polyvinyl chloride (PVC) materials. The SVE well included a 30-foot long screened interval extending from 20 feet bgs to 50 feet bgs. The shallow AS well at each location was installed to a depth of 60 feet bgs and screened between 57.5 feet bgs to 60 feet bgs. The deep AS well at each location was installed to a depth of 70 feet bgs and screened between 67.5 feet bgs to 70 feet bgs.

Tetra Tech initiated operation of the soil vapor extraction (SVE) and air sparging (AS) systems on September 20, 2017 and January 22, 2018, respectively. The SVE system ran continuously from the September 2017 through December 2019. At this time, Tetra Tech shut the system down based on review of vapor analytical data showing minimal contaminant concentrations in

the influent vapor stream. The AS system operated between January 2018 and September 2019. The AS system was limited to air injection into VEAS-2 at the shallow and deep intervals since the air sparge wells at the other three locations were screened within tightly packed fine-grained alluvium and were unresponsive to air injection. The SVE system was restarted in February 2020 and operated through March 2020, with soil vapor extraction limited to wells VEAS-2 and VEAS-3 to focus on residual contamination in groundwater detected in samples collected from MW-1 and MW-4.

The system was turned off in March 2020, at the direction of ADEQ, after volatile organic compound (VOC) removal rates had diminished to asymptotic levels (averaging less than one pound per month removal) and most COC concentrations in groundwater had decreased to levels below applicable regulatory standards except for 1, 2-DCA which was detected slightly above the Arizona Aquifer Water Quality Standard (AWQS).

*Characterization of the groundwater plume:*

Benzene, toluene and 1, 2-DCA were the only COCs detected in groundwater at concentrations above their respective AWQS (toluene was detected above the AWQS once in 2016, only in groundwater collected from MW-1). Prior to the operation of the SVE system, the highest benzene concentration detected in the groundwater beneath the site was 990 µg/L and the highest 1,2-DCA concentration detected in groundwater was 27 µg/L. Groundwater impacts were limited to samples collected from MW-1, MW-3 and MW-4, located within approximately 30 feet of the former UST areas. By the time the remediation system was installed, COC concentrations in groundwater collected from MW-3 were reduced below applicable AWQS. MW-5 is located at the southeast corner of the Site and serves as a cross gradient monitoring point. The up gradient direction is delineated by MW-6. The groundwater impacts above AWQS are limited to benzene and 1, 2-DCA in MW-4.

During the remediation system operation, periodic groundwater monitoring was conducted from September 2017 to February 2020. COC concentrations in groundwater collected from MW-1 were reduced below AWQS within six months. COC concentrations in groundwater collected from MW-4 were reduced below AWQS within one year. Benzene concentrations in groundwater collected from MW-4 briefly increased above the AWQS in the 3rd and 4th quarter of 2019 but dropped back below the AWQS in the 1st quarter of 2020. Concentrations of 1, 2-DCA in groundwater collected from MW-4 increased above the AWQS in the 3rd quarter of 2018 and fluctuated between 10 and 13 µg/L through the 1<sup>st</sup> quarter of 2020. Concentrations of 1, 2-DCA in groundwater collected from MW-1 increased above the AWQS in the 1st quarter of 2020 (9.41 µg/L).

In April 2020, additional sampling was conducted at MW-1 and MW-4 in an attempt to characterize a vertical COC profile within each well. Passive diffusion bags (PDBs) were installed on March 25, 2020 at five depth intervals within each well and were allowed to equilibrate with the surrounding groundwater for two weeks. PDBs were installed in MW-1 at 49.5 feet, 54.5 feet, 59.5 feet, 64.5 feet and 68.5 feet below top of casing. PDBs were installed in MW-4 at 49 feet, 54 feet, 59 feet, 64 feet and 68 feet below top of casing. On April 10, 2020, the PDBs were retrieved and the groundwater was sampled for VOCs.

Benzene was detected in the 54-foot sample collected from MW-4 at a concentration (7.44  $\mu\text{g/L}$ ) greater than the AWQS. Benzene was not detected above the laboratory detection limit in any of the four other grab samples collected from MW-4 or the five grab samples collected from MW-1. Analysis of the MW-4 samples revealed 1, 2-DCA concentrations above the AWQS in samples collected at 49 feet, 59 feet and 64 feet, ranging from 7.31  $\mu\text{g/L}$  to 12  $\mu\text{g/L}$ . 1, 2-DCA was not detected in the samples collected at 54 feet and 68 feet at concentrations exceeding the AWQS. The average 1, 2-DCA concentration in the five samples collected from MW-4 was 7.68  $\mu\text{g/L}$ , slightly above the AWQS of 5  $\mu\text{g/L}$ .

Analysis of the MW-1 samples revealed 1, 2-DCA concentrations above the AWQS in samples collected at 54.5 feet and 59.5 feet (11.4  $\mu\text{g/L}$  and 12.2  $\mu\text{g/L}$ , respectively). 1, 2-DCA was not detected in the samples collected at 49.5 feet, 64.5 feet and 68.5 feet at concentrations exceeding the AWQS. The average 1, 2-DCA concentration in the five samples collected from MW-1 was 5.6  $\mu\text{g/L}$ , slightly above the AWQS of 5  $\mu\text{g/L}$ .

The PDB sampling suggests the residual 1, 2-DCA mass near MW-4 appears to be in the 59 to 64 ft. bgs range and near MW-1 appears to be in the 55 to 60 ft. bgs range.

#### *Groundwater plume stability:*

Groundwater impacts were historically limited to samples collected from MW-1, MW-3 and MW-4. Prior to initiating corrective action, the size of the plume reduced further and was limited to the area around MW-1 and MW-4. Groundwater monitoring during corrective action demonstrated that COC concentrations in groundwater beneath the site were reduced below AWQS within one year. Benzene concentrations in groundwater collected from MW-4 briefly increased above the AWQS in the 3rd and 4th quarter of 2019 but dropped back below the AWQS in the 1st quarter of 2020. Concentrations of 1, 2-DCA in groundwater collected from MW-4 increased above the AWQS in the 3rd quarter of 2018 and fluctuated between 10 and 13  $\mu\text{g/L}$  through the 1st quarter of 2020. Concentrations of 1, 2-DCA in groundwater collected from MW-1 increased above the AWQS in the 1st quarter of 2020 (9.41  $\mu\text{g/L}$ ). Rising groundwater elevation data and PDB sampling at these wells suggest these increases in 1,2-DCA concentration are most likely due to a gradual desorption of residual COC mass in the fine-grained alluvium (clay) at approximately 50 to 55 feet bgs.

#### *Natural Attenuation:*

Natural attenuation processes include diffusion, dispersion, sorption, volatilization, and biodegradation. A decreasing trend in VOC concentrations in groundwater has been established, which supports that natural attenuation is occurring. Hydrologic and geochemical data can be used to indirectly demonstrate the type(s) of natural attenuation processes.

A statistical analysis of historical COC concentrations in groundwater collected from MW-1 and MW-4 was conducted using the Mann-Kendall trend test, to determine if the limited groundwater impacts beneath the site are stable and/or decreasing. Analysis including all groundwater monitoring data between 2015 and 2020 indicates that benzene and 1, 2-DCA concentrations in groundwater exhibited a decreasing trend in MW-1 and MW-4. An analysis limited to more

recent groundwater data collected in 2019 and 2020 indicate that benzene concentrations at MW-4 exhibit no trend (neither increasing or decreasing), 1,2-DCA concentrations at MW-4 exhibit a stable trend, and 1,2-DCA concentrations at MW-1 exhibit not trend (neither increasing or decreasing). This data suggests groundwater impacts will be limited to the area near MW-1 and MW-4, is not expected to migrate or expand, and should naturally attenuate over time. The primary line of evidence for natural attenuation is decreasing contaminant trends. Based on a review of groundwater analytical data and Mann-Kendall Toolkit, a decreasing trend of COC concentrations in groundwater is well documented in all wells.

*Threatened or impacted drinking water wells:*

ADEQ conducted a receptor survey on October 14, 2019 using reviewed information available on the Arizona Department of Water Resources (ADWR) website for water wells within a ½-mile radius of the Site. The database identified eighty (80) wells within the search radius. Of these wells, sixty-five (65) are listed as “Monitoring,” thirteen (13) as “Other,” two (2) as “Non-Exempt,” and none as “Exempt.” The two “Non-Exempt” wells are located to the northwest of the site between ¼ and ½ mile. Well #55-60395 is registered to the City of Douglas as well #7, which was abandoned in 2015. Well #55-626201 is registered to the Union Pacific Rail Road as an industrial well, which was abandoned in 2012.

The City of Douglas operates a regulated public water system (AZ04-02014) The City of Douglas serves approximately 16,165 people. The City operates six (6) deep wells that produce high-quality water for public distribution in the City. Hydrologic studies have indicated that the water resources available are generous, with active recharge from the Mule, Dragoon, and Chiricahua mountain ranges. Water stored in the sand and gravel beds of the Douglas Basin Aquifer is adequate to supply our needs for years to come. The wells are widely separated to minimize the risk of any potential local contamination or naturally occurring quality problems. Not all wells are necessary to provide daily needs, but all are run periodically to keep them in operating condition. The average daily usage in the winter time is 3.0 million gallons per day. Peak usage in the summertime is approximately 5.4 million gallons per day. The 2018 Consumer Confidence Report (dated June 2019) is posted on the City’s webpage but VOCs aren’t required annually. According to ADEQ’s Safe Drinking Water Database, the water system was sampled for VOCs in March 2019, with no detections above laboratory reporting limits.

According to ADWR rules, any new or replacement well located at or near the LUST site would need to meet the criteria of A.A.C. R12-15-1302 (B) (3).

*Other exposure pathways:*

In 2015, the results of the preliminary soil and groundwater investigations were reviewed by ADEQ and Tetra Tech to determine if the site was fully characterized. Based on this review, six vapor monitoring probes were installed to assess the extent of VOCs in soil vapor beneath the site to determine if an immediate threat to human health existed. Soil vapor data was assessed by comparing the results to EPA’s Soil Vapor Screening Levels (SVSL). Analysis of the 2015 soil vapor samples indicated that 1, 2, 4-trimethylbenzene and benzene were present in soil vapor beneath the Site at concentrations greater than the applicable SVSL. The soil vapor survey indicated that VOCs in soil vapor beneath the site were a potential risk to human health,

warranting corrective action at the Site. Historical soil vapor analytical results are presented in the *Site Characterization Report* (SCR).

Five confirmation soil borings (CB-1 through CB-5) were drilled between February 18 and February 26, 2019 at locations selected to give a representative overview of the previously contaminated areas near the former UST pits without interfering with on-site monitoring wells, VE/AS wells, or remediation system piping. Soil samples were collected from the borings every five linear feet beginning at 15 feet bgs, with the final sample collected at 50 feet bgs, just above the water table. Confirmation soil sample analysis revealed no detections of COCs at concentrations exceeding the applicable residential Arizona residential Soil Remediation Levels (rSRLs).

Tetra Tech performed a soil vapor intrusion risk assessment of the Site using soil gas data collected in September 2019 and the U.S. Environmental Protection Agency (EPA) Excel-based tool for the Johnson and Ettinger (J&E) model. The purpose of the risk evaluation was to assess whether detected concentrations of VOCs in soil gas could present a potential vapor intrusion human health risk to future occupants of the Site under a residential land use scenario. The risk assessment concluded that the predicted indoor air concentrations and potential risks estimated by the EPA J&E model are acceptable. The results of the risk assessment show that all predicted carcinogenic and non-carcinogenic risks to a hypothetical residential receptor are well below levels of significance for all chemicals of potential concern (COPCs) detected in soil gas (i.e., well below an incremental cancer risk of  $1 \times 10^{-6}$  and well below a hazard quotient of 1).

There are potential residential receptors within a quarter mile of the Site, including a daycare, two schools and a housing development. Coqui Children's Center is approximately 1,300-foot northeast of the Site (up gradient), Sarah Marley Elementary School is approximately 1,250-foot southeast (down/cross gradient) of the Site, Head Start Douglas is approximately 900 feet south (down gradient) of the Site and the nearest residence is approximately 300-feet to the east (cross-gradient). However, the subsurface soil contamination has not migrated away from the source area, and these properties are served drinking water from the City of Douglas.

*Requirements of A.R.S. §49-1005(D) and (E):*

The results of the corrective action completed at the site assure protection of public health, welfare and the environment, to the extent practicable, the clean-up activities completed at this site allow for the maximum beneficial use of the site, while being reasonable, necessary and cost effective.

*Other information that is pertinent to the LUST case closure approval:*

The facility and LUST files were reviewed for information regarding prior cleanup activities, prior site uses and operational history of the UST system prior to removal.

Groundwater data tables:

MW-1 (source area)  
Total Depth: 69 feet. Screened 49-69 feet.

<b>Date</b>	<b>Benzene AWQS is 5.0 µg/L</b>	<b>1,2-DCA AWQS is 5.0 µg/L</b>	<b>Depth to Water (feet)</b>
April 2015	<b>40.1</b>	<5.00	50.6
August 2016	<b>990</b>	<b>&lt;38</b>	52.0
January 2017	<b>50</b>	<b>10</b>	52.47
April 2017	<b>63</b>	<b>9.8</b>	52.06
August 2017	<b>80/48</b>	<b>13/7.3</b>	52.55
September 2017 SVE start			
January 2018	2.5	<b>10</b>	53.12
January 2018 AS start			
April 2018	<0.21	2.4	53.72
August 2018	0.69	4.2	53.31
September 2018 AS end			
October 2018	0.79	<b>5.7</b>	51.81
April 2019	<1.00/<1.00	3.51	51.77
July 2019	<1.00	3.41	51.87
November 2019	<1.00	4.31	51.46
December 2019 SVE end			
February 2020	<1.00	<b>9.41</b>	49.13

MW-4 (adjacent to the source area)  
Total depth of well 70 feet. Screened 38-70 feet.

<b>Date</b>	<b>Benzene AWQS is 5.0 µg/L</b>	<b>1,2-DCA AWQS is 5.0 µg/L</b>	<b>Depth to Water (feet)</b>
August 2016	<b>66</b>	<b>16</b>	51.4
January 2017	<b>46</b>	<b>25</b>	51.88
April 2017	<b>56</b>	<b>27</b>	52.18
August 2017	<b>64</b>	<b>26</b>	51.75
September 2017 SVE start			
January 2018	<b>23</b>	<b>27</b>	53.23
April 2018	<0.21/<0.21	<b>10/11</b>	53.77
August 2018	<0.21	4.5	
September 2018 AS end			51.52
October 2018	1.7/1.7	<b>11/11</b>	51.52
April 2019	<1.00	<b>12.2</b>	51.47

July 2019	<b>14.9</b>	<b>9.28</b>	51.86
November 2019	<b>19.4</b>	<b>12.7</b>	51.49
December 2019 SVE end			
February 2020	<1.00	<b>10.8</b>	49.12

MW-2 (down gradient)  
Total Depth: 70 feet. Screened 40-70 feet.

Date	Benzene AWQS is 5.0 µg/L	1,2-DCA AWQS is 5.0 µg/L	Depth to Water (feet)
August 2016	<0.21	2.6	52.5
January 2017	2.7	2.9	52.45
April 2017	<0.21	2.9	52.61
August 2017	<0.21	2.4	52.83
January 2018	<0.21	1.8	53.73
April 2018	<0.21	1.6	54.31
August 2018	<0.21	1.9	54.03
October 2018	<0.21	2.3	52.85
April 2019	<1.00	1.8	52.8
July 2019	<1.00	1.68	52.54
November 2019	<1.00	1.82	52.1
February 2020	<1.00	1.98	49.65

MW-3 (cross gradient)  
Total Depth: 70 feet. Screened 40-70 feet.

Date	Benzene AWQS is 5.0 µg/L	1,2-DCA AWQS is 5.0 µg/L	Depth to Water (feet)
August 2016	<b>170</b>	12	51.5
January 2017	3.2	4.4	51.58
April 2017	<b>6.7</b>	3.7	51.71
August 2017	0.94	1.3	51.88
January 2018	<0.21	3.6	52.78
April 2018	<0.21	0.66	53.35
August 2018	0.23	1.5	52.99
October 2018	<0.21	0.48	51.53
April 2019	<1.00	<1.00	51.5
July 2019	<1.00	<1.00	51.53
November 2019	<1.00/<1.00	<1.00/<1.00	51.13
February 2020	<1.00	<1.00	49

MW-5 (cross gradient)  
Total depth 70 feet. Screened 40-70 feet.

Date	Benzene AWQS is 5.0 µg/L	1,2-DCA AWQS is 5.0 µg/L	Depth to Water (feet)
August 2017	<0.21	<0.22	52.69
January 2018	<0.21	<0.22	53.83
April 2018	<0.21	<0.22	54.46
August 2018	<0.21	<0.22	54.05
October 2018	<0.21	<0.22	52.65
April 2019	<1.00	<1.00	52.6
July 2019	<1.00	<1.00	52.47
November 2019	<1.00	<1.00	52.14
February 2020	<1.00	<1.00	49.27

MW-6 (up gradient)  
Total depth 70 feet. Screened 40-70 feet.

Date	Benzene AWQS is 5.0 µg/L	1,2-DCA AWQS is 5.0 µg/L	Depth to Water (feet)
January 2018	<0.21	<0.37	53.25
April 2018	<0.21	<0.38	52.47
August 2018	<0.21	<0.38	51.55
October 2018	<0.21	<0.38	50.03
April 2019	<1.00	<1.00	49.99
July 2019	<1.00	<1.00	50.51
November 2019	<1.00	<1.00	50.31
February 2020	<1.00	<1.00	48.28

Passive Diffusion Bag (PDB) Sampling

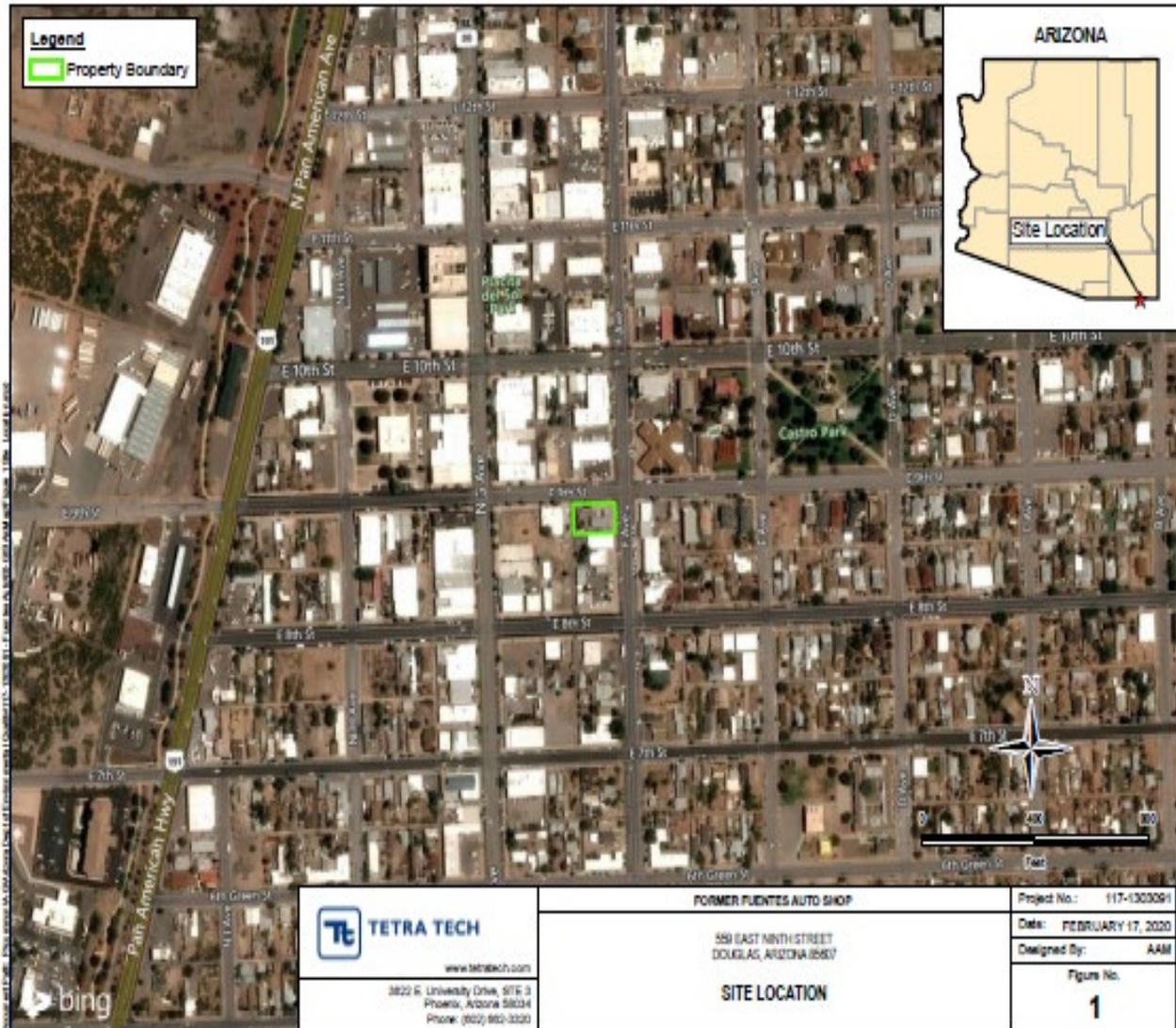
Location		MW-1						
Sample ID	AWQS (µg/L)	MW-1-49.5	MW-1-54.5	MW-1-59.5	MW-1-64.5	MW-1-68.5	Max Conc	Avg Conc
Sample Depth (ft below top of casing)		49.5	54.5	59.5	64.5	68.5		
Date Collected		04/10/2020	04/10/2020	04/10/2020	04/10/2020	04/10/2020		
VOCs by EPA Method 8260B (µg/L)								
Benzene	5	<1.00	0.333 J	<1.00	0.164 J	<1.00	0.33	0.15
1,2-Dichloroethane	5	1.28	11.4	12.2	3.12	<1.00	12.2	5.6

Location		MW-4					Max Conc	Avg Conc
Sample ID	AWQS (µg/L)	MW-4-49	MW-4-54	MW-4-59	MW-4-64	MW-4-68		
Sample Depth (ft below top of casing)			49	54	59	64	68	
Date Collected		04/10/2020	04/10/2020	04/10/2020	04/10/2020	04/10/2020		
VOCs by EPA Method 8260B (µg/L)								
Benzene	5	0.498 J	7.44	0.197 J	<1.00	<1.00	7.44	1.7
1,2-Dichloroethane	5	7.31	4.8	12	9.73	4.56	12	7.68

Notes:

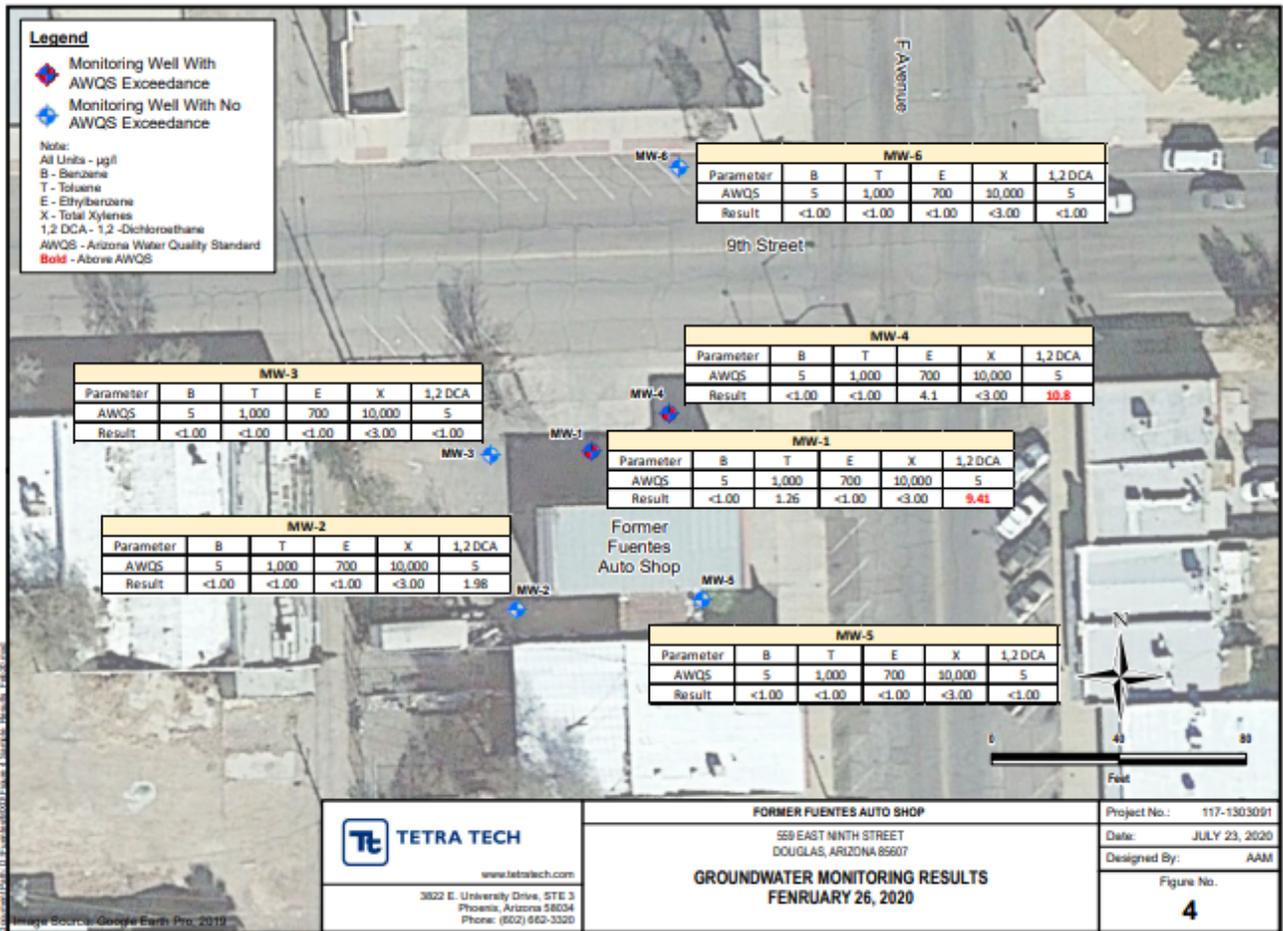
VOCs - Volatile Organic Compounds  
µg/L - micrograms per liter  
ID - Identification  
EPA - United States Environmental Protection Agency

AWQS = AZ Aquifer Water Quality Standard  
**Bold** - Analyte was detected at a concentration greater than the laboratory reporting limit  
**Bold** - Analyte was detected at a concentration greater than the Arizona Aquifer Water Quality Standard  
 < - Indicates analyte not present above the listed laboratory reporting limit  
 J - Analyte was detected at a concentration above the method detection limit, but below the reporting limit. The concentration is an estimate.









**COC Concentrations in Groundwater  
 Former Fuentes Auto Shop – Douglas, AZ**

