

## PROPOSED LEAKING UST (LUST) CASE CLOSURE

The Arizona Department of Environmental Quality (ADEQ) is considering closure of the following leaking underground storage tank (LUST) cases:

**LUST Case File #1986.01, .02**  
**Facility ID # 0-002144**  
**Yavapai County**

**Beaver Hollow Mini-Mart**  
**1955 East Cornville Road**  
**Rimrock, Arizona 86335**

The Beaver Hollow Mini-Mart operates as a gasoline and diesel fuel service station and convenience store. Surrounding properties include a restaurant, recreational vehicle parking and residences. LUST #1986.01-.02 were assigned to a former 2,000-gallon diesel UST and a former 2,000-gallon gasoline UST that were removed in June 1991. The UST owner/operator is Flag Car Wash, Inc. Preliminary site investigations took place between 1998 and 1999. The State Lead Unit oversaw site characterization activities beginning in 2000. Active remediation using a soil vapor extraction (SVE) and air injection (AI) occurred until January 2009. In June-July 2010, three confirmation borings were drilled to demonstrate that remediation had removed a majority of the chemicals of concern (COCs) since the previously drilled soil borings in 1998 and 2000. Results from the above three soil borings showed low enough soil concentrations to consider closure by risk assessment or using a Declaration of Environmental Use Restriction. ADEQ approved site characterization in July 2010. In September 2010 as part of a risk assessment, five nested permanent soil vapor monitoring wells were installed (to sample at 5 feet below ground surface [bgs] and 10 feet bgs). Results from the first round of soil vapor samples indicated a current or recent release due to the extremely high COC concentrations for one location (at five feet bgs and ten feet bgs). Five rounds of soil vapor sampling were conducted from September 2010 to September 2012. The same location mentioned previously consistently had extremely high results. In August 2012, another soil boring was installed in a similar location to the borings drilled in June/July 2010. The results show an increase in volatile organic compound (VOC) concentrations at 15 bgs and 25 bgs in comparison to the borings in 2010. This was another indication of a current or recent release. At depths of 85 to 99 bgs, the soil concentrations were similar to those from the 2010 borings. In February 5, 2013, a helium tracer test was performed on the product lines to detect if a small volume release was occurring at the site. Lab results showed helium concentrations ranging from 2.6% to 8.7%, which indicates the system was not tight and a small volume release may be occurring that other methods would not be able to detect. Helium was consistently detected above grade, which was another indication of a leak. The State Lead Unit turned over corrective actions for the site to the UST owner/operator, Flag Car Wash, Inc. for the new LUST release 1986.03. In March 2014, a *Notice of Consolidation of LUST Case Files* was issued to the UST owner/operator. LUST release 1986.03 was merged with LUST release 1986.02.

Corrective actions began at the site in 1998, which included the installation of fifteen groundwater monitor wells in and around the Site. Groundwater sampling has been conducted since 1998. Sampling has been suspended at all wells with non-detectable concentrations of the COCs over two consecutive groundwater monitoring events. The 2018 Groundwater Report indicates that the concentrations of COCs exceeding the applicable regulatory standard is limited to benzene in monitoring well MW-10. MW-10 is located down gradient off-site near the Cornville Road exit on Interstate 17. The 2018 Groundwater Report indicates that at sentinel well locations (MW-14S and MW-14D) the concentrations of the COCs have been below applicable regulatory levels or below laboratory reporting limits since at least 2010.

The COCs for the Site groundwater historically were volatile organic compounds (VOCs) associated with impacts from gasoline and/or diesel fuel releases. The groundwater COCs include benzene, toluene, ethylbenzene, and total xylenes (BTEX), methyl tert-butyl ether (MTBE), and naphthalene. The groundwater is currently contaminated with benzene at concentrations that exceed applicable Tier 1 Corrective Action Standards.

Data provided by Geosyntec in the *Corrective Action Completion Report* received December 4, 2018, the *Soil Vapor Survey Results Report* received August 15, 2018, and all other available site information has been used by ADEQ to determine whether remaining levels of contaminants at the site are adequately protective of human health and the environment. A site-specific risk assessment and detailed file/information search were also completed.

Based upon the results of remedial activities and site specific information, the above-referenced LUST site is eligible for alternative LUST closure under Arizona Revised Statutes (A.R.S.) §49-1005(E). Arizona Administrative Code (A.A.C.) R18-12-263.04 allows case closure of a LUST site with groundwater contamination above the Arizona AWQS or Tier 1 Corrective Action Standards. ADEQ has considered the results of a site-specific assessment and the rule specific criteria below:

1. *Threatened or impacted drinking water wells:* A search for threatened or impacted drinking wells was conducted in a 0.5-mile radius around MW-10 as part of the Tier 3 Evaluation using the Arizona Department of Water Resources (ADWR) Wells 55 Database. MW-10 was selected as the origin point for the search, because it was the only monitor well for which the concentration of benzene exceeded the AWQS. Six wells (55-517565, 55-522218, 55-562031, 55-805237, 55-805230 and 55-806881) were identified as being down gradient of MW-10. The Tier 3 Evaluation exposure point was taken to be well 55-562031, which is the nearest domestic well and lies approximately 600 ft. down gradient of MW-10. Well 55-562031 is identified in the 2018 Groundwater Report and other Site documents as the “Womack” well that was drilled as a replacement for now abandoned well 55-802908. Well #55-802908 may have been abandoned due to impacts that likely originated at another LUST site up gradient to the east. The 2018 Groundwater Report indicates that well 55-562031 was not impacted when last sampled in 2011, and wells MW-14S and MW-14D (which lie approximately 300 ft. down gradient of MW-10 and up gradient 300 feet of 55-562031) were not impacted when sampled in 2018. In addition, a BIOSCREEN model was prepared as part of the Tier 3 Evaluation and the model indicates that under conservative conditions (i.e., an infinite source at MW-10) natural attenuation by biodegradation and dissolution will mitigate the concentration of benzene to less than 5 µg/L within 100 ft. down gradient of MW-10.

2. *Other exposure pathways:* In January 2000, the State Lead Unit, and its contractor Terranext, installed borings to vertically define the soil contamination found during UST Permanent Closure. Several borings/monitoring wells were installed. MW-11 was installed at the source area. The soil data indicates VOC contamination associated with petroleum releases present over applicable regulatory standards between 15 and 110 feet bgs. Terranext installed confirmation soil borings in June-July 2010 and in August 2012 to evaluate remedial progress after active remediation ended in January 2009. Several soil vapor surveys were conducted between 2010 and 2012. The UST owner/operator and its contractor, Geosyntec, installed additional soil borings in August 2014. The soil data indicates that VOC contamination associated with a petroleum release was present over residential Soil Remediation Levels (rSRLs) between a depth of 10 and 80 feet bgs. No polyaromatic hydrocarbons (PAHs) were reported. Geosyntec conducted a shallow soil vapor survey in May 2018. Soil vapor samples were analyzed by EPA Method TO-15, for VOCs, and for fixed-gases by EPA Method D1946. Field and laboratory quality assurance/quality control (QA/QC) was acceptable. Geosyntec used the on-line screening version of the

Johnson & Ettinger (J&E) model with site-specific data and model default parameters to evaluate potential human health risk under a residential land-use scenario. A cumulative cancer risk (ELCR) and a non-cancer hazard index (HI) value was calculated for all CoCs [both petroleum related CoCs and non-petroleum related CoCs were evaluated together]. The ELCR and the HI was 8.56-07 and 0.577, respectively. All of these values represent acceptable risk since they are below the target thresholds of E-06 and 1.0, respectively. Soil samples collected from BH-2 in August 2014 had benzene, xylene and trimethylbenzene (TMB) contamination present over rSRLs at 10 feet bgs. Soil samples collected from BH-4 had one, 2, 4-TMB contamination present over rSRL at 10 feet bgs. All of the VOC contamination concentrations are below the EPA Regional Screening Level values for carcinogenic ingestion, and noncancer child hazard ingestion screening levels. The highest benzene concentration at other SB locations where VOCs were present in soil at 10 feet bgs were soil borings that were converted into vapor extraction (VE) wells. Incidental dermal contact with the groundwater is considered *de minimis* risk. In a ¼-mile land use/receptor survey, there are no schools, day care centers, hospitals or other sensitive populations.

3. *Groundwater plume stability:* The maximum dissolved-phase VOC contamination beneath the site appear to have existed around the former northern dispenser island and have decreased in extent and concentration between 2007 and 2018. Monitor wells MW-1 through MW-4 were installed near the source. VOC contamination in down gradient off-site wells MW-8, MW-9 and MW-10 was reported beginning in 1998. In May 2018, all on site wells and MW-8 and MW-9 show no VOC contamination present over an applicable regulatory standard. The average depth to groundwater beneath the site has ranged from approximately 45 to 81 feet bgs from 1994 to 2018. Seasonal groundwater trends are apparent with the highest groundwater elevations typically recorded in the spring and the lowest groundwater elevations in the fall. Depth to groundwater was generally observed to decrease to the south of the Site. The gradient was observed to be approximately 0.0084 feet per foot (ft. /ft.) with a flow direction approximately southwest. Groundwater elevations site wide were observed to have fallen by approximately 2 to 4 ft. since November 2017. Geosyntec evaluated plume stability using BIOSCREEN. The centerline output from the model, as prepared above, indicated that the COCs are anticipated to degrade to negligible concentrations less than 100 ft. downgradient of MW-10 under both the first order decay model (using the most conservative half-life) and the instantaneous reaction model (using median values for the groundwater chemistry parameters). The output of the model further indicated that under the most conservative scenario (no degradation, infinite source) the concentration of the COCs at the exposure point would be negligible. This data supports that the contaminant plume will continue to shrink over time. The model was run in reverse by using the Excel Goal Seek function to determine the input concentration (at MW-10) that would result in the concentration of a COC exceeding 0.005 mg/L (the Arizona Aquifer Water Quality Standard for benzene) at the point of exposure under the instantaneous reaction model. The modeled value was approximately 79,500 mg/L at MW-10. This result supports a conclusion that the remaining dissolved COC plume near MW-10 is unlikely to impact the point of exposure (Womack well).

4. *Characterization of the groundwater plume:* Fifteen groundwater monitor wells have been installed in and around the Site and groundwater samples have been collected for analysis since 1998. Sampling has been suspended at all wells with non-detectable concentrations of the COCs over two consecutive groundwater monitoring events. The maximum concentration of COCs, as indicated in the 1<sup>st</sup> 2018 Groundwater Semi-annual Report are as follows: benzene at 13 µg/L (in monitor well MW-10), toluene at 0.71 µg/L (in monitor well MW-10), ethylbenzene: less than 0.50 µg/L (not detected), total xylenes at less than 1.50 µg/L (not detected), naphthalene: 1.1 µg/L (in monitor well MW-10), and MTBE at 61 µg/L (in monitor well MW-10). The highest benzene concentration in MW-10 was 1,530 µg/L in

January 1999. Other VOC concentrations have been mostly below laboratory detection limits or slightly above, since at least 2013 with the exception of MW8, which is near MW9.

5. *Natural Attenuation:* Natural attenuation processes include diffusion, dispersion, sorption, volatilization, and biodegradation. A decreasing trend in chemical concentrations in groundwater has been established, which supports natural attenuation is occurring. Hydrologic and geochemical data can be used to indirectly demonstrate the type(s) of natural attenuation processes. Monitored natural attenuation (MNA) parameters were collected during the February and May 2018 groundwater monitoring events. The 1st 2018 *Groundwater Report* indicates that negative oxidative-reductive potentials are present in MW-8 and MW-10, an indicator that aerobic biodegradation has occurred in what is expected to be an oxidative environment. Geochemical results for MW6, MW7 and MW9 indicate that sulfate and nitrate are depleted, iron is reducing and methanogenesis is weak. The comparison of detectable methane in MW9 and non-detect methane in MW7 and MW11 indicates that methanogenesis is occurring. Lower sulfate and nitrate concentrations in MW6 (area of former higher concentrations of contamination) and MW9 (location of current contamination) compared to concentrations in MW7 and MW11 (areas with no contamination impact) indicate that the sulfate and nitrate area being used as electron acceptors during anaerobic degradation of the hydrocarbons.

6. *Removal or control of the source of contamination.* Source control has been completed by the UST system being permanently closed in June 1999. Soil vapor extraction (SVE) and air sparging (AS) was used to mitigate the release area impacts between 2000 and 2009. A total of approximately 228,957 pounds of VOCs were reportedly recovered. SVE began again in July 2015 and operated through May 2017. The system was briefly restarted in November/December 2017 to evaluate rebound. The total amount of VOCs removed was approximately 16,400 lbs. The groundwater impacts have been naturally attenuated by biodegradation and dispersion.

7. *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.

8. *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 for MW-10 (off-site)

Date	Benzene AWQS is 5 µg/L	Depth to water
January 1999	1,530	--
February 2000	440	77.02
September 2001	1,000	77.40
September 2002	430	83.64
July 2003	300	78.07
December 2003	730	82.00
December 2004	430	74.60
October 2007	100	78.42

September 2008	<b>610</b>	76.07
March 2010	<b>240</b>	71.26
February 2011	<b>99</b>	72.91
September 2012	<b>57</b>	75.97
August 2014	<b>17.6</b>	83.45
October 2015	<b>118</b>	82.48
March 2016	<b>66.8</b>	72.04
September 2016	<b>44.0</b>	82.71
February 2017	<b>40.7</b>	71.06
November 2017	<b>7.2</b>	81.06
May 2018	<b>13</b>	82.02

Site specific information concerning this closure is available for review during normal business hours at the ADEQ Records Center <http://www.azdeq.gov/function/assistance/records.html> , 1110 W. Washington St., Suite 140, Phoenix, AZ 85007. ADEQ welcomes comments on the proposed LUST case closure. Please call the Records Center at 602-771-4380 to schedule an appointment. A 30-day public comment period is in effect commencing **February 11, 2019 and ending March 12, 2019**. Comments may be submitted by mail or email. Written comments should be sent to:

Arizona Department of Environmental Quality  
Waste Programs Division  
Attn: Debi Goodwin  
1110 W. Washington Street  
Phoenix, AZ 85007

or electronically mailed to: [dg1@azdeq.gov](mailto:dg1@azdeq.gov).

If sufficient public interest is demonstrated during the public comment period, ADEQ may announce and hold a public meeting. ADEQ will consider all submitted comments and reserves the right to respond to those comments following the public comment period. For more information on this notice, please contact the Sr. Risk Assessor, Debi Goodwin at (602) 771-4453 or at [dg1@azdeq.gov](mailto:dg1@azdeq.gov).

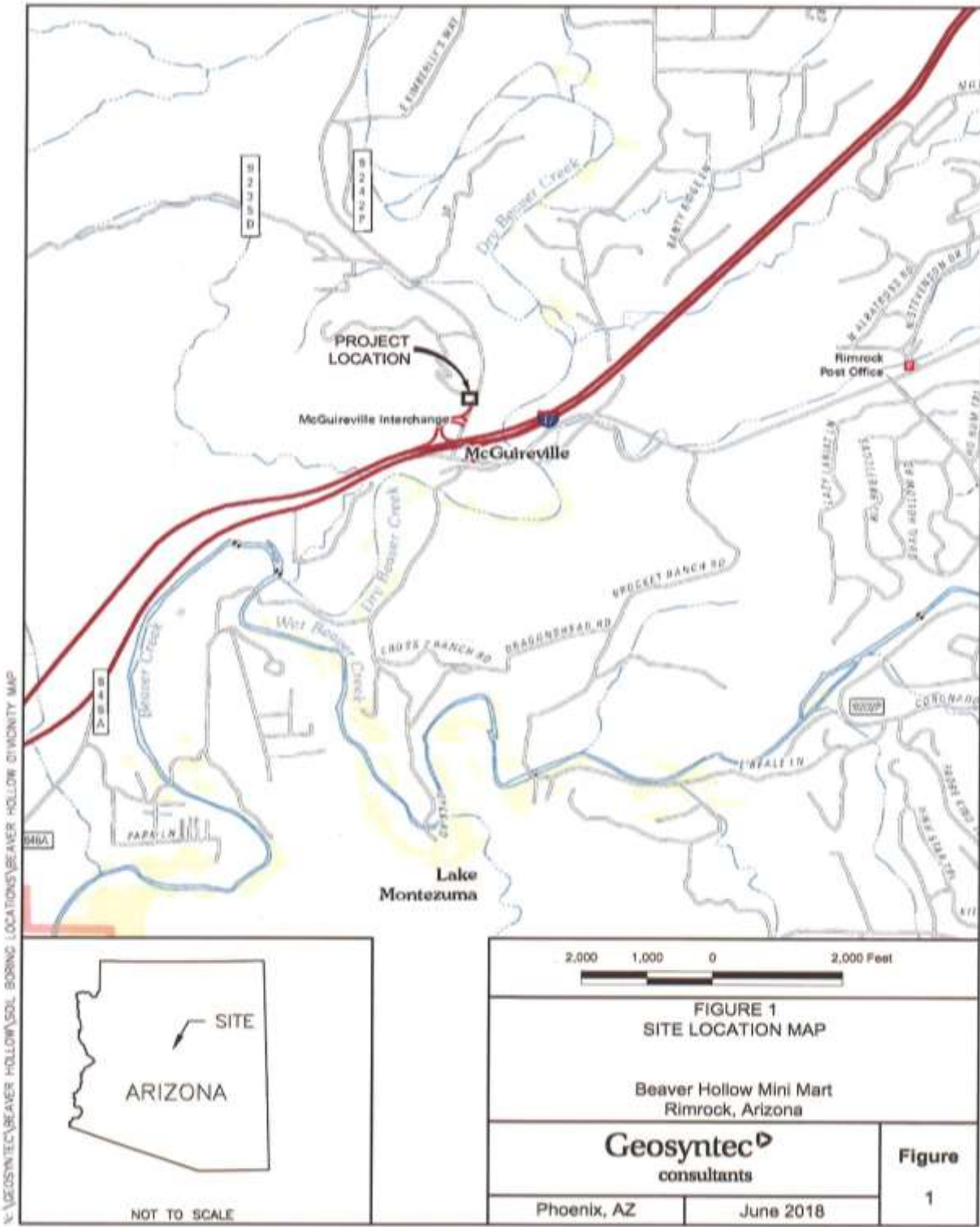
Copies of the cited statutes and rules can be found at:  
<http://www.azleg.gov/ArizonaRevisedStatutes.asp?Title=49>, and  
[http://www.azsos.gov/public\\_services/Title\\_18/18-12.htm](http://www.azsos.gov/public_services/Title_18/18-12.htm)

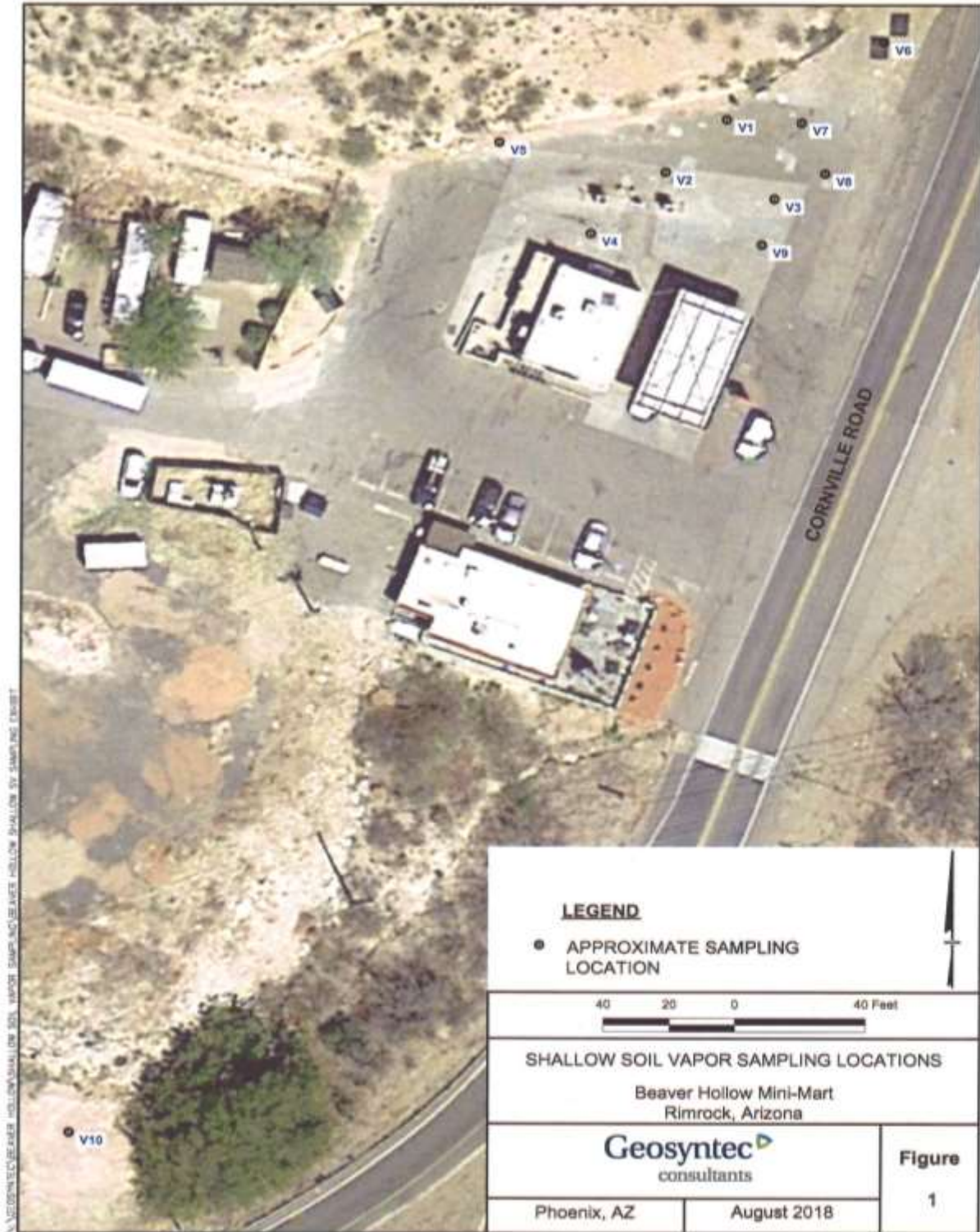
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ADEQ tomará las medidas razonables para proveer acceso a los servicios del departamento a personas con capacidad limitada para hablar, escribir o entender inglés y / o para personas con discapacidades. Las solicitudes de servicios de interpretación de idiomas, interpretación ASL, subtítulos de CART, o

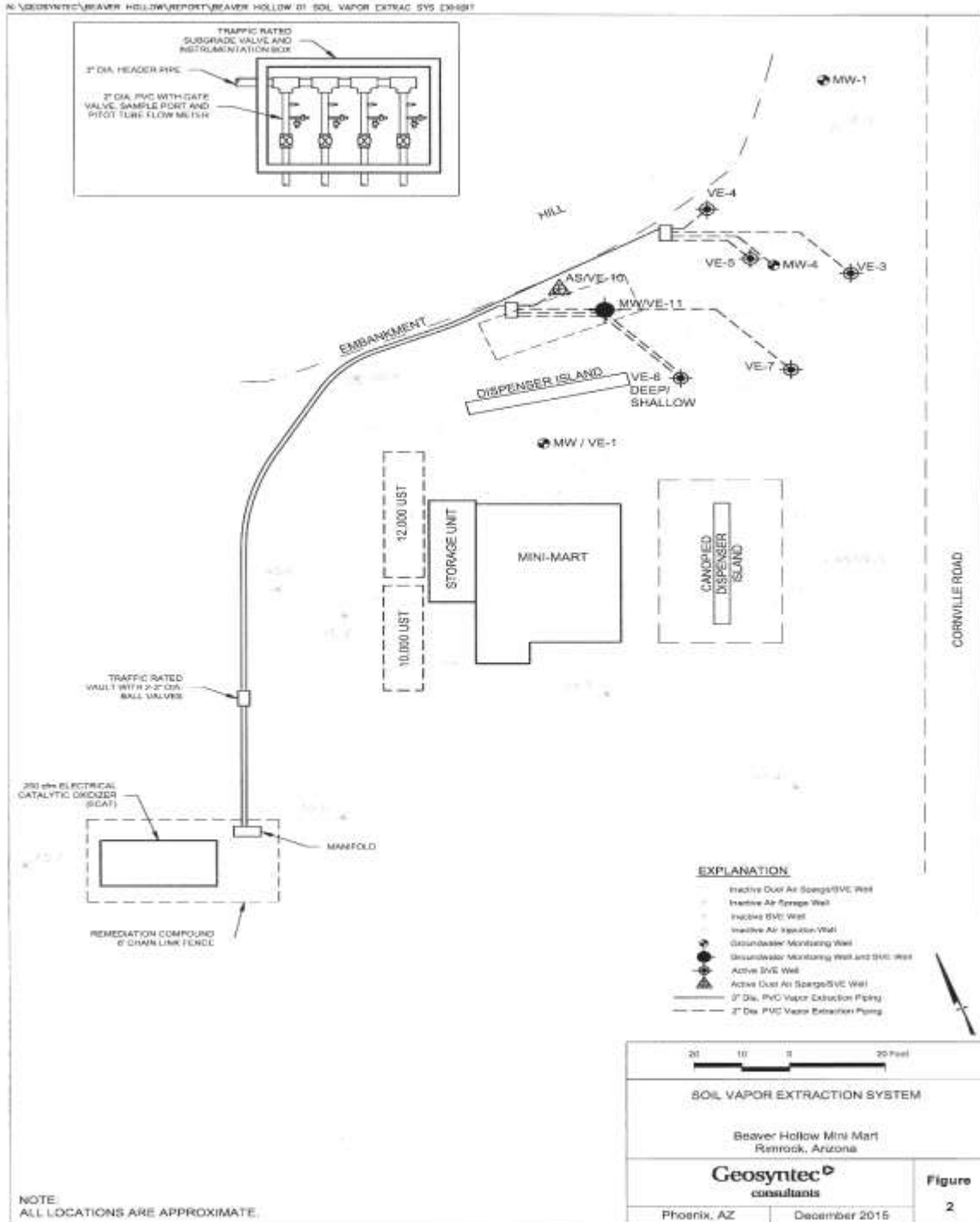
adaptaciones por discapacidad deben realizarse con al menos 48 horas de anticipación contactando a Ian Bingham, Coordinador de Anti-Discriminación del Título VI al 602-771-4322 o [Bingham.Ian@azdeq.gov](mailto:Bingham.Ian@azdeq.gov). Los servicios de teleimpresores están disponibles llamando al 7-1-1 con al menos 48 horas de anticipación para hacer los arreglos necesarios.

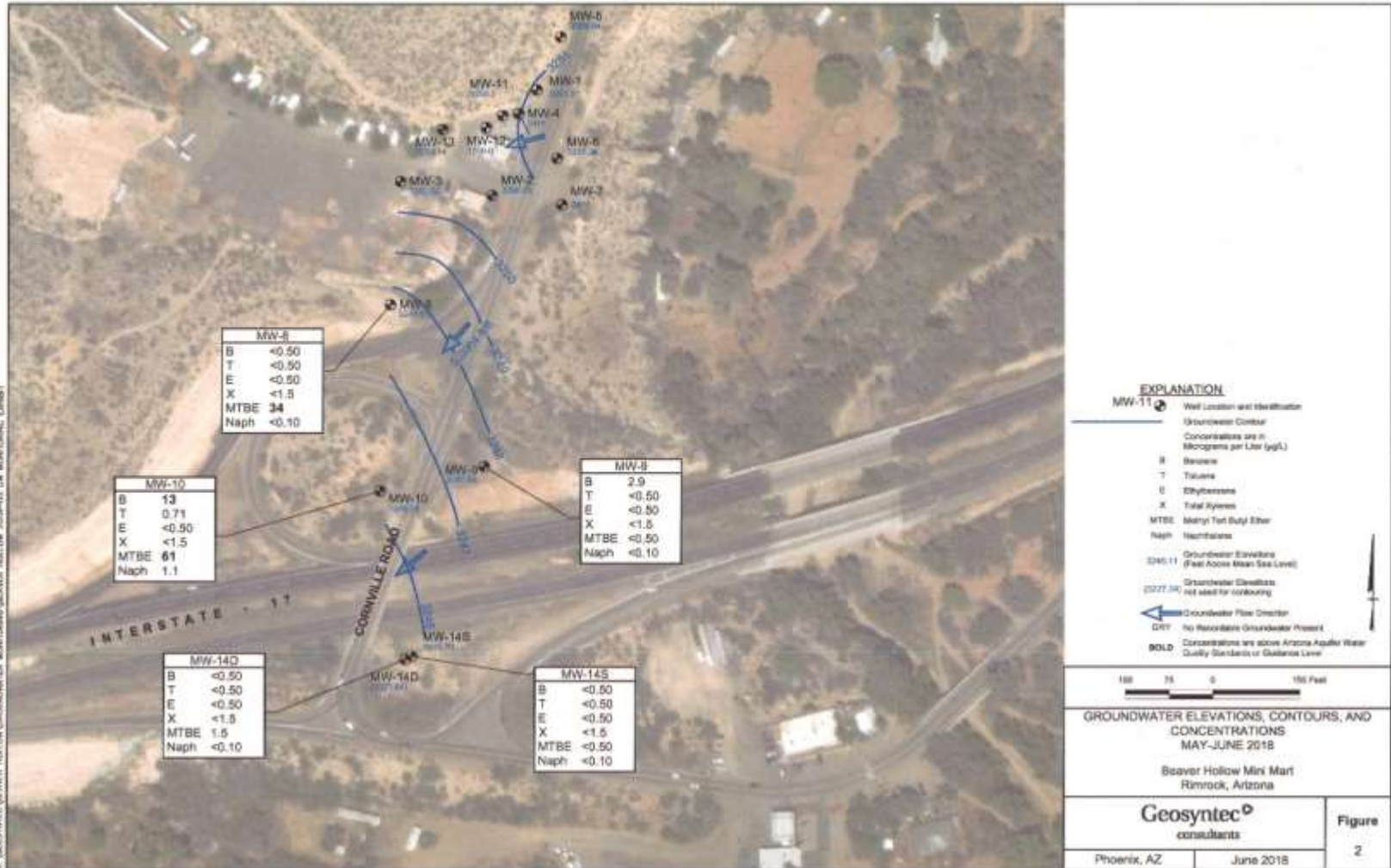




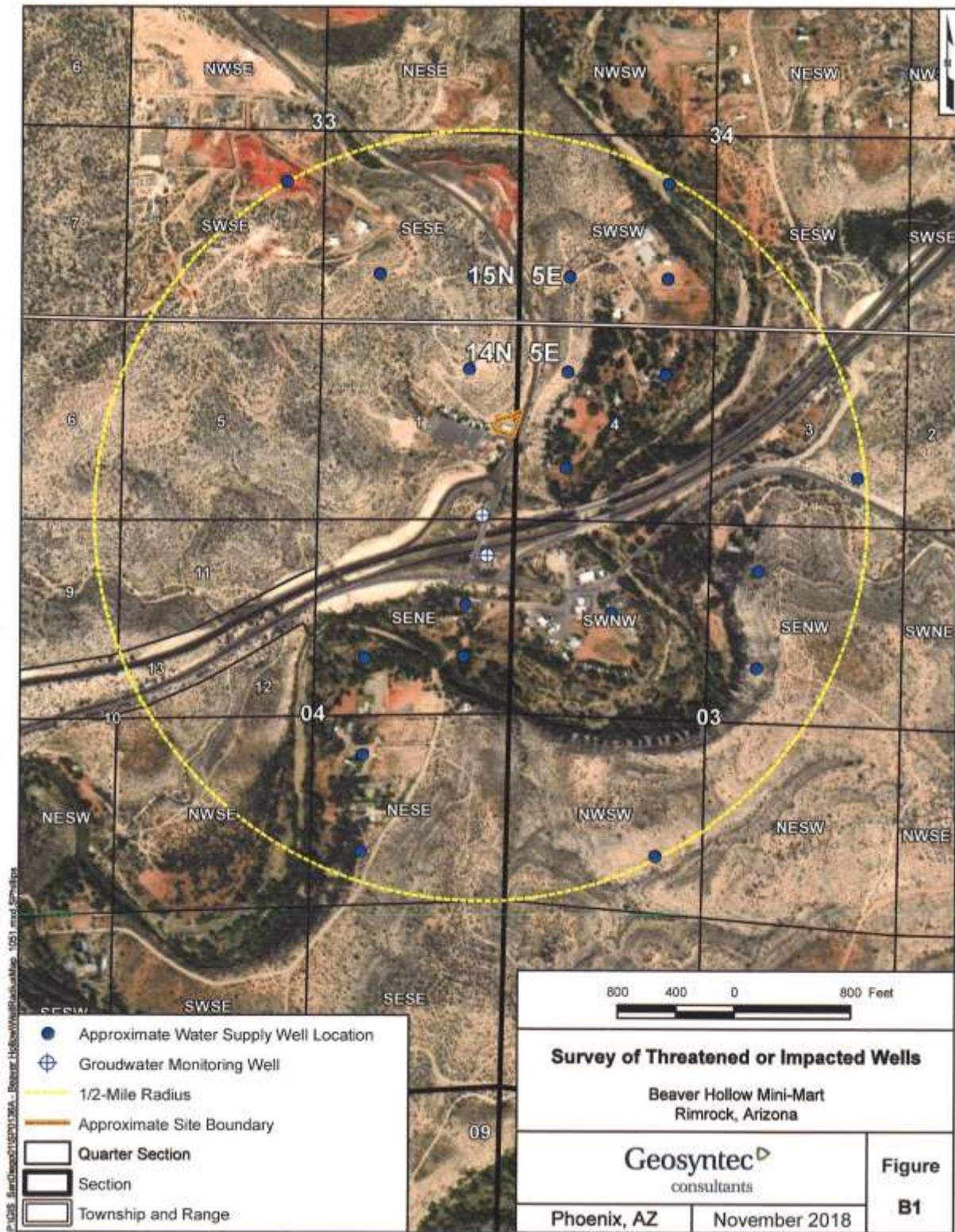












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