PRELIMINARY

FOCUSED FEASIBLITY STUDY REPORT

Duck Valley Indian Reservation

Owyhee, Nevada

Akana Project Number 16-005

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1.0 INTRODUCTION

The Bureau of Indian Affairs (BIA) contracted Cooper Ziets Engineers, Inc, dba Akana, to provide this Focused Feasibility Study Report (Report) for the evaluation of remedial alternatives for the petroleum hydrocarbon impacts to Trust Resources in the town of Owyhee, Nevada on the Shoshone Paiutes of Duck Valley Indian Reservation (DVIR). This Report is in fulfillment of the requirements of Akana contract A16PX00431, Task 10 Remedial Design. This report intends to provide preliminary remedial alternatives to address the remaining risk from releases of diesel- and gasoline-range petroleum hydrocarbons (PHCs) through the historic use of heating oil and other fuels stored in ASTs and USTs.

The preliminary remedial alternatives proposed in this report are based past site assessments and cleanups conducted to date. While extensive soil and groundwater assessments have been conducted in the past, additional site assessment activities; including soil gas survey, additional soil, and groundwater assessment, are recommended prior to refining and selecting the final remedy for the petroleum impacts in the town of Owyhee.

1.1 SITE LOCATION

The town of Owyhee is located within the northeast quarter of the DVIR. The main access to DVIR and Owyhee is via Nevada State Highway 225 from the north and south. The town contains residential neighborhoods, a hospital, a police station/correctional facility, a post office, schools, a telephone company, education offices, a senior citizen center, Great Basin College, and the tribal courthouse and community center. The town also contains numerous BIA structures including a Road Maintenance Shop, Irrigation Shop, and numerous quarters for BIA personnel. The location of the town of Owyhee is shown on Figure 1. The general layout of the town and Site structures are shown on Figure 2.

1.2 RELEASE HISTORY

In February 1985, 8,000 gallons of heating oil was delivered to a 16,000-gallon above ground storage tank (AST), located approximately 75 feet east of Highway 225 near an old power plant. Five day later and before the 8,000 gallons should had been consumed, the tank was empty, suggesting that the underground heating oil distribution pipeline that carried fuel to BIA residences and building throughout the town of Owyhee had substantial leaks. Use of the heating oil pipeline was discontinued in 1985, and the 16,000-gallon AST continued to be used to store fuel, which was transferred by trucks to individual consumers. The former heating oil distribution system is shown on Figure 3.

In October 1987, an odor of oil was noticed in municipal Well #1. By March 1988, the odor was

so strong that Well #1 and nearby municipal Well #2 were taken out of operation and municipal Well #3 was placed into service. The former municipal well locations are shown on Figure 2.

In March 1988, the Indian Health Service (IHS) reported that the Owyhee public water contained a petroleum like taste. The Shoshone Paiute Tribe conducted 9 test pits excavated to a depth of 12 to 15 feet east, west, and north of the Tribal Maintenance Building. Free-phased hydrocarbons were observed in two test pits north of Tribal Maintenance Building, between the building and the municipal Wells #1 and #3. Soil was excavated along the buried distribution pipeline in front of the Tribal Maintenance Building to groundwater. At least two leaks were discovered in the pipeline after the soil was excavated from around the pipe. Soil sampling analyses for Total Petroleum Hydrocarbons in the diesel organic range (TPH-d), reported concentrations ranging from 11,000 to 12,000 milligrams per kilogram (mg/kg).

In March 1988, a 12,000-gallon diesel underground storage tank (UST) located on the east side of the BIA Roads Shop building and a 12,000-gallon diesel UST located south of the Old Power Plant (east of the Highway) were removed. No petroleum hydrocarbon-impacted soil was reported in either excavation. No soil test data was provided for this activity. Neither UST were connected to the distribution pipeline.

In 1992, municipal Owyhee Well 2 was installed approximately one mile to the northwest of Well #1 and Well #2 and was added to the community water supply. Owyhee Well 3 was installed in 1999 approximately half mile south of Well #1 and Well #2. Locations of former and current municipal wells are presented on Figure 2.

1.2.1 Site Investigations and Removal Actions

In 1995 and 1996, BIA contracted the removal of approximately sixty feet of heating oil distribution pipeline northeast of the Tribal Maintenance Building, near the intersection of BIA Road and Gah-Nee Road. During the pipeline removal soil within the excavation was observed to have been impacted the entire length of the pipeline. BIA also plugged and abandoned the injection well, removed and disposed of several leaking drums containing used motor oil, road sealant, herbicides (2,4-D, 2,4,5-T and Dinoseb) from the BIA Roads Yard. Approximately 40 cubic yards of Dinoseb contaminated soil were excavated to a depth of seven feet.

In 1999, Cherokee General Corporation and SECOR International Incorporated (SECOR) removed most of the remaining oil pipeline and significant quantities of petroleum hydrocarbon impacted soils where feasible. SECOR conducted a subsurface investigation to estimate the remaining impact to soils and groundwater and characterized the hydrogeology of the site. The results from the investigation suggested four major releases (Locations 1 through 4) and two moderate releases (Locations 5 and 6) as follows:

Location 1. Along the heating oil pipeline east of Highway 225.

Location 2. At a former heating oil UST, 200 feet west of Highway 225.

i. At a 90 degree turn in the pipeline, 475 feet west of Highway 225 at the intersection of "L" Street and "C" Street.

Location 3. Along the pipeline near the location of 6 ASTs in the Tribal Maintenance Yard.

Location 4. At a former UST location in the northern area of town near the jail.

Location 5. At the discharge pipe outlet in the BIA Road Shop Yard.

Of these releases, SECOR reported that four (Locations 2 through 5) appeared to have impacted groundwater in the area, and northwest, of the releases. Evidence of groundwater impact in these four areas consist mainly of TPH-d, although groundwater down-gradient of the Tribal Maintenance Yard release (Location 4) contains both TPH-d and Total Petroleum Hydrocarbons in the gasoline range (TPH-g). Groundwater was not encountered during excavation in Location 1. Groundwater samples collected in the area surrounding the discharge pipe outlet (Location 6) indicated that groundwater was not impacted.

Other areas where petroleum releases occurred along the pipeline and at former storage tank locations were investigated by SECOR in 1999 and mitigated through soil removal. Relatively shallow subsurface soils that were impacted with petroleum products by past activities (e.g., equipment storage) at the BIA Road Shop area were also excavated and removed. In total, approximately 2,850 cubic yards of impacted soil were removed from throughout the site. Of the 30 areas excavated during this investigation, petroleum hydrocarbon contaminated soil was left in 18 of the areas due to the location of buildings or structures, roads or utilities at the time which prevented further excavation, or where the amount of clean soils overlying impacted areas made the removal of soils cost prohibitive. A summary of the historical excavation areas and approximate volumes removed is provided in Table 1 and locations of excavations are shown in Figure 3.

In 2002, the BIA contracted Western Construction Incorporated (Western) to begin grading and paving roads throughout Duck Valley. While the roads were under construction, SECOR supervised Western during excavation of petroleum hydrocarbon impacted soils from beneath the roads where impacted soils had been left during the 1999 investigation. During this investigation, approximately 1,932 cubic yards of impacted soil were excavated from beneath roads and transported by Western to a licensed disposal facility. The total volume of soils excavated was comprised of 1,348 cubic yards from the areas near the intersection of "L" Street

and "C" Street (L7 area); 560 cubic yards from the area along the pipeline near the ASTs in the northeast corner of the Tribal Maintenance Yard (L34 area); and 24 cubic yards from approximately 50 feet west of Highway 51 along the northern edge of "D" Street (L18 area). Impacted soils remain in the soil in the L7 and L34 areas along utility corridors and beyond the street right-of-way. TPH impacted groundwater and "smear" zones remain throughout the L7 and L34 areas. SECOR reported that impacted soils in the L18 area appear to have been removed. Excavations are presented in Figure 4.

1.2.2 Groundwater Monitoring

Thirty groundwater monitoring wells, MW-1 through MW-30, were installed between 2000 and 2008 to characterize the local groundwater flow system and presence of PHCs in shallow groundwater. Wells MW-16, MW-17, and MW-18, located at the former IHS hospital north of town, and wells MW-4 and MW-5, west of the Road Maintenance Building, were plugged and abandoned in 2008. The wells have been monitored and sampled periodically, at times on a quarterly basis. The monitoring well network is shown on Figure 5.

Three additional monitoring wells (MW-31, MW-32, and MW-33) were installed in 2018 and monitoring well MW-1 was abandoned and replaced with monitoring well MW-1R.

1.2.3 Current Groundwater Assessment Results

Akana conducted a groundwater assessment (Akana 2021) of recent groundwater analytical results collected from the monitoring well network collected quarterly from October 2018 to December 2019. The historical and supplemental groundwater data indicate that TPH-d and TPH-g concentrations decreased in groundwater across the site compared with historical concentrations. Additionally, the areal extent of TPH-d and TPH-g has decreased over time and is currently stable. Considering the data seasonality, the concentrations of the detected petroleum hydrocarbons appear to have leveled off since the October 2018 monitoring event and are not declining further.

The TPH-d and TPH-g concentration data from the quarterly sampling events conducted in 2019 show that these compounds are consistently detected at similar concentrations in wells located in five areas where residual petroleum hydrocarbons still reside in subsurface soils at depths spanning or near the water table. The highest concentrations of petroleum hydrocarbons in groundwater continue to be detected in monitoring wells MW-23 and MW-24. Wells in the other four areas also exhibit detectable, but lower, concentrations of one or more petroleum hydrocarbons. Depth to groundwater data is summarized on Table 2 and Groundwater analytical results are summarized on Tables 3 through 5.

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Akana concluded the rate of in situ biodegradation of petroleum hydrocarbons in groundwater is currently balanced with the rate of dissolution and leaching of hydrocarbons from the overlying impacted soil areas, thereby keeping the extent of groundwater zones stable.

1.3 REGIONAL GEOLOGY AND HYDROGEOLOGY

Rock formations on DVIR were formed during four different periods of geologic history that cover a time span of about 330 million years. The oldest are sedimentary and metamorphic rocks of Paleozoic age (sandstone, siltstone, phyllite, quartz mica schist, and slate), which are exposed only in the southeast corner of DVIR. These oldest formations were folded, faulted, and intruded at depth by stocks of granitic rock (granodiorite and quartz monzonite) of Cretaceous age. The stocks were fractured and mineralized along the fractures with gold-quartz veins, also of Cretaceous age. The entire assemblage was then uplifted, and the upper part eroded, exposing the granitic and older rocks at the surface.

After a lapse of approximately 50 million years, the erosion surface was covered by a third group of rocks (volcanic tuffs, lava flows, and interbedded sediments) of Tertiary age. Total thickness of these volcanic rocks exceeds 3,000 ft. The latest volcanic rock to be deposited is the basalt of the Banbury Formation which is about 7 million years old. In Idaho, this formation has been mapped as Snake River basalt. In the southern part of DVIR, much of the volcanic rock has been eroded, again exposing parts of the granitic and older formations. In the northern part, Banbury basalt is nearly flat-lying and forms most of the surface at higher altitudes, but in Duck Valley, part of the basalt is eroded to form the fourth group of formations (older and younger alluvium), mostly of Quaternary age.

On the east and western areas of DVIR, a series of Tertiary lava flows covered the erosional surface. The lava flows were subsequently eroded. The Owyhee River Plain in the north-central and central portions of DVIR is an erosional feature filled with Quaternary aged gravel, sand, and silt.

Younger geologic units within DVIR consist of partially consolidated older alluvium and largely unconsolidated alluvium, colluvium, terrace gravels, and landslide deposits. These materials have been deposited by stream and river processes, mass wasting, sheetwash, and gravity. Soils include coarse-grained river alluvium to a depth of approximately 70 to 100 ft, overlain by clayey to silty sand topsoil.

The Owyhee River Basin sediments in the area of investigation can be classified into three groundwater-bearing units:

An upper unconfined groundwater-bearing units associated with recent alluvial and colluvial deposits (5 to 20 ft in depth)

An intermediate, partially confined groundwater-bearing unit within valley-fill deposit consisting of cobbles and terrace deposits located beneath a fine-grained aquitard (40 to 120 ft in depth)

A deep groundwater-bearing unit beneath the valley-fill deposits consisting primarily of fractured basalt and rhyolite bedrock (greater than 200 ft in depth)

Groundwater within Duck Valley is held in a basin underlain and surrounded by volcanic rock. Lava dams at the terminus of the valley trap groundwater in an alluvial groundwater-bearing unit. There is reference to interconnection between the upper and the intermediate groundwater-bearing unit based on field observations and interpretations, but no specific information was provided.

1.4 LOCAL GEOLOGY AND HYDROGEOLOGY

Local geology in the area of the Site consists of varying types of Quaternary alluvial deposits. These deposits range widely in thickness, composition, and hydraulic conductivity. They consist of a mixture of gravels, clays, sands, and basalt boulders, which are indicative of near talus slope erosional deposits and fluvial deposits. Information collected on the lithology surrounding the former drinking water wells, driller logs of the shallower monitoring wells installed at the Site, and information on sediments encountered during remedial excavations are provided in Stantec (2009) and SECOR (2000).

The Site's monitoring wells are drilled to depths of 20 ft bgs and are completed within the upper unconfined groundwater-bearing unit. Generally, the lithology encountered at wells increase in fines upward. Groundwater is expected to move faster through the lower, coarser, and more permeable alluvial units than the upper, finer units. The upper, fine-grained units allow some passage and storage of groundwater, but restrict flow compared to the coarser alluvial material below. The upper, fine-grained units retain petroleum hydrocarbon released at ground surface or at shallow depths.

Two geologic cross sections were developed along the lines shown on Figure 6, based on well boring log lithologic information and water level data from the June 2019 (seasonal high groundwater) and December 2019 (seasonal low groundwater) monitoring events. Cross section A-A' is the north-south transect (MW-15, MW-29, MW-13, MW-28, MW-8, MW-27 and MW-31) as shown on Figure 7. Cross section B-B' is the east-west transect (MW-3, MW-5, MW6, MW-8, MW-27, MW9, and MW-23) as shown on Figure 8. The cross sections show the generally flat hydraulic gradient of the groundwater surface. Based on the boring logs for the active monitoring well network, the lithology is very heterogenous consisting of various soil types and sediments ranging from fine grained silts, sand, and clays, within embedded gravel layers,

boulders and cobbles which comprise the alluvial deposits across the local area within Owyhee.

The depth to groundwater recorded in monitoring wells between 2005 and 2013 ranged from approximately 3 to 20 ft bgs. During the supplemental investigations (April 2016 to December 2019), the depth to groundwater ranged between 3 and 21 ft bgs, corresponding to elevations of 5381.90 and 5393.40 ft MSL, respectively. Groundwater surface elevations measured in site wells are summarized in Table 2.

Groundwater levels in the area of the site fluctuate seasonally. High water levels are measured during the spring water runoff months and low levels in the fall. Typically, groundwater is encountered at shallower depths and fluctuates less in the western, downgradient part of the area. It is encountered deeper and fluctuates more widely in the eastern, upgradient areas closer to the hills. A minimum groundwater level fluctuation of 3.34 ft was observed in MW-24, and a maximum of 9.17 ft in MW-22. Wells MW-23 and MW-24 exhibit lower water level fluctuations than their surrounding wells.

Historic groundwater flow directions in the area of the Site have been westerly to northerly, but generally northwesterly. The localized flow directions shift seasonally within the complex, variably permeable upper groundwater-bearing unit. The groundwater gradient has historically been reported to range between 0.003 and 0.006 ft per ft. The gradients measured during this supplemental investigation ranged between 0.002 and 0.004 ft per ft. Figures 9 through 13 depict the potentiometric surfaces for the April 2016, October 2018, June, September, and December 2019 monitoring events.

The elevation of water in the adjacent irrigation canal was measured during the October 2018 field work at 5390.12 ft MSL. The water level was observed to be very near the canal bottom. The highest water levels measured in wells MW-3, MW-30R and MW-15, in a line generally parallel to the canal, were 5389.77, 5387.65, and 5386.41 ft MSL, respectively, all measured in June 2019. These data indicate that the canal bottom in this area is at a higher hydraulic head than the adjacent groundwater and does not receive groundwater discharge.

1.5 GROUNDWATER USE

The source of drinking water in the Duck Valley Community System, which includes Owyhee, Newtown, and Thomas Loop, are under the supervision of the Shoshone-Paiute Tribes Water and Sanitation Department. The Duck Valley Community System is supplied by two dedicated groundwater production wells which serve the town of Owyhee. The first well referred to as the Owyhee Water System No. 2 Pumphouse is located at River Road approximately 0.8 miles northwest of Owyhee with additional connections along Highway 225 to the rodeo grounds turn-off. A second supply well known as Owyhee Water System No. 3 Pumphouse –

Chinatown Bridge is located approximately 0.4 miles south of town and serves as a backup well for the Owyhee drinking water system. Groundwater from production wells No. 2 and No. 3 is pumped to two storage tanks located 0.20 miles to the east of Owyhee, approximately 150 feet higher than Owyhee. The locations of the two active Owyhee municipal drinking water wells are shown on Figure 3.

The former Owyhee water system used three former wells, Well #1, Well #2, and Well #3, for their water supply. Well #1 and Well #2 were disconnected from the system in 1988 due to the concerns with presence of petroleum hydrocarbons in well water samples in 1987 and 1988. Well #3 continued operations until at least 1996. Subsequently, the three wells were decommissioned in 2008. Presently there are no reported uses of the shallow groundwater within the town of Owyhee.

2.0 ENVIRONMENTAL RISK

2.1 CONCEPTUAL SITE MODEL

A Conceptual Site Model (CSM) indicating potential human and ecological receptors and their exposure pathways is provided on Figure 14. The CSM diagram represents the connection between the contaminant sources, release mechanisms, exposure pathways and routes, and potential human health and ecological receptors. The specific elements of the CSM and their evaluation which are important to characterizing the remaining environmental risk at the Site are discussed below.

The current PHC source in Site media is residual PHC saturations in subsurface soil in areas discussed in Sections 1.2.1. The depth of excavation in several areas exceeded 20 ft. However, impacted soils were left in place under roadways, close to structures, and elsewhere in adjacent areas. Detectable TPHd concentrations, as high as 26,000 mg/kg near the Power House location, were reported in soil samples collected at the end of excavations as discussed in Section 1.2.1. The historic data is not comprehensive but does indicate that continued presence of PHCs in soil presents potential for human exposure through soil ingestion, dust inhalation, and dermal contact, if disturbed, under residential land uses and for workers conducting subsurface excavation work. Potentially applicable soil screening levels are included on Table 6 for comparison purposes.

The current PHC release mechanisms to groundwater are their dissolution from soil into percolating soil water and groundwater, and their distribution and migration within the saturated zone and the “smear” zone caused by the seasonally fluctuating groundwater surface. These release mechanisms lead to continued presence of PHCs in groundwater samples at levels exceeding one or more of their water quality standards (Tables 3 through 5), as follows:

- TPHD in well MW-24
- One or more VOCs in wells MW-23 and MW-24
- Naphthalene in wells MW-6, MW-8R, MW-11, MW-13, MW-23, MW-23, and MW-28

There are no known domestic, garden, stock, or other small water supply wells in the area of the Site. So intentional drinking of water or uses such as watering garden or irrigation are not known to be current exposure pathways. Future use of shallow groundwater for drinking or landscape water which might be incidentally ingested needs to be decided by the stakeholders.

Groundwater levels seasonally rise to within a few feet of the ground surface in several areas. There is a potential for digging or small excavations deep enough to reach groundwater and result in human exposure to impacted groundwater for residents and workers.

An additional release mechanism is potential volatilization of petroleum hydrocarbons from groundwater and intrusion into buildings. Using the EPA Vapor Intrusion Screening Levels Calculator with default conservative parameters, target groundwater concentrations above which there is a potential vapor intrusion exposure in a residential scenario was calculated for the PHCs detected in Site groundwater samples. The target groundwater concentrations are listed in Tables 3 through 5.

A comparison of detected concentrations with the vapor intrusion target concentrations shows the following:

Concentrations of benzene, ethylbenzene, total xylenes, 1,2,3 – trimethylbenzene, 1,2,4-trimethylbenzene, and naphthalene exceeded their target groundwater concentrations in well MW-24.

Concentrations of ethylbenzene, 1,2,3 – trimethylbenzene, 1,2,4-trimethylbenzene, naphthalene, and a one-time detection of 1,3,5 – trimethylbenzene exceeded their target groundwater concentrations in well MW-23.

Naphthalene, 1,2,3 –, 1,2,4-, and 1,3,5 – trimethylbenzene were detected in well MW-8R in October 2018 at levels exceeding their target groundwater concentrations. Naphthalene was also detected in this well in December 2019 at a level exceeding its target concentration.

Naphthalene concentration exceeded its target groundwater concentration in MW-11 in October 2018.

A one-time detection of 1,1,2-trichloroethane exceeding its target groundwater concentration occurred in well 19 in September 2019.

Based on the consistent detections of several PHCs in wells MW-23 and MW-24 at levels exceeding their target groundwater concentrations, and of several exceedances at well MW-8R, the potential to this exposure pathway appears to exist in the two areas of these wells. One-time exceedances in wells MW-11 and MW-19 do not signify an exposure risk.

No ecological receptors at risk from exposure to petroleum hydrocarbons remaining in soil and groundwater are identified at the Site. The zone of impacted groundwater is stable and contained within the area delimited by the monitoring wells. Therefore, there doesn't appear to be a potential for migration of petroleum hydrocarbons to water sources outside the Site area. Furthermore, groundwater near the adjacent irrigation canal is lower than the bottom of the canal. Therefore, the is no discharge of impacted groundwater to the canal which would cause their migration in the canal further downstream. No other surface water bodies are present within the area of the Site.

2.2 REMEDIAL GOALS

Remedial goals (RGs) are defined as the lowest concentrations of chemicals detected in soil and groundwater at the Site which are protective of human health and the environment. The detected concentrations were compared with several federal and state water and soil quality screening levels and standards. These standards have been developed based on human health risk factors with default conservative assumptions and are therefore, not necessarily RGs but can be established as RGs for the Site. Other levels, more or less stringent, can be established based on site-specific data, as deemed appropriate by the stakeholders.

The standards have been developed under residential and worker exposure scenarios. The following exposure scenarios are considered herein since the area of the Site contains a mixture of residential neighborhoods, community centers, offices, a school, and other buildings whose use creates opportunities for potential current and future human exposure to chemicals.

The standards and screening levels for PHCs in soil and groundwater (Table 6) may be considered as RGs for the Site as follows:

- The EPA (2017) residential soil screening levels (SSL) for exposure to soil (Soil) and protection of groundwater from contamination from soil (Soil-to-GW).

  The SSLs were calculated using default reasonable maximum exposure assumptions and standard vetted toxicity values and are based on a carcinogenic risk of 1x10-6 and non-carcinogenic hazard quotient of 1 for a child; the values represent the lower of the risk or hazard. Note that the Soil-to-GW SSLs are based on a dilution attenuation factor of 1 (no attenuation of the contaminant in the soil matrix).

The EPA (2017) Soil-to-GW screening values are back-calculated from federal MCLs for drinking water. While EPA (2017) lists SSLs for TPH, EPA Region 9 (2018) has low confidence in the derivation of the TPH values, and instead relies on local and state guidelines for TPH.

+ Nevada Department of Environmental Protection (NDEP 2014) Reportable Concentrations (RC) for petroleum sites issued in 2009. While the NDEP RCs are not enforceable since the Site is on tribal land, they are nonetheless useful guidelines for decision making. Note that the NDEP RC for TPH applies to all petroleum hydrocarbons and does not distinguish among the type or range of hydrocarbons (e.g., diesel range).

  Potential RGs for Site groundwater are listed at the bottom of Tables 4 through 7 and include the following standards and screening levels:

  — EPA Tap Water Screening Levels (calculated with conservative assumptions and input values mentioned for soil).

  — Federal drinking water MCLs. Note that NDEP has adopted the federal MCLs for drinking water in Nevada.

  — Volatilization of PHCs detected in groundwater into indoor air was identified as a potential exposure pathway whereby building occupants may be exposed to health risks. Therefore, EPA Vapor Intrusion Target Groundwater Concentrations need to be considered as a potential RG.

The EPA and NDEP regulatory screening level values are presented on Table 6 and on the soil, summary Tables 7 to 9 and groundwater monitoring Tables 3 to 5. Based on a review of these screening level values the RGs for the site and the most protective screening levels for soil are the EPA Risk Based SSL Soil (protection of groundwater) and EPA VISL for groundwater.

2.3 CONFIRMED AND SUSPECTED SOURCE AREAS

Groundwater iso-concentration figures were generated using the December 2019 TPH-d, TPH-g, naphthalene, and TCE. The iso-concentration Figures 15 through 18 illustrate two distinct PHC groundwater plumes sourced from residual soil remaining in contact with the groundwater. The TCE iso-centration map illustrate only one monitoring well (MW-10) has detectable concentrations of TCE. The focus source areas are further described below and shown on Figure 19.

2.3.1 East Source Area

The East source area includes the residential property 310 and includes monitoring wells MW23, MW24. Groundwater data collected from these monitoring wells exceed the drinking water MCLs, Tap water RSL, and vapor intrusion target VISLs for VOCs. The wells have consistent detections of gasoline and heating oil range hydrocarbons. Seasonal depth to groundwater measured in the wells range from approximately 6 to 16 feet. Groundwater flow direction is predominantly to the north and northwest.

The potential sources of impacts to wells MW-23 and MW-24 include heating oil excavation L15 located on the east side of residence 310, UST excavation (U12/U13) located northeast of residence 3115 and heating oil excavation areas at the Former Power Plant (building 333) and gasoline and diesel fueling activities on the east side of HWY 225.

The shallow excavation at L15 had a maximum detection of 1,100 mg/kg at a depth of 2.5 feet. Due to the proximity of the residence additional impacted soil could not be removed. The heating UST excavation (U12/U13) located approximately 100 feet southwest of MW 23 had detections of gasoline in the soil ranging from 620 mg/kg to 1,200 mg/kg at depth of 14 feet. The source of the gasoline is unknown. A former service station is located on the east side of HWY 225 has a documented gasoline release to the groundwater (MW19), however monitoring wells MW20 and MW 21 located downgradient of the gasoline release and upgradient of monitoring wells MW23 and MW24 have not detected gasoline or VOCs in the groundwater.

Numerous remedial excavations have been conducted at the former Power Plant area. Gasoline and heating oil remains in the soil at depths of 13 to 19 feet. The source of the gasoline is not documented. Gasoline detected in the soils at the former Power Plant area may be a potential source impacting MW-23 and MW24. Monitoring well MW10 located at the former Power House area is located upgradient of the remedial excavations L29 and does not characterize the groundwater impacts at excavation L29.

There are three shallow heating oil excavations located over 60 feet downgradient of the MW24. The maximum soil concentration is 410 mg/kg. While these source areas are not believed to be contributing to the impacts to MW23 and MW24 they should be considered if further groundwater delineation is planed downgradient of MW-24.

2.3.2 West Source Area

The West area of concern includes the vacant lot north of the Tribal Maintenance building. Residual soil remaining from remedial excavations L7 and L34 have contributed to dissolved concentrations of heating oil to monitoring wells MW-6, MW-8R, MW-11, MW13 and MW28. Groundwater data collected from these monitoring wells exceed the drinking water MCLs, Tap

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water RSL, and vapor intrusion target VISLs for VOCs (MW-8R only). The VOCs detected in this well may be the result of an 800-gallon surface release of gasoline located near the ASTs on the Tribal Maintenance property. Based on the SECOR estimated extents of soil contamination (above 100 mg/kg) indicated on report figures, over 1000 cubic yards of diesel impacted soil remains in place at L7 and L34.

Depth to water ranges from 6 to 12 feet bgs seasonally. The groundwater flow direction is predominately to the northwest.

2.4 DISTRIBUTION OF CONTAMINANTS IN SOIL AND DATA GAPS

2.4.1 East Area

Akana recommends collecting soil samples near residence 310 to estimate the remaining diesel impacted soil in this area. Only shallow soil samples were collected and no over excavation of impacted soil was reported. Based on the historic soil data collected near the Power House (building 333) impacted soil remains at depth and potentially under the Power House. To refine cleanup costs Akana recommends collecting additional soil samples in this area.

2.4.2 West Area

SECOR estimates approximate 500 cubic yard of impacted PHC soil remains at excavation L34 under or adjacent to B Street and approximately 500 cubic yards PHC soil remains at excavation L7 under or near L Street. Akana recommends advancing soil borings around the excavations L7 and L34 to provided data to estimate the volume of PHC impacted soil remaining in this area.

2.5 DISTRIBUTION OF CONTAMINANTS IN GROUNDWATER AND DATA GAPS

2.5.1 East Area

Akana recommends collecting groundwater data downgradient of excavation L29 and downgradient of monitoring well MW24 to delineate the potential groundwater impacts in this area. The groundwater impacts are currently not delineated near the potential source area at L29 or down gradient of monitoring well MW-24. To evaluate the vapor intrusion pathway, Akana recommends collecting soil gas samples near wells MW-23 and MW-24 to determine if the pathway is potentially complete

2.5.2 West Area

The groundwater well network in the West Area has adequately characterize and delineated the

PHC in this area. No additional monitoring wells are needed in this area. Akana recommends collecting soil gas samples in the vicinity of monitoring wells MW-8R and MW-11 to determine if the pathway is potentially complete.

2.6 PRELIMINARY EXPOSURE ASSESSMENT

The following section describes the exposure pathways and receptors associated with PHC releases at the Owyhee Site. The potential exposure pathways are also illustrated the CSM on Figure 14.

2.6.1 Soil-to-Groundwater Pathway

The current PHC release mechanisms to groundwater are their dissolution from soil into percolating soil water and groundwater, and their distribution and migration within the saturated zone and the "smear" zone caused by the seasonally fluctuating groundwater surface.

2.6.2 Direct Contact Pathway

PHC has been removed from the surface soils at the former Road Maintenance Shop and other release areas. Future excavation workers may be exposed to subsurface PHC in the release areas at depth.

2.6.3 Vapor Pathway

Impacted soil and groundwater is near or under structures at the Site and potentially a complete pathway. Akana recommends conducting a soil gas survey to determine if this pathway is complete.

2.6.4 Surface Water

Groundwater near the adjacent irrigation canal is lower than the bottom of the canal. Therefore, the is no discharge of impacted groundwater to the canal which would cause PHC migration in the canal further downstream. No other surface water bodies are present within the area of the Site.

2.6.5 Groundwater/Drinking Water

Presently no shallow groundwater is used as a source of drinking water at the Site. Currently the BIA or the Tribe does not have institutional controls for restrictions to utilize the shallow groundwater, thus this pathway may be complete in the future.

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3.0 REMEDIAL ACTION OBJECTIVES

3.1 REMEDIAL ACTION OBJECTIVES

Akana propose to use the EPA Risk Based SSL (protection of groundwater) and EPA VISL for groundwater volatilization to indoor air. Local groundwater use in the town of Owyhee currently is not used for drinking water and is not reasonably likely in the future. Active cleanup of the groundwater will not be based on groundwater consumption but may be managed by institutional controls and deed restrictions.

Trench workers exposures are concerns that will need to be addressed in areas near utilities under the roadways of Owyhee and under foundations of BIA buildings (former Power House and building 310). Removal or cleanup of these soils will also improve the groundwater quality.

3.2 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

The Shoshone-Paiute Tribes Environmental Protection Program (TEPP) manages several different programs funded through grants by U.S. EPA. The programs include Water Quality, NonPoint Source, Superfund, Wetlands, Pesticides, and the Solid Waste Transfer Station and Recycling Center. The TEPP also formed an alliance with the Bureau of Indian Affairs to continue to work on BIA environmental issues on the DVIR. TEPP currently does not have published cleanup standards but will oversee the selection of cleanup standards and remedy for the Site to meet the tribes current and future land use in Owyhee Nevada.

3.3 CLEANUP GOALS

The cleanup goals include remediating local groundwater to below the EPA VISL for TPHg, TPHd, ethylbenzene, total xylenes and naphthene. The EPA VISLs are presented on Tables 3 to 5.

4.0 FEASIBILITY STUDY

4.1 FOCUSED EVALUATION OF CLEANUP ALTERNATIVES

Akana is proposing the cleanup alternatives presented below with the following assumptions:

- Groundwater will not be used for drinking water.
- Expanded groundwater delineation in the East Area with the additional installation of four new monitoring wells.
- Detected concentrations in groundwater will not need further remediation other than proposed.

- Continuation of monitored natural attenuation (MNA) in addition to active treatment where applied.
- PHC soil remaining in several areas is based on the SECOR (SECOR 2002) soil estimate Figures.

4.1.1 Cleanup Action Alternative 1—Institutional Controls and Restrictive Covenants

Alternative 1 - Continue monitoring of existing well network for MNA and concentration reductions in groundwater (Base Operational Cost). Installation of four new monitoring wells to close data gaps to the east of existing plumes.

This alternative relies on ongoing natural attenuation of PHCs including their dissolution from the soil matrix, dispersion, and diffusion in the water column to biodegradation sites, and in situ biodegradation to decrease the PHC concentrations in groundwater. This option is expected to require the longest remediation timeframe compared with the other options listed below and therefore, place the most restrictions on use of the Site properties. Alternative 1 may take a long time for concentrations to reach cleanup goals and regulatory screening criteria. Alternative 1 would require the tribal implementation of institutional controls including deed restrictions to limit groundwater use, vapor barrier requirements for new buildings, and the preparation of a Contaminated Media Management Plan tracking and response. This alternative is the least costly of the four alternatives considered.

4.1.2 Cleanup Action Alternative 2—In-Situ Bioremediation

Alternative 2 - Expand the existing well network to fill in groundwater data gaps in the east and west areas. Install new monitoring wells to delineate transport and concentration boundaries to the east area. Continue monitoring of existing well network for MNA and concentration reductions in groundwater. Complete limited excavation of identified impacted soils areas where access is possible (estimated at 100 cubic yards). Implement biotreatment amendment injections at areas where residual groundwater and soil concentrations remain the highest.

This alternative relies on the in-situ biodegradation process but attempts to enhance the rate of biodegradation through injection of food substrate, nutrients, and potentially more aggressive PHC-degrading bacteria into the groundwater zone. Its effectiveness is predominantly dependent on a uniform distribution of the injected reagents within groundwater to reach all PHC-impacted areas. Through active biotreatment, the contaminant degradation rate is increased compared with MNA, however, it does not treat PHCs retained within the unsaturated soil beyond what may be disturbed seasonably within the “smear zone” as the water table fluctuates.

Alternative 2 is a composite approach to enhance MNA through amendment injections, natural distribution through the vadose zone, and target removal of contaminated soil, however, significant soil impact would likely remain in inaccessible areas, so this alternative may not treat part of the source therefore treatment goals may take up to 10 years to achieve the remedial goals.

4.1.3 Cleanup Action Alternative 3—Soil Vapor Extraction/Sparging

Alternative 3 - Expand the existing well network to fill in groundwater data gaps in the east areas. Install new monitoring wells to delineate transport and concentration boundaries to the east. Continue monitoring of existing well network for MNA and concentration reductions in groundwater. Install new air sparge, soil vapor extraction systems at three locations for groundwater and soil treatment. The addition of passive treatment using bio amendment injections is not considered in this alternative.

Soil vapor extraction includes creating a localized vacuum in the subsurface using a blower to extract vapors of PHCs to the ground surface for capture. The efficiency and effectiveness of this option increases in soils with higher permeability. It indirectly treats groundwater by partitioning dissolved phase PHCs from the water table. This option works best for volatile PHCs which are at relatively low levels in site soil and groundwater. The air sparging component used air injected from the surface into the subsurface below the seasonal low groundwater; air applied allows volatile contaminants to partition from groundwater into the vapor/air phase – allowing the vacuum applied in the unsaturated zone to capture and extract contaminants.

Air sparging combined with soil vapor extraction is a proven technology that is very effective where both groundwater and soil contamination exists with volatile compounds. Overall effectiveness is highly dependent on the soil type, uniformity, homogeneity which allows for more complete vacuum response and capture, therefore pilot testing is highly recommended and included in the alternative costs.

This Alternative may not be considered if the results of the soil gas survey do not show concentrations or impacts above the defined screening level values for the exposure pathways identified in the CSM.

4.1.4 Cleanup Action Alternative 4—Removal of Structures and Bulk Source

Alternative 4 - Expand the existing well network to fill in groundwater data gaps in the east areas. Install new monitoring wells to delineate transport and concentration boundaries to the east. Demolition of buildings 310 and 333 to allow access to subsurface soils for soil excavation -

source area mass removal. Excavate residual hot spot soil remaining in place from previous removal actions to eliminate exposure pathway and hydrocarbon mass (assumes 1000 cubic yards of PCS). Amendment injections at areas where residual concentrations remain the highest for both groundwater and soil.

This alternative includes excavation and proper disposal of the PHC-impacted soil from the vadose and saturated zones within the target areas. Alternative 4 removes the soil sources of PHC impacts and therefore, has a much faster implementation timeframe than the other options. Once the contaminant mass source in the soil is removed, the groundwater concentrations are expected to decline significantly as a result through both MNA and enhanced treatment using amendments.

The key factor to consider for this option includes the need to excavate underneath roadways and sidewalks. Therefore, portions of the roadways and sidewalks must be removed during excavations and be re-constructed after excavations are complete. Additionally, presence of utility lines which may be in the way must be addressed. Finally, excavations will need to address the presence of buildings still located near PHC source areas. However, compared with the excavations conducted between 1999 and 2002, there are no actively used buildings or structures at or adjacent to the 6 areas. The buildings remaining at these areas all appear to be inactive or abandoned and could be removed to access the contaminated soil.

4.2 COMPARISON OF ALTERNATIVES

The above remedial options have been used at a great many sites throughout the US and internationally for many years. Abundant technical information is available for their design and operation, construction, and maintenance cost, as well as effectiveness and efficiency. However, every site is different and site-specific information must be used to design specific systems, develop cost estimates, and develop operation, maintenance, and monitoring processes.

A key difference between this site on a tribal reservation compared with sites elsewhere is whether the technology is culturally acceptable. Therefore, the cleanup action will be selected if deemed acceptable by the Tribal Council.

A summary of the cleanup action alternative costs is provided on Table 10. The table provides a breakdown of capital, recurring and future costs in net present value and a cost range of -30% and +50%. The costs range from $792,000 for Alternative 1 to $1,657,000 for Alternative 4.

A summary of the cleanup alternative advantages and limitations are presented on Table 11. The table is used to provide guidance on recommending the appropriate cleanup plan.

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4.3 RECOMMENDED CLEANUP ACTION ALTERNATIVE

Akana recommends Alternative 2 as the timeliest and cost-effective remedy to achieve the cleanup goals for the Site. This alternative is the least intrusive of the proposed remedies and has a shorter duration than alternative 1 which is least costly. The final remedy will be implemented with the TEPP review and approval.

Akana also recommends prior to selecting a remedy to address the groundwater impacts exceeding the EPA VISL, a soil gas survey should be conducted to evaluate if this pathway is potentially complete to determine if a cleanup is required.

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Table 1
Summary of Historic Soil Excavation Volumes
Groundwater Assessment Report
Duck Valley Indian Reservation

Source	Area	Excavation ID	Volume Removed (cubic yards)	Soil Remaining above Federal and Nevada TPH Action Level
Heating Oil Pipeline	West side of Highway 225, near Tribal Resources Building (2002) West of Highway 225, along northern border of D Street	L18-01/L33 L18-02 L-18	5 24	Diesel Diesel
	West side of Highway 225, near houses #308-#312	L15 and L16	0	Diesel
	East of Highway 225, near old power plant	L29 L17 L17B L13 L13A L30 L31	400 5 25 650-800 25 55 75	Diesel, Gasoline Diesel, Gasoline Diesel Diesel Diesel Diesel
	Along residential street west of Highway 225, northwest of house #3115 (2002) Along residential street west of Highway 225, south of house #312	L7 L36 L-7 north and south of C Street (L-7S, L-7N, L-7C)	500-600 15 1,348	Diesel (w) Diesel
	Northeast of Road Maintenance Building and north of Tribal Maintenance Building (2002) Northeast of Road Maintenance Building and north of Tribal Maintenance Building	L1 L2 L34 (L-34S and L-34N)	0 0 375 560	Diesel Diesel (w)
Discharge Pipeline	BIA Tribal Maintenance Building yard	D4, D5, D7, D10, D8, D9 (outlet)	115 50	Diesel, Gasoline

Table 1 (Continued)
Summary of Historic Soil Excavation Volumes
Groundwater Assessment Report
Duck Valley Indian Reservation

Source	Area	Excavation ID	Volume Removed (cubic yards)	Soil Remaining above Federal and Nevada TPH Action Level
Road Maintenance Building	Along west side of the Tribal Maintenance Building	S1-S6	90	
	East side of Tribal Maintenance Building: former 500-gal AST	S7	5	
	East side of building; former 280-gal AST	S8	5	
	South side of building; former 500-gal AST	S9	5	
	Drummed oil leakage area	S10	10	
	Tar spillage area	S11	10	
	Surface staining from equipment	S12	40	
Other USTs	East of Tribal Maintenance Building	U3-U6	25	Diesel
	East of Highway 225, near old power plant	U7-U10	60	
	Near house #3115	U12-U13	300	Diesel, Gasoline (w)
Other ASTs	Tribal Maintenance Building yard; former 1,000-gallon AST	A1-A4	25	

Notes : AST Aboveground Storage Tank
UST Underground Storage Tank
(w) Petroleum release in this area has impacted groundwater
Source : This is a reproduction of information gathered from SECOR International, Inc. May 2000 Subsurface Investigation Report and SECOR International, Inc. December 2002 Report of Findings from Soil Excavation and Groundwater Monitoring.

Table 2

Summary of Groundwater Surface Elevations in Wells, April 2016 - December 2019

Groundwater Assessment Report

Duck Valley Indian Reservation

Well ID	Location (deg, min, sec)		Top of Casing (TOC) Elevation (ft MSL)	Date	Depth to Water (ft below TOC)	Water Surface Elevation (ft MSL)
	Latitude	Longitude				
MW-1	41 56 34.61	-116 05 54.65	5392.45*	4/28/2016	Not Measured**	--
MW-1R	41 56 34.65	-116 05 54.48	5396.257	10/18/2018	11.38	5384.88
				6/6/2019	5.38	5390.88
				9/10/2019	8.76	5387.50
				12/11/2019	11.36	5384.90
MW-2	41 56 34.88	-116 05 57.34	5394.417	4/28/2016	4.30	5390.12
				10/18/2018	8.33	5386.09
				6/4/2019	4.13	5390.29
				9/9/2019	7.42	5387.00
				12/9/2019	8.89	5385.53
MW-3	41 56 34.82	-116 05 59.73	5392.503	4/28/2016	Not Found	--
				10/18/2018	6.70	5385.80
				6/4/2019	2.73	5389.77
					5.07	5387.43
				12/9/2019	7.53	5384.97
MW-5R	41 56 36.93	-116 05 57.71	5395.337	4/27/2016	6.00	5388.93
				10/16/2018	9.85	5385.49
				6/4/2019	5.74	5389.60
				9/9/2019	9.14	5386.20
				12/9/2019	10.58	5384.76
MW-6	41 56 37.00	-116 05 56.69	5396.137	4/28/2016	7.10	5389.06
				10/16/2018	10.49	5385.65
				6/4/2019	6.47	5389.67
				9/9/2019	9.68	5386.46
				12/9/2019	11.07	5385.07

Table 2

Summary of Groundwater Surface Elevations in Wells, April 2016 - December 2019

Groundwater Assessment Report

Duck Valley Indian Reservation

Well ID	Location (deg, min, sec)		Top of Casing (TOC) Elevation (ft MSL)	Date	Depth to Water (ft below TOC)	Water Surface Elevation (ft MSL)
	Latitude	Longitude				
MW-7	41 56 37.74	-116 05 58.50	5393.594	4/27/2016	5.14	5386.96
				10/16/2018	8.50	5385.09
				6/5/2019	4.63	5388.96
				9/9/2019	8.04	5385.55
				12/9/2019	9.45	5384.14
MW-8	41 56 38.11	-116 05 56.44	5394.60*	4/28/2016	6.18	5388.42
				10/18/2018	10.97	5384.97
MW-8R	41 56 38.00	-116 05 56.35	5395.944	6/4/2019	6.65	5389.29
				9/9/2019	10.25	5385.69
				12/9/2019	11.03	5384.91
MW-9	41 56 39.65	-116 05 52.68	5397.212	4/28/2016	7.89	5389.32
				10/18/2018	13.21	5384.00
				6/5/2019	6.80	5390.41
				9/9/2019	11.10	5386.11
				12/10/2019	13.36	5383.85
MW-10	41 56 40.71	-116 05 48.96	5404.213	4/27/2016	16.99	5387.25
				10/16/2018	20.28	5383.93
				6/3/2019	13.58	5390.63
				9/9/2019	17.62	5386.59
				12/9/2019	20.44	5383.77
MW-11	41 56 40.12	-116 05 56.42	5395.562	4/28/2016	7.54	5388.14
				10/18/2018	11.14	5384.42
				6/4/2019	6.71	5388.85
				9/10/2019	10.50	5385.06
				12/10/2019	12.05	5383.51

Table 2

Summary of Groundwater Surface Elevations in Wells, April 2016 - December 2019

Groundwater Assessment Report

Duck Valley Indian Reservation

Well ID	Location (deg, min, sec)		Top of Casing (TOC) Elevation (ft MSL)	Date	Depth to Water (ft below TOC)	Water Surface Elevation (ft MSL)
	Latitude	Longitude				
MW-12	41 56 39.14	-116 05 58.88	5395.2	4/27/2016	7.33	5387.90
				10/18/2018	10.11	5385.09
				6/5/2019	Not Measured	--
				9/9/2019	10.06	5385.14
				12/10/2019	11.48	5383.72
MW-13	41 56 40.21	'-116 05 58.29	5394.147	4/28/2019	6.12	5388.03
				10/18/2018	9.55	5384.60
				6/4/2019	5.86	5388.29
				9/9/2019	9.33	5384.82
				12/10/2019	10.71	5383.44
MW-14	41 56 42.71	-116 05 57.32	5395.514	4/27/2016	8.15	5387.35
				10/18/2018	12.05	5383.46
				6/5/2019	6.88	5388.63
				9/10/2019	9.62	5385.89
				12/10/2019	12.04	5383.47
MW-15	41 56 43.50	-116 06 00.33	5391.432	4/27/2016	5.31	5386.32
				10/17/2018	8.37	5383.06
				6/6/2019	5.02	5386.41
				9/10/2019	8.0	5383.43
				12/11/2019	9.53	5381.90
MW-19	41 56 37.28	-116 05 47.72	5403.85	4/27/2016	15.51	5387.97
				10/18/2018	19.43	5384.42
				6/3/2019	12.83	5391.02
				9/9/2019	16.70	5387.15
				12/9/2019	19.54	5384.31

Table 2

Summary of Groundwater Surface Elevations in Wells, April 2016 - December 2019

Groundwater Assessment Report

Duck Valley Indian Reservation

Well ID	Location (deg, min, sec)		Top of Casing (TOC) Elevation (ft MSL)	Date	Depth to Water (ft below TOC)	Water Surface Elevation (ft MSL)
	Latitude	Longitude				
MW-20	41 56 37.48	-116 05 49.61	5400.761	4/27/2016	13.38	5387.22
				10/16/2018	16.43	5384.33
				6/3/2019	9.84	5390.92
				9/10/2019	13.72	5387.04
				12/9/2019	16.54	5384.22
MW-21	41 56 38.33	-116 05 49.99	5400.145	4/27/2016	12.38	5387.57
				10/18/2018	15.94	5384.21
				6/3/2019	9.32	5390.83
				9/10/2019	13.22	5386.93
				12/9/2019	16.05	5384.10
MW-22	41 56 40.53	-116 05 48.28	5404.483	4/28/2016	17.07	5387.45
				10/17/2018	20.44	5384.04
				6/6/2019	11.40	5393.08
				9/10/2019	17.77	5386.71
				12/11/2019	20.57	5383.91
MW-23	41 56 40.79	-116 05 50.78	5399.676	4/28/2016	12.20	5387.44
				10/17/2018	15.64	5384.04
				6/6/2019	6.09***	5393.59***
				9/10/2019	13.05	5386.63
				12/11/2019	15.78	5383.90
MW-24	41 56 41.56	-116 05 51.03	5399.484	4/28/2016	12.41	5387.11
				10/18/2018	15.50	5383.98
				6/4/2019	6.08***	5393.40
				9/10/2019	13.00	5386.48
				12/10/2019	15.75	5383.73

Table 2

Summary of Groundwater Surface Elevations in Wells, April 2016 - December 2019

Groundwater Assessment Report

Duck Valley Indian Reservation

Well ID	Location (deg, min, sec)		Top of Casing (TOC) Elevation (ft MSL)	Date	Depth to Water (ft below TOC)	Water Surface Elevation (ft MSL)
	Latitude	Longitude				
MW-25	41 56 40.43	-116 05 54.07	5397.048	4/27/2016	7.77	5388.60
				10/18/2018	13.09	5383.96
				6/4/2019	6.88	5390.17
				9/10/2019	10.78	5386.27
				12/10/2019	13.18	5383.87
MW-26	41 56 39.08	-116 05 55.22	5395.419	4/27/2016	6.50	5388.46
				10/16/2018	11.37	5384.05
				6/4/2019	5.91	5389.51
				9/10/2019	9.03	5386.39
				12/10/2019	11.59	5383.83
MW-27	41 56 37.62	-116 05 54.52	5398.016	4/27/2016	9.85	5388.19
				10/16/2018	13.80	5384.22
				6/3/2019	7.70	5390.32
				9/9/2019	11.31	5386.71
				12/9/2019	13.88	5384.14
MW-28	41 56 39.10	-116 05 57.23	5394.842	4/28/2016	6.69	5388.26
				10/18/2018	9.94	5384.90
				6/6/2019	6.03	5388.81
				9/9/2019	9.53	5385.31
				12/11/2019	11.03	5383.81
MW-29	41 56 41.19	-116 05 58.41	5393.925	4/27/2016	6.29	5387.39
				10/18/2018	9.69	5384.24
				6/5/2019	6.05	5387.88
				9/9/2019	9.5	5384.43
				12/10/2019	10.89	5383.04

Table 2

Summary of Groundwater Surface Elevations in Wells, April 2016 - December 2019

Groundwater Assessment Report

Duck Valley Indian Reservation

Well ID	Location (deg, min, sec)		Top of Casing (TOC) Elevation (ft MSL)	Date	Depth to Water (ft below TOC)	Water Surface Elevation (ft MSL)
	Latitude	Longitude				
MW-30	41 56 41.21	-116 06 00.32	5391.77*	4/28/2016	Not Found	--
MW-30R	41 56 40.97	-116 06 00.05	5392.77	10/18/2018	8.20	5384.57
				6/5/2019	5.12	5387.65
				9/9/2019	8.42	5384.35
				12/10/2019	9.82	5382.95
MW-31	41 56 33.42	-116 05 51.38	5399.273	10/18/2018	15.90	5383.37
				6/6/2019	7.37	5391.90
				9/9/2019	11.38	5387.89
				12/11/2019	14.36	5384.91
MW-32	41 56 41.50	-116 05 52.13	5398.775	10/18/2018	15.04	5383.74
				6/4/2019	8.53	5390.25
				9/10/2019	13.32	5385.46
				12/10/2019	15.17	5383.61
MW-33	41 56 41.74	-116 05 54.43	5397.982	10/18/2018	14.25	5383.73
				6/4/2019	7.97	5390.01
				9/10/2019	11.63	5386.35
				12/10/2019	14.38	5383.60

Notes:

ft MSL - Feet calibrated to Mean Sea Level

ft TOC - Measured in feet below Top of Casing

* Top of Casing Elevation data and location coordinates from April 2013 survey

** Well MW-1 wellhead cavity was full of water and was not measured.

*** Data is supect and was not used in analysis.

Table 3

Summary of Supplemental Investigation TPH Groundwater Data
Groundwater Assessment Report
Duck Valley Indian Reservation

Well ID	Sampling Date	TPHg (mg/L)	TPHd (mg/L)
MW-1	4/28/2016	NS	NS
MW-1R	10/18/2018	<0.0314	<0.0247
	6/6/2019	0.0331 BJ	0.0338 J
	9/10/2019	0.0800 BJ	0.0824 J
	12/11/2019	0.0473 J	<0.0247
MW-2	4/28/2016	NS	NS
	10/18/2018	0.0323 BJ	<0.0247
	6/4/2019	<0.0314	0.0408 BJ
	9/9/2019	<0.0314	0.0386 J
	12/9/2019	<0.0314	<0.0247
MW-3	4/28/2016	NS	NS
	10/18/2018	<0.0314	<0.0247
	6/4/2019	0.0345 BJ	0.0421 BJ
	9/9/2019	<0.0314	0.0418 J
	12/9/2019	0.0792 BJ	<0.0247
MW-5R	4/27/2016	<0.0314	0.0472 J
	10/16/2018	<0.0314	**0.102**
	6/4/2019	<0.0314	0.0252 BJ
	9/9/2019	<0.0314	0.0397 J
	12/9/2019	<0.0314	<0.0247
MW-6	4/28/2016	<0.0314	**0.232**
	10/16/2018	<0.0314	**0.692**
	6/4/2019	0.0390 BJ	0.196 B
	9/9/2019	0.101 B	**0.755**
	12/9/2019	0.0792 J	**0.801**
MW-7	4/27/2016	<0.0314	**0.120**
	10/16/2018	<0.0314	<0.0247
	6/5/2019	<0.0314	0.0418 BJ
	9/9/2019	<0.0314	0.0465 J
	12/9/2019	<0.0314	<0.0247
MW-8R	4/28/2016	<0.0314	**0.123**
	10/18/2018	**0.662**	**2.46**
	6/4/2019	0.0406 BJ	0.273 B
	9/9/2019	0.0352 J	**0.760**
	12/9/2019	0.120 B	**1.71**
MW-9	4/28/2016	<0.0314	**4.10**
	10/18/2018	<0.0314	**2.06**
	6/5/2019	<0.0314	**1.34**
	9/9/2019	0.0812 BJ	**0.738**
	12/10/2019	0.0315 BJ	**0.404**
MW-10	4/27/2016	<0.0314	**0.426**
	10/16/2018	<0.0314	**0.223**
	6/3/2019	0.0656 BJ	**2.77**
	9/9/2019	<0.0314	**1.14**
	12/9/2019	<0.0314	**0.354**
MW-11	4/28/2016	0.0761 J	**7.31**
	10/18/2018	0.206 B	**86.5**
	6/4/2019	0.0900 BJ	**1.28**
	9/10/2019	0.0549 J	**1.07**
	Dup2 - 9/10/2019	0.134 B	**1.11**
	12/10/2019	0.0980 BJ	**1.13**
	DUP 12/10/2019	0.105 B	**1.40**

Table 3

Summary of Supplemental Investigation TPH Groundwater Data
Groundwater Assessment Report
Duck Valley Indian Reservation

Well ID	Sampling Date	TPHg (mg/L)	TPHd (mg/L)
MW-12	4/27/2016	<0.0314	0.0928 J
	10/18/2018	0.0351 BJ	2.10
	6/5/2019	<0.0314	<0.0247
	9/9/2019	<0.0314	<0.0247
	12/10/2019	<0.0314	<0.0247
MW-13	4/28/2019	<0.0314	**1.52**
	10/18/2018	0.0384 BJ	**0.210**
	6/4/2019	0.0795 BJ	**0.782**
	9/9/2019	0.109 B	**0.807**
	12/10/2019	0.0661 BJ	**0.405**
MW-14	4/27/2016	<0.0314	0.0405 J
	10/18/2018	<0.0314	0.0331 J
	6/5/2019	0.0373 BJ	<0.0247
	9/10/2019	0.0869 BJ	0.0623 J
	12/10/2019	<0.0314	<0.0247
MW-15	4/27/2016	<0.0314	<0.0247
	10/17/2018	<0.0314	0.0471 J
	6/6/2019	<0.0314	0.0613 J
	9/10/2019	0.0782 BJ	**0.148**
	12/11/2019	<0.0314	<0.0247
MW-19	4/27/2016	**0.466**	**0.184**
	10/18/2018	**0.627**	**0.183**
	6/3/2019	0.0343 BJ	**0.295**
	9/9/2019	**0.365**	**0.261**
	12/9/2019	NS	NS
MW-20	4/27/2016	<0.0314	0.0590 J
	10/16/2018	<0.0314	<0.0494
	6/3/2019	0.0323 BJ	0.0931 J
	9/10/2019	0.0875 BJ	0.0745 J
	12/9/2019	<0.0314	<0.0247
MW-21	4/27/2016	<0.0314	0.0582 J
	10/18/2018	<0.0314	0.0740 J
	6/3/2019	0.0332 BJ	0.0921 J
	9/10/2019	0.0753 BJ	0.0932 J
	12/9/2019	<0.0314	<0.0247
MW-22	4/28/2016	<0.0314	**2.39**
	10/17/2018	<0.0314	**2.10**
	6/6/2019	<0.0314	**0.771**
	9/10/2019	0.0998 BJ	**1.51**
	12/11/2019	0.0385 BJ	**1.24**
MW-23	4/28/2016	**0.554**	**5.73**
	10/17/2018	**0.346**	**5.14**
	6/6/2019	0.0939 BJ	**0.743**
	DUP-6/6/2019	0.158 B	**1.01**
	9/10/2019	0.247 B	**3.16**
	12/11/2019	**0.523**	**4.47**

Table 3

Summary of Supplemental Investigation TPH Groundwater Data
Groundwater Assessment Report
Duck Valley Indian Reservation

Well ID	Sampling Date	TPHg (mg/L)	TPHd (mg/L)
MW-24	4/28/2016	0.799 J3	**9.21**
	10/18/2018	**1.47**	**20.9**
	6/4/2019	**1.59**	**9.83**
	9/10/2019	0.883 B	**13.1**
	Dup1-9/10/2019	**1.05**	**13.7**
	12/10/2019	**2.48**	**14.5**
	DUP 12/10/2019	**2.05**	**15**
MW-25	4/27/2016	<0.0314	**0.137**
	10/18/2018	<0.0314	0.0394 J
	6/4/2019	<0.0314	0.0663 BJ
	9/10/2019	0.0577 BJ	0.0769 J
	12/10/2019	0.0388 BJ	0.136 B
MW-26	4/27/2016	<0.0314	**1.10**
	10/16/2018	<0.0314	**0.340**
	6/4/2019	0.0378 BJ	0.274 B
	9/10/2019	0.0834 BJ	**0.215**
	12/10/2019	<0.0314	**1.18**
MW-27	4/27/2016	<0.0314	0.0684 J
	10/16/2018	<0.0314	0.0759 J
	6/3/2019	0.0323 BJ	0.0517 J
	9/9/2019	<0.0314	0.0623 J
	12/9/2019	<0.0314	0.256 B
MW-28	4/28/2016	0.0565 J	**1.31**
	10/18/2018	0.0396 J	**0.720**
	6/6/2019	0.0632 BJ	**0.770**
	9/9/2019	0.0375 J	**0.748**
	12/11/2019	0.0879 BJ	0.0824 BJ
MW-29	4/27/2016	<0.0314	**0.129**
	10/18/2018	<0.0314	**0.450**
	6/5/2019	<0.0314	<0.0247
	9/9/2019	0.0883 BJ	**0.120**
	12/10/2019	0.0421 BJ	**0.398**
MW-30R	4/28/2016	Not installed yet	
	10/18/2018	0.0338 BJ	0.0751 J
	6/5/2019	<0.0314	<0.0247
	9/9/2019	0.0748 BJ	0.0753 J
	12/10/2019	<0.0314	0.0584 BJ
MW-31	4/28/2016	Not installed yet	
	10/18/2018	<0.0314	**0.290**
	6/6/2019	<0.0314	0.0919 J
	9/9/2019	<0.0314	0.0884 J
	12/11/2019	<0.0314	0.108 B
MW-32	4/28/2016	Not installed yet	
	10/18/2018	<0.0314	**1.10**
	6/4/2019	0.0343 BJ	**0.863**
	9/10/2019	0.0940 BJ	**0.949**
	12/10/2019	0.0320 BJ	**1.67**

Table 3

Summary of Supplemental Investigation TPH Groundwater Data
Groundwater Assessment Report
Duck Valley Indian Reservation

Well ID	Sampling Date	TPHg (mg/L)	TPHd (mg/L)
MW-33	4/28/2016	Not installed yet	
	10/18/2018	<0.0314	**0.191**
	6/4/2019	<0.0314	0.0758 BJ
	9/10/2019	0.0924 BJ	0.0948 J
	12/10/2019	0.0356 BJ	0.103 B
EPA Tapwater Regional Screening Level		0.2	0.08
EPA Target Concentration (Vapor Intursion) VISL		0.16	0.00075
EPA Residential Tapwater injestion SL		NE	NE
EPA Residential Tapwater dermal SL		NE	NE
EPA Residential Tapwater inhalation SL		NE	NE
EPA Region 9 MCL		NE	NE

Notes:

TPHg Total Petroleum Hydrocarbons as Gasoline - Shown on laboratory report as TPH Low Fraction

TPHd Total Petroleum Hydrocarbons as Diesel - Shown on laboratory report as TPH High F

mg/L - milligrams per Liter

The "<" indicates that the compound was not detected at the listed laboratory Reporting Limit.

NS Not Sampled

NA Not Analyzed

NE Not Established

J - Result is less than the reporting limit, but greater than or equal to the method detection limit. The concentration represents an estimated value.

B - The same analyte is found in the associated blank.

Bold face type indicates a detected value.

Table 4

Summary of Supplemental Investigation VOCs Groundwater Data

Groundwater Assessment Report

Well ID	Sampling Date	TCE (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl benzene (µg/L)	Total Xylenes (µg/L)	n-Butyl benzene (µg/L)	sec-Butyl benzene (µg/L)	tert-Butyl benzene (µg/L)	Isopropyl benzene (µg/L)	P-Isopropyl toluene (µg/L)	n-Propyl benzene (µg/L)	1, 2, 4-Trimethyl benzene (µg/L)	1, 2, 3-Trichloro benzene (µg/L)	1, 3, 5-Trimethyl benzene (µg/L)	1,2,3 Trimethyl benzene (µg/L)	MEK (µg/L)	1,1,2-Trichloroethane (µg/L)
MW-1R	10/18/2018	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	6/6/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	9/10/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	12/11/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
MW-2	4/28/2016	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<3.93	<0.383
	10/18/2018	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	6/4/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	9/9/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	12/9/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
MW-3	4/28/2016	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	<3.93	<0.383
	10/18/2018	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	6/4/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	9/9/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	12/9/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
MW-5R	4/27/2016	<0.398	<0.331	<0.780	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	0.360 J	<0.387	<0.321	<3.93	<0.383
	10/16/2018	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	6/4/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	9/9/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	12/9/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
MW-6	4/28/2016	<0.398	<0.331	<0.780	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	10/16/2018	<0.398	<0.331	<0.412	<0.384	<1.06	**1.50**	<0.365	0.545 J	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	6/4/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	9/9/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.362	0.903 J	0.482 J	<0.326	0.400 J	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	12/9/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.362	0.0886 J	0.637 J	<0.326	0.421 J	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
MW-7	4/27/2016	<0.398	<0.331	<0.780	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	10/16/2018	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	6/5/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	9/9/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.384
	12/9/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.384
MW-8	4/28/2016	<0.398	<0.331	<0.780	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
MW-8R	10/18/2018	<0.398	<0.331	**0.416 J**	**10.2**	**33.6**	**6.72**	**4.48**	**1.94**	**3.50**	**4.00**	**11.7**	**174**	<0.230	**33.6**	**43.6**	<3.93	<0.383
	6/4/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	9/9/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.362	**1.3**	0.707 J	<0.326	0.461 J	**1.39**	**2.47**	<0.230	<0.387	<0.321	<3.93	<0.383
	12/9/2019	<0.398	<0.331	<0.412	<0.384	<1.06	**3.60**	**3.79**	<0.399	0.638 J	0.967 J	**2.33**	**2.88**	0.489 J	<0.387	<0.321	<3.93	<0.383
MW-9	4/28/2016	<0.398	<0.331	<0.780	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	10/18/2018	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	6/5/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	9/9/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	12/10/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
MW-10	4/27/2016	0.989 J	<0.331	<0.780	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	10/16/2018	0.730 J	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	6/3/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	9/9/2019	0.488 J	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	12/9/2019	0.595 J	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383

Table 4

Summary of Supplemental Investigation VOCs Groundwater Data

Groundwater Assessment Report

Well ID	Sampling Date	TCE (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl benzene (µg/L)	Total Xylenes (µg/L)	n-Butyl benzene (µg/L)	sec-Butyl benzene (µg/L)	tert-Butyl benzene (µg/L)	Isopropyl benzene (µg/L)	P-Isopropyl toluene (µg/L)	n-Propyl benzene (µg/L)	1, 2, 4-Trimethyl benzene (µg/L)	1, 2, 3-Trichloro benzene (µg/L)	1, 3, 5-Trimethyl benzene (µg/L)	1,2,3 Trimethyl benzene (µg/L)	MEK (µg/L)	1,1,2-Trichloroethane (µg/L)
MW-11	4/28/2016	<0.398	<0.331	<0.780	<0.384	<1.06	0.421 J	**1.68**	0.532 J	<0.326	<0.350	0.463 J	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	10/18/2018	<0.398	<0.331	<0.412	<0.384	<1.06	**2.55**	**4.74**	**1.09**	<0.326	<0.350	0.657 J	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	6/4/2019	<0.398	<0.331	<0.412	<0.384	<1.06	0.853 J	**2.78**	0.693 J	<0.326	<0.350	0.569 J	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	9/10/2019	<0.398	<0.331	<0.412	<0.384	<1.06	0.883 BJ	2.90 B	0.688 J	<0.326	<0.350	0.556 J	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	Dup2-9/10/2019	<0.398	<0.331	<0.412	<0.384	<1.06	1.01 B	3.10 B	0.800 J	<0.326	<0.350	0.929 J	**2.26**	<0.230	<0.387	<0.321	<3.93	<0.383
	12/10/2019	<0.398	<0.331	<0.412	<0.384	<1.06	0.948 J	**2.95**	0.856 J	<0.326	<0.350	0.764 J	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	DUP 12/10/2019	<0.398	<0.331	<0.412	<0.384	<1.06	**1.10**	**2.73**	0.761 J	<0.326	<0.350	0.764 J	<0.373	<0.230	<0.387	0.352 J	<3.93	<0.383
MW-12	4/27/2016	<0.398	<0.331	<0.780	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	10/18/2018	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	6/5/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230 J4	<0.387	<0.321	<3.93	<0.383
	9/9/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.384
	12/10/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.384
MW-13	4/28/2019	<0.398	<0.331	<0.780	<0.384	<1.06	<0.361	<0.365	0.461 J	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	10/18/2018	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	6/4/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	0.460 J	<0.326	<0.350	<0.349	0.664 J	<0.230	<0.387	<0.321	<3.93	<0.383
	9/9/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	0.413 J	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.384
	12/10/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	0.401 J	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.384
MW-14	4/27/2016	<0.398	<0.331	<0.780	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	10/18/2018	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	6/5/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	9/10/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	12/10/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
MW-15	4/27/2016	<0.398	<0.331	<0.780	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	10/17/2018	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	6/6/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	9/10/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	12/11/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
MW-19	4/27/2016	<0.398	<0.331	<0.780	<0.384	<1.06	**1.16**	0.855 J	<0.399	<0.326	<0.350	0.351 J	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	10/18/2018	<0.398	<0.331	<0.412	<0.384	<1.06	**1.15**	**1.06**	<0.399	<0.326	0.710 J	0.368 J	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	6/3/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	9/9/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.362	0.654 J	<0.399	<0.326	0.545 J	0.408 J	<0.373	<0.230	<0.387	<0.321	9.70 J	**1.33**
	12/9/2019	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-20	4/27/2016	<0.398	<0.331	<0.780	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	10/16/2018	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	6/3/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	9/10/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.384
	12/9/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.384
MW-21	4/27/2016	<0.398	<0.331	<0.780	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	10/18/2018	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	6/3/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	9/10/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	12/9/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
MW-22	4/28/2016	<0.398	<0.331	<0.780	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	10/17/2018	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	0.505 J	<0.326	<0.350	<0.349	0.658J	<0.230	<0.387	0.638 J	<3.93	<0.383
	6/6/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	9/10/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	0.475 J	0.503 J	0.475 J	<0.350	<0.349	**1.44**	<0.230	<0.387	0.757 J	<3.93	<0.383
	12/11/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	0.708 J	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	0.374 J	<3.93	<0.383

Table 4

Summary of Supplemental Investigation VOCs Groundwater Data

Groundwater Assessment Report

Well ID	Sampling Date	TCE (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl benzene (µg/L)	Total Xylenes (µg/L)	n-Butyl benzene (µg/L)	sec-Butyl benzene (µg/L)	tert-Butyl benzene (µg/L)	Isopropyl benzene (µg/L)	P-Isopropyl toluene (µg/L)	n-Propyl benzene (µg/L)	1, 2, 4-Trimethyl benzene (µg/L)	1, 2, 3-Trichloro benzene (µg/L)	1, 3, 5-Trimethyl benzene (µg/L)	1,2,3 Trimethyl benzene (µg/L)	MEK (µg/L)	1,1,2-Trichloroethane (µg/L)
MW-23	4/28/2016	<0.398	<0.331	<0.780	**11.7**	**41.4**	**2.49**	**5.03**	**1.46**	**7.32**	**1.53**	**10.8**	**105**	<0.230	**19.0**	**37.1**	<3.93	<0.383
	10/17/2018	<0.372	0.725 J	<0.412	**12.3**	<1.06	**1.55**	**6.13**	**1.88**	**8.03**	**1.56**	**10.7**	**117**	<0.230	<0.387	**40.0**	<3.93	<0.383
	6/6/2019	<0.398	<0.331	<0.412	0.848 J	**3.34**	0.541 J	**1.43**	0.457 J	0.909 J	<0.350	**1.22**	**13.9**	<0.230	<0.387	**4.55**	<3.93	<0.383
	DUP-6/6/2019	<0.398	<0.331	<0.412	**2.16**	**8.13**	0.849 J	**2.35**	0.645 J	**1.99**	0.660 J	**2.61**	**29.2**	<0.230	<0.387	**10.8**	<3.93	<0.383
	9/10/2019	<0.372	0.419 J	<0.412	**4.72**	**6.58**	1.73 B	**4.75**	**1.27**	**4.31**	0.798 J	**6.29**	**20.6**	**5.29**	<0.387	<0.321	<3.93	<0.383
	12/11/2019	<0.372	0.568 J	<0.412	**10.3**	**30.7**	**3.23**	**7.28**	**1.96**	**8.52**	**1.60**	**12.9**	**70.7**	<0.230	<0.387	**28.7**	<3.93	<0.383
MW-24	4/28/2016	<0.398	**24.7**	1.44 J	**47.2**	<1.06	**4.71**	**4.36**	**1.3**	**9.01**	**3.14**	**15.2**	**186**	<0.230	0.669 J	**57.3**	<3.93	<0.383
	10/18/2018	<0.398	**17.6**	0.802 J	**62.8**	<1.06	**4.69**	**4.68**	<0.399	**9.90**	**3.79**	**15.6**	**248**	<0.230	<0.387	**87.1**	<3.93	<0.383
	6/4/2019	<0.398	**18.4**	0.496 J	**36.4**	**112**	**3.52**	**3.87**	**1.14**	**8.11**	**3.42**	**10.2**	**159**	<0.230	<0.387	**62.9**	<3.93	<0.383
	9/10/2019	<0.398	**21**	<0.412	**44.7**	**74.9**	<0.361	3.26 J	<0.399	**8.42**	2.41 J	**14.6**	**129**	**12.4**	<0.387	<0.321	<3.93	<0.383
	Dup1-9/10/2019	<0.398	**19.9**	0.452 J	**50.0**	**79.0**	3.81 B	**4.64**	**1.49**	**10.3**	**2.75**	**16.2**	**140**	**12.9**	<0.387	<0.321	<3.93	<0.383
	12/10/2019	<0.398	**22.3**	0.713 J	**75.2**	**206**	**7.73**	**7.31**	**1.91**	**14.2**	**6.56**	**22.8**	**263**	<0.230	<0.387	**124**	<3.93	<0.383
	DUP 12/10/2019	<0.398	**20.9**	<0.412	**63.3**	**169**	6.42 J	5.99 J	<0.399	**11.5**	6.09 J	**20.7**	**304**	<0.230	<0.387	**110**	<3.93	<0.383
MW-25	4/27/2016	<0.398	<0.331	<0.780	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	**1.92**	<0.230	<0.387	<0.321	<3.93	<0.383
	10/18/2018	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	6/4/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	9/10/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	12/10/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
MW-26	4/27/2016	<0.398	<0.331	<0.780	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	10/16/2018	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	6/4/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	9/10/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	12/10/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
MW-27	4/27/2016	<0.398	<0.331	<0.780	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	10/16/2018	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	6/3/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	9/9/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	12/9/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
MW-28	4/28/2016	<0.398	<0.331	<0.780	<0.384	<1.06	0.498 J	**1.14**	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	10/18/2018	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	0.665 J	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	6/6/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	0.835 J	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	9/9/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	0.629 J	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	12/11/2019	<0.398	<0.331	<0.412	<0.384	<1.06	0.521 J	**1.55**	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
MW-29	4/27/2016	<0.398	<0.331	<0.780	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	10/18/2018	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	0.787 J	<3.93	<0.383
	6/5/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	9/9/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	12/10/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
MW-30R	10/18/2018	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	**1.34**	<0.230	<0.387	0.392 J	<3.93	<0.383
	6/5/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230 J4	<0.387	<0.321	<3.93	<0.383
	9/9/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	12/10/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
MW-31	10/18/2018	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	6/6/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230 J4	<0.387	<0.321	<3.93	<0.383
	9/9/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	12/11/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383

Table 4

Summary of Supplemental Investigation VOCs Groundwater Data

Groundwater Assessment Report

Well ID	Sampling Date	TCE (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl benzene (µg/L)	Total Xylenes (µg/L)	n-Butyl benzene (µg/L)	sec-Butyl benzene (µg/L)	tert-Butyl benzene (µg/L)	Isopropyl benzene (µg/L)	P-Isopropyl toluene (µg/L)	n-Propyl benzene (µg/L)	1, 2, 4-Trimethyl benzene (µg/L)	1, 2, 3-Trichloro benzene (µg/L)	1, 3, 5-Trimethyl benzene (µg/L)	1,2,3 Trimethyl benzene (µg/L)	MEK (µg/L)	1,1,2-Trichloroethane (µg/L)
MW-32	10/18/2018	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	6/4/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	9/10/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	12/10/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
MW-33	10/18/2018	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	6/4/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	9/10/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
	12/10/2019	<0.398	<0.331	<0.412	<0.384	<1.06	<0.361	<0.365	<0.399	<0.326	<0.350	<0.349	<0.373	<0.230	<0.387	<0.321	<3.93	<0.383
EPA Vapor Intrusion Target Groundwater Concentration VISL		1.19	1.59	1,920	3.49	38.5	NE	NE	NE	NE	NE	243	24.8	NE	17.5	35.1	224,000	0.619
EPA Residential Tapwater injestion SL		1.20	1.4	NE	7.1	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	1.4
EPA Residential Tapwater dermal SL		7.40	9.8	NE	120	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	20
EPA Residential Tapwater inhalation SL		0.96	0.72	NE	2.2	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	0.35
EPA Region 9 MCLs		5	5	1,000	700	10,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	5

Notes:

µg/L micro-grams per liter

MEK = Methyl ethyl ketone or 2-Butanone

TCE = Trichloroethene

The "<" indicates that the compound was not detected at the listed laboratory Reporting Limit.

NS Not Sampled

NA Not Analyzed

NE Not Established

J - Result is less than the reporting limit, but greater than or equal to the method detection limit. The concentration represents an estimated value.

Bold face type indicates a detected value.

Table 5

Summary of Supplemental Investigation SVOCs Groundwater Data

Groundwater Assessment Report

Well ID	Sampling Date	Naphthalene (µg/L)	Acenaphthene (µg/L)	Acenaphthylene (µg/L)	Anthracene (µg/L)	Chrysene (µg/L)	Dibenzofuran (µg/L)	Fluoranthene (µg/L)	Fluorene (µg/L)	Phenanthrene (µg/L)	Pyrene (µg/L)
MW-1R	10/18/2018	0.0396 BJ	<0.0100	<0.0120	<0.0140	<0.0108	<0.00105	<0.0157	<0.00850	<0.00820	<0.0117
	6/6/2019	0.0411 J	<0.0100	<0.0120	<0.0140	<0.0108	0.00723 BJ	<0.0157	<0.00850	<0.00820	<0.0117
	9/10/2019	0.0292 BJ	<0.0100	<0.0120	<0.0140	<0.0108	0.0130 J	<0.0157	<0.00851	0.0148 J	<0.0118
	12/11/2019	0.0488 BJ	<0.0100	<0.0120	<0.0140	<0.0108	0.00827 BJ	<0.0157	<0.00851	<0.00820	<0.0117
MW-2	4/28/2016	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	10/18/2018	0.0425 B J	<0.0100	<0.0120	<0.0140	<0.0108	<0.00105	<0.0157	<0.00850	<0.00820	<0.0117
	6/4/2019	0.0744 BJ	<0.0100	<0.0120	<0.0140	<0.0108	0.00423 BJ	<0.0157	<0.00850	<0.00820	<0.0117
	9/9/2019	<0.0198	<0.0100	<0.0120	<0.0140	<0.0108	0.00467 BJ	<0.0157	<0.00850	<0.00820	<0.0117
	12/9/2019	0.0431 BJ	<0.0100	<0.0120	<0.0140	<0.0108	0.00934 BJ	<0.0157	<0.00850	<0.00820	<0.0117
MW-3	4/28/2016	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	10/18/2018	0.0324 BJ	<0.0100	<0.0120	<0.0140	<0.0108	<0.00105	<0.0157	<0.00850	<0.00820	<0.0117
	6/4/2019	0.0654 BJ	<0.0100	<0.0120	<0.0140	<0.0108	0.00396 BJ	<0.0157	<0.00850	<0.00820	<0.0117
	9/9/2019	<0.0198	<0.0100	<0.0120	<0.0140	<0.0108	0.00476 BJ	<0.0157	<0.00850	<0.00820	<0.0117
	12/9/2019	0.0225 BJ	<0.0100	<0.0120	<0.0140	<0.0108	0.00765 BJ	<0.0157	<0.00850	0.0178 J	<0.0117
MW-5R	4/27/2016	<1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/16/2018	<0.0198	<0.0100	<0.0120	<0.0140	<0.0108	0.00283 BJ	<0.0157	<0.00850	<0.00820	<0.0117
	6/4/2019	0.114 BJ	<0.0100	<0.0120	<0.0140	<0.0108	<0.00105	<0.0157	<0.00850	<0.00820	<0.0117
	9/9/2019	<0.0198	<0.0100	<0.0120	<0.0140	<0.0108	0.00471 BJ	<0.0157	<0.00850	<0.00820	<0.0117
	12/9/2019	0.0241 BJ	<0.0100	<0.0120	<0.0140	<0.0108	0.00793 BJ	<0.0157	<0.00850	<0.00820	<0.0117
MW-6	4/28/2016	<1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/16/2018	<0.0198	**3.13**	<0.0120	**0.617**	<0.0108	**2.16**	0.0235 J	**3.72**	**1.66**	**0.0707**
	6/4/2019	0.113 BJ	0.0378 J	<0.0120	<0.0140	<0.0108	<0.00105	<0.0157	0.0167 J	<0.00820	0.0126 J
	9/9/2019	**0.878**	**2.99**	<0.0121	**0.634**	<0.0109	**2.21**	0.0220 J	**3.96**	**3.83**	**0.0688**
	12/9/2019	**1.94**	**3.83**	<0.0121	**1.24**	<0.0109	**2.58**	0.0305 J	**5.16**	**5.39**	**0.0991**
MW-7	4/27/2016	<1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/16/2018	<0.0198	<0.0100	<0.0120	<0.0140	<0.0108	<0.00105	<0.0157	<0.00850	<0.00820	<0.0117
	6/5/2019	0.0397 J	<0.0100	<0.0120	<0.0140	<0.0108	0.00913 BJ	<0.0157	<0.00850	0.0113 J	<0.0117
	9/9/2019	<0.0198	<0.0100	<0.0120	<0.0140	<0.0108	0.00682 BJ	<0.0157	<0.00850	0.0125 J	<0.0117
	12/9/2019	0.0250 BJ	<0.0100	<0.0120	<0.0140	<0.0108	0.00784 BJ	<0.0157	<0.00850	<0.00820	<0.0117
MW-8R	4/28/2016	<1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/18/2018	**93.2**	**5.35**	<0.0120	**0.786**	<0.0108	**4.77**	0.0241 J	**7.64**	**14.3**	**0.0787**
	6/4/2019	**0.363**	**0.425**	<0.0120	0.0470 J	<0.0108	**0.444**	<0.0157	**0.559**	**0.517**	0.0127 J
	9/9/2019	**2.07**	**2.61**	<0.0120	**0.0140**	<0.0108	**2.37**	<0.0157	**3.58**	**4.36**	0.0319 J
	12/9/2019	**5.33**	**6.14**	<0.0120	**0.780**	<0.0108	**5.32**	0.0245 J	**8.53**	**14**	**0.0846**
MW-9	4/28/2016	<1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/18/2018	0.0599 BJ	<0.0100	<0.0120	0.0368 J	<0.0108	<0.00105	<0.0157	<0.00850	<0.00820	<0.0117
	6/5/2019	0.0862 J	0.0487 J	<0.0120	<0.0140	<0.0108	0.0308 BJ	<0.0157	**0.0502**	<0.00820	<0.0117
	9/9/2019	0.0339 BJ	<0.0100	<0.0120	0.0140 J	<0.0108	0.0104 BJ	<0.0157	0.0125 J	0.0129 J	<0.0117
	12/10/2019	0.0244 BJ	<0.0100	<0.0120	<0.0140	<0.0108	0.00789 BJ	<0.0157	<0.00850	<0.00820	<0.0117
MW-10	4/27/2016	<1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/16/2018	<0.0198	0.0288 J	<0.0120	0.0168 J	<0.0108	**0.0625**	<0.0157	<0.00850	0.0296 J	<0.0117
	6/3/2019	0.0611 BJ	0.0386 J	<0.0120	<0.0140	<0.0108	**0.0598**	<0.0157	<0.00850	<0.00820	<0.0117
	9/9/2019	0.0646 BJ	**0.139**	<0.0120	0.0332 J	<0.0108	**0.214**	<0.0157	0.0484 J	**0.0942**	<0.0117
	12/9/2019	0.102 BJ	**0.133**	<0.0120	0.0218 J	<0.0108	**0.247**	<0.0157	**0.0723**	**0.0915**	<0.0117

Table 5

Summary of Supplemental Investigation SVOCs Groundwater Data

Groundwater Assessment Report

Well ID	Sampling Date	Naphthalene (µg/L)	Acenaphthene (µg/L)	Acenaphthylene (µg/L)	Anthracene (µg/L)	Chrysene (µg/L)	Dibenzofuran (µg/L)	Fluoranthene (µg/L)	Fluorene (µg/L)	Phenanthrene (µg/L)	Pyrene (µg/L)
MW-11	4/28/2016	<1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/18/2018	**18.8**	**22.5**	<0.480	**24.1**	**0.149**	**11.3**	**0.416**	**29.2**	**78.3**	**6.36**
	6/4/2019	**1.69**	**2.70**	<0.0120	**0.314**	<0.0108	**2.63**	<0.0157	**4.40**	**4.63**	**0.0835**
	9/10/2019	**1.45**	**3.16**	<0.0120	<0.0140	<0.0108	**3.06**	0.0219 J	**5.71**	**7.06**	**0.0774**
	Dup2-9/10/2019	**1.44**	**3.07**	<0.0120	<0.0140	<0.0108	**2.94**	0.0212 J	**5.56**	**6.59**	**0.0790**
	12/10/2019	**2.16**	**3.59**	<0.0120	**0.647**	<0.0108	**3.32**	0.0240 J	**6.15**	**8.05**	**0.0964**
	DUP 12/10/2019	**2.16**	**3.49**	<0.0120	**0.632**	<0.0108	**3.24**	0.0242 J	**6.04**	**7.52**	**0.0893**
MW-12	4/27/2016	<1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/18/2018	0.0431 BJ	<0.0100	<0.0120	<0.0140	<0.0108	<0.00105	<0.0157	<0.00850	<0.00820	<0.0117
	6/5/2019	0.0523 J	<0.0100	<0.0120	<0.0140	<0.0108	0.00959 BJ	<0.0157	<0.00850	<0.00820	<0.0117
	9/9/2019	0.0309 BJ	<0.0100	<0.0120	<0.0140	<0.0108	0.00739 BJ	<0.0157	<0.00850	<0.00820	<0.0117
	12/10/2019	0.0226 BJ	<0.0100	<0.0120	<0.0140	<0.0108	0.00586 BJ	<0.0157	<0.00850	<0.00820	<0.0117
MW-13	4/28/2019	<1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/18/2018	0.204 BJ	**0.324**	<0.0120	**0.357**	<0.0108	**0.435**	<0.0157	**0.799**	**0.19**	0.0393 J
	6/4/2019	**1.74**	**2.67**	<0.0120	**0.875**	<0.0108	**2.07**	0.0195 J	**4.20**	**2.64**	0.0497 J
	9/9/2019	**0.914**	**2.50**	<0.0120	**0.520**	<0.0108	**1.78**	0.0192 J	**3.66**	**0.953**	**0.0635**
	12/10/2019	**0.898**	**1.87**	<0.0120	**0.816**	<0.0108	**1.61**	0.0231 J	**3.13**	**0.579**	**0.0763**
MW-14	4/27/2016	<1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/18/2018	0.0527 BJ	<0.0100	<0.0120	<0.0140	<0.0108	<0.00105	<0.0157	<0.00850	<0.00820	<0.0117
	6/5/2019	0.0614 J	<0.0100	<0.0120	<0.0140	<0.0108	0.00852 BJ	<0.0157	<0.00850	<0.00820	<0.0117
	9/10/2019	0.0510 BJ	<0.0100	<0.0120	<0.0140	<0.0108	0.00897 BJ	<0.0157	<0.00850	0.00892 J	<0.0117
	12/10/2019	0.0237 BJ	<0.0100	<0.0120	<0.0140	<0.0108	0.00622 BJ	<0.0157	<0.00850	<0.00820	<0.0117
MW-15	4/27/2016	<1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/17/2018	<0.0198	<0.0100	<0.0120	<0.0140	<0.0108	<0.00105	<0.0157	<0.00850	<0.00820	<0.0117
	6/6/2019	0.0326 J	<0.0100	<0.0120	<0.0140	<0.0108	0.00778 BJ	<0.0157	<0.00850	<0.00820	<0.0117
	9/10/2019	0.0232 BJ	<0.0100	<0.0120	<0.0140	<0.0108	<0.00105	<0.0157	<0.00850	0.0126 J	<0.0117
	12/11/2019	0.0229 BJ	<0.0100	<0.0120	<0.0140	<0.0108	0.00553 BJ	<0.0157	<0.00850	<0.00820	<0.0117
MW-19	4/27/2016	<1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/18/2018	<0.0198	<0.0100	<0.0120	<0.0140	<0.0108	<0.00105	<0.0157	<0.00850	0.0353 J	<0.0117
	6/3/2019	0.0306 BJ	<0.0100	<0.0120	<0.0140	<0.0108	<0.00105	<0.0157	<0.00850	<0.00820	<0.0117
	9/9/2019	0.122 BJ	<0.0100	<0.0120	<0.0140	<0.0108	0.00704 BJ	<0.0157	0.00914 J	0.0189 J	<0.0117
	12/9/2019	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-20	4/27/2016	<1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/16/2018	<0.0198	<0.0100	<0.0120	<0.0140	<0.0108	0.00228 BJ	<0.0157	<0.00850	<0.00820	<0.0117
	6/3/2019	0.0249 BJ	<0.0100	<0.0120	<0.0140	<0.0108	<0.00105	<0.0157	<0.00850	<0.00820	<0.0117
	9/10/2019	<0.0198	<0.0100	<0.0120	<0.0140	<0.0108	0.00782 BJ	<0.0157	<0.00850	<0.00820	<0.0117
	12/9/2019	0.0347 BJ	<0.0100	<0.0120	<0.0140	<0.0108	0.00476 BJ	<0.0157	<0.00850	<0.00820	<0.0117
MW-21	4/27/2016	<1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/18/2018	0.0839 BJ	<0.0100	<0.0120	<0.0140	<0.0108	<0.00105	<0.0157	0.0153 J	0.0344 J	<0.0117
	6/3/2019	0.0287 BJ	<0.0100	<0.0120	<0.0140	<0.0108	<0.00105	<0.0157	<0.00850	<0.00820	<0.0117
	9/10/2019	<0.0198	<0.0100	<0.0120	<0.0140	<0.0108	0.00701 J	<0.0157	<0.00850	<0.00820	<0.0117
	12/9/2019	0.0285 BJ	<0.0100	<0.0120	<0.0140	<0.0108	0.00479 BJ	<0.0157	<0.00850	<0.00820	<0.0117

Table 5

Summary of Supplemental Investigation SVOCs Groundwater Data

Groundwater Assessment Report

Well ID	Sampling Date	Naphthalene (µg/L)	Acenaphthene (µg/L)	Acenaphthylene (µg/L)	Anthracene (µg/L)	Chrysene (µg/L)	Dibenzofuran (µg/L)	Fluoranthene (µg/L)	Fluorene (µg/L)	Phenanthrene (µg/L)	Pyrene (µg/L)
MW-22	4/28/2016	<1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/17/2018	**1.87**	**0.151**	<0.0120	**0.0743**	<0.0108	2.3	<0.0157	0.422	0.344	<0.0117
	6/6/2019	0.154 J	<0.0100	<0.0120	**0.0622**	<0.0108	0.0154 BJ	<0.0157	0.0131 J	0.0157 J	<0.0117
	9/10/2019	<0.0198	<0.0100	<0.0120	**0.103**	<0.0108	<0.00105	<0.0157	<0.00850	**0.363**	<0.0117
	12/11/2019	**2.07**	**0.0885**	<0.0120	**0.0888**	<0.0108	**2.71**	<0.0157	**0.365**	**0.348**	<0.0117
MW-23	4/28/2016	**97.2**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/17/2018	**85.0**	**3.26**	<0.0120	<0.0140	<0.0108	**3.89**	<0.0157	**4.85**	**7.24**	**0.0724**
	6/6/2019	**1.95**	**1.03**	<0.0120	**0.105**	<0.0108	**1.30**	<0.0157	**1.71**	**1.13**	0.0297 J
	DUP-6/6/2019	**10.9**	**1.51**	<0.0120	**0.135**	<0.0108	**1.95**	<0.0157 J3 J4	**2.46**	**2.72**	0.0370 J
	9/10/2019	**38.9**	**2.35**	<0.0120	<0.0140	<0.0108	**3.01**	<0.0157	**3.59**	**4.67**	**0.0538**
	12/11/2019	**84.8**	**3.62**	<0.0120	**0.614**	<0.0108	<0.00105	0.0261 J	**5.77**	**8.91**	**0.121**
MW-24	4/28/2016	**289**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/18/2018	**250**	**2.83**	<0.0120	**0.568**	<0.0108	**3.01**	<0.0157	**4.44**	**8.17**	**0.149**
	6/4/2019	**225**	**3.04**	<0.0120	**0.476**	<0.0108	**3.57**	0.0189 J	**4.63**	**7.23**	**0.0595**
	9/10/2019	**218**	**2.48**	<0.0121	<0.0140	<0.0109	**2.87**	<0.0157	**3.59**	**5.66**	**0.0686**
	Dup1-9/10/2019	**201**	**2.39**	<0.0121	<0.0140	<0.0109	**2.74**	0.0451 J	**3.54**	**4.62**	**0.0598**
	12/10/2019	**415**	**3.86**	<0.0121	**0.596**	<0.0109	**4.15**	0.0362 J	**5.63**	**9.41**	**0.0928**
	Dup 12/10/2019	**361**	**3.87**	<0.0121	**0.548**	<0.0109	**4.22**	0.0278 J	**5.67**	**8.95**	**0.0786**
MW-25	4/27/2016	**2.19 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/18/2018	0.0474 BJ	<0.0100	<0.0120	<0.0140	<0.0108	<0.00105	<0.0157	<0.00850	<0.00820	<0.0117
	6/4/2019	0.193 BJ	<0.0100	<0.0120	<0.0140	<0.0108	<0.00105	<0.0157	<0.00850	<0.00820	<0.0117
	9/10/2019	0.0358 BJ	<0.0100	<0.0120	<0.0140	<0.0108	0.0106 BJ	<0.0157	0.00938 J	0.0191 J	<0.0117
	12/10/2019	<0.0198	<0.0100	<0.0120	<0.0140	<0.0108	0.00664 BJ	<0.0157	<0.00850	<0.00820	<0.0117
MW-26	4/27/2016	<1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/16/2018	<0.0198	<0.0100	<0.0120	<0.0140	<0.0108	<0.00105	<0.0157	<0.00850	<0.00820	<0.0117
	6/4/2019	0.0929 BJ	<0.0100	<0.0120	<0.0140	<0.0108	<0.00105	<0.0157	<0.00850	<0.00820	<0.0117
	9/10/2019	0.0329 BJ	<0.0100	<0.0120	<0.0140	<0.0108	0.0128 BJ	<0.0157	0.0151 J	0.0273 J	<0.0117
	12/10/2019	<0.0198	<0.0100	<0.0120	<0.0140	<0.0108	0.00576 BJ	<0.0157	<0.00850	<0.00820	<0.0117
MW-27	4/27/2016	<1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/16/2018	0.0204 J	<0.0100	<0.0120	<0.0140	<0.0108	<0.00105	<0.0157	<0.00850	<0.00820	<0.0117
	6/3/2019	0.0259 BJ	<0.0100	<0.0120	<0.0140	<0.0108	<0.00105	<0.0157	<0.00850	<0.00820	<0.0117
	9/9/2019	<0.0198	<0.0100	<0.0120	<0.0140	<0.0108	0.00435 BJ	<0.0157	<0.00850	<0.00820	<0.0117
	12/9/2019	<0.0198	<0.0100	<0.0120	<0.0140	<0.0108	0.00417 BJ	<0.0157	<0.00850	<0.00820	<0.0117
MW-28	4/28/2016	1.08 J	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/18/2018	<0.0198	**1.88**	<0.0120	**0.385**	<0.0108	**1.78**	<0.0157	**2.38**	**2.96**	0.0497 J
	6/6/2019	**1.5**	**2.45**	<0.0120	**0.497**	<0.0108	**2.05**	0.0176 J J3 J4	**3.91**	**5.61**	**0.0728**
	9/9/2019	**0.897**	**2.31**	<0.0120	<0.0140	<0.0108	**1.63**	0.0184 J	**3.57**	**3.91**	**0.0657**
	12/11/2019	**2.36**	**4.23**	<0.0120	**1.15**	<0.0108	<3.45	0.0334 J	**7.43**	**11.9**	**0.105**
MW-29	4/27/2016	<1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	10/18/2018	0.268 B	**0.353**	0.0197 J	**0.0802**	<0.0108	**0.486**	<0.0157	**0.422**	**0.114**	<0.0117
	6/5/2019	0.0539 J	<0.0100	<0.0120	<0.0140	<0.0108	0.00850 BJ	<0.0157	<0.00850	<0.00820	<0.0117
	9/9/2019	0.0214 BJ	0.0334 J	<0.0120	<0.0140	<0.0108	0.0349 BJ	<0.0157	**0.0207**	0.00839 J	<0.0117
	12/10/2019	<0.536	<0.619	<0.0120	<0.190	<0.0108	<0.753	<0.0157	<0.269	<0.161	0.0242 J

Table 5

Summary of Supplemental Investigation SVOCs Groundwater Data

Groundwater Assessment Report

Well ID	Sampling Date	Naphthalene (µg/L)	Acenaphthene (µg/L)	Acenaphthylene (µg/L)	Anthracene (µg/L)	Chrysene (µg/L)	Dibenzofuran (µg/L)	Fluoranthene (µg/L)	Fluorene (µg/L)	Phenanthrene (µg/L)	Pyrene (µg/L)
MW-30R	10/18/2018	0.0740 BJ	0.0148 J	<0.0120	<0.0140	<0.0108	0.0144 J	<0.0157	0.0216 J	**0.0531**	<0.0117
	6/5/2019	0.0602 J	<0.0100	<0.0120	<0.0140	<0.0108	0.00919 BJ	<0.0157	<0.00850	<0.00820	<0.0117
	9/9/2019	<0.0198	<0.0100	<0.0120	<0.0140	<0.0108	<0.00105	<0.0157	<0.00850	0.00912 J	<0.0117
	12/10/2019	<0.0198	<0.0100	<0.0120	<0.0140	<0.0108	0.00803 BJ	<0.0157	<0.00850	<0.00820	<0.0117
MW-31	10/18/2018	0.0620 BJ	<0.0100	<0.0120	<0.0140	<0.0108	<0.00105	<0.0157	<0.00850	**0.0190 J**	<0.0117
	6/6/2019	0.0491 J	<0.0100	<0.0120	<0.0140	<0.0108	0.00841 BJ	<0.0157	<0.00850	<0.00820	<0.0117
	9/9/2019	<0.0198	<0.0100	<0.0120	<0.0140	<0.0108	0.00448 BJ	<0.0157	<0.00850	<0.00820	<0.0117
	12/11/2019	<0.0198	<0.0100	<0.0120	<0.0140	<0.0108	0.00853 BJ	<0.0157	<0.00850	<0.00820	<0.0117
MW-32	10/18/2018	0.0489 BJ	<0.0100	<0.0120	<0.0140	<0.0108	<0.00105	<0.0157	<0.00850	<0.00820	<0.0117
	6/4/2019	**0.348**	<0.0100	<0.0120	0.0205 J	<0.0108	<0.00105	<0.0157	<0.00850	0.0247 J	<0.0117
	9/10/2019	0.0732 BJ	0.0124 J	<0.0120	0.0207 J	<0.0108	0.0199 BJ	<0.0157	0.0231 J	0.0395 J	<0.0117
	12/10/2019	<0.0198	<0.0100	<0.0120	0.0360 J	<0.0108	0.00768 BJ	<0.0157	<0.00850	0.0133 J	<0.0117
MW-33	10/18/2018	1.33 BJ	<0.0100	<0.0120	<0.0140	<0.0108	<0.00105	<0.0157	<0.00850	<0.00820	<0.0117
	6/4/2019	0.278 B	<0.0100	<0.0120	<0.0140	<0.0108	<0.00105	<0.0157	<0.00850	0.00869 J	<0.0117
	9/10/2019	0.0538 BJ	<0.0100	<0.0120	<0.0140	<0.0108	0.00939 BJ	<0.0157	<0.00850	0.00883 J	<0.0117
	12/10/2019	<0.0198	<0.0100	<0.0120	<0.0140	<0.0108	0.00638 BJ	<0.0157	<0.00850	<0.00820	<0.0117
EPA Tapwater Regional Screening Level		0.17	530	NE	1,800	25	7.9	800	290	NE	120
EPA Vapor Intrusion Target Groundwater Concentration VISL		4.59	NE	NE	NE	NE	NE	NE	NE	NE	NE
EPA Residential Tapwater injestion SL		0.65	NE	NE	NE	250	NE	NE	NE	NE	NE
EPA Residential Tapwater dermal SL		1	NE	NE	NE	NE	NE	NE	NE	NE	NE
EPA Residential Tapwater inhalation SL		0.17	NE	NE	NE	NE	NE	NE	NE	NE	NE
EPA Region 9 MCLs		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

µg/L micro-grams per liter

DUP - Field Duplicate collected on this date

The "<" indicates that the compound was not detected at the listed laboratory Reporting Limit.

NA Not Analyzed

NS Not sampled

NE Not Established

J - Result is less than the reporting limit, but greater than or equal to the method detection limit. The concentration represents an estimated value.

B - The same analyte is found in the associated blank.

Bold face type indicates detections.

Exceeds Tap water RSL

Exceeds vapor intrustion and tapwater RSL

Table 6 Duck Valley IR Owhyee Nevada Regulatory Screening Values Summary

Analytes – Primary Compounds of Concern (PCOCs)	RSL - Residential Soil (mg/kg)	EPA – Risk Based SSL Soil [Protection of Groundwater (mg/kg)	State of Nevada Closure Levels Residential Soil (mg/kg)	**Max Detection for Soil Screening**	EPA Groundwater MCL (mg/L)	EPA RSL Residential Tapwater (mg/) (TCR=1E-06 / THQ=1)	Target Groundwater Concentration (TCR=1E-06 or THQ=1) (mg/L)[5]	Target Groundwater Concentration (TCR=0.0001 or THQ=1) (mg/L)[5]	**Max Detection for Groundwater Screening**	EPA RSL – Residential Air (ug/m3)
Benzene	1.2	0.00023	1.2	TBD	0.005	0.0014 / 0.080	0.00159	0.138	0.57	0.36
Ethylbenzene	5.8	0.0017	5.8	TBD	0.7	0.0071 / 2.0	0.00349	0.349	0.063	1.1
Naphthalene	2	0.0033	3.8	TBD	NE[3]	0.00065 / 0.40	0.00459	0.174	0.361	0.083
TPH-Gx	97-2400[1]	0.23-89[1]	NE[3]	1,200	NE[3]	0.2	0.16	0.16	2.05	3.1
TPH-Dx	96-520[2]	1.5-8.8[2]	NE[3]	26,000	NE[3]	0.08	0.00075	0.00075	15	100-630[2]
TCE	0.94	0.00018	0.94	0.4	0.005	0.0012 / 0.010	0.00119	0.00518	0.0004	0.48

1 **Total Petroleum Hydrocarbons - aromatic medium to high range**
2 **Total Petroleum Hydrocarbons - aliphatic low to medium range**
3 NE – Not Established
4 RSL = EPA Regional Screening Levels
5 EPA Residential Vapor Intrusion from Screening Levels (VISL) - Groundwater

AKANA

Table 7
Duck Valley Indian Reservation
Investigation/Monitoring Petroleum Impacts
TPH Soil Results Summary

Sample ID	Sample Location	Sample Collection Date	DRO (mg/kg)	GRO (mg/kg)
SECOR Pipeline/UST/AST Removal and Subsurface Investigation May through September 1999				
House 3115 UST	**upgraidient East Area**			
U12-31-13'	U12-03	6/30/1999	**4900**	NA
U12-3@l13'	U12-03	6/30/1999	NA	NA
SOPE-USTR-0001-14.0'	U12-02	5/22/1999	**<5**	**1200**
SOPE-USTR-0002-14.0'	U13-03	5/22/1999	3	**620**
Power Plant UST	**upgraidient East Area**			
SOPE-USTP-0001-22.0	U7	5/22/1999	NA	**30**
SOPE-USTP-0004-22.0	U10	5/22/1999	NA	**180**
Pipeline	**East**			
SOPE-OILA-0001-02.5	L1	5/21/1999	**4200**	NA
SOPE-OILB-0001-5.0	L2	5/21/1999	NA	<6
SOPE-OILF-0001-03. 0	L6	5/21/1999	**6**	NA
SOPE-OILH-0001-02.5	L8	5/21/1999	**5**	NA
SOPE-OILl-0001-02.5	L9	5/20/1999	<5	NA
SOPE-OILL-0001-02.5	L12	5/20/1999	**38**	NA
SOPE-OIL0-0001-02.5	L15	5/21/1999	**1100**	NA
SOPE-OILP-0001-02. 5	L16	5/20/1999	**110**	NA
SOPE-OILQ-0001-06.0	L17	6/3/1999	**3****	NA
SOPE-OILR-0001-02.5	L18-02	6/25/1999	**410**	NA
SOPE-OILS-0001-02.0	L19-01	6/24/1999	**3****	NA
L13 Excavation	**upgradient East**			
L13 WWALL@4.5'	L13-01	6/3/1999	**21**	NA
L13 WWALL@8.5		6/3/1999	**32**	NA
L13 SWALL@4.5'	L13-02	6/3/1999	**120**	NA
L13 SWALL@10'		6/3/1999	<10	NA
L13 SWALL@15'		6/3/1999	<10	NA
L13 EWALL@4.5'	L13-03	6/3/1999	**32**	NA
L13 EWALL@9'		6/3/1999	<10	NA
L13 NEWALL@4.5'	L13-04	6/3/1999	<10	NA
L13 NEWALL@10'		6/3/1999	<10	NA
SOPE-OILM-0004-12.0	L13-05	6/3/1999	**5**	NA
SOPE-OILM-0003-10.0	L13-06	6/2/1999	**4****	NA
SOPE-OILM-0002-07 .5	L13-07	6/2/1999	**3****	NA
SOPE-OILM-0001-05.0	L13-08	6/2/1999	**5**	NA
L13NE-5.0	L13-09	6/2/1999	**6**	NA
L13NW-5.0	L13-10	6/2/1999	<5	NA
L13A Excavation	**upgradient East**			
PHN-1@5.0'	L13A-01	7/7/1999	**3700**	NA
PHN-2@10.0'	L13A-02	7/7/1999	**18**	NA
PHW-1@10.0'	L13A-03	7/7/1999	**6100**	NA
PHE-1@10.0'	L13A-04	7/7/1999	**26,000**	NA
PHF-1(Q)16.0'	L13A-05	7/7/1999	**6900**	NA
PHS-1@16.0'	13A-06	7/7/1999	**7500**	NA
L29 Excavation	**Upgradient East**			
SOEX3-WST-13.5	L29-02	5/25/1999	**6100**	**780**
SOEX3-W-13.5	L29-04	5/25/1999	**3800**	**540**
SOEX3-NEB 18.5	L29-07	5/25/1999	**2700**	**480**
SOEX3-STB-19.0	L29-01	5/25/1999	**6300**	**620**
SOEX3-N-13.5	L29-06	5/25/1999	**17**	**40**
SOEX3-NWB-18.5	L29-05	5/25/1999	**7000**	**710**
SOEX3-SW-13.5	L29-03	5/25/1999	**4600**	**750**
SOEX3-EST-13.5	L29-08	5/25/1999	**13,000**	**880**
SOEX3-ST-5.5	L29-09	5/25/1999	**5**	<30
SOEX3-E-13.5	L29-10	5/25/1999	**13**	<6
L29A Excavation	**Upgradient East**			
EX3EAST-TP-15.0'	L29A-01	7/13/1999	<5	NA
EX3EAST-TP-21.5'	L29A-02	7/13/1999	<5	NA
SOPE-OILAA-0001-01.5	L27	6/25/1999	**3****	NA
Road Shop AST	**Maintnenace West**			
SOPP-ASTS-0001-07 .0	A1	6/8/1999	NA	<6
SOPP-ASTS-0002-07.0	A2	6/8/1999	NA	<6
SOPP-ASTS-0003-08.0	A3	9/20/1999	NA	<10
SOPP-ASTS-0004-08.0	A4	9/20/1999	NA	<10

Table 7
Duck Valley Indian Reservation
Investigation/Monitoring Petroleum Impacts
TPH Soil Results Summary

Sample ID	Sample Location	Sample Collection Date	DRO (mg/kg)	GRO (mg/kg)
SOPE-OILBB-0001-01.0	L28	6/25/1999	**26**	NA
L7 Excavation		**WEST**		
SOPE-OILG-0001-03.0	L7-01	6/22/1999	**120**	NA
SOPE-OILG-0002-21.0	L7-01	6/22/1999	<5	NA
SOPE-OILG-0003-05.5	L7-03	6/23/1999	**3 ****	NA
SOPE-OILG-0004-14.5	L7-03	6/23/1999	**3****	NA
L7-5@9.0'	L7-05	6/23/1999	**2300**	NA
L7-6@9.0'	L7-06	6/23/1999	**760**	NA
SOPE-OILG-0005-XX. X	L7-XX	6/22/1999	**290**	NA
Additional Excavation of Impacted Soil of the L-7 area beneath the roads; Secor in 2002				
L7 S75@14'	L7	2002	**76**	**54**
L& S65 @ 14'	L7	2002	**240**	NM
L& S65 @ 16'	L7	2002	**250**	NM
L7 S65W @ 6'	L7	2002	ND	NM
L7 S40 @18'	L7	2002	ND	NM
L7 S20 @ 19'	L7	2002	ND	NM
L7 S20W @ 6'	L7	2002	ND	NM
L7 N10 @ 9'	L7	2002	**1,800**	NM
L7 N10 @ 18'	L7	2002	ND	NM
L7 N40E @ 9'	L7	2002	ND	ND
L7 N30W @ 8'	L7	2002	**560**	ND
L7 N40 @ 18'	L7	2002	ND	ND
L7 N75 @ 16'	L7	2002	ND	ND
L7 N80 @ 6'	L7	2002	ND	ND
L7 CN10 @ 11'	L7	2002	**250**	ND

Table 7
Duck Valley Indian Reservation
Investigation/Monitoring Petroleum Impacts
TPH Soil Results Summary

Sample ID	Sample Location	Sample Collection Date	DRO (mg/kg)	GRO (mg/kg)
L7 CN45 @ 11'	L7	2002	ND	ND
L7 CE20S @5'	L7	2002	ND	ND
L7 CNE30 @ 9'	L7	2002	ND	ND
L34 Excavation		**West**		
TYEX.WWL-1-10.0'	L34-01	7/8/1999	<5	NA
TYEX-1-SOFL-1-14'	L34-02	7/8/1999	<5	NA
TYEX-NWWL-1-10.0'	L34-03	7/8/1999	**1,600**	NA
TYEX-SEWL-1-10.0'	L34-04	7/8/1999	**3****	NA
TYEX-NEWL-1-8.0'	L34-05	7/8/1999	**6,100**	NA
TYEX-NWL-1-8.0'	L34-06	7/8/1999	**730**	NA
TYEX-SWL-10.0	L34-07	7/13/1999	**490**	NA
Additional Excavation of Impacted Soil of the L-34 area beneath the roads; Secor in 2002				
L34 20 @ 6'	L34	2002	ND	ND
L34 20 @ 12'	L34	2002	**12**	ND
L34 E26 @6'	L34	2002	ND	ND
L34 E @ 4'	L34	2002	ND	ND
L34 E20 @ 12'	L34	2002	**1,900**	**410**
L34 NW @ 12'	L34	2002	ND	ND
L34 NW Wall @ 12'	L34	2002	ND	ND
L34 NE 50 @ 12'	L34	2002	**4,000**	**910**
L34 NE 70 @ 12'	L34	2002	**1,400**	**470**
L34 NE 70 E Wall @ 9'	L34	2002	ND	ND
L34 NE 70 N Wall @ 9'	L34	6/24/1905	ND	ND
L35 Excavation		**West**		
SOPE-TP01-0001-13.0	L35-01	7/1/1999	**4****	NA
L17 Excavation				
L17 WSTW@5'	L17-01	6/3/1999	<10	NA
L17 WSTN@2.5'	L17-02	6/3/1999	**320**	NA
L17A Excavation				
L17NORTH2-TP-14.5	L17A-01	7/13/1999	<5	NA
L17NORTH2-TP-21.5	L17A-02	7/13/1999	<5	NA
L17B Excavation				
L17North-TP-8.0'	L178-01	7/8/1999	**28**	NA
L17North-TP-22.0'	L178-02	7/8/1999	**560**	NA
L18 Excavation -		**Down Gradient East**		
L18 S @2.5;	L18	2002	**38 (oil)**	ND
L 18 E @ 2.5'	L18	2002	**57 (oil)**	ND
L18 W @ 2,5'	L18	2002	**ND**	ND
L18 N @ 2.5'	L18	2002	**15-d, 28 (oil)**	ND
L18 @ 4'	L18	2002	**15 (oil)**	ND

Table 7
Duck Valley Indian Reservation
Investigation/Monitoring Petroleum Impacts
TPH Soil Results Summary

Sample ID	Sample Location	Sample Collection Date	DRO (mg/kg)	GRO (mg/kg)
SRK UST/AST Removal, Monitor Well Installation and Subsurface Investigation October 2000				
East Wells				
MW-9 - 11.5'		10/28/2000	ND	ND
MW-10 - 2'		10/23/2000	**38**	ND
MW-10 - 25.7'		10/23/2000	**1080**	**10.5**
MW-22@25'		8/6/2008	**630**	**100**
MW-23@20'		8/7/2008	**390**	**310**
MW-24@20'		8/7/2008	**200**	**270**
West Wells				
MW-11 - 9.3'		10/28/2000	**1510**	**7.1**
MW-6 - 9'		10/26/2000	**565**	ND
MW-6 dup - 9'		10/26/2000	**657**	ND
MW-8 - 9.5'		10/27/2000	**53**	ND
MW-12 - 9.5'		10/27/2000	**15**	ND
MW-13 - 9'		10/28/2000	ND	ND
MW-14 - 10'		10/28/2000	ND	ND
MW-28@20'		8/10/2008	**250**	**97**
USEPA RSL Residentail Soil (mg/kg)			**96-520[2]**	**97-2400[1]**
USEPA Risk Based SSL (mg/kg) (Protection of Groundwater)			**1.5-8.8[2]**	**0.23-89[1]**

Notes:
mg/kg - milligrams per kilogram
TPHd Total Petroleum Hydrocarbons as Diesel
TPHg Total Petroleum Hydrocarbons as Gasoline
J - Result is less than the reporting limit, but greater than or equal to the method detection limit. The concentration
"<" indicates that the compounds was not detected at the indicated laboratory Reporting Limit.
ND - Not Detected
NE - Not Established
NA- Not Analyzed
NM- Not Measured
PRGs - Preliminary Remediation Goals
RBSL - Risk Based Screening Level
Bold face type indicates detections.
Exceeds SSL

1 Total Petroleum Hydrocarbons - aromatic medium to high range
2 Total Petroleum Hydrocarbons - aliphatic low to medium range

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Table 8
Duck Valley Indian Reservation
Investigation/Monitoring Petroleum Impacts
VOC Soil Results Summary

Sample ID	Sample Collection Date	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	TCE (mg/kg)	1, 2, 4-Trimethylbenzene (mg/kg)	4-Isopropyltoluene (mg/kg)
SECOR Pipeline/UST/AST Removal and Subsurface Investigation - May through September 1999								
House 3115 UST								
U12-31-13'	6/30/1999	NA	NA	NA	NA	NA	NA	NA
U12-3@l13'	6/30/1999	NA	NA	NA	NA	NA	NA	NA
SOPE-USTR-0001-14.0'	5/22/1999	<5	<5	<5	<10	NA	NA	NA
SOPE-USTR-0002-14.0'	5/22/1999	<5	<5	<5	<10	NA	NA	NA
Power Plant UST	**East**							
SOPE-USTP-0001-22.0	5/22/1999	<0.06	<0.06	<0.06	<0.1	NA	NA	NA
SOPE-USTP-0004-22.0	5/22/1999	<0.06	<0.06	<0.06	**0.2**	NA	NA	NA
Pipeline								
SOPE-OILA-0001-02.5	5/21/1999	NA	NA	NA	NA	NA	NA	NA
SOPE-OILB-0001-5.0	5/21/1999	<0.06	<0.06	<0.06	<0.1	NA	NA	NA
SOPE-OILF-0001-03. 0	5/21/1999	NA	NA	NA	NA	NA	NA	NA
SOPE-OILH-0001-02.5	5/21/1999	NA	NA	NA	NA	NA	NA	NA
SOPE-OILl-0001-02.5	5/20/1999	NA	NA	NA	NA	NA	NA	NA
SOPE-OILL-0001-02.5	5/20/1999	NA	NA	NA	NA	NA	NA	NA
SOPE-OIL0-0001-02.5	5/21/1999	NA	NA	NA	NA	NA	NA	NA
SOPE-OILP-0001-02. 5	5/20/1999	NA	NA	NA	NA	NA	NA	NA
SOPE-OILQ-0001-06.0	6/3/1999	NA	NA	NA	NA	NA	NA	NA
SOPE-OILR-0001-02.5	6/25/1999	NA	NA	NA	NA	NA	NA	NA
SOPE-OILS-0001-02.0	6/24/1999	NA	NA	NA	NA	NA	NA	NA
SOPE-OILAA-0001-01.5	6/25/1999	NA	NA	NA	NA	NA	NA	NA
SOPE-OILBB-0001-01.0	6/25/1999	NA	NA	NA	NA	NA	NA	NA
L13 Excavation								
L13 WWALL@4.5'	6/3/1999	NA	NA	NA	NA	NA	NA	NA
L13 WWALL@8.5	6/3/1999	NA	NA	NA	NA	NA	NA	NA
L13 SWALL@4.5'	6/3/1999	NA	NA	NA	NA	NA	NA	NA
L13 SWALL@10'	6/3/1999	NA	NA	NA	NA	NA	NA	NA
L13 SWALL@15'	6/3/1999	NA	NA	NA	NA	NA	NA	NA
L13 EWALL@4.5'	6/3/1999	NA	NA	NA	NA	NA	NA	NA
L13 EWALL@9'	6/3/1999	NA	NA	NA	NA	NA	NA	NA
L13 NEWALL@4.5'	6/3/1999	NA	NA	NA	NA	NA	NA	NA
L13 NEWALL@10'	6/3/1999	NA	NA	NA	NA	NA	NA	NA
SOPE-OILM-0004-12.0	6/3/1999	NA	NA	NA	NA	NA	NA	NA
SOPE-OILM-0003-10.0	6/2/1999	NA	NA	NA	NA	NA	NA	NA

Table 8
Duck Valley Indian Reservation
Investigation/Monitoring Petroleum Impacts
VOC Soil Results Summary

Sample ID	Sample Collection Date	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	TCE (mg/kg)	1, 2, 4-Trimethylbenzene (mg/kg)	4-Isopropyltoluene (mg/kg)
SOPE-OILM-0002-07 .5	6/2/1999	NA	NA	NA	NA	NA	NA	NA
SOPE-OILM-0001-05.0	6/2/1999	NA	NA	NA	NA	NA	NA	NA
L13NE-5.0	6/2/1999	NA	NA	NA	NA	NA	NA	NA
L13NW-5.0	6/2/1999	NA	NA	NA	NA	NA	NA	NA
L13A Excavation								
PHN-1@5.0'	7/7/1999	NA	NA	NA	NA	NA	NA	NA
PHN-2@10.0'	7/7/1999	NA	NA	NA	NA	NA	NA	NA
PHW-1@10.0'	7/7/1999	NA	NA	NA	NA	NA	NA	NA
PHE-1@10.0'	7/7/1999	NA	NA	NA	NA	NA	NA	NA
PHF-1(Q)16.0'	7/7/1999	NA	NA	NA	NA	NA	NA	NA
PHS-1@16.0'	7/7/1999	NA	NA	NA	NA	NA	NA	NA
L29 Excavation	**East**							
SOEX3-WST-13.5	5/25/1999	<0.2	<0.2	**2.8**	**16**	NA	NA	NA
SOEX3-W-13.5	5/25/1999	<0.2	<0.2	**0.6**	**6.3**	NA	NA	NA
SOEX3-NEB 18.5	5/25/1999	<0.3	<0.3	**0.6**	**4.4**	NA	NA	NA
SOEX3-STB-19.0	5/25/1999	<0.2	<0.2	**1**	**5.1**	NA	NA	NA
SOEX3-N-13.5	5/25/1999	<0.2	<0.2	<0.2	<0.5	NA	NA	NA
SOEX3-NWB-18.5	5/25/1999	<0.2	<0.2	**2**	**7.5**	NA	NA	NA
SOEX3-SW-13.5	5/25/1999	<0.2	<0.2	**1**	**15**	NA	NA	NA
SOEX3-EST-13.5	5/25/1999	<6	<6	<6	**7****	NA	NA	NA
SOEX3-ST-5.5	5/25/1999	<0.3	<0.3	<0.3	<0.6	NA	NA	NA
SOEX3-E-13.5	5/25/1999	<0.06	<0.06	<0.06	<0.1	NA	NA	NA
EX3EAST-TP-15.0'	7/13/1999	NA	NA	NA	NA	NA	NA	NA
EX3EAST-TP-21.5'	7/13/1999	NA	NA	NA	NA	NA	NA	NA
L29A Excavation								
EX3EAST-TP-15.0'	7/13/1999	NA	NA	NA	NA	NA	NA	NA
EX3EAST-TP-21.5'	7/13/1999	NA	NA	NA	NA	NA	NA	NA
L33 Excavation								
NH0-1	7/7/1999	NA	NA	NA	NA	NA	NA	NA
Road Shop AST								
SOPP-ASTS-0001-07 .0	6/8/1999	<0.06	<0.06	<0.06	<0.1	NA	NA	NA
SOPP-ASTS-0002-07.0	6/8/1999	<0.06	<0.06	<0.06	<0.1	NA	NA	NA
SOPP-ASTS-0003-08.0	9/20/1999	<0.02	<0.02	<0.02	<0.02	NA	NA	NA
SOPP-ASTS-0004-08.0	9/20/1999	<0.02	<0.02	<0.02	<0.02	NA	NA	NA
L7 Excavation								
SOPE-OILG-0001-03.0	6/22/1999	NA	NA	NA	NA	NA	NA	NA
SOPE-OILG-0002-21.0	6/22/1999	NA	NA	NA	NA	NA	NA	NA
SOPE-OILG-0003-05.5	6/23/1999	NA	NA	NA	NA	NA	NA	NA
SOPE-OILG-0004-14.5	6/23/1999	NA	NA	NA	NA	NA	NA	NA
L7-5@9.0'	6/23/1999	NA	NA	NA	NA	NA	NA	NA
L7-6@9.0'	6/23/1999	NA	NA	NA	NA	NA	NA	NA

Table 8
Duck Valley Indian Reservation
Investigation/Monitoring Petroleum Impacts
VOC Soil Results Summary

Sample ID	Sample Collection Date	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	TCE (mg/kg)	1, 2, 4-Trimethylbenzene (mg/kg)	4-Isopropyltoluene (mg/kg)
SOPE-OILG-0005-XX. X	6/22/1999	NA	NA	NA	NA	NA	NA	NA
L30 Excavation								
SOEX2-WB-6.0	6/2/1999	NA	NA	NA	NA	NA	NA	NA
SOEX2-EB-9.0	6/2/1999	NA	NA	NA	NA	NA	NA	NA
SOEX2-ES-6.0	6/2/1999	NA	NA	NA	NA	NA	NA	NA
L31 Excavation								
SOEX1-B-10.0	5/25/1999	NA	NA	NA	NA	NA	NA	NA
SOEX1-N-7.0	5/25/1999	NA	NA	NA	NA	NA	NA	NA
SOEX1-E-7.0	5/25/1999	NA	NA	NA	NA	NA	NA	NA
SOEX1-S-7.0	5/25/1999	NA	NA	NA	NA	NA	NA	NA
SOEX1-W-7.0	5/25/1999	NA	NA	NA	NA	NA	NA	NA
L32 Excavation								
L7NORTH-TP-10.5'	7/8/1999	NA	NA	NA	NA	NA	NA	NA

Table 8
Duck Valley Indian Reservation
Investigation/Monitoring Petroleum Impacts
VOC Soil Results Summary

Sample ID	Sample Collection Date	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	TCE (mg/kg)	1, 2, 4-Trimethylbenzene (mg/kg)	4-Isopropyltoluene (mg/kg)
L34 Excavation								
TYEX.WWL-1-10.0'	7/8/1999	NA	NA	NA	NA	NA	NA	NA
TYEX-1-SOFL-1-14'	7/8/1999	NA	NA	NA	NA	NA	NA	NA
TYEX-NWWL-1-10.0'	7/8/1999	NA	NA	NA	NA	NA	NA	NA
TYEX-SEWL-1-10.0'	7/8/1999	NA	NA	NA	NA	NA	NA	NA
TYEX-NEWL-1-8.0'	7/8/1999	NA	NA	NA	NA	NA	NA	NA
TYEX-NWL-1-8.0'	7/8/1999	NA	NA	NA	NA	NA	NA	NA
TYEX-SWL-10.0	7/13/1999	NA	NA	NA	NA	NA	NA	NA
L35 Excavation								
SOPE-TP01-0001-13.0	7/1/1999	NA	NA	NA	NA	NA	NA	NA
L36 Excavation								
SOPE-TP02-0001-13.0	7/1/1999	NA	NA	NA	NA	NA	NA	NA
L17 Excavation								
L17 WSTW@5'	6/3/1999	NA	NA	NA	NA	NA	NA	NA
L17 WSTN@2.5'	6/3/1999	NA	NA	NA	NA	NA	NA	NA
L17A Excavation								
L17NORTH2-TP-14.5	7/13/1999	NA	NA	NA	NA	NA	NA	NA
L17NORTH2-TP-21.5	7/13/1999	NA	NA	NA	NA	NA	NA	NA
L17B Excavation								
L17North-TP-8.0'	7/8/1999	NA	NA	NA	NA	NA	NA	NA
L17North-TP-22.0'	7/8/1999	NA	NA	NA	NA	NA	NA	NA
West Monitoring Wells								
MW-8 - 9.5'	10/27/2000	ND	ND	ND	ND	NA	ND	ND
MW-11 - 9.3'	10/28/2000	ND	ND	ND	ND	NA	ND	ND

Table 8
Duck Valley Indian Reservation
Investigation/Monitoring Petroleum Impacts
VOC Soil Results Summary

Sample ID	Sample Collection Date	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	TCE (mg/kg)	1, 2, 4-Trimethylbenzene (mg/kg)	4-Isopropyltoluene (mg/kg)
MW-12 - 9.5'	10/27/2000	ND	ND	ND	ND	NA	ND	ND
MW-13 - 9'	10/28/2000	ND	ND	ND	ND	NA	ND	ND
MW-14 - 10'	10/28/2000	ND	ND	ND	ND	NA	ND	ND
MW-28@20'	8/10/2008	NA	NA	NA	NA	<0.04	NA	NA
East Monitoring Wells								
MW-9 - 11.5'	10/28/2000	ND	ND	ND	ND	NA	ND	ND
MW-10 - 2'	10/23/2000	ND	ND	ND	ND	NA	ND	ND
MW-10 - 25.7'	10/23/2000	ND	ND	ND	ND	NA	ND	ND
MW-22@25'	8/6/2008	NA	NA	NA	NA	<0.04	NA	NA
MW-23@20'	8/7/2008	NA	NA	NA	NA	<0.4	NA	NA
MW-24@20'	8/7/2008	NA	NA	NA	NA	<0.02	NA	NA
USEPA Risk Based SSL (mg/kg) for protection of groundwater		**0.00023**	**0.76**	**0.0017**	**0.019**	**0.00018**	**0.00018**	**0.00018**

Notes:
mg/kg - milligrams per kilogram
J - Result is less than the reporting limit, but greater than or equal to the method detection limit. The concentration represents an estimated value.
"<" indicates that the compounds was not detected at the indicated laboratory Reporting Limit.
ND - Not Detected
NE- Not Established
NA- Not Analyzed
PRGs - Preliminary Remediation Goals
RBSL - Risk Based Screening Level
Bold face type indicates detections.

Shading indicates values exceeded the EPA Risk Based Soil Screening Level (SSL) for protection of groundwater

U.S. Bureau of Indian Affairs
Duck Valley Indian Reservation
Investigation/Monitoring Petroleum Impacts
PAH Soil Results Summary
Table 9

Sample ID	Sample Collection Date	Naphthalene (mg/kg)	1-Methylnaphthalene (mg/kg)	2-Methylnaphthalene (mg/kg)	Acenaphthene (mg/kg)	Acenaphthylene (mg/kg)	Anthracene (mg/kg)	Benzo(a)anthracene (mg/kg)	Benzo(a)pyrene (mg/kg)	Benzo(b)fluoranthene (mg/kg)	Benzo(k)fluoranthene (mg/kg)	Benzo(g,h,i)perylene (mg/kg)	bis 2-ethylhexylphthalate (mg/L)	Chrysene (mg/kg)	Dibenz(a,h)anthracene (mg/kg)	Fluoranthene (mg/kg)	Fluorene (mg/kg)	Indeno(1,2,3-cd)pyrene (mg/kg)	Phenanthrene (mg/kg)	Pyrene (mg/kg)
SECOR Pipeline/UST/AST Removal and Subsurface Investigation - May through September 1999																				
House 3115 UST																				
U12-31-13'	6/30/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
U12-3#113'	6/30/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-USTR-0001-14.0'	5/22/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-USTR-0002-14.0'	5/22/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jail UST																				
SOPE-USTJ-0001-08.0'	5/25/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-USTJ-0002-08.0'	5/25/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Power Plant UST																				
SOPE-USTP-0001-22.0	5/22/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-USTP-0004-22.0	5/22/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Road Shop Yard																				
SOPE-RDYA-0002-05.0	9/20/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-RDYA-0003-05.0	9/20/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-RDYA-0004-05.0	9/20/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-RDYA-0005-05.0	9/20/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-RDYA-0006-05.0	9/20/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-RDYA-0007-05.0	9/20/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-ASTH-0001-1.5	11/3/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-ASTI-0001-1.5	11/3/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-RDYA-0008-00.6	6/8/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-RDYA-0009-00.8	9/20/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-RDYA-0014-00.8	6/8/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Road Shop UST																				
SOPE-USTS-0001-06.5	6/9/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-USTS-0002-06.5	6/9/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-USTS-0003-06.5	6/9/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-USTS-0004-06.5	6/9/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Used Oil AST																				
SOPE-ASTU-0001-00.8	6/8/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Road Shop Discharge Pipe Outlet and Line																				
SOPE/SOVA-OVRP-0001-04. 5	6/8/1999	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOPE/SOVA-OSRA-0001-04.5	6/8/1999	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOVA/SOPE-DSRC-0001-05.0	6/4/1999	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOIW-5.0	5/25/1999	ND	ND	**20**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
INJW@7.5', SOVA-INJW-0003-	6/4/1999	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOVA/SOPE-INJW-0001-06.0	6/4/1999	ND	ND	**8**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOVA/SOPE-INJW-0002/0004-0/7.5	6/4/1999	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOPE-INJW-0003-07.0	6/4/1999	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOPE/SOVA-MSDSRC-0002-04. 5	6/8/1999	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOVA/SOPE-MDDSRC-0003-04.5	6/8/1999	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SOPE-INJW-0003-XX.X	6/8/1999	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Road Shop AST																				
SOPP-ASTS-0001-07 .0	6/8/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPP-ASTS-0002-07.0	6/8/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPP-ASTS-0003-08.0	9/20/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPP-ASTS-0004-08.0	9/20/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pipeline																				
SOPE-OILA-0001-02.5	5/21/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-OILB-0001-5.0	5/21/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-OILF-0001-03. 0	5/21/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-OILH-0001-02.5	5/21/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-OILI-0001-02.5	5/20/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-OILL-0001-02.5	5/20/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-OILD-0001-02.5	5/21/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-OILP-0001-02. 5	5/20/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-OILQ-0001-06.0	6/3/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-OILR-0001-02.5	6/25/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-OILS-0001-02.0	6/24/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-OILAA-0001-01.5	6/25/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-OILBB-0001-01.0	6/25/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
L7 Excavation																				
SOPE-OILG-0001-03.0	6/22/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-OILG-0002-21.0	6/22/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-OILG-0003-05.5	6/23/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-OILG-0004-14.5	6/23/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
L7-5@9.0'	6/23/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
L7-6@9.0'	6/23/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-OILG-0005-XX. X	6/22/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
L13 Excavation																				
L13 WWALL@4.5'	6/3/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
L13 WWALL@8.5	6/3/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
L13 SWALL@4.5'	6/3/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
L13 SWALL@10'	6/3/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
L13 SWALL@15'	6/3/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
L13 EWALL@4.5'	6/3/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
L13 EWALL@9'	6/3/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
L13 NEWALL@4.5'	6/3/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
L13 NEWALL@10'	6/3/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-OILM-0004-12.0	6/3/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-OILM-0003-10.0	6/2/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-OILM-0002-07 .5	6/2/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOPE-OILM-0001-05.0	6/2/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
L13NE-5.0	6/2/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
L13NW-5.0	6/2/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
L13A Excavation																				
PHN-1@5.0'	7/7/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHN-2@10.0'	7/7/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHW-1@10.0'	7/7/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHE-1@10.0'	7/7/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHF-1(Q)16.0'	7/7/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHS-1@16.0'	7/7/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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L29 Excavation																				
SOEX3-WST-13.5	5/25/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOEX3-W-13.5	5/25/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOEX3-NEB 18.5	5/25/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOEX3-STB-19.0	5/25/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOEX3-N-13.5	5/25/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOEX3-NWB-18.5	5/25/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOEX3-SW-13.5	5/25/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOEX3-EST-13.5	5/25/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOEX3-ST-5.5	5/25/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOEX3-E-13.5	5/25/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX3EAST-TP-15.0'	7/13/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX3EAST-TP-21.5'	7/13/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
L29A Excavation																				
EX3EAST-TP-15.0'	7/13/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX3EAST-TP-21.5'	7/13/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
L30 Excavation																				
SOEX2-WB-6.0	6/2/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOEX2-EB-9.0	6/2/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOEX2-ES-6.0	6/2/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
L31 Excavation																				
SOEX1-B-10.0	5/25/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOEX1-N-7.0	5/25/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOEX1-E-7.0	5/25/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOEX1-S-7.0	5/25/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SOEX1-W-7.0	5/25/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
L32 Excavation																				
L7NORTH-TP-10.5'	7/8/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
L33 Excavation																				
NH0-1	7/7/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
L34 Excavation																				
TYEX.WWL-1-10.0'	7/8/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TYEX-1-SOFL-1-14'	7/8/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TYEX-NWWL-1-10.0'	7/8/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TYEX-SEWL-1-10.0'	7/8/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TYEX-NEWL-1-8.0'	7/8/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TYEX-NWL-1-8.0'	7/8/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TYEX-SWL-10.0	7/13/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
L35 Excavation																				
SOPE-TP01-0001-13.0	7/1/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
L36 Excavation																				
SOPE-TP02-0001-13.0	7/1/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
L17 Excavation																				
L17 WSTW@5'	6/3/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
L17 WSTN@2.5'	6/3/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
L17A Excavation																				
L17NORTH2-TP-14.5	7/13/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
L17NORTH2-TP-21.5	7/13/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
L17B Excavation																				
L17North-TP-8.0'	7/8/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
L17North-TP-22.0'	7/8/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SRK UST/AST Removal, Monitor Well Installation and Subsurface Investigation - October 2000																				
MW-1 - 10'	10/26/2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2 - 1'	10/25/2000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-2 - 6.5'	10/26/2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3 - 7'	10/25/2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4 - 7'	10/24/2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5 - 8'	10/24/2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-6 - 9'	10/26/2000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-6 dup - 9'	10/26/2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-7 - 9.5'	10/26/2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-8 - 9.5'	10/27/2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-9 - 11.5'	10/28/2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-10 - 2'	10/23/2000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-10 - 25.7'	10/23/2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-11 - 9.3'	10/28/2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-12 - 9.5'	10/27/2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-13 - 9'	10/28/2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-14 - 10'	10/28/2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-15 - 9.5'	10/27/2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-16 - 14'	10/29/2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-17 - 14.3'	10/29/2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-17 - 17'	10/29/2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-18 - 19.4'	10/30/2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-1 - 11'	10/30/2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-2 - 11'	10/30/2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-2 dup - 11'	10/30/2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SB-3 - 10'	10/30/2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2/MW-5 composite - 0.1'	10/26/2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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SECOR Irrigation Shop Soil Investigation - October 2004																				
RSA-1	9/29/2004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**35**	NA	NA	NA	NA	NA	NA	NA
RSA-2	9/29/2004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**120**	NA	NA	NA	NA	NA	NA	NA
RSA-3	9/29/2004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<.360	NA	NA	NA	NA	NA	NA	NA
RSA-4	9/29/2004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<.370	NA	NA	NA	NA	NA	NA	NA
RSA-5	9/29/2004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.088 J**	NA	NA	NA	NA	NA	NA	NA
RSA-6	9/29/2004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.350	NA	NA	NA	NA	NA	NA	NA
RSA-DUP	9/29/2004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.190 J**	NA	NA	NA	NA	NA	NA	NA
IS-1	10/1/2004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.083 J**	NA	NA	NA	NA	NA	NA	NA
IS-2	10/1/2004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.140 J**	NA	NA	NA	NA	NA	NA	NA
IS-3	10/1/2004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA
IS-4	10/1/2004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA
IS-5	10/1/2004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA
IS-6	10/1/2004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA
IS-7	10/1/2004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA
IS-8	10/1/2004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA
IS-9	10/1/2004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA
IS-10	10/1/2004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA
IS-DUP	10/1/2004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA
Stantec Monitor Well Installation, Soil Sampling, Abandonment and Monitoring Activities - August 2008																				
MW-22@25'	8/6/2008	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-23@20'	8/7/2008	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-24@20'	8/7/2008	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-28@20'	8/10/2008	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-30@20'	8/10/2008	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
USEPA Risk Based SSL (mg/kg)		**0.00054**	**0.006**	**0.19**	**5.5**	**NE**	**58**	**0.0042**	**0.004**	**0.041**	**0.4**	**NE**	**1.3**	**1.2**	**0.013**	**89**	**5.4**	**0.13**	**NE**	**13**

Notes:
mg/kg - milligrams per kilogram
J - Result is less than the reporting limit, but greater than or equal to the method detection limit. The concentration represents an estimated value.
"<" indicates that the compounds was not detected at the indicated laboratory Reporting Limit.
ND - Not Detected
NE - Not Established
NA- Not Analyzed
PRGs - Preliminary Remediation Goals
RBSL - Risk Based Screening Level

Bold face type indicates detections.

Shading indicates values exceeded the EPA Risk Based Soil Screening Level (SSL) for protection of groundwater

Cost Details - Summary of Alternatives Cost
Technology-Alternatives Review
DVIR Owyhee, NV

Table 10: Summary of Soil and Groundwater Treatment Technology (Alternatives) Costs

Item	Alternative 1 - Expand Well Network, Continue Current MNA with Institutional Controls and Covenants	Alternative 2: Expand Existing Well Network, Limited Soil Excavation, Active Bioremediation, and MNA	Alternative 3: Expand Existing Well Network, Groundwater Air Sparging with Soil SVE	Alternative 4: Expand Existing Well Network, Removal of Buildings, Source Area Soil Excavation, and Insitu Bioremediation
Capital Costs				
Work Plan and Monitoring Reports	$40,000	$95,000	$100,000	$105,000
Alternative Evaluations and Testing	$0	$40,000	$45,000	$30,000
Alternative Remedy Implementation-Construct	$20,000	$281,000	$370,000	$498,000
Contingency (15% on capital costs)	$9,000	$62,000	$77,000	$95,000
Subtotal Capital Costs	$69,000	$478,000	$592,000	$728,000
Recurring and Future Costs				
Operation and maintenance	$63,000	$286,000	$402,000	$312,000
Groundwater monitoring and reporting	$424,000	$301,000	$300,000	$300,000
Groundwater Well Network Future Improvements	$142,000	$231,000	$141,000	$196,000
Contingency (15% on future costs)	$94,000	$123,000	$126,000	$121,000
Subtotal Recurring and Future Costs	$723,000	$941,000	$969,000	$929,000
NPV - Total Alternative Base Cost	**$792,000**	**$1,419,000**	**$1,561,000**	**$1,657,000**
FS Typical Actual Cost Range (-30% - +50%)	**$555,000 - $1,200,000**	**$1,000,000 - $2,150,000**	**$1,100,000 - $2,340,000**	**$1,160,000 - $2,490,000**

Alternative 1 - Continue monitoring of existing well network for MNA and concentration reductions in groundwater (Base Operational Cost)

Alternative 2: Expand the existing well network to fill in groundwater data gaps in the east and west areas.

Install new monitoring wells to delineate transport and concentration boundaries to the north of east area and central of west area

Continue monitoring of existing well network for MNA and concentration reductions in groundwater

Limted excavation of impacted soils where access is possible

Amendment injections at areas where residial concentrations remain the highest

Alternative 3: Expand the existing well network to fill in groundwater data gaps in the east and west areas.

Install new monitoring wells to delineate transport and concentration boundaries to the north of east area and central of west area

Continue monitoring of existing well network for MNA and concentration reductions in groundwater

Install new air sparge, soil vapor extraction systems at three locations for groundwater and soil treatment

Alternative 4: Expand the existing well network to fill in groundwater data gaps in the east and west areas.

Install new monitoring wells to delineate transport and concentration boundaries to the north of east area and central of west area

Continue monitoring of existing well network for MNA and concentration reductions in groundwater

Demolition of buildings 310 and 333 to allow access to subsurface soils for excavation - source area mass removal

Excavate residual hot spot soil remaing in place from previous removal actions to eliminate exposure pathway and hydrocarbon mass

Amendment injections at areas where residial concentrations remain the highest for both groundwater and soil

Notes:

Alternative	Actions/Concepts	Advantages	Disadvantages/Limitations/ Uncertainties	O&M Considerations	Comments	Retained (Yes/No/Future)	Estimated Cost (3)
Alternative 1 - Continue monitoring of existing well network for MNA and concentration reductions in groundwater (Base Operational Cost). Installation of four new monitoring wells to close data gaps to the east of existing plumes.	■ Maintain existing monitoring well network, expand with additional wells to fill in data gaps on east edge of the plumes.	■ Low cost. ■ Low maintenance (e.g., well inspection, cleaning, and scheduled maintenance and replacement).	■ Data indicate that MNA alone may not meet current screening concentration criteria for groundwater and soil.. ■ Represents baseline condition, and continued attenuation - not a viable alternative alone to meet the needs of DVIR and BIA. ■	■ Minimal O&M associated with this alternative. ■	■ Need input from DVIR Tribe Council. ■ .	**Yes** Existing MNA approach alone will not meet screening level clean up criteria in a timely manner based on 20 years of MNA since 2000. However, due to the low level of risk the alternative is retained.	■ Capital $69,000 ■ O&M $487,000 ■ Future $236,000 20-yr life cycle $792,000 Estimated cost of current groundwater monitoring and additional wells. Capital costs are costs of ongoing monitoring and installation of new wells. O&M costs are costs to maintain existing well network.
Alternative 2 - Expand the existing well network to fill in groundwater data gaps in the east areas. Continue monitoring of existing well network for MNA and concentration reductions in groundwater. Complete limited excavation of impacted soils where access is possible. Amendment injections at areas where residual concentrations remain the highest for both groundwater and soil**.**	■ Maintain existing monitoring well network, expand with additional wells to fill in data gaps on east edge of the plumes. ■ Spot excavation where possible to remove residual soil mass. ■ Injection of bio amendments to enhance degradation in both groundwater and soil smear zone.	■ Targets areas with highest residual soil concentrations and groundwater. ■ Includes limited soil excavation. ■ Promotes enhanced concentration reduction using injection of amendments. ■ Enhances soil mass reduction within the vadose smear zone with seasonal groundwater fluctuations. ■	■ Does not provide a complete clean up of contaminants in the vadose zone soils. ■ Some soil mass contributing to the groundwater concentrations is left is place. ■	■ Minimal O&M associated with this alternative. ■	■ Need input from DVIR Tribe Council. ■	**Yes** Provides enhanced and accelerated treatment of groundwater and soil through use of amendment injections and also removal of hot spot residual soils.	■ Capital $478,000 ■ O&M $587,000 ■ Future $354,000 10-yr life cycle $1.4 M Estimated cost of current groundwater monitoring and additional wells. Capital costs are costs of ongoing monitoring and installation of new wells and amendment injections. O&M costs are costs to maintain existing well network.

Alternative	Actions/Concepts	Advantages	Disadvantages/Limitations/ Uncertainties	O&M Considerations	Comments	Retained (Yes/No/Future)	Estimated Cost (3)
Alternative 3 - Expand the existing well network to fill in groundwater data gaps in the east areas. Continue monitoring of existing well network for MNA and concentration reductions in groundwater. Install new air sparge, soil vapor extraction systems (AS/SVE) at three locations for groundwater and soil treatment. The addition of passive treatment using bioamendment injections is not considered in this alternative.	■ Maintain existing monitoring well network, expand with additional wells to fill in data gaps on east edge of the plumes. ■ Install air sparging / soil vapor extraction systems at three locations to facilitate aeration and volatilization of contaminants in both groundwater and soil.	■ Proven technologies to enhance removal of volatile compounds from both soil and groundwater. ■ Relatively easy to install and operate. ■ Remediates a wide range of contaminants. ■	■ Requires routine operation and maintenance of the mechanical components. ■ Effectiveness is based on the specific subsurface properties and soil types which could reduce mass removal benefits over time.	■ AS/SVE systems require routine maintenance and periodic inspection to ensure proper operation. ■ Local personal would be beneficial to ensure the systems are operating properly.	■ Need input from DVIR Tribe Council. ■ Local personnel may not be available for routine operational checks and maintenance. ■	**Yes** AS/SVE is an approved and recognized technology for treatment of the targeted compounds.	■ Capital $592,000 ■ O&M $702,000 ■ Future $267,000 10-yr life cycle $1.56 M Estimated cost of current groundwater monitoring and additional wells. Capital costs are costs of ongoing monitoring and installation of new wells and installation of the AS/SVE systems. O&M costs are costs to maintain existing well network and treatment systems.
Alternative 4 - Expand the existing well network to fill in groundwater data gaps in the east areas. Demolition of buildings 310 and 333 to allow access to subsurface soils for soil excavation - source area mass removal. Excavate residual hot spot soil remaining in place from previous removal actions to eliminate exposure pathway and hydrocarbon mass (assumes 1000 cubic yards). Amendment injections at areas where residual concentrations remain the highest for both groundwater and soil**.**	■ Maintain existing monitoring well network, expand with additional wells to fill in data gaps on east edge of the plumes. ■ Demolition of structures to allow access to subsurface where contaminant mass exists. ■ Excavation to remove most of the residual soil mass beneath structures and utility corridors. ■ Injection of bio amendments to enhance degradation in both groundwater and soil smear zone. ■ Maintain existing monitoring well network, expand with additional wells to fill in data gaps on east edge of the plumes. ■	■ Targets areas with highest residual soil concentrations and groundwater. ■ Includes more extensive soil excavation. ■ Promotes enhanced concentration reduction using injection of amendments. ■ Enhances soil mass reduction within the vadose smear zone with seasonal groundwater fluctuations. ■	■ Requires additional excavation, earthwork, and disruption of potential services within the public right of way during excavation activities. ■ Still potential for some soil mass contributing to the groundwater concentrations is left is place. ■ Cost is higher than other alternatives.	■ Minimal O&M associated with this alternative. ■	■ Need input from DVIR Tribe Council. ■	**Yes** Provides enhanced and accelerated treatment of groundwater and soil through use of amendment injections and removal of residual soils. Most complete clean up remedy of the four alternatives.	■ Capital $_728,000 ■ O&M $612,000 ■ Future $317,000 10-yr life cycle $1.67 M Estimated cost of current groundwater monitoring and additional wells. Capital costs are costs of ongoing monitoring and installation of new wells and amendment injections. O&M costs are costs to maintain existing well network.

General Notes:

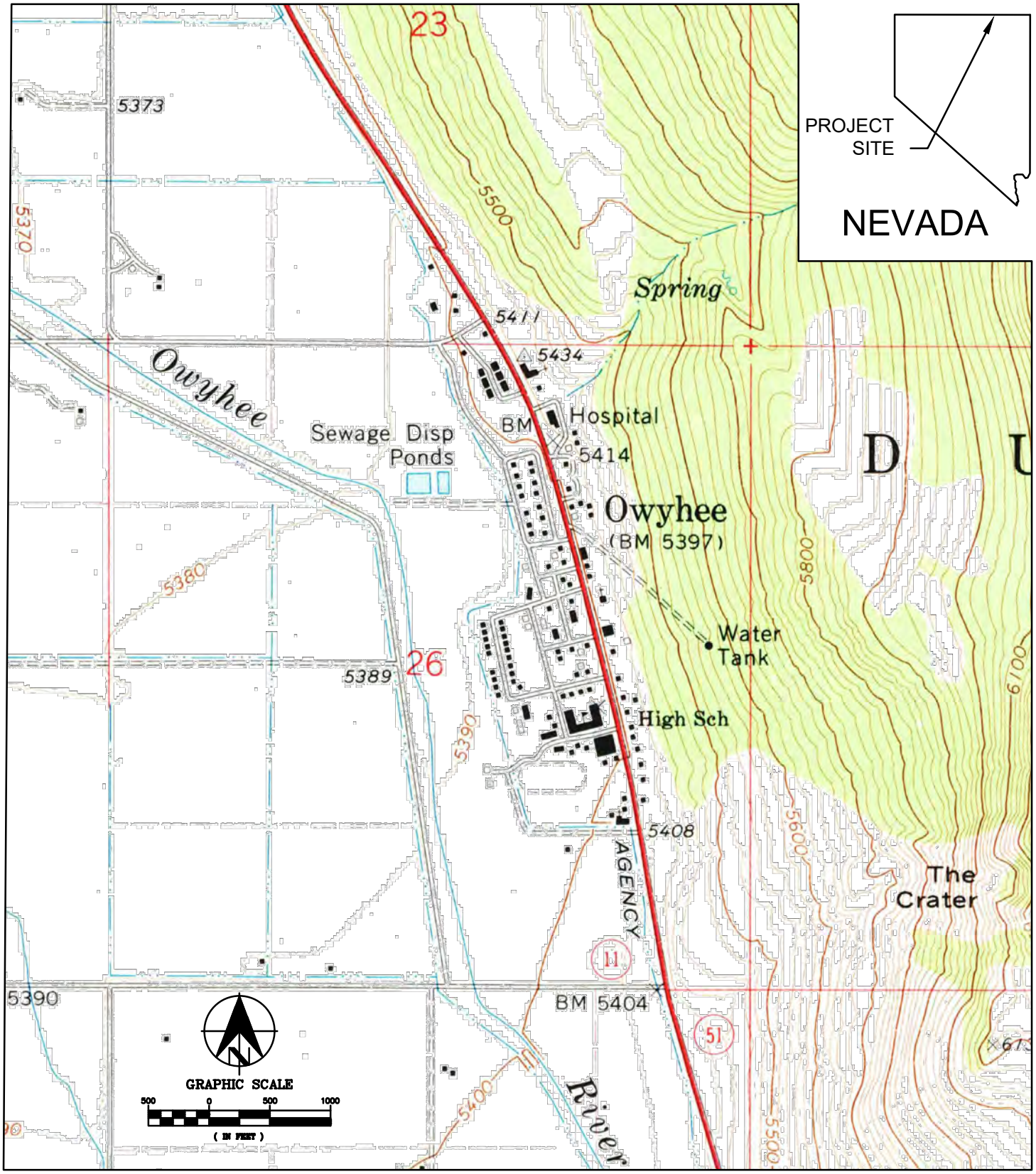
Alternatives shown here are preliminary. Alternatives considered in a feasibility study might be different than shown here.
(1) Reference and treatment alternatives based on meeting the requirements set forth by applicable governing agencies, BIA, and the Tribe Council.
(2) Alternatives can be combined and applied to different contributing areas where separation of the treatment approach makes sense
(3) Alternative 1 cost assume 20-year design life, Alternatives 2 through 4 assume a 10-year design life.
(4) Capital costs are 2021 dollars. Future and recurring costs are net present value calculated at a net discount rate of 7.5 percent.

Abbreviations:

O&M operation and maintenance

Elements Common to Alternatives:

- Continue groundwater monitoring and reporting.
- O&M schedule must include routine maintenance, as applicable.
- All alternatives must meet monitoring requirements specified in the SAP and QAPP.
- Monitoring of influent and effluent of AS/SVE treatment systems if selected



SOURCE: USGS 1974

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GROUNDWATER ASSESSMENT REPORT
DUCK VALLEY INDIAN RESERVATION, NV
SITE LOCATION

16-005
FIG.1

P:\PDX PROJECTS\2016\16-005 BIA Duck Valley Env. Investigation\Task 9 - Groundwater Assessment Report\Submittal\16-005_CAD Files\Report Figures\2021-0329_John Baker\FIGURE 1 - SITE LOCATION.dwg 3/31/2021 4:13 PM

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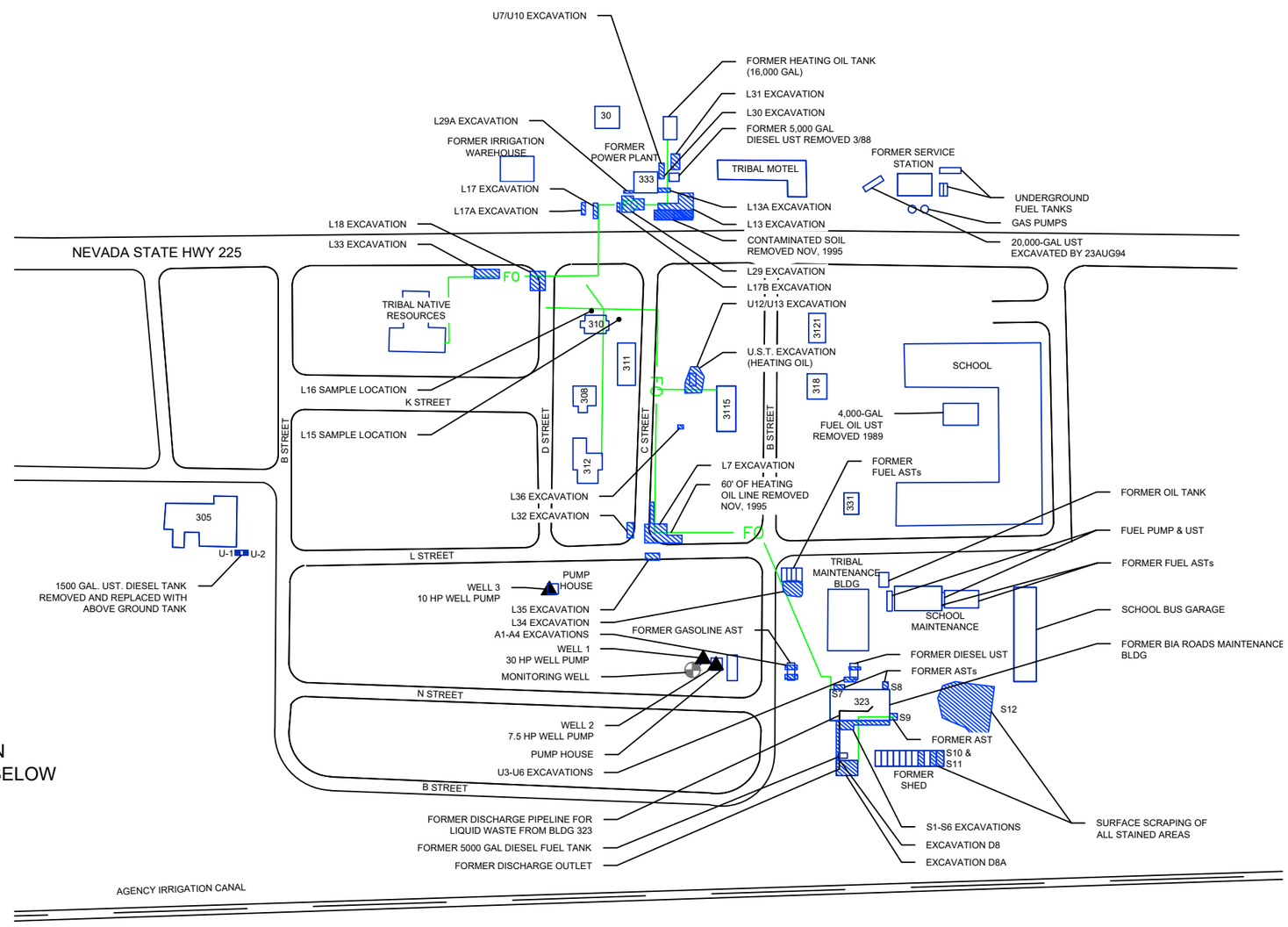
DUCK VALLEY INDIAN RESERVATION, NV
LOCATIONS OF FORMER AND CURRENT
MUNICIPAL WELLS

16-005
FIG. 2

P:\PDX PROJECTS\2016\16-005 BIA Duck Valley Env. Investigation\Task 9 - Groundwater Assessment Report\Submittal\16-005_CAD Files\Report Figures\2021-0329_John Baker\FIGURE 2 - LOCATION OF MUNICIPAL SUPPLY WELLS.dwg 4/8/2021 10:25 AM



GRAPHIC SCALE

100 0 100 200

(IN FEET)

LEGEND

- AREAS OF HISTORICAL EXCAVATION
- FO — EXCAVATED FUEL OIL LINE 1' TO 3' BELOW GROUND SURFACE
- EXISTING MONITORING WELL
- EXISTING MUNICIPAL WELL
- SAMPLE LOCATION

SOURCE: This is a reproduction of information gathered from SECOR International, Inc. May 2000. Subsurface Investigation Report, Duck Valley Shoshone-Paiute Reservation, Owyhee, Nevada

P:\PDX PROJECTS\2016\16-005 BIA Duck Valley Env. Investigation\Environmental\Task 9 - Groundwater Assessment Report\Submittal\16-005_CAD Files\Report Figures\2021-0329_John Baker\FIGURES 3 - 6_15.dwg 8/5/2021 10:27 AM

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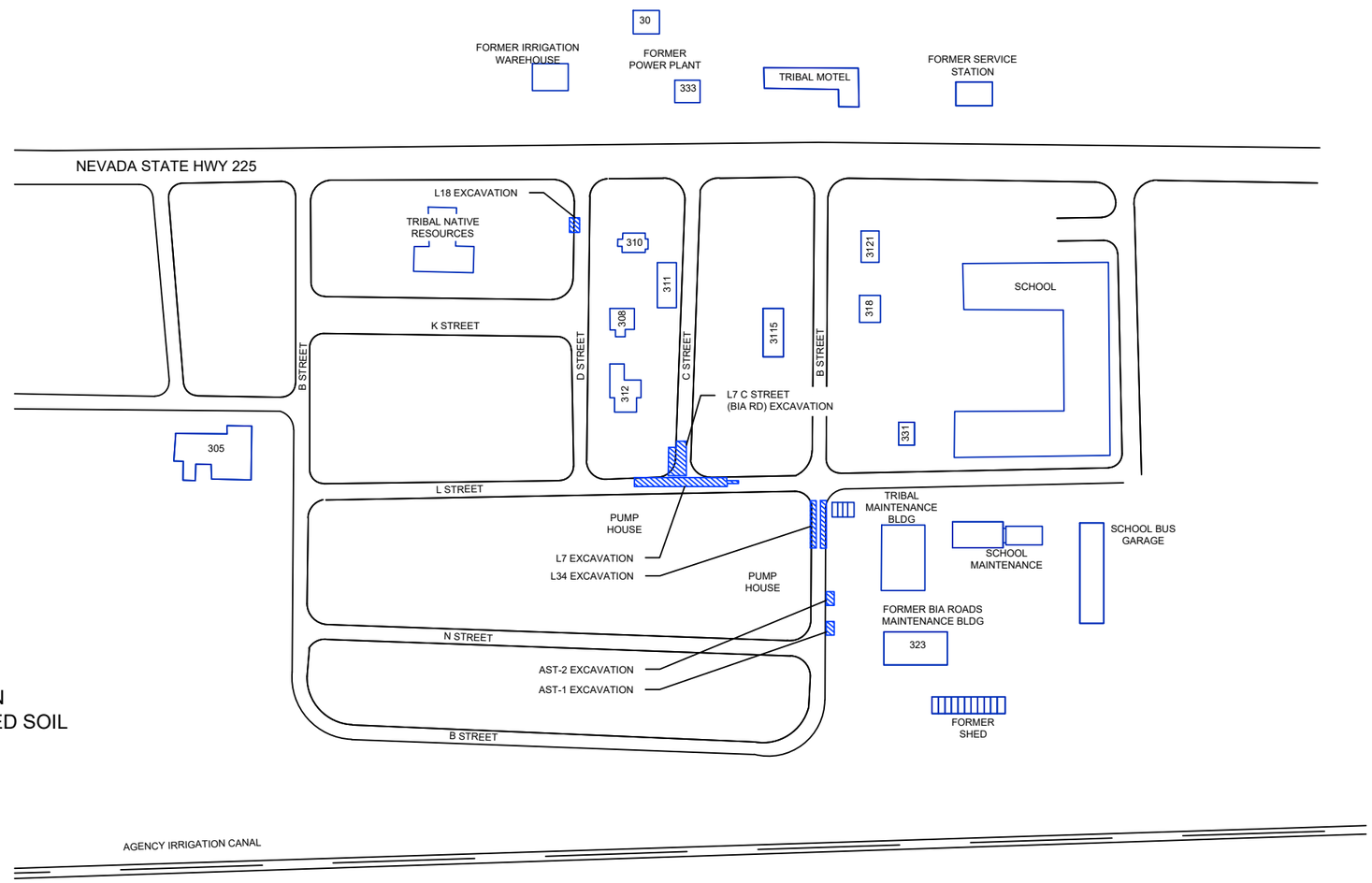
CONTAMINANT SOURCE AND RELEASE AREA MAP
1999

16-005

FIG. 3



GRAPHIC SCALE

100 0 100 200

(IN FEET)

LEGEND

AREAS OF HISTORICAL EXCAVATION ESTIMATED BOUNDARY OF IMPACTED SOIL (>100 MG/KG TPH)

SOURCE: This is a reproduction of information gathered from SECOR International, Inc. December 2002. Report of Findings from Soil Excavation and Groundwater Monitoring, Duck Valley Indian Reservation Owyhee, Nevada

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CONTAMINANT SOURCE AND RELEASE AREA MAP 2002

16-005

FIG. 4

P:\PDX PROJECTS\2016\16-005 BIA Duck Valley Env. Investigation\Task 9 - Groundwater Assessment Report\Submittal\16-005_CAD Files\Report Figures\2021-0329_John Baker\FIGURES 3 - 6_15.dwg 6/2/2021 10:12 AM
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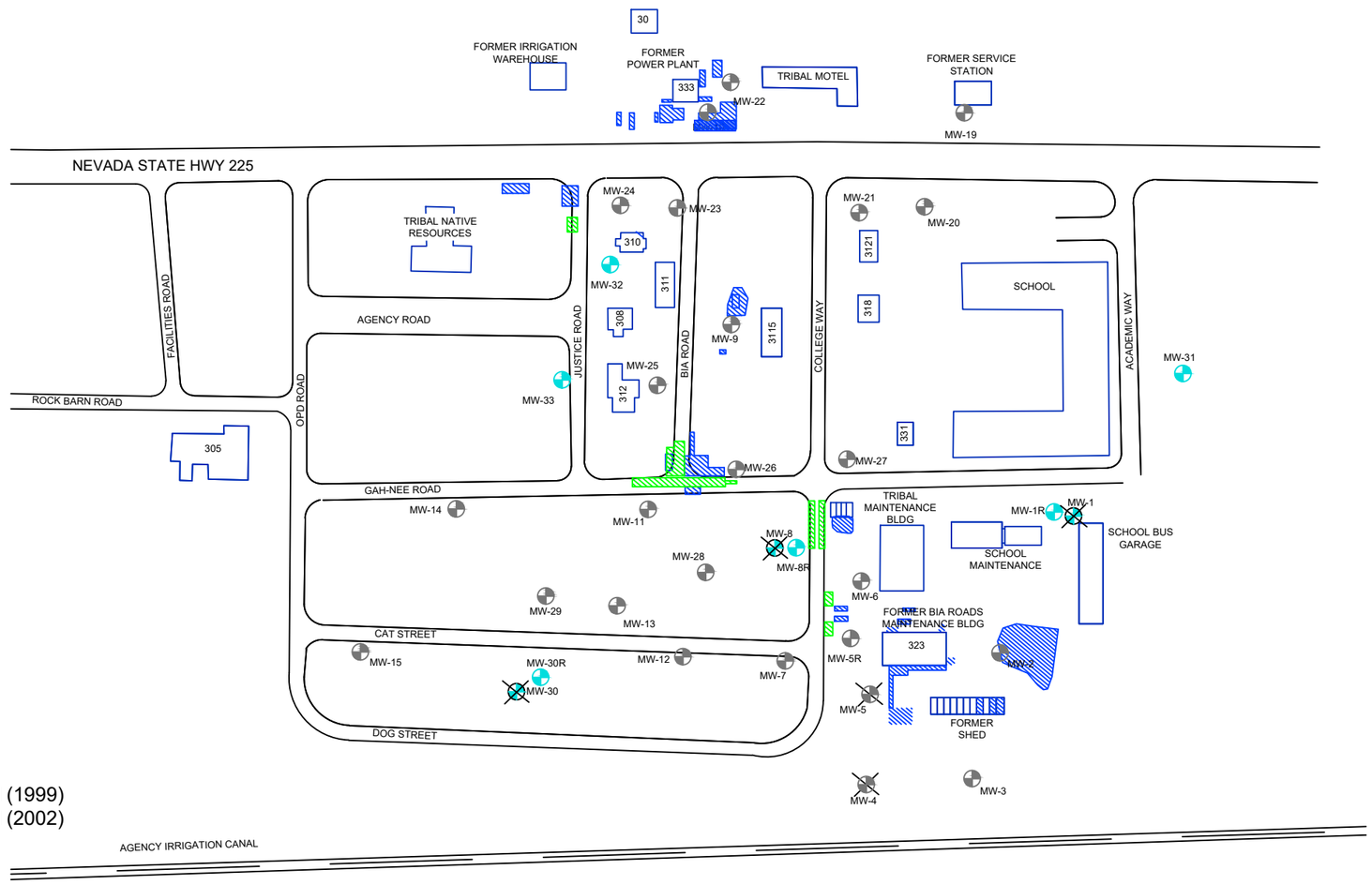

SOURCE: This is a reproduction of information gathered from Stantec. December 16, 2009. Summary Report, Well Installation, Abandonment and Monitoring Activities, October 2007 to May 2009. Bureau of Indian Affairs, Duck Valley Indian Reservation, Owyhee, Nevada.

P:\PDX PROJECTS\2016\16-005 BIA Duck Valley Env. Investigation\Environmental\Task 10 - Remedial Design\BIA Meeting Folder\Data Gap figures\CAD FILES\FIGURES 3 - 6_18.dwg 7/15/2021 1:08 PM
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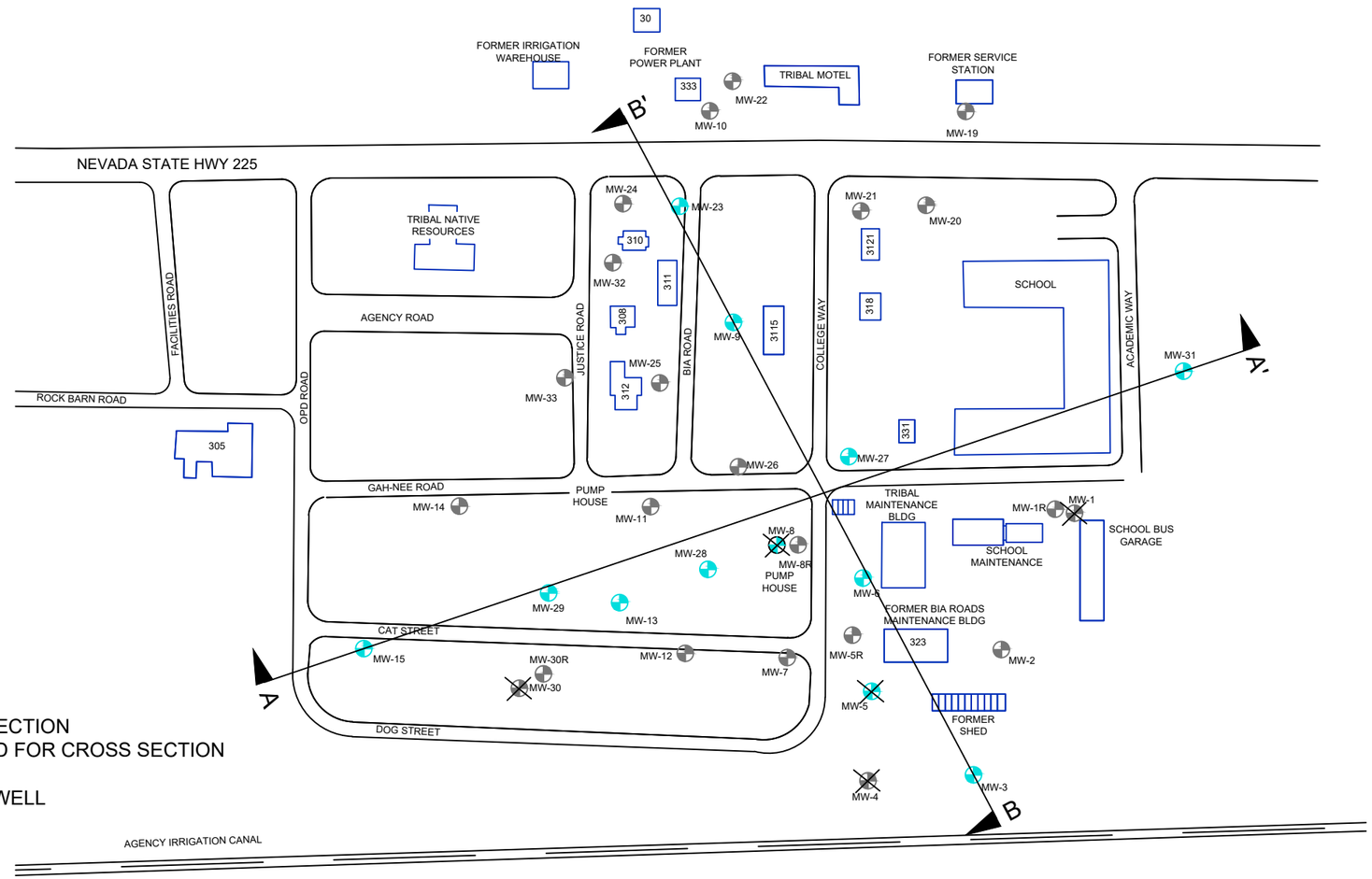
DUCK VALLEY INDIAN RESERVATION, NV

GROUNDWATER MONITORING WELLS LOCATIONS

16-005

FIG. 5



GRAPHIC SCALE

100 0 100 200

(IN FEET)

LEGEND

- MONITORING WELL USED FOR CROSS SECTION
- DECOMMISSIONED MONITOR WELL USED FOR CROSS SECTION
- EXISTING MONITOR WELL
- EXISTING DECOMMISSIONED MONITOR WELL

P:\PDX PROJECTS\2016\16-005 BIA Duck Valley Env. Investigation\Environmental\Task 9 - Groundwater Assessment Report\Submittal\16-005_CAD Files\Report Figures\2021-0329_John Baker\FIGURE 9 - CROSS SECTION LOCATIONS.dwg 8/4/2021 10:52 AM

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GROUNDWATER ASSESSMENT REPORT
DUCK VALLEY INDIAN RESERVATION, NV

CROSS SECTION LOCATION

16-005

FIG. 6

LEGEND

- CLAY / SILT
- GRAVEL AND SAND
- SAND WITH GRAVEL AND COBBLES
- GRAVEL, COBBLES WITH SAND
- SAND
- CLAYEY SAND
- CLAYEY COBBLES
- SAND WITH GRAVEL
- COBBLES AND BOULDERS

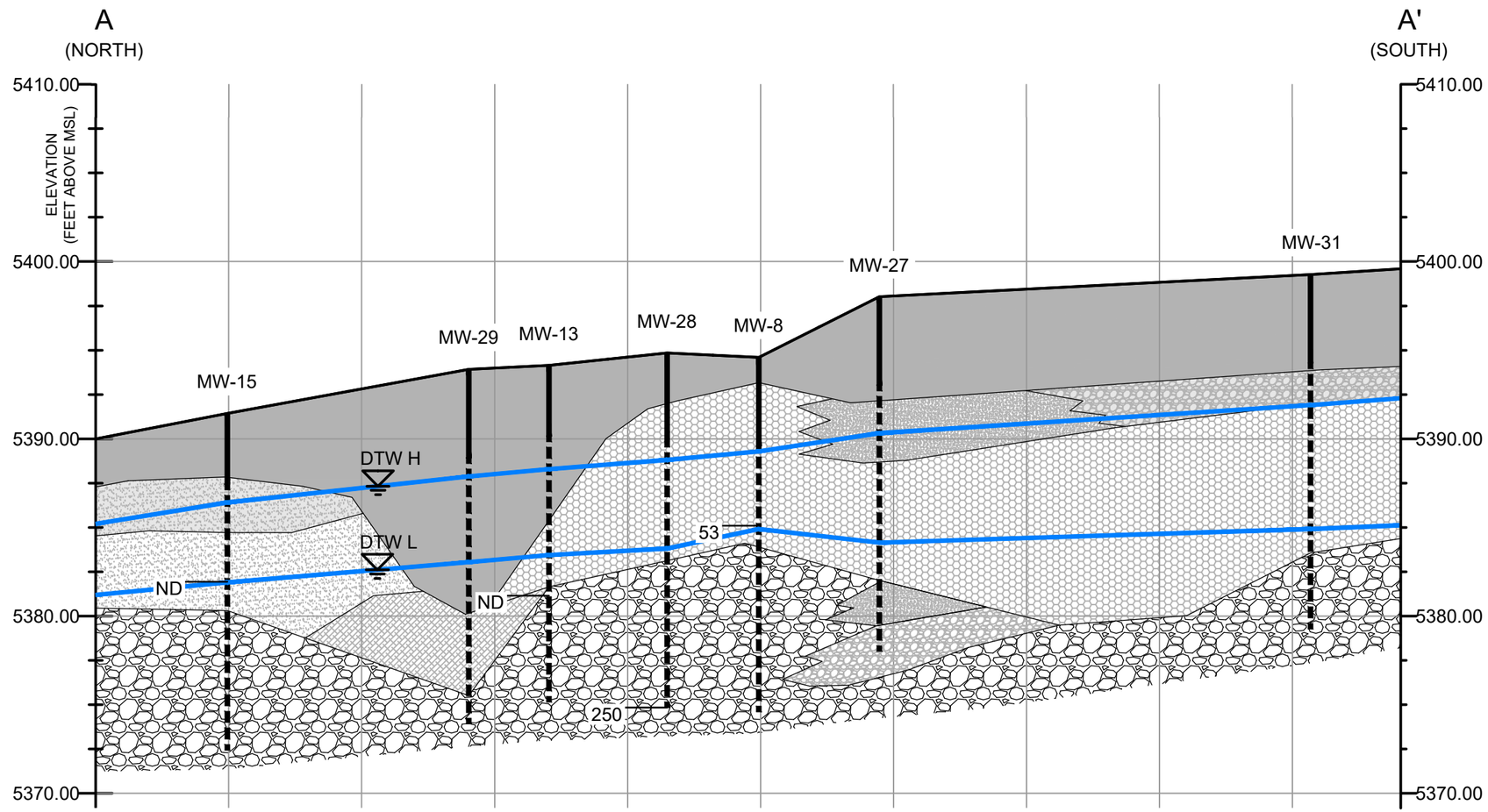
MW-3 MONITORING WELL I.D.

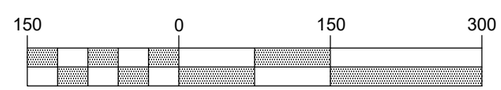
WELL CASING

WELL SCREEN

DTW H (L) DEPTH TO WATER HIGH (LOW) MEASURED JUNE, 2019 (DECEMBER, 2019)

250 TPH-D AS DIESEL RESULTS IN mg/kg, SHOWN ON LEFT OF WELL AT DEPTH OF SAMPLE





(IN FEET)

VERTICAL EXAGGERATION = 20

NOTES:
1. ND = NON-DETECT
2. NO SOIL ANALYTICAL DATA COLLECTED FOR MONITORING WELL MW-27, MW-29, AND MW-31.

P:\PDX PROJECTS\2016\16-005 BIA Duck Valley Env. Investigation\Environmental\Task 9 - Groundwater Assessment Report\Submittal\16-005_CAD Files\Report Figures\2021-0329_John Baker\FIGURE XX - GEOLOGIC CROSS SECTIONS.dwg 8/4/2021 2:54 PM
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DUCK VALLEY INDIAN RESERVATION, NV

GEOLOGIC CROSS SECTION A-A'

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FIG. 7

LEGEND

- CLAY / SILT
- GRAVEL AND SAND
- SAND WITH GRAVEL AND COBBLES
- GRAVEL, COBBLES WITH SAND
- SAND
- SAND WITH CLAY
- CLAY WITH GRAVEL
- SAND AND GRAVEL
- COBBLES AND BOULDERS

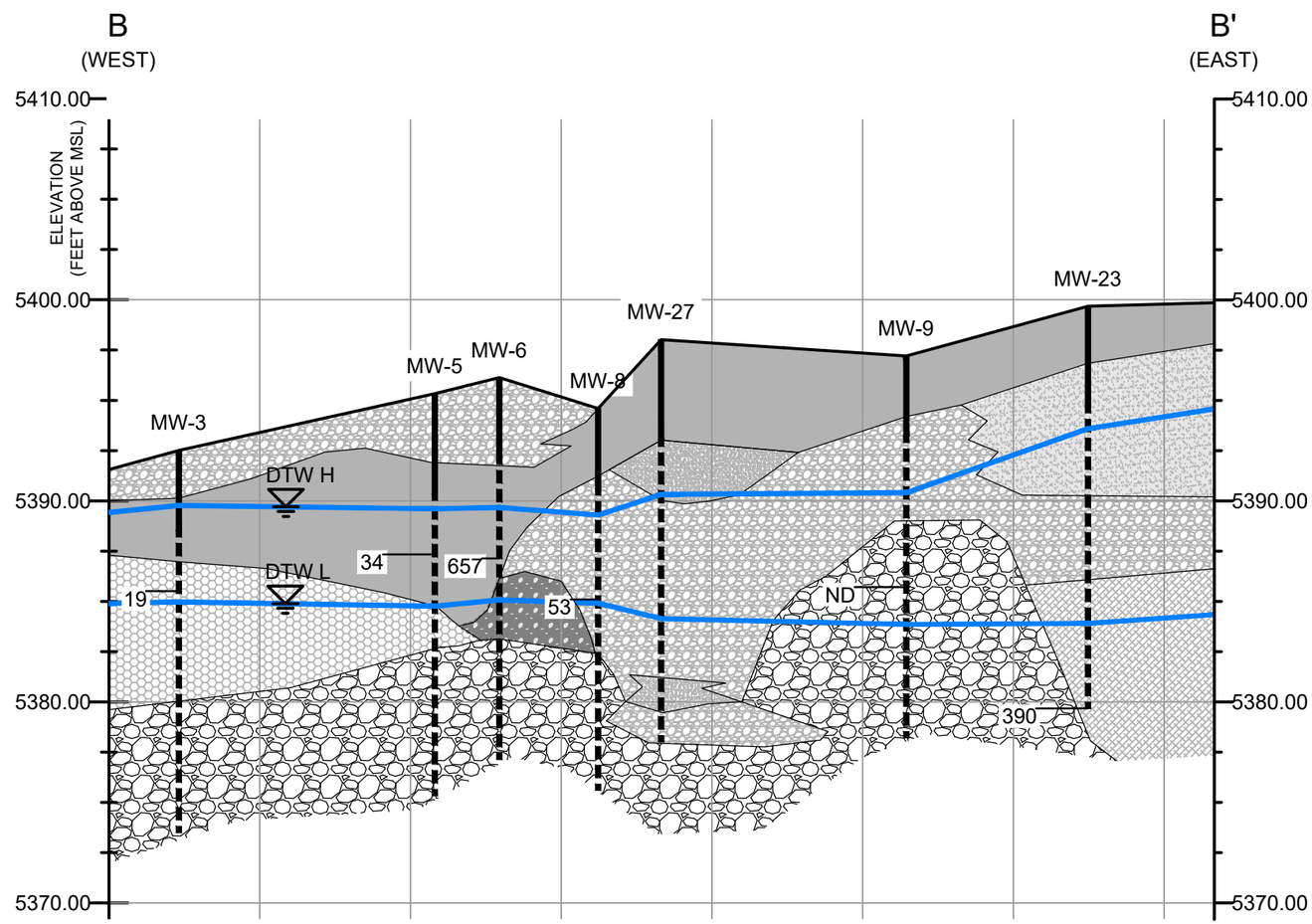
MW-3 MONITORING WELL I.D.

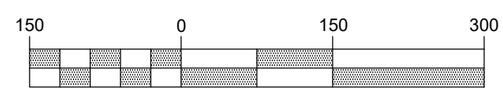
WELL CASING

WELL SCREEN

DTW H (L) DEPTH TO WATER HIGH (LOW)
MEASURED JUNE, 2019 (DECEMBER, 2019)

19 TPH-D AS DIESEL
RESULTS IN mg/kg, SHOWN ON LEFT OF
WELL AT DEPTH OF SAMPLE





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VERTICAL EXAGGERATION = 20

NOTE:
1. ND = NON-DETECT
2. NO SOIL ANALYTICAL DATA COLLECTED FOR MONITORING WELL MW-27.

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GROUNDWATER ASSESSMENT REPORT
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GEOLOGIC CROSS SECTION B-B'

16-005

FIG. 8

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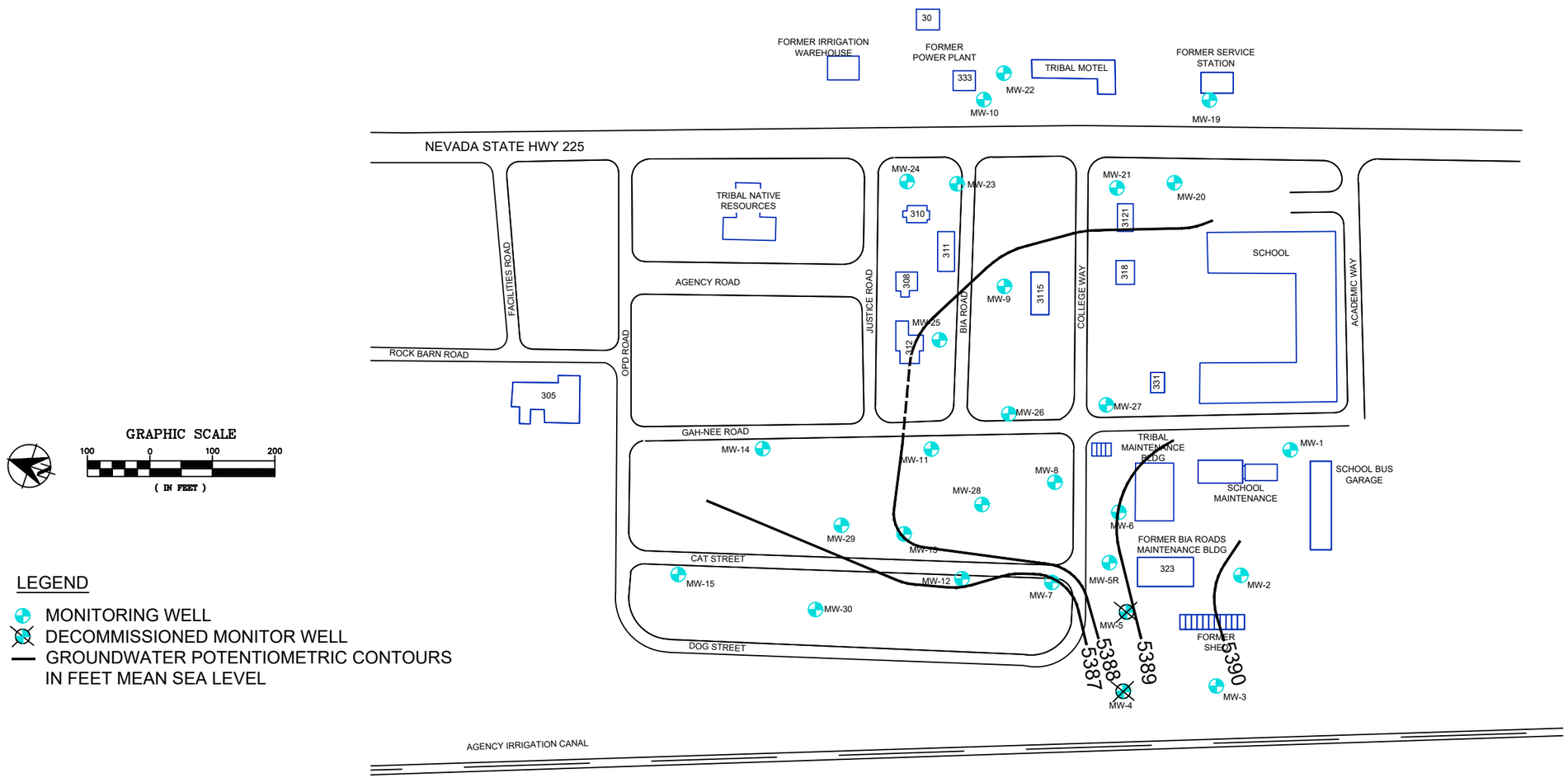

P:\PDX PROJECTS\2016\16-005 BIA Duck Valley Env. Investigation\Task 9 - Groundwater Assessment Report\Submittal\16-005_CAD Files\Report Figures\2021-0329_John Baker\FIGURES 12- 16_POTENTIOMETRIC.dwg 6/2/2021 10:15 AM

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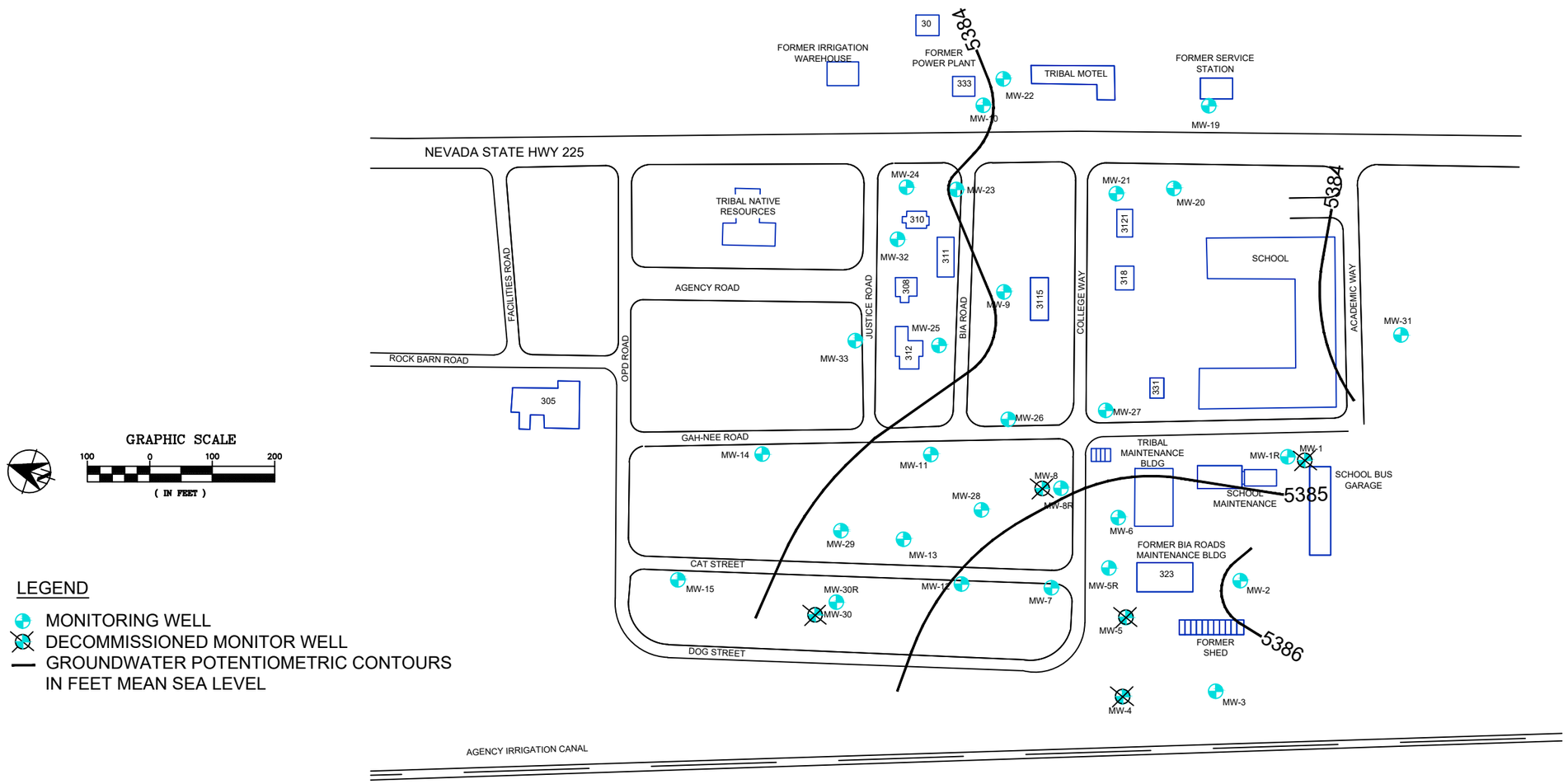
GROUNDWATER ASSESSMENT REPORT
DUCK VALLEY INDIAN RESERVATION, NV

GROUNDWATER POTENTIOMETRIC SURFACE
APRIL 2016

16-005

FIG. 9



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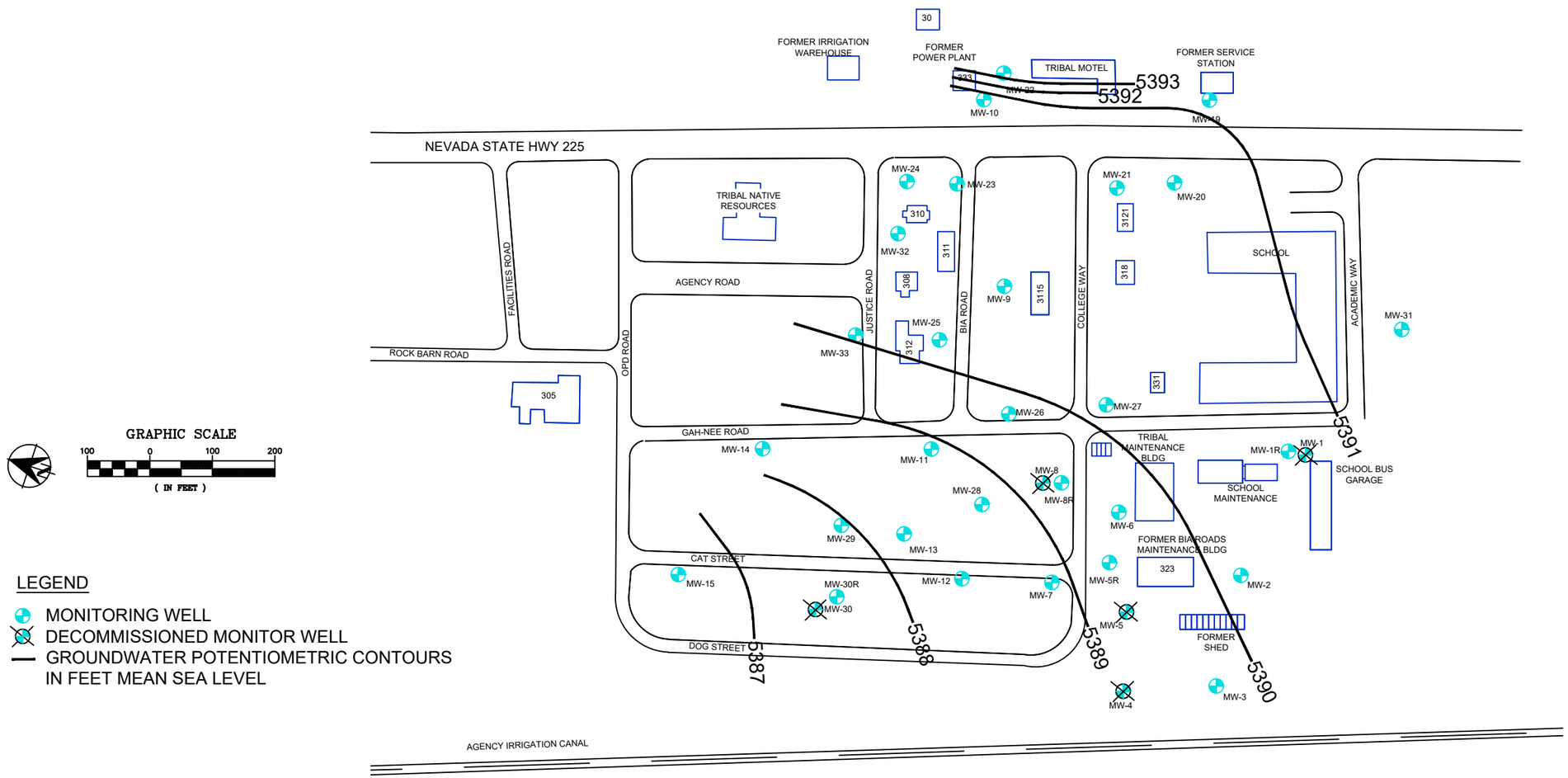
DUCK VALLEY INDIAN RESERVATION, NV

GROUNDWATER POTENTIOMETRIC SURFACE
OCTOBER 2018

16-005

FIG. 10



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GROUNDWATER POTENTIOMETRIC SURFACE
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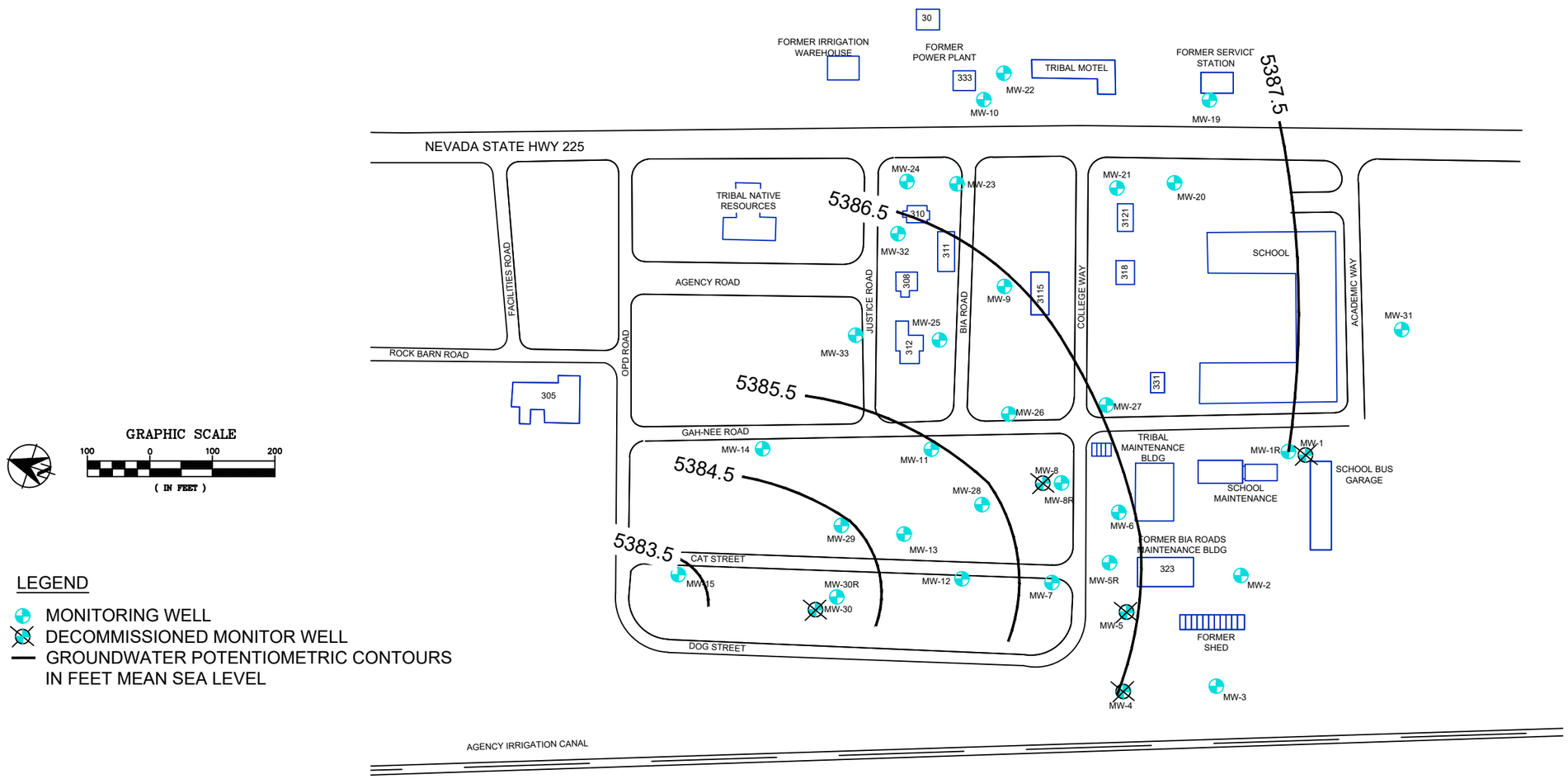
FIG. 11



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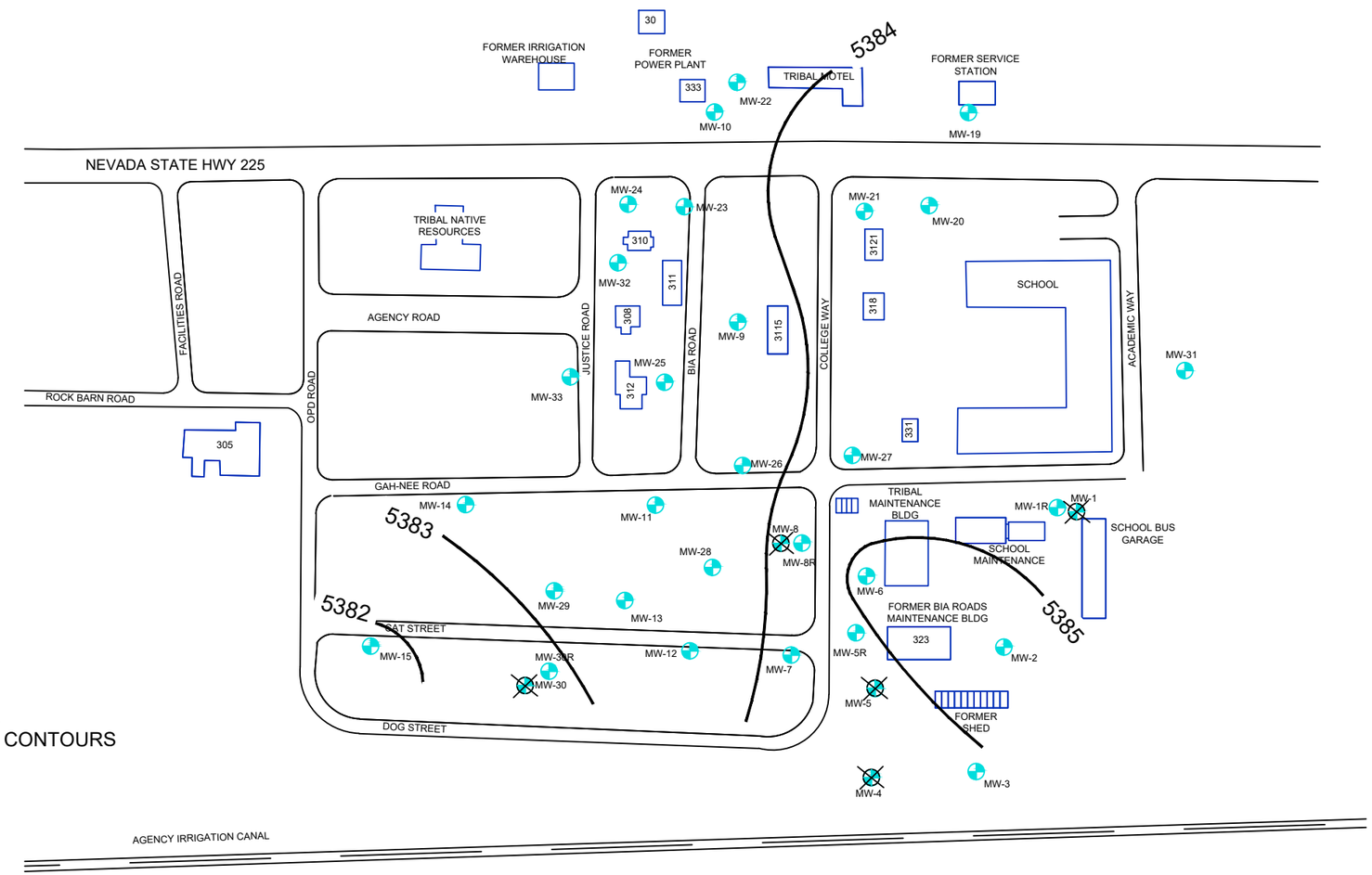
DUCK VALLEY INDIAN RESERVATION, NV

GROUNDWATER POTENTIOMETRIC SURFACE
SEPTEMBER 2019

16-005

FIG. 12



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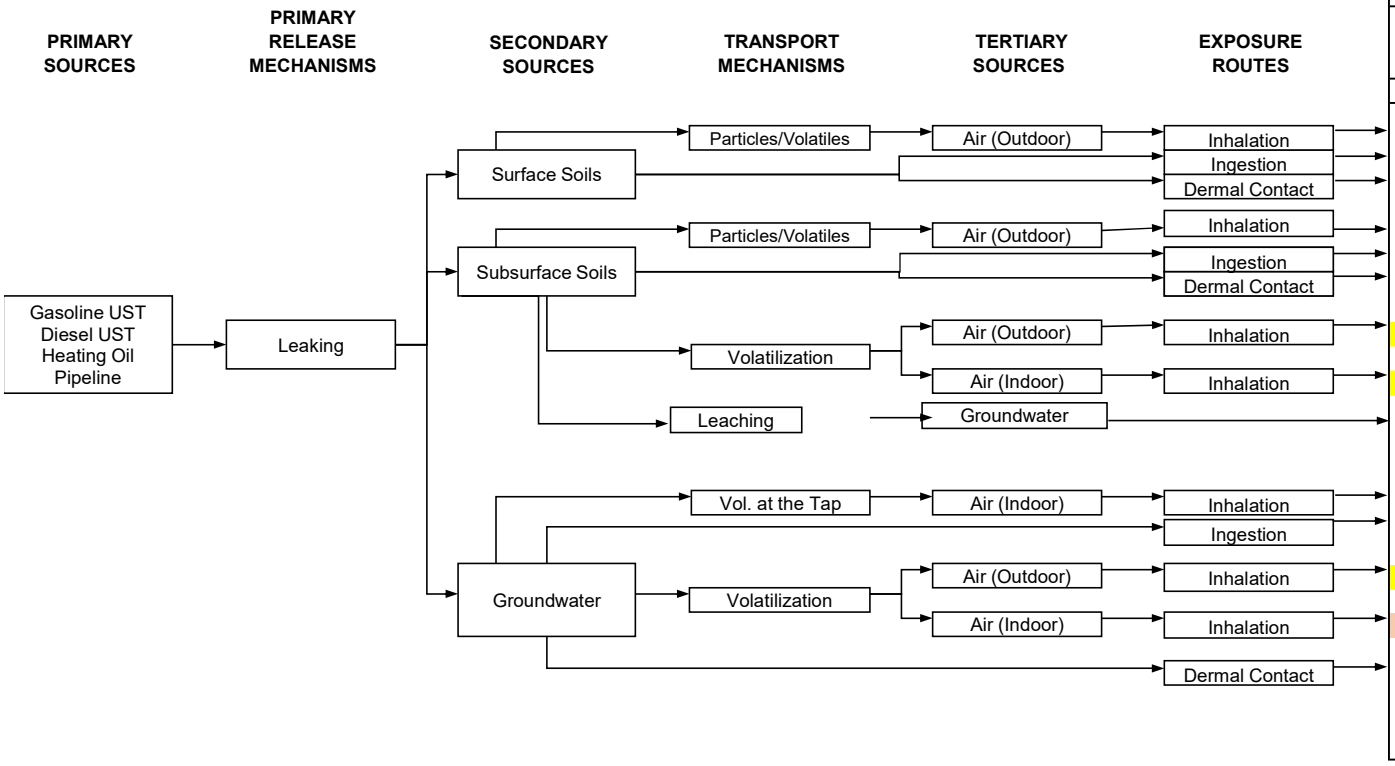
GROUNDWATER POTENTIOMETRIC SURFACE
DECEMBER 2019

16-005

FIG. 13

Duck Vally
Conceptual Site Model
Figure 14



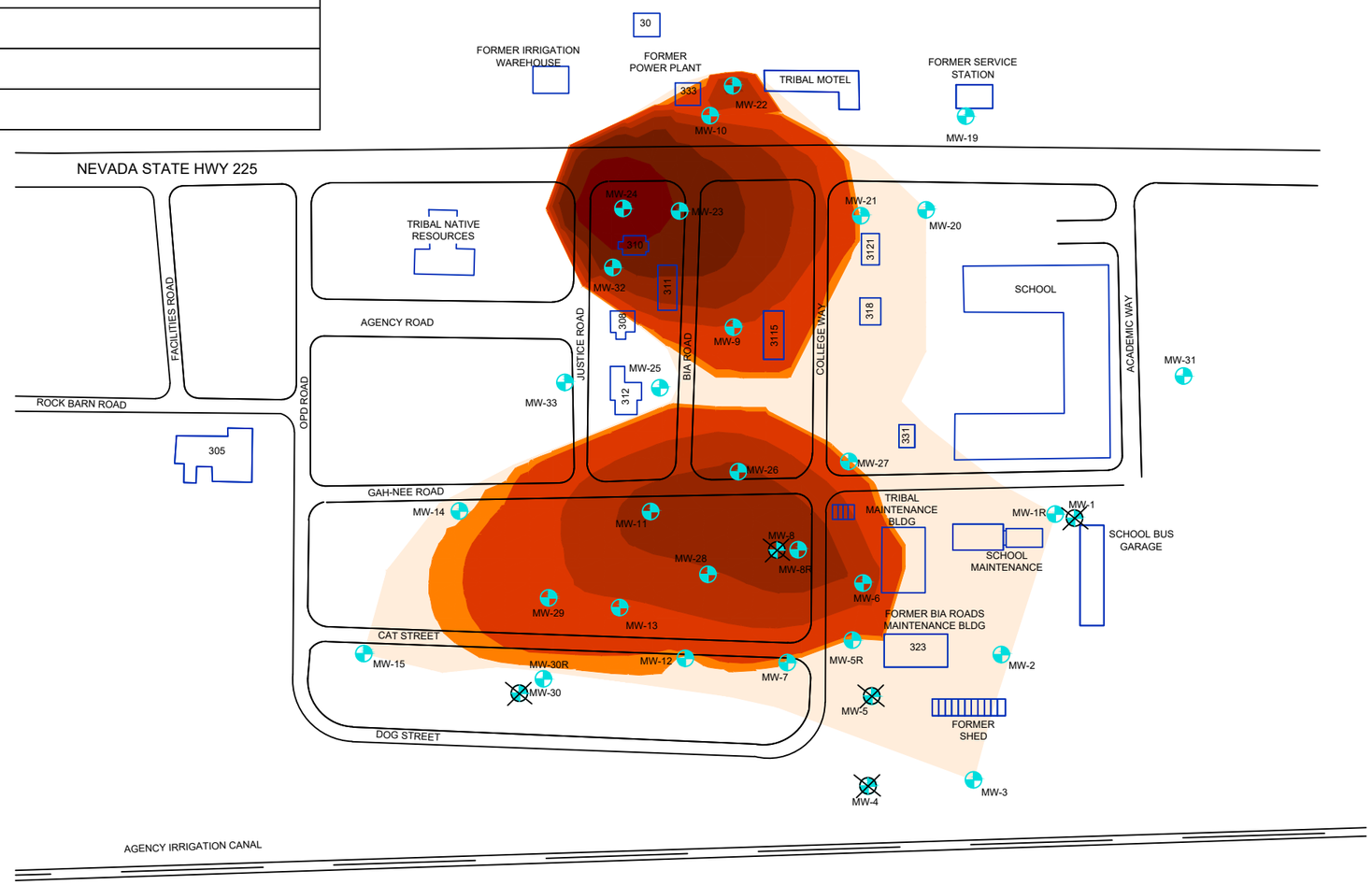
POTENTIAL RECEPTORS					
Residential (1)		Composite Worker		Construction	
Current	Future	Current	Future	Current	Future
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	+
-	-	-	-	-	+
-	-	-	-	-	+
+	+	-	+	-	+
+	+	-	+	-	-
	+	-	-	-	-
-	+	-	-	-	-
-	+	-	-	-	+
+	+	-	+	-	+
+	+	-	+	-	-
-	+	-	+	-	+

Notes:

+ This route is a primary source of exposure.
- There is no exposure by this route.

Not provided in RSL Generic Tables but RSLs can be
Site data not available to calculate RSLs for soils.
exceeds RSL,VISL or Risk Based SSL

TPH-d CONCENTRATION		
COLOR	RANGE (mg/L)	NOTE
	< 0.0247	NOT DETECTED AT, OR ABOVE THE METHOD DETECTION LIMIT
	0.0248 - 0.090	
	0.090 - 0.500	
	0.500 - 1.000	
	1.000 - 2.000	
	2.000+	



GRAPHIC SCALE

100 0 100 200

(IN FEET)

LEGEND

MONITORING WELL

DECOMMISSIONED MONITOR WELL

P:\PDX PROJECTS\2016\16-005 BIA Duck Valley Env. Investigation\Task 9 - Groundwater Assessment Report\Submittal\16-005_CAD Files\Report Figures\2021-0329_John Baker\FIGURES 18 - 21_ISOCONCENTRATION.dwg 6/2/2021 8:13 PM
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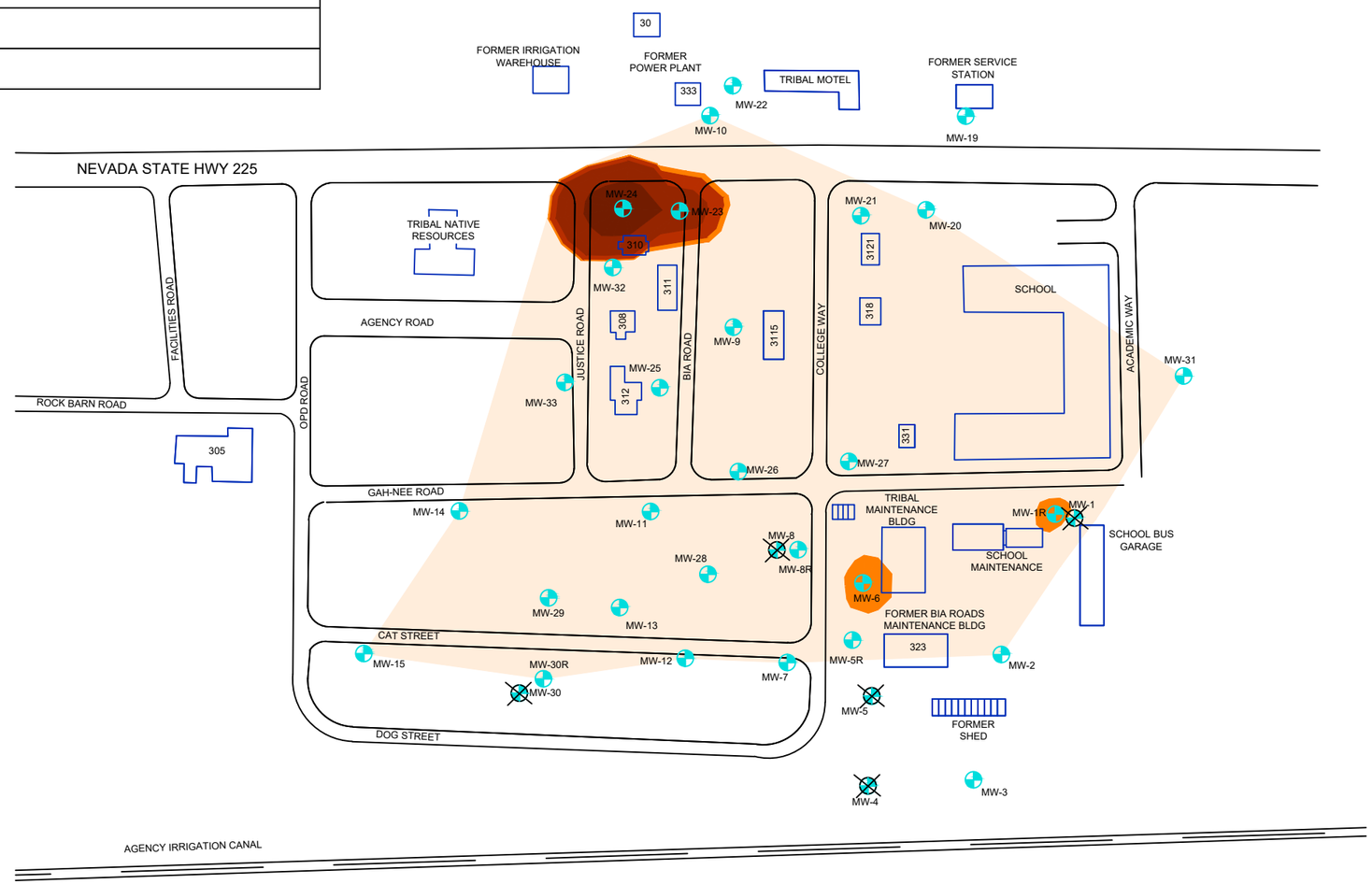
DUCK VALLEY INDIAN RESERVATION, NV

ISO-CONCENTRATION OF TPH-d
DECEMBER 2019

16-005

FIG. 15

TPH-g CONCENTRATION		
COLOR	RANGE (mg/L)	NOTE
	< 0.0314	NOT DETECTED AT, OR ABOVE THE METHOD DETECTION LIMIT
	0.0315 - 0.090	
	0.090 - 0.250	
	0.250 - 1.000	
	1.000 +	



GRAPHIC SCALE

100 0 100 200

(IN FEET)

LEGEND

MONITORING WELL

DECOMMISSIONED MONITOR WELL

P:\PDX PROJECTS\2016\16-005 BIA Duck Valley Env. Investigation\Task 9 - Groundwater Assessment Report\Submittal\16-005_CAD Files\Report Figures\2021-0329_John Baker\FIGURES 18- 21_ISOCONCENTRATION.dwg 6/3/2021 10:23 AM
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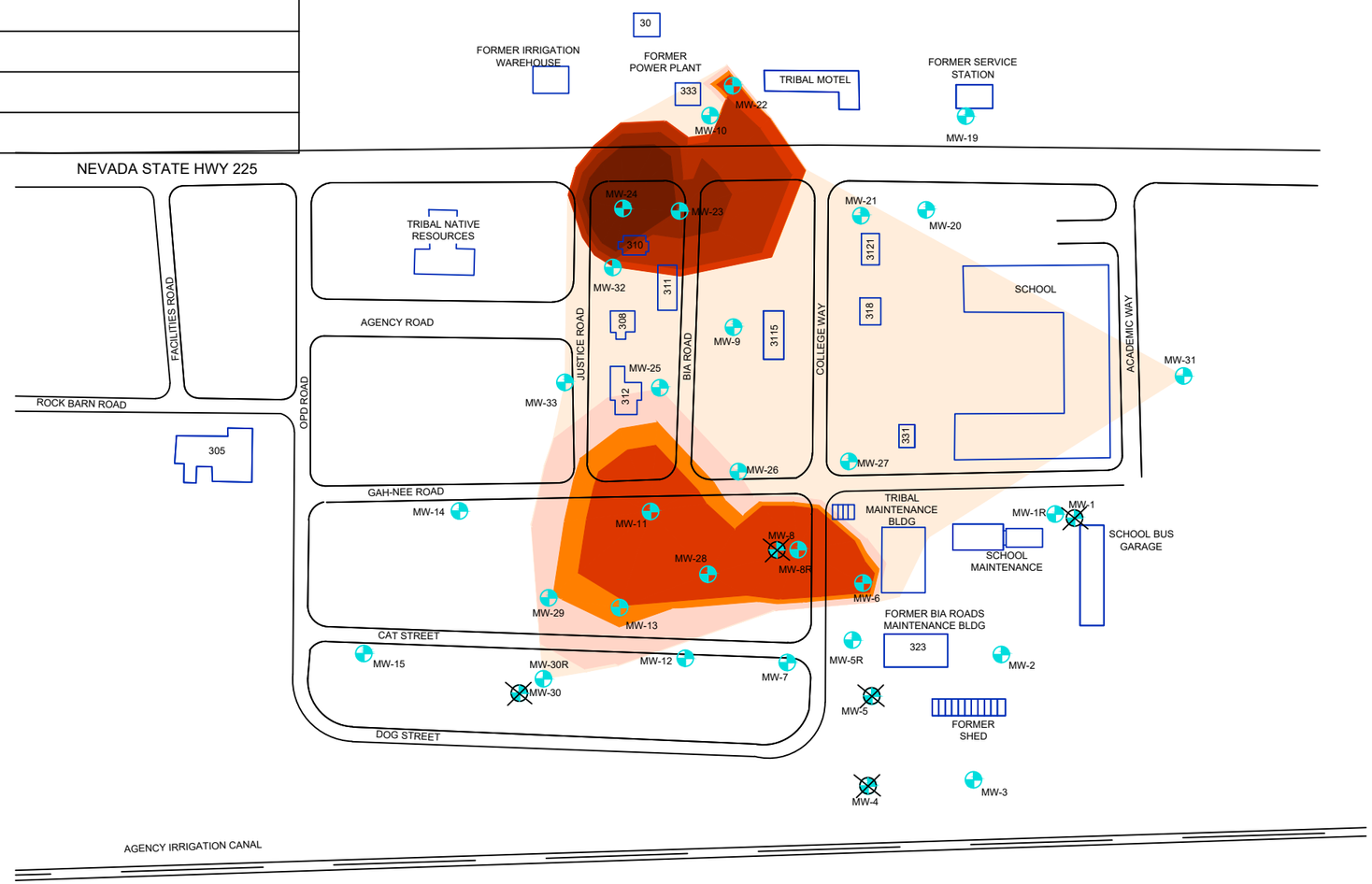
ISO-CONCENTRATION OF TPH-g
DECEMBER 2019

16-005

FIG. 16

NAPHTHALENE CONCENTRATION		
COLOR	RANGE (µg/L)	NOTE
	0 - 0.020	NOT DETECTED AT, OR ABOVE THE METHOD DETECTION LIMIT
	0.020 - 0.600	
	0.600 - 1.000	
	1.000 - 10.000	
	10.000 - 50.000	
	50.000 - 100.000	
	100.000 +	



GRAPHIC SCALE

100 0 100 200

(IN FEET)

LEGEND

MONITORING WELL

DECOMMISSIONED MONITOR WELL

P:\PDX PROJECTS\2016\16-005 BIA Duck Valley Env. Investigation\Task 9 - Groundwater Assessment Report\Submittal\16-005_CAD Files\Report Figures\2021-0329_John Baker\FIGURES 18 - 21_ISOCONCENTRATION.dwg 6/2/2021 8:15 PM
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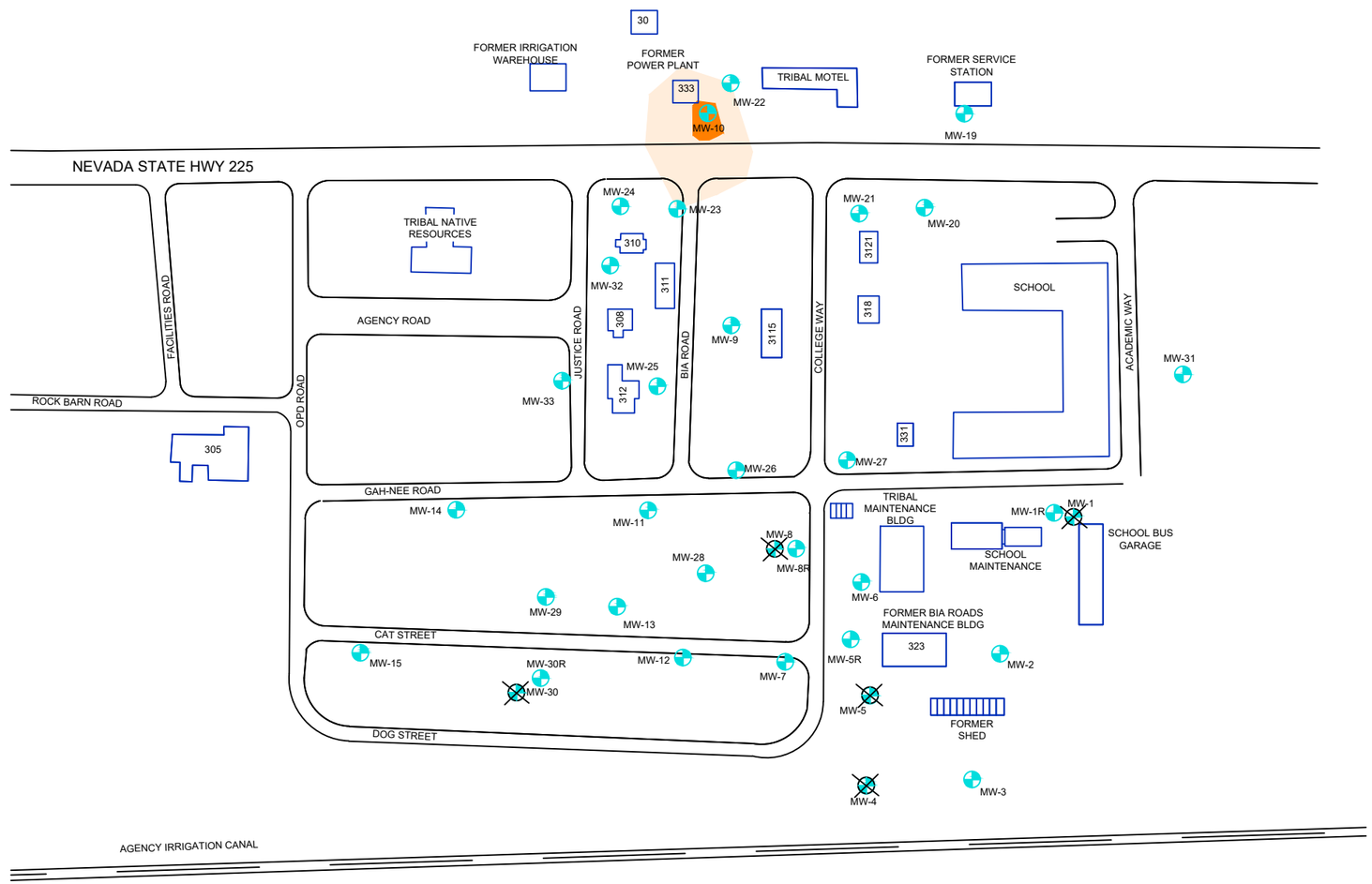
ISO-CONCENTRATION OF NAPHTHALENE
DECEMBER 2019

16-005

FIG. 17

TCE CONCENTRATION		
COLOR	RANGE (µg/L)	NOTE
	< 0.398	NOT DETECTED AT, OR ABOVE THE METHOD DETECTION LIMIT
	0.398 - 0.900	



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DECEMBER 2019

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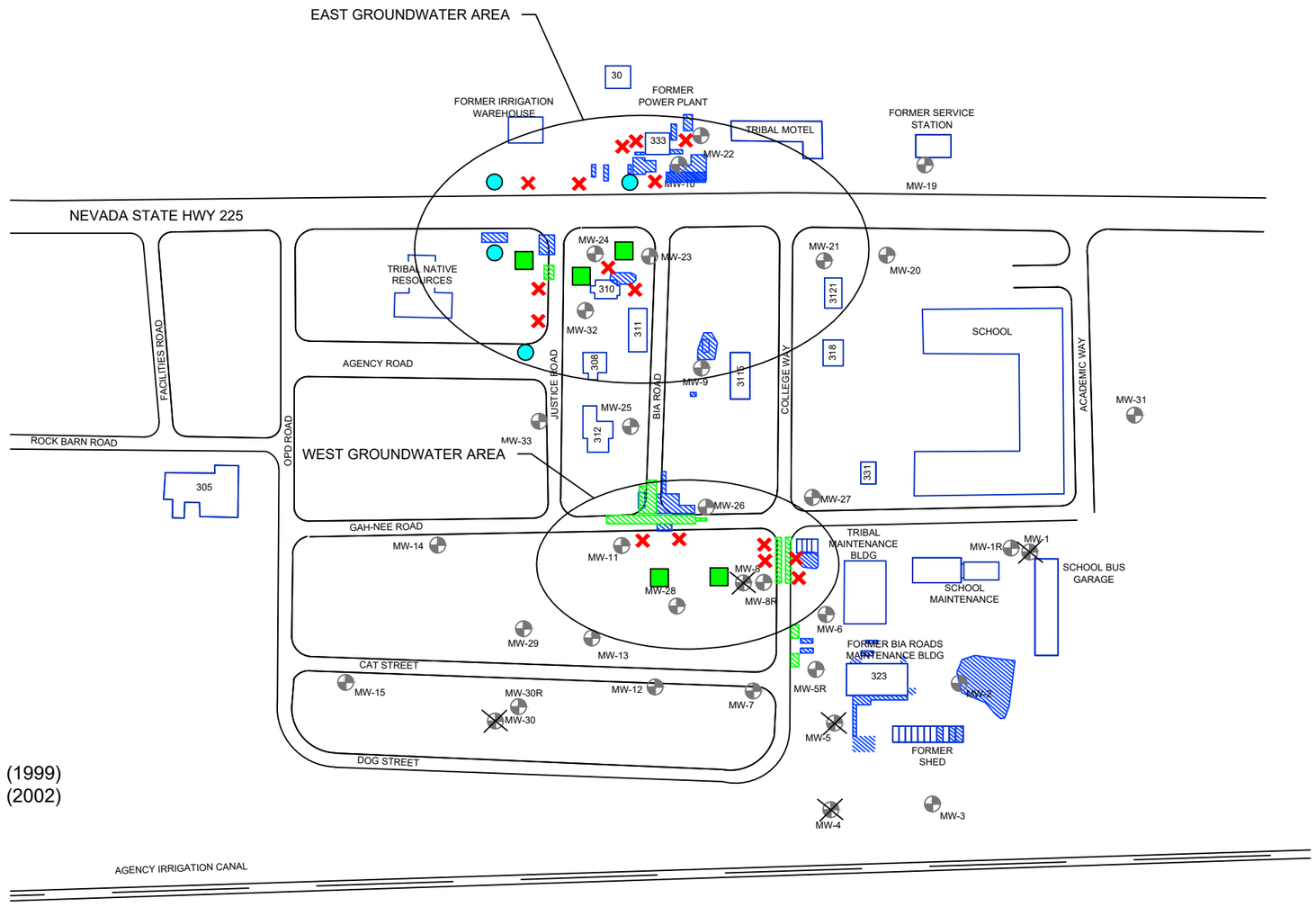
FIG. 18



LEGEND

- EXISTING MONITORING WELL
- DECOMMISSIONED MONITOR WELL
- AREAS OF HISTORICAL EXCAVATION (1999)
- AREAS OF HISTORICAL EXCAVATION (2002)
- PROPOSED NEW MONITORING WELL
- PROPOSED SOIL GAS
- PROPOSED SOIL BORING

SOURCE: This is a reproduction of information gathered from Stantec. December 16, 2009. Summary Report, Well Installation, Abandonment and Monitoring Activities, October 2007 to May 2009. Bureau of Indian Affairs, Duck Valley Indian Reservation, Owyhee, Nevada.

\\webserver\Projects\PDX PROJECTS\2016\16-005 BIA Duck Valley Env. Investigation\Environmental\Task XX 2021 Additional Remedial Investigations\Proposal Figures\CAD\FIGURE 1 - PROPOSED ADDITIONAL SAMPLING.dwg 8/31/2021 3:16 PM
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PROPOSAL

DUCK VALLEY INDIAN RESERVATION, NV

PROPOSED ADDITIONAL SOIL BORINGS, MONITORING WELLS AND SOIL GAS SAMPLING

16-005

FIG. 19