GW - 040

PERMITS, RENEWALS & MODS

2020

Chavez, Carl J, EMNRD

From:	Ho, Nancy <Ho.Nancy@epa.gov>
Sent:	Monday, August 10, 2020 1:24 PM
To:	Chavez, Carl J, EMNRD
Cc:	Brooks, Janet; Ogden, Sarah, NMENV; Ortelli, Angelo, NMENV; Polak, Tiffany, EMNRD
Subject:	[EXT] EPA comments: Marathon Petroleum Company, L.P. Former Giant Bloomfield Refinery (GW-40) in San Juan County: WQCC Application Administratively Complete
Attachments:	EPA Letter Comments 2020 GW-40 Discharge Permit w Enclosure dated August 10-2020 _Signed.pdf

Hi Carl,

Please see attached EPA comments.

Thanks,
Nancy

From: Chavez, Carl J, EMNRD <CarlJ.Chavez@state.nm.us>
Sent: Monday, August 10, 2020 9:45 AM
To: Ho, Nancy <Ho.Nancy@epa.gov>
Cc: Polak, Tiffany, EMNRD <Tiffany.Polak@state.nm.us>
Subject: RE: Question: Marathon Petroleum Company, L.P. Former Giant Bloomfield Refinery (GW-40) in San Juan County: WQCC Application Administratively Complete

Nancy:

Good morning.

You may send your comments electronically to me, since OCD is currently not accepting hardcopies.

Please copy the OCD Environmental Director (Acting for Vacant Bureau Chief Position) at Tiffany.Polak@state.nm.us.

Thank you.

Mr. Carl J. Chavez, CHMM (#13099)
New Mexico Oil Conservation Division (Albuquerque Office)
Energy Minerals and Natural Resources Department
5200 Oakland Avenue, NE
Albuquerque, New Mexico 87113
Ph. (505) 660-7923
E-mail: CarlJ.Chavez@state.nm.us
"Why not prevent pollution, minimize waste to reduce operating costs, reuse or recycle, and move forward with the rest of the Nation?" (To see how, go to: http://www.emnrd.state.nm.us/OCD and see "Publications")

From: Chavez, Carl J, EMNRD
Sent: Monday, June 22, 2020 4:03 PM
To: : 'Sandoval, Alexandra J., DGF' <alexandra.sandoval@state.nm.us>; Wunder, Matthew, DGF <Matthew.Wunder@state.nm.us>; 'Shije, Suzette, IAD' <Suzette.Shije@state.nm.us>; ddapr@nmda.nmsu.edu; James_Amos@blm.gov; psisneros@nmag.gov; r@rthicksconsult.com; sric.chris@earthlink.net; nmparks@state.nm.us; Blaine, Tom, OSE <Tom.Blaine@state.nm.us>; marieg@nmoga.org; Fetner, William, NMENV <william.fetner@state.nm.us>; lazarus@glorietageo.com; perry@glorietageo.com; cjoyner@fs.fed.us; Pierard, Kevin, NMENV <Kevin.Pierard@state.nm.us>; bsg@garbhall.com; Hunter, Michelle, NMENV <Michelle.Hunter@state.nm.us>; claudette.horn@pnm.com; ekendrick@montand.com; pam@ipanm.org; Bratcher, Mike, EMNRD <mike.bratcher@state.nm.us>; Kelly, Jonathan, EMNRD <Jonathan.Kelly@state.nm.us>; Powell, Brandon, EMNRD <Brandon.Powell@state.nm.us>; Torres, Susan, EMNRD <Susan.Torres@state.nm.us>; Polak, Tiffany, EMNRD <Tiffany.Polak@state.nm.us>; sgarciarichard@slo.state.nm.us
Cc: Tulk, Laura, EMNRD <Laura.Tulk@state.nm.us>; Lujan, Elizabeth, EMNRD <Elizabeth.Lujan@state.nm.us>; gjmccartney@marathonpetroleum.com; Devin Hencmann <dhencmann@ltenv.com>; Stuart Hyde <shyde@ltenv.com>
Subject: Marathon Petroleum Company, L.P. Former Giant Bloomfield Refinery (GW-40) in San Juan County: WQCC Application Administratively Complete

Ladies and Gentlemen:

The New Mexico Oil Conservation Division (OCD) recently deemed the Water Quality Control Commission- WQCC Former Giant Bloomfield Refinery Discharge Permit Abatement Application for Marathon Petroleum Company, L.P. application to be "**administratively complete**" under 20.6.2.3108 NMAC.

The OCD public notice is scheduled to post in the Sunday, July 12, 2020 editions of the Farmington Daily Times and Albuquerque Journal. OCD will allow at least 30-days from the date of the newspaper postings for the public comment period to be completed. The OCD draft permit will be posted on or before the post date. The final discharge permit, if issued, is subject to completion of the technical review process with additional notice to stakeholders. If there are any changes made by OCD to the original draft permit, if issued, OCD will allow for an additional 30-days for the appeal period to elapse under 20.6.2.3112 NMAC before permit issuance.

New Discharge Permit Marathon Petroleum Company LP (GW-40) Former Giant Bloomfield Refinery (6/22/2020)

Western Refining Southwest, Inc.: Abatement of Groundwater and Vadose Zone Contamination under Water Quality Control Commission- WQCC 20.6.2.3114 NMAC Discharge Permit Application
The former Giant Bloomfield Refinery (GBR) Facility is located in the NW/4 of Section 27, and SW/4 of Section 22, Township 29 North, Range 12 West, NMPM, San Juan County, New Mexico. The facility may be found driving toward the northeast corner of United States Highway 64 and County Road 3500, approximately five miles west of Bloomfield, New Mexico.

Administratively Complete (6/19/2020)
Description (6/22/2020)
Application (5/13/2020)
Discharge Permit (Draft to be posted soon)
Public Notice (Estimated OCD date: Sunday 7/12/2020)

Please click on the OCD draft discharge permit web link at http://www.emnrd.state.nm.us/OCD/env-draftpublicetc.html to keep apprised of updates and for access to OCD Online Web based information resources.

Please contact me at (505) 660-7923 or E-mail: CarlJ.Chavez@state.nm.us if you have questions or require further assistance.

Thank you.

Mr. Carl J. Chavez, CHMM (#13099)
New Mexico Oil Conservation Division (Albuquerque Office)
Energy Minerals and Natural Resources Department
5200 Oakland Avenue, NE
Albuquerque, New Mexico 87113
Ph. (505) 660-7923
E-mail: CarlJ.Chavez@state.nm.us
"Why not prevent pollution, minimize waste to reduce operating costs, reuse or recycle, and move forward with the rest of the Nation?" (To see how, go to: http://www.emnrd.state.nm.us/OCD **and see "Publications")**

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1201 ELM STREET, SUITE 500
DALLAS, TEXAS 75270

via Email to carlj.chavez@state.nm.us

Date: August 10, 2020

Carl Chavez
New Mexico Oil Conservation Division
Energy, Minerals & Natural Resources Department, Environmental Bureau
5200 Oakland Avenue, NE
Albuquerque, New Mexico 87113

Re: Lee Acres Landfill Superfund Site
EPA Comments on the 2020 Discharge Permit and Permit Application for the Marathon Petroleum Company LP (GW-40) Former Giant Bloomfield Refinery

Dear Mr. Chavez:

The U.S. Environmental Protection Agency (EPA) Region 6 office has completed its review of the Marathon Petroleum Company LP (GW-40) Former Giant Bloomfield Refinery Discharge Permit Application along with the New Mexico Oil Conservation Division's (OCD) issued Discharge Permit to the GW-40 facility.

EPA looks forward to continued coordination with your agency and the opportunity to review the annual report submitted by Marathon for the GW-40 facility, which is required to be submitted to the OCD on or before June 15th of ech year. Please see the enclosed comments.

If you have any questions regarding this matter please contact me at (214) 665-3179 or via e-mail at ho.nancy@epa.gov .

Sincerely,

NANCY HO
Digitally signed by NANCY HO
DN: c=US, o=U.S. Government, ou=Environmental Protection Agency, cn=NANCY HO, 0.9.2342.19200300.100.1.1=68001003655648
Date: 2020.08.10 14:18:41 -05'00'

Nancy Ho
Project Manager
Superfund and Emergency Management Division

Enclosure (1)

cc: Sarah (Maggie) Ogden, Ground Water Quality Bureau – Superfund Oversight Section, NMED
Leigh (Whitney) Thomas, Bureau of Land Management
Tiffany Polak, Environmental Director (Acting for Vacant Bureau Chief Position), NM OCD

EPA Comments
on the
Discharge Permit Application dated May 13, 2020 and Application Addendum dated July 16, 2020 for the Marathon Petroleum Company LP (GW-40) Former Giant Bloomfield Refinery

1. Background Concentrations (Section 12.1 Pages 13-14) – The first paragraph of this section states, *"…elevated concentrations of several constituents are present due to the offsite migration of contaminants originating from the Lee Acres Landfill Superfund site."*

   EPA notes the Record of Decision for the Lee Acres Landfill site determined the Giant Bloomfield Refinery lost approximately 45,000 barrels of refined product into the soils and groundwater from 1975 to 1984. EPA notes it could be likely the elevated concentrations of several constituents at the GBR facility are due to existing historical contamination present at and from the GBR site rather than offsite migration from the Lee Acres Landfill Site. Petroleum hydrocarbons are known to persist in the environment for several decades. In addition, the final Lee Acres Landfill Remedial Investigation report found the area south of GBR-24 (with wells in the northern part within this defined area as having floating product attributed to activities by GBR). Subsequent Lee Acres Landfill cover monitoring inspection historical reports including from 2019 and 2020 indicate the cover is in good condition and appears to be working properly. Please see the following studies which may also assist Marathon in determining migration of contaminants and in refining assumptions and inputs used for statistical analyses for creating "background" levels of contaminants at its facility. These studies discuss higher manganese and dissolved organic carbon concentrations near rivers; the occurrence of manganese reduction and mobilization associated with certain conditions, including reducing conditions due to biodegradation of residual crude oil causing reductive dissolution of manganese from aquifer sediments.

   Elevated Manganese Concentrations in United States Groundwater, Role of Land Surface–Soil–Aquifer Connections
   Peter B. McMahon, Kenneth Belitz, James E. Reddy, and Tyler D. Johnson
   Environmental Science & Technology **2019** *53* (1), 29-38
   DOI: 10.1021/acs.est.8b04055

   Reductive Dissolution and Precipitation of Manganese Associated with Biodegradation of Petroleum Hydrocarbons
   Leslie A. Klinchuch and Thomas A. Delfino
   Environmental Geosciences 2000 Volume 7, Number 2.

2. Section 14 – Facility Closure and Post Closure Plan – The first paragraph states that groundwater will be sampled for chemical analyses annually when the facility is in operation. The second paragraph

states "once eight consecutive quarters with groundwater contaminants below applicable standards is documented, facility closure will be requested from the NMOCD…". EPA recommends the GBR's chemical analyses results be below NMWQCC standards instead of the currently proposed GBR Background Threshold Values as the determining factor for facility closure proposal. Furthermore, EPA recommends there be at least eight consecutive quarters from calendar year 2021 of chemical analytical data that are below NMWQCC standards instead of solely two sample sets of annual chemical analytical data prior to proposal for facility closure. Note the Bureau of Land Management will conduct a multi-year groundwater study beginning in 2020/2021 with an estimated completion before 2025 at the Lee Acres Landfill site that may have findings to assist Marathon in developing its Stage 2 Abatement Plan.

3. Appendix A GBR Background Threshold Values: It appears the method for determining the GBR Background Threshold Values was determined by using data from wells potentially affected by petroleum hydrocarbon contamination at the site. Note the method for determining background concentrations at the Lee Acres Landfill site was determined by using sampling data from sites unaffected by activities at the landfill. This means inherently the GBR background threshold values proposed would be of higher values if data was not used solely from unaffected petroleum hydrocarbon sample sites. EPA recommends the proposed background threshold values utilized be calculated by using data from wells from locations unaffected by man-made contamination.

4. Stage 1 Abatement Plan – Section 3.0 Current Site Conditions – The last sentence of this paragraph states,
"With no active source, the residual contaminants are not likely to migrate with or without the hydraulic barrier introduced by the remediation system."

EPA notes the current plan does not consider the role of land-surface-soil aquifer connections that can cause residual contaminants to migrate. See previous studies mentioned above.

5. Stage 1 Abatement Plan – Section 4.0 Recommendations – Second paragraph – LTE proposed sampling be ceased at wells that have at least eight quarters of analytical results with no exceedances of NMWQCC standards and/or background concentrations. EPA recommends the GBR's chemical analyses results be below NMWQCC standards instead of the currently proposed GBR Background Threshold Values as the determining factor to cease sampling.

6. Stage 2 Abatement Plan – EPA looks forward to continued coordination with NMOCD and opportunity to review and comment on the Stage 2 Abatement Plan.

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Revised August 1, 2011

Submit Original
Plus 1 Copy
to Santa Fe
1 Copy to Appropriate
District Office

DISCHARGE PLAN APPLICATION FOR SERVICE COMPANIES,GAS PLANTS, REFINERIES, COMPRESSOR, GEOTHERMAL FACILITES AND CRUDE OIL PUMP STATIONS

(Refer to the OCD Guidelines for assistance in completing the application)

[X] New [ ] Renewal [ ] Modification

1. Type: Discharge Permit
2. Operator: Western Refining Southwest, Inc.

   Address: 111 County Road 4990, Bloomfield NM 87413

   Contact Person: Greg McCartney Phone: 419-310-4888
3. Location: NW 1/4 /4 SW1/4 /4 Section 22 & 27 Township 29N Range 12W

   Submit large scale topographic map showing exact location.
4. Attach the name, telephone number and address of the landowner of the facility site. SECTION 2.0
5. Attach the description of the facility with a diagram indicating location of fences, pits, dikes and tanks on the facility. SECTION 5.0
6. Attach a description of all materials stored or used at the facility. SECTION 6.0
7. Attach a description of present sources of effluent and waste solids. Average quality and daily volume of waste water must be included. SECTION 7.0
8. Attach a description of current liquid and solid waste collection/treatment/disposal procedures. SECTION 8.0
9. Attach a description of proposed modifications to existing collection/treatment/disposal systems. SECTION 9.0
10. Attach a routine inspection and maintenance plan to ensure permit compliance. SECTION 10.0
11. Attach a contingency plan for reporting and clean-up of spills or releases. SECTION 11.0
12. Attach geological/hydrological information for the facility. Depth to and quality of ground water must be included. SECTION 12.0
13. Attach a facility closure plan, and other information as is necessary to demonstrate compliance with any other OCD rules, regulations and/or orders. SECTION 14.0

14. CERTIFICATIONI hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.

Name: Greg McCartney Title: Senior Environmental Professional

Signature: Gregory McCartney Date: March 27, 2020

E-mail Address: gjmccartney@marathonpetroleum.com

DISCHARGE PERMIT APPLICATION

FORMER GIANT BLOOMFIELD REFINERY
BLOOMFIELD, NEW MEXICO

MARCH 2020

Prepared for:

WESTERN REFINING SOUTHWEST, INC.
111 COUNTY ROAD 4990
BLOOMFIELD, NEW MEXICO 87413

Prepared by:

LT ENVIRONMENTAL, INC.
848 East Second Avenue
Durango, Colorado 81301
970.385.1096

A proud member of WSP

DISCHARGE PERMIT APPLICATION

FORMER GIANT BLOOMFIELD REFINERY
BLOOMFIELD, NEW MEXICO

Project Number: 095820002

Prepared by:	Stuart Hyde, LG LTE Project Geologist	March 27, 2020 Date
Reviewed by:	Ashley Ager, P.G. LTE Senior Geologist	March 27, 2020 Date

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FIGURES

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APPENDICES

1.0 DISCHARGE PERMIT TYPE

Western Refining Southwest, Inc. (Western) proposes the potential discharge of water derived from wells at the inactive former Giant Bloomfield Refinery (GBR) in San Juan County, New Mexico. Monitoring and recovery wells were installed as part of site characterization activities and as a remedial action (groundwater recovery and treatment) to address groundwater contamination associated with historical releases of diesel fuel on the GBR property. For the purposes of this document, the "Site" is considered to be the lateral and vertical extents of contamination related to historical diesel-fuel releases originating from the GBR property. The "Facility" is considered the groundwater recovery and treatment system, as well as the existing water-discharge infrastructure, located on the GBR property.

Since 2015, no water has been discharged at the Facility. However, additional groundwater sampling is planned as part of additional characterization proposed for the Site per the *Stage 1 Abatement Plan* prepared by LT Environmental (LTE). Depending on the results of the additional sampling, the groundwater recovery and treatment system may be reactivated and require the discharge of treated effluent into the existing infiltration trenches located at the Site.

2.0 OPERATOR INFORMATION

The landowner, operator and legally responsible party is as follows:

Western Refining Southwest, Inc.
539 South Main Street, Room M-7081
Findlay, OH 45840
Phone: (419) 421-2338

Correspondence regarding this discharge plan should be directed to the local representative:

Gregory McCartney
Senior Environmental Professional
Marathon Petroleum Company LP
539 South Main Street, Room M-7081
Findlay, OH 45840
Phone: (419) 310-4888

3.0 LOCATION

The Facility is located on the northeast corner of United States Highway 64 and County Road 3500, approximately five miles west of Bloomfield, New Mexico, in the southwest quarter of Section 22 and the northwest quarter of Section 27, Township 29 North, Range 12 West in San Juan County, New Mexico (Figure 1).

4.0 LANDOWNER INFORMATION

The landowner, operator and legally responsible party is as follows:

Western Refining Southwest, Inc.
539 South Main Street, Room M-7081
Findlay, OH 45840
Phone: (419) 421-2338

5.0 FACILITY DESCRIPTION

The Facility consists of the former Giant Bloomfield Refinery storage tanks and equipment, as well as the remedial equipment installed for recovery, treatment, and discharge of groundwater from the Site (pumps, piping, and treatment system). The refinery operated from 1974 to 1982 and is presently inactive. A remediation system was installed in stages beginning in 1988 and has gradually been simplified over time. The remediation system was designed to treat groundwater affected by various releases during operation of the former refinery and periodic spills at the truck unloading facility. The remediation system consists of a series of groundwater monitoring wells, groundwater recovery wells, water treatment equipment, and treated-water infiltration trenches. During operation, the treatment system could process up to 5,000,000 gallons of water per year. Currently, the Facility and associated equipment is located within the GBR property boundary. The location of the current Facility equipment is shown on Figure 2.

6.0 STORED MATERIALS

The refinery is no longer in operation and there are no stored materials located at the Facility.

7.0 EFFLUENT SOURCES

The effluent will be derived from groundwater pumped from a series of recovery wells at the Site. Groundwater in several areas of the Site is impacted by petroleum hydrocarbons. However, the recovered water will be treated prior to discharge (see Section 8.0). Table 1 presents the analytical results of the influent and effluent water in 2015 prior to shut-down of the remediation system. Up to 420,000 gallons of water was previously treated and discharged per month.

8.0 WATER COLLECTION, TREATMENT, AND DISPOSAL

8.1 WATER COLLECTION

At the Facility, petroleum hydrocarbon-impacted groundwater and phase-separated hydrocarbons (PSH) may be pumped from the shallow aquifer through a series of recovery wells located within the formerly defined contaminant plume associated with the Site. Locations of previously used recovery wells are shown in Figure 2 and are identified by the acronym GRW (Giant Recovery Well), followed by a numerical designation. There may be solid filters in each recovery well enclosure to control deposition of solid contaminants in the system. Flow meters will be installed to monitor volumes of groundwater recovered.

8.2 WATER TREATMENT

Recovered water exhibiting dissolved phase contaminants and/or PSH above New Mexico Water Quality Control Commission (NMWQCC) regulatory standards require treatment to within applicable guidelines prior to discharge. A carbon adsorption process formerly was utilized for water treatment prior to discharge and is available for future use, if appropriate. This process removes contaminants from the groundwater by forcing it through tanks containing activated carbon treated to attract the contaminants. Figure 3 presents a simplified representation of the groundwater recovery and treatment system at the Site. Figure 4 details the carbon adsorption tank and associated piping used at the refinery.

8.2.1 Tank 102

Depending on the volume recovered, Tank 102 (capacity of 500 barrels, or 21,000 gallons) may be used as an intermediate storage tank for the water treatment system. The tank can store water before it is treated.

8.3 WATER DISCHARGE

Once treated, water can be discharged to an infiltration trench located within the Site boundary. Infiltration trenches consist of subsurface distribution systems placed within gravel packs. Water infiltrates into the surrounding strata and eventually makes its way to the shallow aquifer. Figure 5 illustrates a typical infiltration gallery. The return of treated water to the aquifer serves to recharge the aquifer.

9.0 PROPOSED MODIFICATION OF EXISTING COLLECTION, TREATMENT, AND DISPOSAL SYSTEMS

No modifications of the existing collection, treatment, and/or disposal systems are requested at this time. Following completion of a Stage 1 Abatement Plan, changes may be proposed in a Stage 2 Abatement Plan.

10.0 INSPECTION AND MAINTENANCE PLAN

When in operation, inspection and maintenance are an integral part of the remediation system. Inspection provides information critical to the safe and efficient operation of the system. Maintenance is key in the prevention of undesirable events and excessive downtime. Regular inspections are performed to assure safe and efficient operation. During operation, the system will be monitored on a regular basis during the work week. Observations will be recorded in a bound field logbook with the date, time, and person recording the information noted.

During operation, an inspection will be made weekly in the control building, at the storage tank, and each recovery well. All equipment will be inspected for leaks and malfunctions. The operator will be familiar with the location of underground lines and note any surface indication of underground leaks. Leaks of any size will be noted and repaired. Readings from all water meters will be observed and recorded in the logbook regularly, and comparisons to previous readings will be made. Abnormal meter readings can indicate problems within the system. On a semi-annual basis, the level of water and product is determined for each monitoring and recovery well. An electronic water/oil detection tape is used to determine levels. The data will be recorded in a logbook.

Maintenance of the Facility will include replacement of filters in well houses, lubrication of rotating equipment, air compressor oil changes, addition of nutrients as necessary, observations of unusual pump and motor noise, inspection of the carbon pre-filter, and repair of any equipment as required. Water volumes removed from each recovery well will be metered. Metered water volumes, as well as water levels, indicate the effectiveness of the well pump and controls. Efforts will be made to maintain consistent pumping rates.

An inspection and maintenance schedule and checklist will be provided with the Stage 2 Abatement Plan.

11.0 SPILLS AND RELEASE CONTINGENCY PLAN

In the event of an unplanned release of water or hydrocarbon at the Facility, the Western Project Manager should be notified and act as the response coordinator. If the Project Manager is not available, the next person noted in the following list of alternates should be notified.

INTERNAL EMERGENCY NOTIFICATIONS

- **24-hour Emergency Line:** 1-888-658-8006
- **Tommy D. Roberts – Facility Supervisor**

  Mobile: 505-801-0421

  Office: 505-632-4195
- **Frank Dooling - Operations**

  Mobile: 505-634-6138

  Office: 505-632-4142

EMERGENCY RESPONSE CONTRACTORS

- **EnviroTech Inc. / Emergency Spill Response Contractor**

  5796 U.S. Highway 64

  Farmington, New Mexico 87401

  24 Hour Emergency Response: 1-800-362-1879
- **H2O Environmental / Emergency Spill Response Contractor**

  2634 S Airport Blvd #2

  Chandler, Arizona 85286

  24 Hour Emergency Response: 480-855-5676

If it is determined that the release is 5 barrels or greater, the OCD will be notified and a written report submitted. Leaks occurring outside of tank containment berms should be contained or redirected so that they can be picked up by pumps or vacuum trucks and placed back in storage. In the event of a broken pipe, the leaking section should be isolated by closing necessary valves and shutting down pumps.

11.1 SPILL AND LEAK PREVENTION AND MONITORING

Leaks and spills are not likely; however, the potential does exist for these events. Tanks and piping are the most likely locations for leak and/or spills. Safeguards in place in the refinery include choice of construction materials, safety and shutdown devices, secondary containment, inspection and security.

11.1.1 Construction Materials

All piping is and will be constructed of PVC or other hydrocarbon and corrosion resistant plastic. Material choices for valves and controls include plastic, stainless steel, bronze and cast iron. All are suitable for water and hydrocarbon service. Storage Tank 102 is constructed of steel.

11.1.2 Safety and Shutdown Devices

All storage tanks are equipped with high- and low-level liquid sensors to detect breaches or overfills. Any treatment system installed may be equipped with an emergency shutoff.

11.1.3 Secondary Containment

Tank 102 has viable earthen secondary containment berms in place. The bermed area has a minimum liquid capacity of 1.5 times the total capacity of the tank contained within it. Berms are monitored and maintained to ensure effectiveness.

11.1.4 Inspection

During system operation, regular inspections will be performed during the work week. These inspections include looking for visual indications of leaks, checking tank levels, recording and comparing meter readings and checking the condition of pump seals and motors. Unusual conditions are noted in the logbook and reported to the Project Manager.

11.1.5 Security

The facility is entirely fenced with chain link or barbed wire. Gates are locked and access is limited to facility personnel and supervised visitors and contractors.

12.0 GEOLOGICAL/HYDROLOGICAL INFORMATION

The Facility and Site are located on weathered outcrops of Nacimiento Formation, which is comprised of shales, sandstones and siltstones of Cretaceous-Tertiary age. Immediately to the west of the Facility and on Western's property is a large unnamed arroyo, which is underlain by 30 to 60 feet of Quaternary alluvial sediments. Older Quaternary terrace deposits of cobbles and boulders are observed on the interfluvial ridges adjacent to the arroyo. These terrace deposits may have been utilized as fill on the refinery site. The San Juan River Valley is located south of the site and contains up to several hundred feet of alluvial fill.

The uppermost zone of ground water in the refinery area is unconfined to partially confined water table unit, which is hosted by the weathered, locally porous sandstones and shales of the Nacimiento Formation and arroyo alluvium. These units merge hydrologically with the San Juan River alluvium to the south. Figures 6 and 7 present generalized cross sections through the refinery site showing the relationship of the arroyo alluvium to bedrock. Major hydrogeologic features of the site are:

- An interconnected water table aquifer hosted by both valley and arroyo fill and the upper parts of the Nacimiento Formation;
- Ground water at a depth of 30 to 70 feet beneath the land surface;
- An upper water table surface generally conforming to topography, with ground water flow from north or northeast to south (towards the San Juan River) through the refinery area;
- Minor, local zones of perched ground water lying 5 to 10 feet above the water table.

Water levels and floating product thicknesses were measured in all wells at the Site during 2019. A record of these measurements is shown in Table 2. A groundwater contour map was prepared based on the static water levels of all the wells at the Site in November 2019 (Figure 8). This map is representative of static conditions of the aquifer because pumping currently is not being performed on wells at the Site. Where floating product was encountered, the product thickness has been multiplied by 0.8 and added to the measured water elevation. This calculation corrects for the difference in density between floating product and water.

12.1 BACKGROUND CONCENTRATIONS

As discussed in the *Stage 1 Abatement Plan* prepared for the Site (LTE, 2020), several constituents are present at the Site at concentrations exceeding NMWQCC standards. However, based on concentrations detected in wells hydrogeologically upgradient of the Site, elevated concentrations of several constituents are present due to the offsite migration of contaminants originating from the Lee Acres Landfill Superfund site. Specifically, chloride, chromium, iron, sulfate, and TDS concentrations are present in groundwater at and downgradient of the Lee Acres Landfill at concentrations above NMWQCC standards; however, these constituents were not considered during the remediation-selection process outlined in the *Record of Decision* for the Superfund site (EPA, 2004). In addition to these constituents, manganese (considered a COC for the Lee Acres Landfill Superfund site) also is found at concentrations above NMWQCC standards. These constituents have long been detected at the Site in upgradient wells GBR-32, GBR-48, GBR-49, and

GBR-50, located hydrogeologically upgradient of the source areas at the Site (identified on Figure 2) and downgradient of the Lee Acres Landfill Superfund site.

In June 2019, LTE performed a statistical analysis using ProUCL software (developed by the United States Environmental Protection Agency, or EPA) to develop “background” concentrations for the following constituents migrating onto the Site: chloride, chromium, iron, manganese, sulfate, and TDS. Table 3 presents the results of the statistical analysis and groundwater analytical results for these constituents detected between 2010 and 2018. Table 3 also presents the cleanup standards (or “remedial goals”) established for the Lee Acres Landfill Superfund site in their *Remedial Investigation Report* (BLM, 1992) and *Record of Decision* (EPA, 2004). Appendix B presents the assumptions and inputs used for the statistical analysis. Appendix B also includes a letter prepared by LTE summarizing our findings that was provided to the EPA for their five-year review of the Lee Acres Landfill Superfund site (conducted in 2019).

12.2 FLOODING POTENTIAL

The greatest threat to flooding of the Facility are the San Juan River (located less than one mile south of the site) and the unnamed arroyo located within the Site itself. History suggests flooding potential of the San Juan River is small. From 1904 until 1976, only 23 flood events (on individual streams, not concurrent on all streams) have been recorded. According to a study conducted by the New Mexico Floodplain Managers Association (2003), previous floods of the San Juan River resulted from general rainstorms, snowmelt augmented by rain, and from cloudburst storms. Rain floods usually occur during the months of September and October. This type of flood results from prolonged heavy rainfall over tributary areas and is characterized by high peak flows of moderate duration. Major floods (recurrence interval of 100 or more years) result from excessive snowmelt runoff generated in the watershed upstream from Bloomfield. Flood flows generated by snowmelt generally occur during the period from May through July. Snowmelt flooding is characterized by moderate peak flows, large volume and long duration, and marked diurnal fluctuation in flow. The refinery is elevated above the floodplain of the San Juan River, decreasing the chance of a river flood, such as the ones described above, from reaching the Facility.

The flooding potential of the arroyo is predicted to be low as well. Similar arroyos have been studied in detail near Farmington and are described as ephemeral in character, flowing only during periods of heavy rainfall (New Mexico Floodplain Managers Association, 2003). Furthermore, the arroyo’s influence on the Site and Facility has been decreased due to the construction of a new highway located between the arroyo and the refinery.

13.0 MONITORING AND REPORTING

When the Facility is in operation, influent/effluent and water samples will be collected on a monthly basis. Per the *Stage 1 Abatement Plan* (LTE, 2020) prepared for the Site, groundwater conditions also will be monitored through sampling of the existing Site monitoring wells. Based on the results of the Stage 1 sampling, a *Stage 2 Abatement Plan* and/or *Groundwater Monitoring Plan* will be prepared for the Site. At a minimum, appropriate wells will be gauged quarterly, with groundwater sampled for chemical analysis annually when the Facility is in operation. Constituents to be analyzed will be based on the results of the *Stage 1* and *Stage 2 Abatement Plans.*

A report of activities performed at the Facility will be prepared annually. The report will include an update of operations, analytical results, water levels, a potentiometric surface map, and discharge volume history. Reports and associated data will be retained by Western for a period of at least five years.

14.0 FACILITY CLOSURE PLAN

The NMOCD will be notified when operations at the Facility are discontinued for a period in excess of six months. In addition, prior to permanent closure of the Facility, a closure plan will be submitted for approval by the NMOCD. Closure and waste disposal will be conducted in accordance with the statutes, rules, and regulations in effect at the time of closure.

15.0 PERMIT RENEWAL

The Facility discharge permit will expire five years after NMOCD approval and notification of this application. Western will prepare and submit an application for discharge permit renewal at least 120 days before the discharge permit expires. If the renewal application is submitted at least 120 day prior to expiration, then the existing discharge permit for the same activity shall not expire until the application for renewal has been approved or disapproved by NMOCD.

16.0 PERMIT MODIFICATIONS

In the case of Facility expansion, increase in discharge, and/or other significant modifications to the discharge of water, Western will notify NMOCD in writing for review and approval prior to implementing the modification. An application and a description of the requested modifications will be included in the written notice.

Modifications to abatement or monitoring plans prepared to address pre-existing contaminants associated with the Site (as of March 2020) also will be submitted to NMOCD in writing for review and approval. These modifications will not require an application and will not be subject to permit fees as described in Table 1 of 20.6.2.3114 NMAC. However, filing and/or review fees may be applied as presented in Table 2 of 20.6.2.3114 NMAC.

17.0 REFERENCES

New Mexico Floodplain Managers Association, 2003, A History of Floods and Flood Problems in New Mexico, LA Bond Associates, High Rolls, New Mexico, 144 p.

United States Bureau of Land Management (BLM). (1992). Remedial Investigation Report for the Lee Acres Landfill. Albuquerque: US Bureau of Land Management.

United States Environmental Protection Agency (EPA). (2004). Record of Decision for the Lee Acres Landfill Superfund Site, Farmington, New Mexico.

18.0 CERTIFICATION

WESTERN REFINING SOUTHWEST, INC.
GIANT BLOOMFIELD REFINERY
BLOOMFIELD, NEW MEXICO

I certify that the information provided in the application is true, accurate, and complete to the best of my knowledge, after reasonable inquiry.

Signature: Gregory McCartney ______________________ March 27, 2020

Gregory McCartney
Senior Environmental Professional
gjmccartney@marathonpetroleum.com

Date

FIGURES

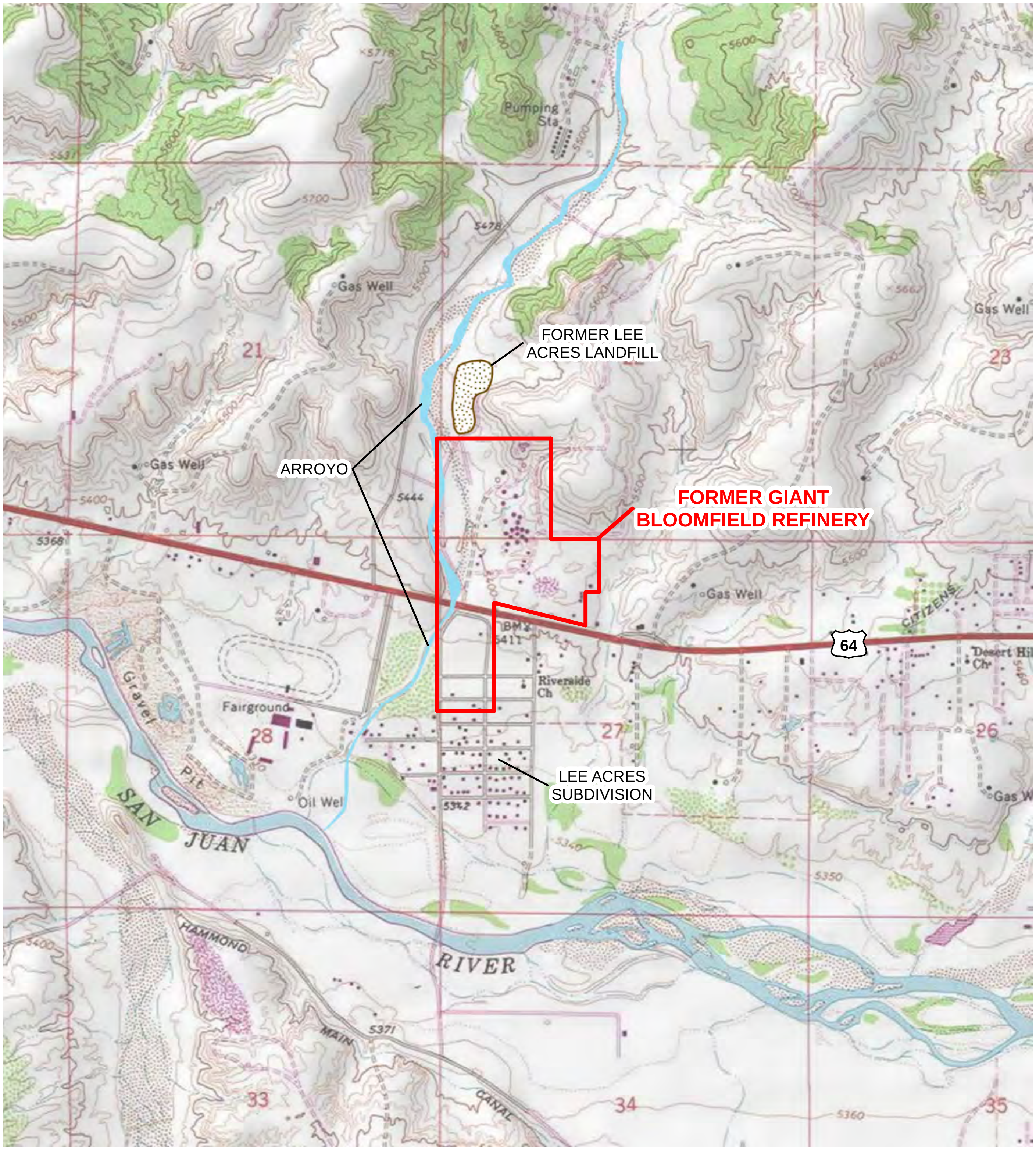

IMAGE COURTESY OF ESRI/USGS

LEGEND

SITE LOCATION

ARROYO

FORMER LEE ACRES LANDFILL

0 2,000 4,000

Feet

N

FIGURE 1
SITE LOCATION MAP
FORMER GIANT BLOOMFIELD REFINERY
SW SEC 22 & NW SEC 27 T29N R12W
SAN JUAN COUNTY, NEW MEXICO
WESTERN REFINING SOUTHWEST, INC.

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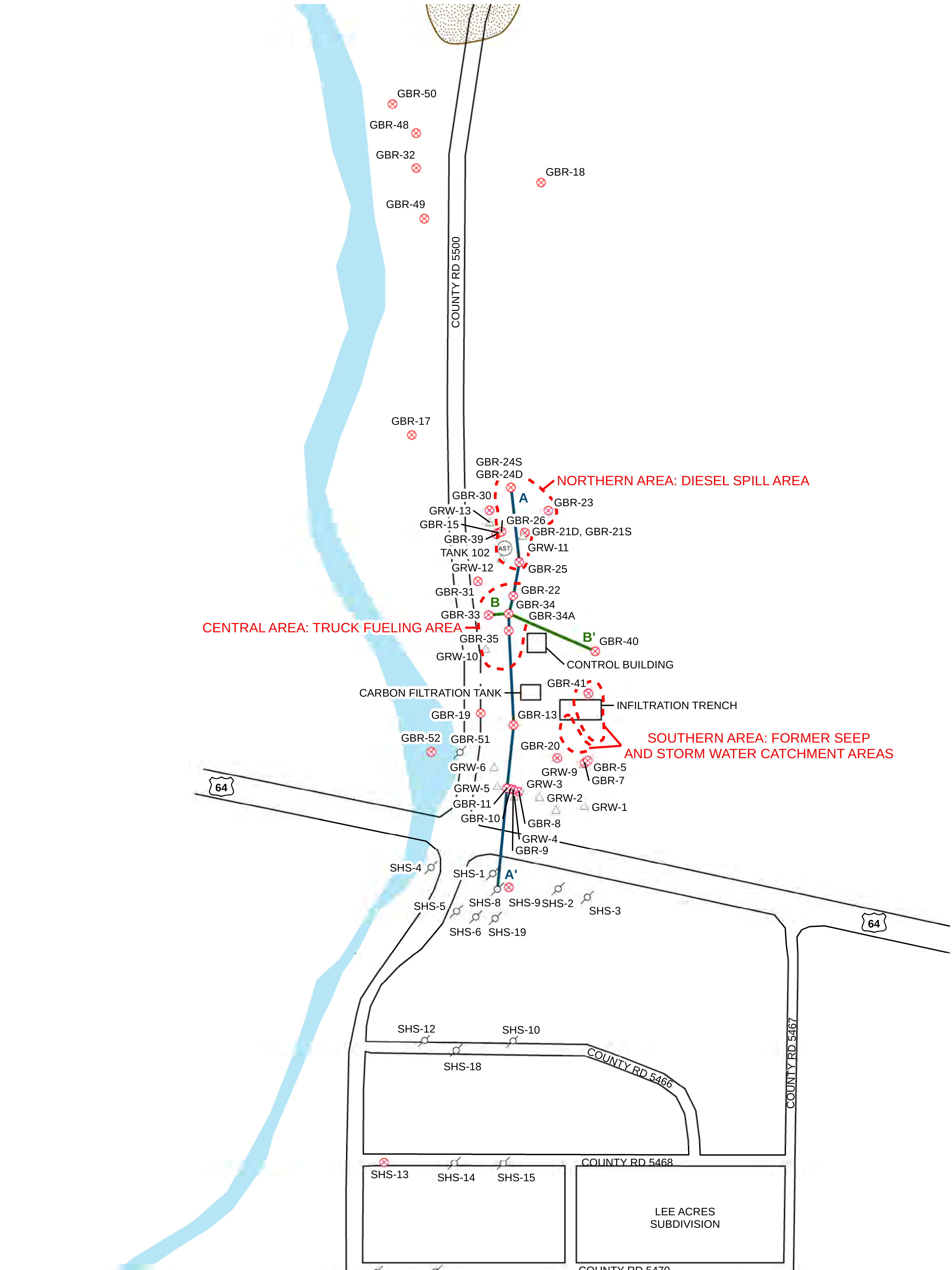

LEGEND

- MONITORING WELL
- INACTIVE RECOVERY WELL
- PLUGGED AND ABANDONED MONITORING WELL
- ABOVEGROUND STORAGE TANK (AST)
- CROSS SECTION A-A'
- CROSS SECTION B-B'
- ARROYO
- FORMER LEE ACRES LANDFILL
- SOURCE AREA

0 300 600
Feet

N

FIGURE 2
SITE MAP
FORMER GIANT BLOOMFIELD REFINERY
SW SEC 22 & NW SEC 27 T29N R12W
SAN JUAN COUNTY, NEW MEXICO
WESTERN REFINING SOUTHWEST, INC.

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FIGURE 3
SIMPLIFIED REPRESENTATION OF THE GROUNDWATER RECOVERY, TREATMENT, AND DISCHARGE SYSTEM
FORMER GIANT BLOOMFIELD REFINERY
SW SEC 22 & NW SEC 27 T29N R12W
SAN JUAN COUNTY, NEW MEXICO
WESTERN REFINING SOUTHWEST, INC.

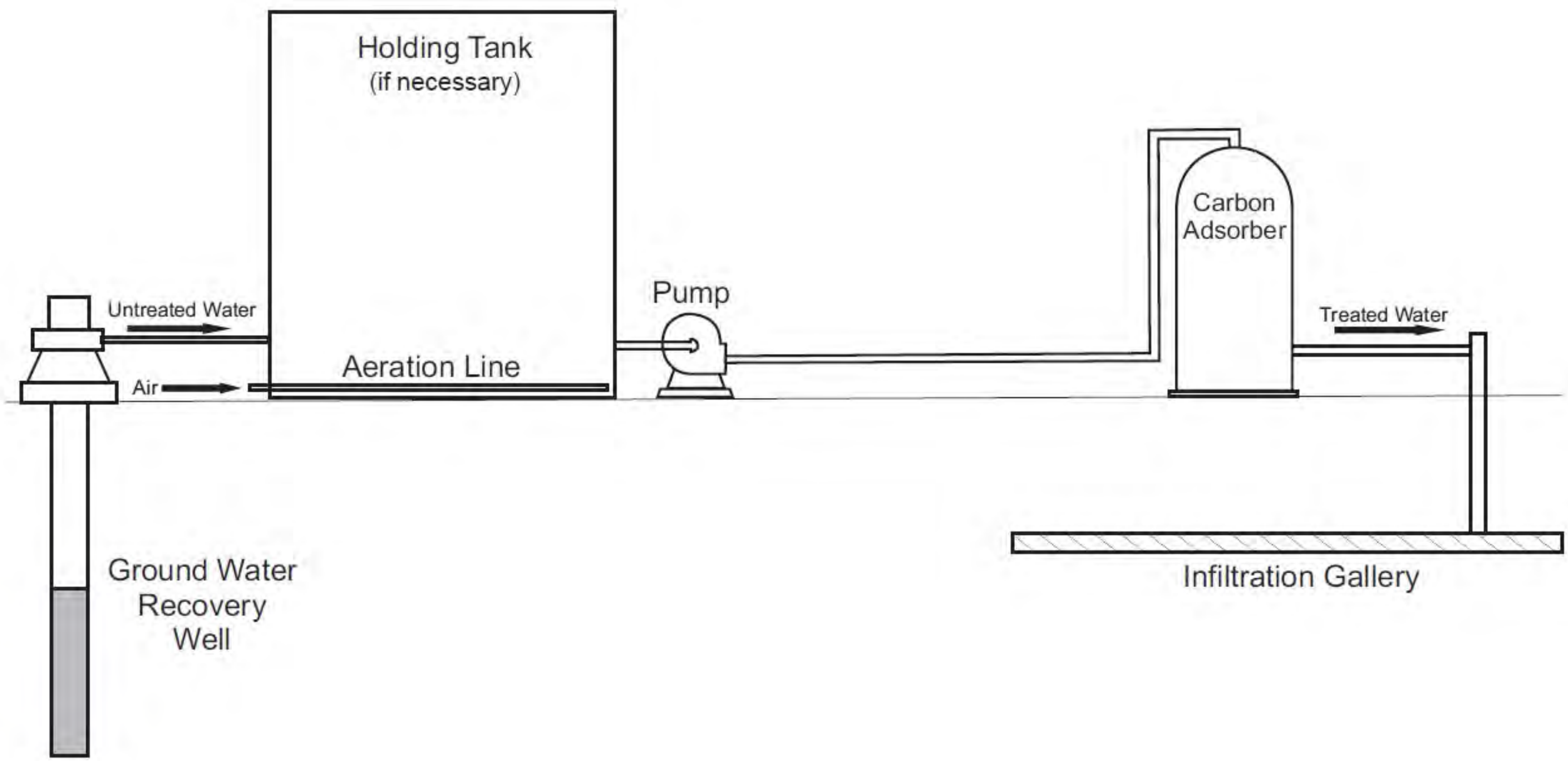


FIGURE 4

THE CARBON ADSORPTION SYSTEM

FORMER GIANT BLOOMFIELD REFINERY

SW SEC 22 & NW SEC 27 T29N R12W

SAN JUAN COUNTY, NEW MEXICO

WESTERN REFINING SOUTHWEST, INC.

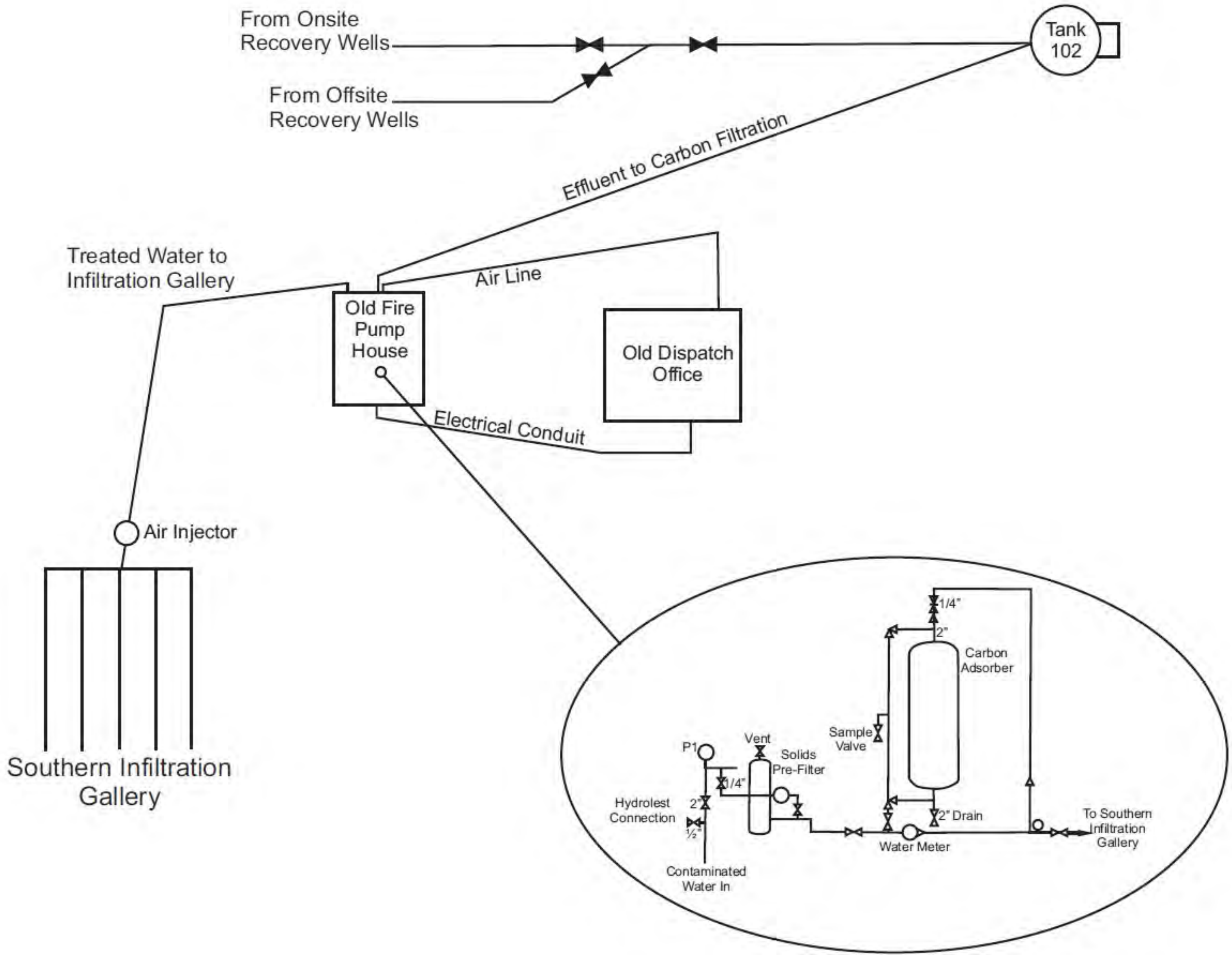
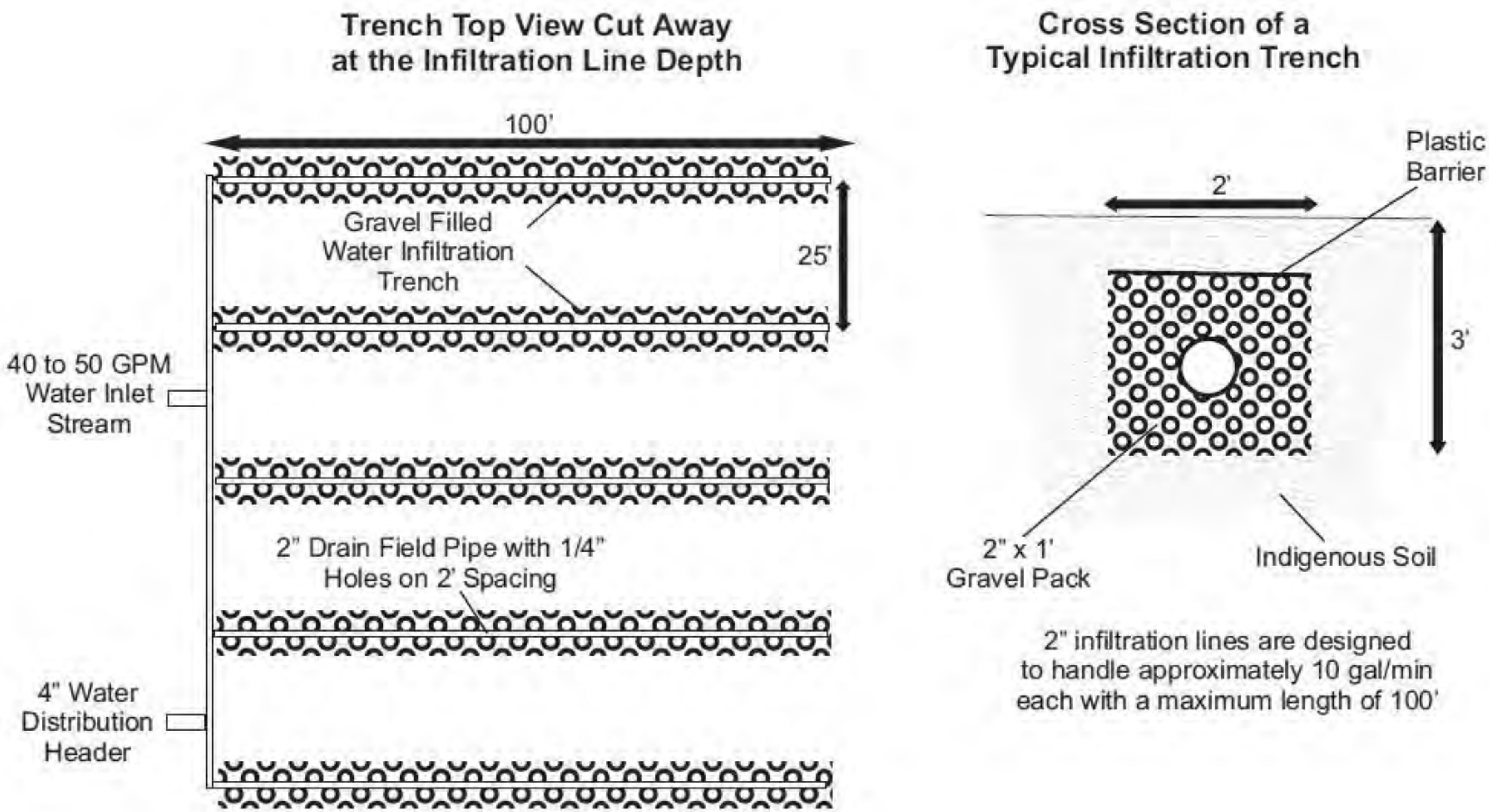
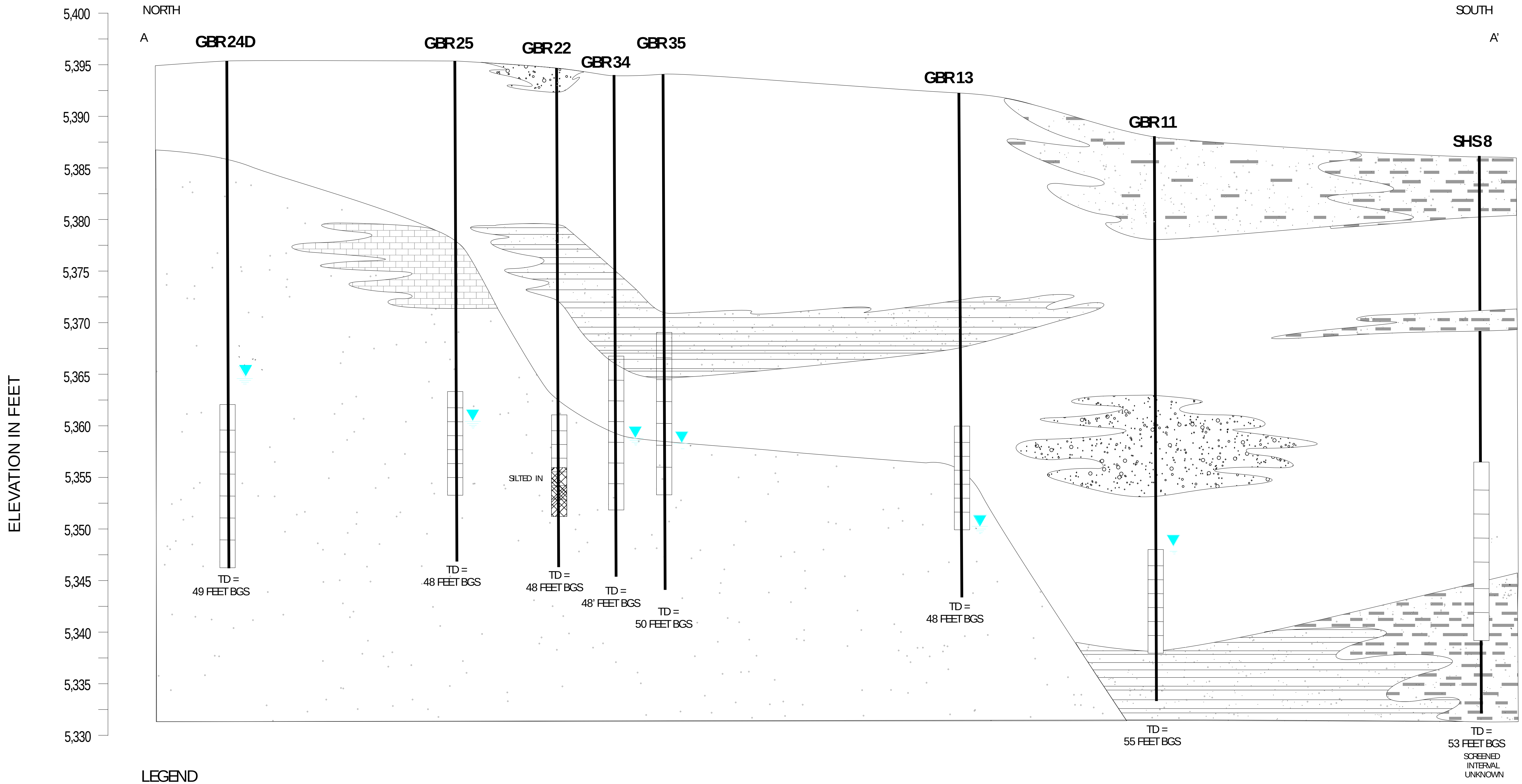


FIGURE 5
INFILTRATION TRENCH DESIGN AND CONSTRUCTION SPECIFICATIONS
FORMER GIANT BLOOMFIELD REFINERY
SW SEC 22 & NW SEC 27 T29N R12W
SAN JUAN COUNTY, NEW MEXICO
WESTERN REFINING SOUTHWEST, INC.





LEGEND

SANDY SILT
CLAYEY SAND
SILTY SAND
SAND
PEBBLES/GRAVEL
NACIMIENTO SHALE
NACIMIENTO SANDSTONE

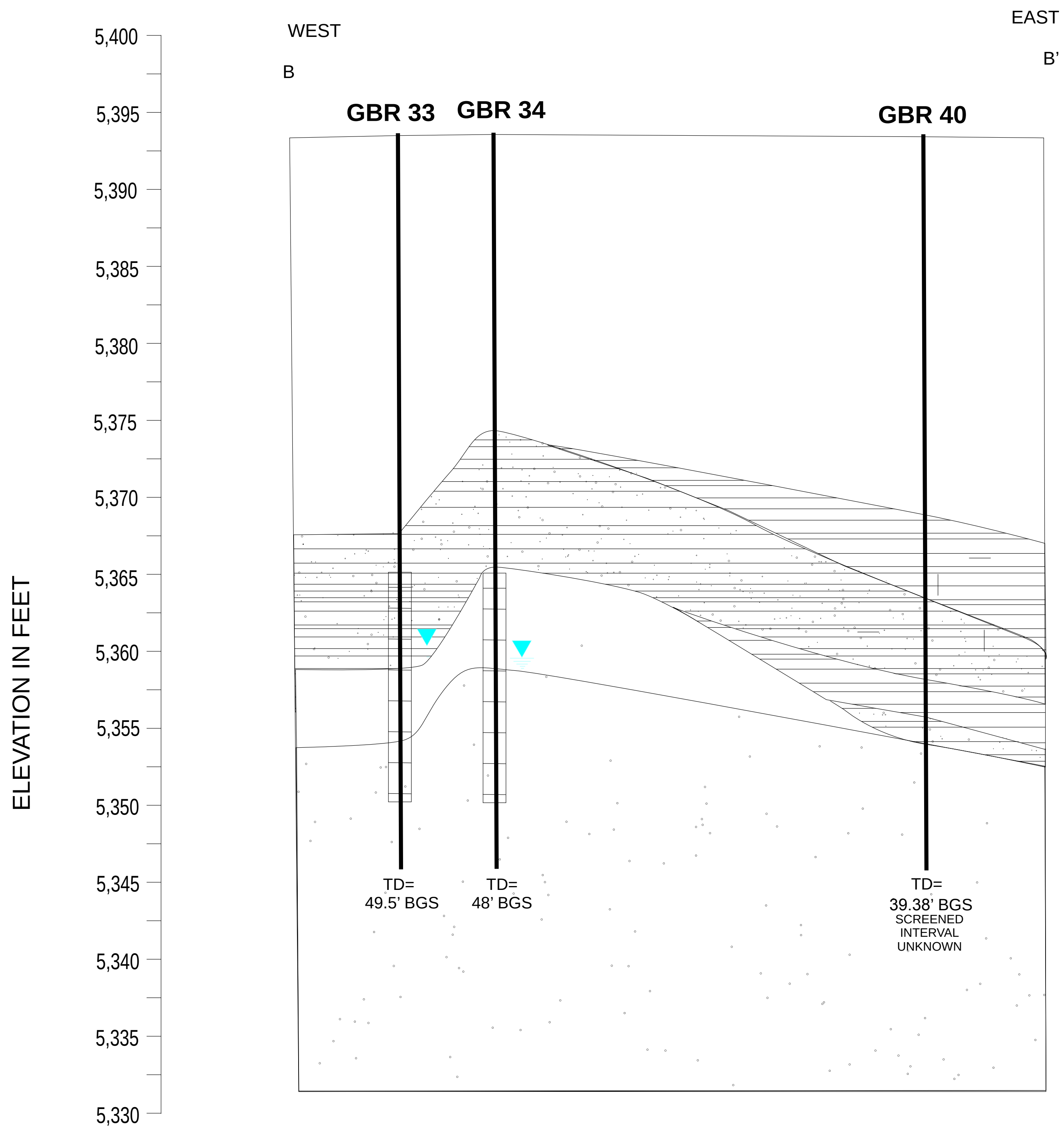
BOREHOLE
SCREENED INTERVAL
BGS BELOW GROUND SURFACE
TD TOTAL DEPTH IN FEET
GROUNDWATER ELEVATION FROM OCTOBER 2018

HORIZONTAL SCALE
1" = 10 FEET

VERTICAL SCALE
1" = 90 FEET

FIGURE 6
CROSS SECTION A-A'
FORMER GIANT BLOOMFIELD REFINERY
SWSW SEC 22 &WNW SEC 27 T29N R12W
WESTERN REFINING SOUTHWEST, INC.

WR1009 1/16



LEGEND

CLAYEY SAND
CLAY
SAND
NACIMIENTO SANDSTONE
DRY
BOREHOLE
SCREENED INTERVAL
BGS BELOW GROUND SURFACE
TD TOTAL DEPTH IN FEET

GROUNDWATER ELEVATION OCTOBER 2017

HORIZONTAL SCALE
1" = 10 FEET

VERTICAL SCALE
1" = 90 FEET

FIGURE 7
CROSS SECTION B-B'
FORMER GIANT BLOOMFIELD REFINERY
SWSW SEC 22 &WNW SEC 27 T29N R12W
WESTERN REFINING SOUTHWEST, INC.

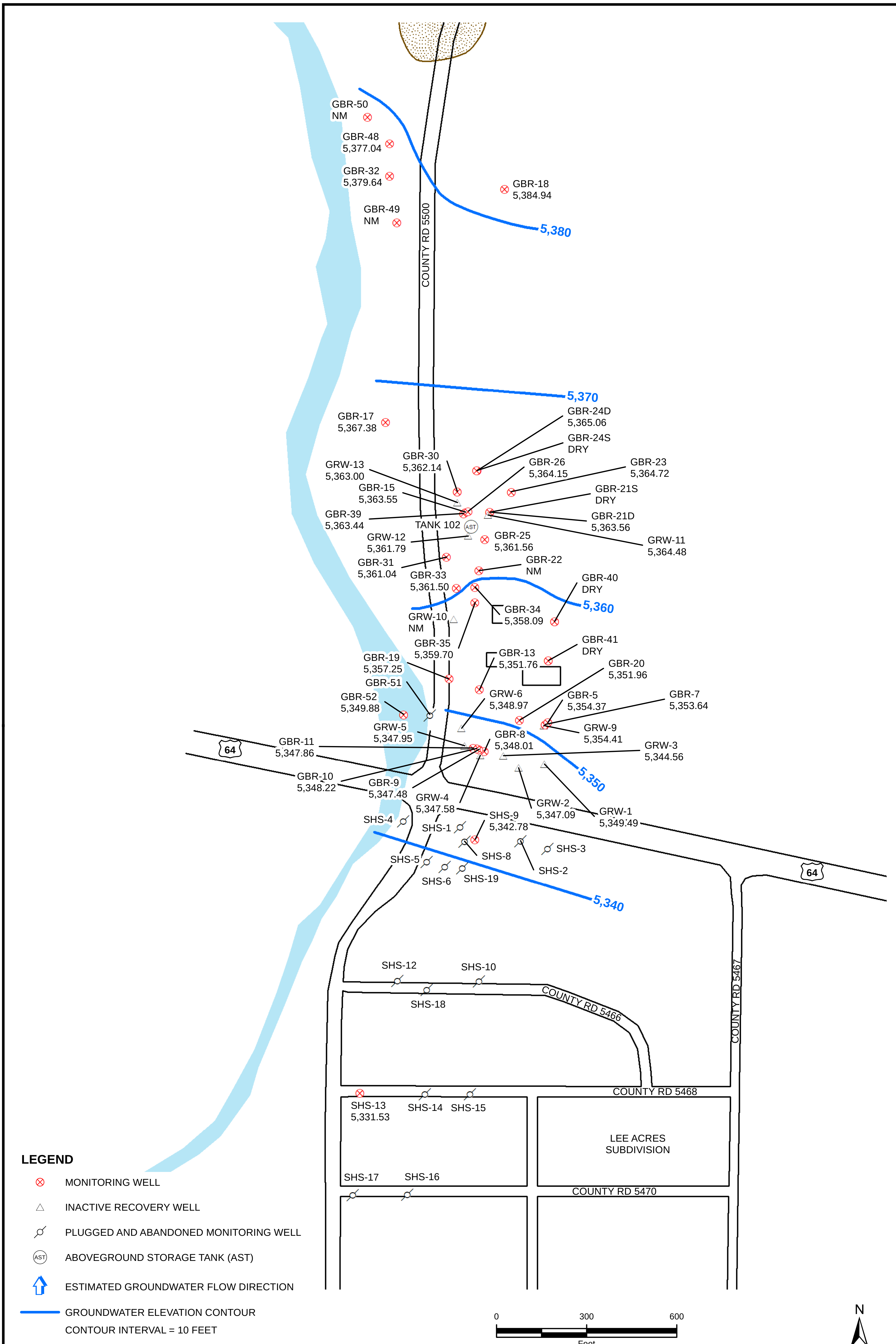


FIGURE 8
GROUNDWATER POTENTIOMETRIC SURFACE MAP (NOVEMBER 2019)
FORMER GIANT BLOOMFIELD REFINERY
SW SEC 22 & NW SEC 27 T29N R12W
SAN JUAN COUNTY, NEW MEXICO
WESTERN REFINING SOUTHWEST, INC.

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TABLES

TABLE 1
2015 INFUENT AND EFFLUENT ANALYTICAL RESULTS

FORMER GIANT BLOOMFIELD REFINERY
WESTERN REFINING SOUTHWEST, INC.
SAN JUAN COUNTY, NEW MEXICO

Analyte	NMWQCC Standard	Unit	Influent 27-Jan	Effluent 27-Jan	Influent 8-Apr	Effluent 8-Apr	Influent 24-Jul	Effluent 24-Jul	Influent 3-Aug	Effluent 3-Aug
USEPA Method 8260B: Volatiles										
benzene	**10**	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
toluene	**750**	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
ethylbenzene	**750**	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
methyl tert-butyl ether (MTBE)	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2,4-trimethylbenzene	**620**	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3,5-trimethylbenzene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-dichloroethane (EDC)	**10**	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-dibromoethane (EDB)	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
naphthalene	NE	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
1-methylnaphthalene	NE	µg/L	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
2-methylnaphthalene	NE	µg/L	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
acetone	NE	µg/L	<10	<10	<10	<10	<10	<10	<10	<10
bromobenzene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
bromodichloromethane	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
bromoform	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
bromomethane	NE	µg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
2-butanone	NE	µg/L	<10	<10	<10	<10	<10	<10	<10	<10
carbon disulfide	NE	µg/L	<10	<10	<10	<10	<10	<10	<10	<10
carbon tetrachloride	**10**	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
chlorobenzene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
chloroethane	NE	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
chloroform	**100**	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
chloromethane	NE	µg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
2-chlorotoluene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4-chlorotoluene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-DCE	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,3-dichloropropene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-dibromo-3-chloropropane	NE	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
dibromochloromethane	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
dibromomethane	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-dichlorobenzene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-dichlorobenzene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-dichlorobenzene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
dichlorodifluoromethane	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-dichloroethane	**25**	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-dichloroethene	**5**	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-dichloropropane	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-dichloropropane	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2,2-dichloropropane	NE	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
1,1-dichloropropene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

TABLE 1
2015 INFUENT AND EFFLUENT ANALYTICAL RESULTS

FORMER GIANT BLOOMFIELD REFINERY
WESTERN REFINING SOUTHWEST, INC.
SAN JUAN COUNTY, NEW MEXICO

Analyte	NMWQCC Standard	Unit	Influent 27-Jan	Effluent 27-Jan	Influent 8-Apr	Effluent 8-Apr	Influent 24-Jul	Effluent 24-Jul	Influent 3-Aug	Effluent 3-Aug
hexachlorobutadiene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-hexanone	NE	µg/L	<10	<10	<10	<10	<10	<10	<10	<10
isopropylbenzene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4-isopropytoluene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4-methyl-2-pentanone	NE	µg/L	<10	<10	<10	<10	<10	<10	<10	<10
methylene chloride	**100**	µg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
n-butylbenzene	NE	µg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
n-propylbenzene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
sec-butylbenzene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
styrene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
tert-butylbenzene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,1,2-tetrachloroethane	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2,2-tetrachloroethane	**10**	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
tetrachloroethene (PCE)	**20**	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-DCE	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,3-dichloropropene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2,3-trichlorobenzene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2,4-trichlorobenzene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,1-trichloroethane	**60**	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-trichloroethane	**10**	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trichloroethene (TCE)	**100**	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trichlorofluoromethane	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2,3-trichloropropane	NE	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
vinyl chloride	**1**	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
xylenes, total	**620**	µg/L	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5

Notes:

BOLD - indicates concentration exceeds the NMWQCC standard
mg/L - milligrams per liter
NE - not established
NMWQCC - New Mexico Water Quality Control Commission
NT - not tested
µg/L - micrograms per liter
USEPA - United States Environmental Protection Agency

TABLE 2
GROUNDWATER ELEVATIONS AND THICKNESS OF PHASE-SEPARATED HYDROCARBONS

FORMER GIANT BLOOMFIELD REFINERY
WESTERN REFINING SOUTHWEST, INC.
SAN JUAN COUNTY, NEW MEXICO

Well Number	Wellhead Elevation (feet)	Total Depth (feet)	March 2019				November 2019			
			Depth to Water (feet BTOC)	Depth to Product (feet)	PSH Thickness (feet)	Adjusted GWEL (feet)	Depth to Water (feet BTOC)	Depth to Product (feet)	PSH Thickness (feet)	Adjusted GWEL (feet)
GRW-1	5,394.30	73.35	43.33	-	-	5,350.97	44.81	-	-	5,349.49
GRW-2	5,391.28	61.00	44.98	-	-	5,346.30	44.19	-	-	5,347.09
GRW-3	5,388.77	58.30	43.83	-	-	5,344.94	44.21	-	-	5,344.56
GRW-4	5,390.02	60.00	42.19	-	-	5,347.83	42.44	-	-	5,347.58
GRW-5	5,390.56	68.30	42.28	-	-	5,348.28	42.61	-	-	5,347.95
GRW-6	5,390.81	53.80	41.45	-	-	5,349.36	41.84	-	-	5,348.97
GRW-9	5,395.70	54.40	41.10	-	-	5,354.60	41.29	-	-	5,354.41
GRW-10	5,395.02	66.02	36.15	-	-	5,358.87	NM - Well blocked at 5 feet			
GRW-11	5,397.85	64.00	33.18	-	-	5,364.67	33.37	-	-	5,364.48
GRW-12	5,397.24	48.00	35.42	-	-	5,361.82	35.45	-	-	5,361.79
GRW-13	5,396.90	61.30	34.51	-	-	5,362.39	33.90	-	-	5,363.00
GBR-5	5,395.07	47.08	41.41	-	-	5,353.66	40.70	-	-	5,354.37
GBR-7	5,395.85	51.65	41.91	41.74	0.17	5,354.08	42.35	42.18	0.17	5,353.64
GBR-8	5,390.50	50.90	42.30			5,348.20	42.49			5,348.01
GBR-9	5,389.92	67.22	42.25	-	-	5,347.67	42.44	-	-	5,347.48
GBR-10	5,390.57	47.56	42.34	-	-	5,348.23	42.35	-	-	5,348.22
GBR-11	5,389.43	51.87	41.29	-	-	5,348.14	41.57	-	-	5,347.86
GBR-13	5,393.04	45.47	40.98	-	-	5,352.06	41.28	-	-	5,351.76
GBR-15	5,397.99	58.42	34.25	-	-	5,363.74	34.44	-	-	5,363.55
GBR-17	5,402.69	43.20	34.68	-	-	5,368.01	35.31	-	-	5,367.38
GBR-18	5,421.68	47.85	37.29	-	-	5,384.39	37.74	-	-	5,383.94
GBR-19 (1)	5,393.83	46.23	-	-	-	-	-	-	-	-
GBR-20	5,393.47	54.57	41.21	-	-	5,352.26	41.51	-	-	5,351.96
GBR-21D	5,400.19	49.77	36.38	-	-	5,363.81	36.63	-	-	5,363.56
GBR-21S	5,400.65	49.77	Dry				Dry			
GBR-22	5,395.91	38.73	37.60	-	-	5,358.31	NM - Cap glued onto well casing			
GBR-23 (2)	5,403.72	39.45	37.54	-	-	-	39.00	-	-	5,364.72
GBR-24D	5,396.77	51.40	30.66	-	-	5,366.11	31.71	-	-	5,365.06
GBR-24S	5,396.08	37.05	33.38	-	-	5,362.70	Dry			
GBR-25	5,397.03	37.12	35.05	-	-	5,361.98	35.47	-	-	5,361.56
GBR-26	5,396.72	41.29	33.57	-	-	5,363.15	32.57	-	-	5,364.15
GBR-30	5,395.59	41.66	33.04	-	-	5,362.55	33.45	-	-	5,362.14
GBR-31	5,396.58	43.50	Dry				35.54	-	-	5,361.04
GBR-32	5,414.86	47.83	34.56	-	-	5,380.30	35.22	-	-	5,379.64
GBR-33	5,396.28	45.72	-	-	-	-	34.78	-	-	5,361.50
GBR-34	5,394.00	42.20	34.54	-	-	5,359.46	35.91	-	-	5,358.09
GBR-35	5,393.66	42.35	34.57	-	-	5,359.09	34.96	-	-	5,358.70
GBR-39	5,397.55	41.42	34.86	-	-	5,362.69	34.11	-	-	5,363.44
GBR-40	5,400.76	39.38	Dry				Dry			
GBR-41	5,396.35	34.28	34.29	-	-	5,362.06	Dry			
GBR-48	5,413.90	43.54	32.04	-	-	5,381.86	36.86	-	-	5,377.04
GBR-49	(3)	40.30	32.96	-	-	-	33.34	-	-	-
GBR-50	(3)	44.37	32.12	-	-	-	32.59	-	-	-
GBR-51	5,389.68	57.07	39.76	-	-	-	P&A	-	-	-
GBR-52	5,387.74	52.73	37.88	-	-	-	37.86	-	-	5,349.88

TABLE 2
GROUNDWATER ELEVATIONS AND THICKNESS OF PHASE-SEPARATED HYDROCARBONS

FORMER GIANT BLOOMFIELD REFINERY
WESTERN REFINING SOUTHWEST, INC.
SAN JUAN COUNTY, NEW MEXICO

Well Number	Wellhead Elevation (feet)	Total Depth (feet)	March 2019				November 2019			
			Depth to Water (feet BTOC)	Depth to Product (feet)	PSH Thickness (feet)	Adjusted GWEL (feet)	Depth to Water (feet BTOC)	Depth to Product (feet)	PSH Thickness (feet)	Adjusted GWEL (feet)
SHS-1	5,383.54	50.40	P&A	-	-	-	P&A	-	-	-
SHS-2	5,381.66	44.56	P&A	-	-	-	P&A	-	-	-
SHS-3 (4)	5,383.33	-	P&A	-	-	-	P&A	-	-	-
SHS-4	5,383.62	52.16	P&A	-	-	-	P&A	-	-	-
SHS-5	5,378.36	47.85	P&A	-	-	-	P&A	-	-	-
SHS-6	5,378.17	52.78	38.05	-	-	5,340.12	P&A	-	-	-
SHS-8	5,380.25	50.92	38.52	-	-	5,341.73	P&A	-	-	-
SHS-9	5,380.79	46.25	Dry				38.01	-	-	5,342.78
SHS-10	5,373.80	45.80	Dry				P&A	-	-	-
SHS-12	5,373.94	52.41	Dry				P&A	-	-	-
SHS-13	5,367.81	47.51	36.03	-	-	5,331.78	36.28	-	-	5,331.53
SHS-14	5,367.07	52.71	34.36	-	-	5,332.71	P&A	-	-	-
SHS-15 (5)	5,366.21	47.78	34.02	-	-	5,332.19	P&A	-	-	-
SHS-16	5,362.58	42.20	31.25	-	-	5,331.33	P&A	-	-	-
SHS-17	5,364.35	46.21	33.87	-	-	5,330.48	P&A	-	-	-
SHS-18	5,373.64	47.36	39.51	-	-	5,334.13	P&A	-	-	-
SHS-19	5,378.89	52.40	37.76	-	-	5,341.13	P&A	-	-	-

Notes:
BTOC - below top of casing
D - designates that the well screen is deep
GWEL - groundwater elevation
NM - not measured
P&A - plugged and abandoned
PSH - phase-separated hydrocarbon
S - designates that the well screen is shallow

(1) Well was paved over in June 2010
(2) Well hit by a vehicle May 2014
(3) Top-of-casing elevation is unknown
(4) Well is damaged by a tree root
(5) Well visibly broken/buried January 2016
- indicates no GWEL or PSH measured
When PSH is detected, the GWEL is corrected using an estimated density correction factor of 0.8

TABLE 3
2010 to 2018 - ANNUAL COMPLIANCE GROUNDWATER LABORATORY ANALYTICAL RESULTS

FORMER GIANT BLOOMFIELD REFINERY
WESTERN REFINING SOUTHWEST, INC.
SAN JUAN COUNTRY, NEW MEXICO

Exploration Location	Wellhead Elevation (feet)	Well Depth (feet)	Screened Interval (depth in feet)	Well Diameter (inches)	Sample Date	Depth to Water (feet BTOC)	USEPA Method 300.0: Anions chloride	sulfate	USEPA Method 200.7: Total Metals chromium	iron	manganese	USEPA Method SM2540C Modified: Total Dissolved Solids total dissolved solids
NMWQCC Standard							**250**	**600**	**0.05**	**1.0**	**0.2**	**1,000**
GBR Background Threshold Values (1)							**560**	**2,546**	**1.553**	**97.06**	**6.42**	**4,566**
Regional Background Levels (Stone, et al. 1983) (2)							**2 - 34,000**	**1.9 - 14,000**	**0.001 - 0.06**	**0.01 - 16**	**0 - 2.6**	NA
Lee Acres RI Background Concentrations - Alluvial Aquifer (1992) (3)							**6.4 - 404**	**420 - 2,120**	**0.0144 - 0.113**	**0 - 1.48**	**0.0161 - 0.423**	**760 - 3,600**
Lee Acres RI/ROD Remedial Goals (1992/2004) (4)							**34,000**	**14,000**	**0.06**	**16**	**0.346**	**10,000**
Units							mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Lee Acres Sampling, 1992 RI Report (5)												
Lee Acres Site 1, Subarea 2, OU 2 - Alluvial Aquifer							**8.8 - 730**	**195 - 4,370**	**0.0108 - 0.124**	**0.118 - 1.71**	**0.0161 - 8.62**	**943 - 6,560**
Lee Acres Site 1, Subarea 3, OU 2 - Southern Area - Alluvial Aquifer							**19 - 2,110**	**830 - 2,610**	**0.0145 - 0.0406**	**0.148 - 23.9**	**0.0214 - 4.23**	**622 - 5,300**
Lee Acres Site 2, Subarea 4 - Alluvial Aquifer							**3.5 - 604**	**310 - 3,220**	**0.043 - 0.110**	**0.0749 - 64.1**	**0.0131 - 3.4**	**616 - 6,370**
GBR Sampling, Upgradient Wells (6)												
GBR-32	5,414.86	45	25 - 40	2	Oct 2018	33.95	200	1,700	0.074	2.7	1.9	3,110
					Dec 2017		290	1,600	0.13	2.3	1.2	3,210
					Jan 2017		320	2,000	0.33	11	1.2	3,500
					Aug 2015		370	2,000	0.02	0.26	0.56	3,830
					Nov 2014		380	1,900	1.4	5.9	0.70	3,800
					Jan 2013		400	2,200	0.098	1.2	0.40	4,320
					Jan 2012		500	**2,800**	0.030	0.88	0.50	4,290
					Jan 2011		420	2,300	0.13	NT	NT	4,010
					Jan 2010		NT	NT	NT	NT	NT	NT
GBR-48	5,413.90	43.6	28.4 - 38.4	2	Oct 2018	35.62	300	1,800	0.036	18	0.49	3,580
					Dec 2017		350	1,900	0.13	40	1.7	3,690
					Jan 2017		340	2,000	0.42	89	4.8	3,360
					Aug 2015		370	2,100	0.95	170	6.4	3,730
					Nov 2014		420	2,100	0.92	52	2.0	4,030
					Jan 2013		230	2,200	0.52	17	0.94	4,020
					Jan 2012		200	1,700	0.63	15	0.83	2,940
					Jan 2011		390	2,200	0.71	9.3	NT	3,510
					Jan 2010		NT	NT	NT	NT	NT	NT
GBR-49	*	38.5	25.9 - 36.3	2	Oct 2018	32.06	180	1,800	1.2	23	0.98	3,010
					Dec 2017		150	1,300	0.018	0.44	0.30	2,720
					Jan 2017		210	1,900	0.2	11	1.1	3,160
					Aug 2015		180	1,500	0.38	7.1	0.54	2,840
					Nov 2014		63	1,400	0.060	41	3.9	2,340
					Jan 2013		240	1,600	0.041	4.6	1.3	3,290
					Jan 2012		260	2,000	0.018	0.23	0.34	3,470
					Jan 2011		310	2,000	0.48	NT	NT	3,390
					Jan 2010		NT	NT	NT	NT	NT	NT

Exploration Location	Wellhead Elevation (feet)	Well Depth (feet)	Screened Interval (depth in feet)	Well Diameter (inches)	Sample Date	Depth to Water (feet BTOC)	USEPA Method 300.0: Anions — chloride	USEPA Method 300.0: Anions — sulfate	USEPA Method 200.7: Total Metals — chromium	USEPA Method 200.7: Total Metals — iron	USEPA Method 200.7: Total Metals — manganese	USEPA Method SM2540C Modified: Total Dissolved Solids — total dissolved solids
NMWQCC Standard							**250**	**600**	**0.05**	**1.0**	**0.2**	**1,000**
GBR Background Threshold Values (1)							**560**	**2,546**	**1.553**	**97.06**	**6.42**	**4,566**
Regional Background Levels (Stone, et al. 1983) (2)							**2 - 34,000**	**1.9 - 14,000**	**0.001 - 0.06**	**0.01 - 16**	**0 - 2.6**	NA
Lee Acres RI Background Concentrations - Alluvial Aquifer (1992) (3)							**6.4 - 404**	**420 - 2,120**	**0.0144 - 0.113**	**0 - 1.48**	**0.0161 - 0.423**	**760 - 3,600**
Lee Acres RI/ROD Remedial Goals (1992/2004) (4)							**34,000**	**14,000**	**0.06**	**16**	**0.346**	**10,000**
Units							mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
GBR-50	*	42.5	26.91 - 37.26		Oct 2018	31.26	59	1,700	0.044	4.0	0.13	2,770
					Dec 2017		54	1,500	0.16	5.8	0.32	2,590
					Jan 2017		59	1,500	0.36	6.8	1.3	2,580
					Aug 2015		44	1,700	0.073	2.2	0.19	2,760
					Nov 2014		52	1,700	0.013	3.6	0.22	2,800
					Jan 2013		49	1,600	<0.0060	1.3	0.12	2,830
					Jan 2012		49	1,800	0.0069	0.72	0.041	2,730
					Jan 2011		46	1,800	0.023	NT	NT	2,640
					Jan 2010		NT	NT	NT	NT	NT	NT

GBR Sampling, Source-Area Wells

Exploration Location	Wellhead Elevation (feet)	Well Depth (feet)	Screened Interval (depth in feet)	Well Diameter (inches)	Sample Date	Depth to Water (feet BTOC)	chloride	sulfate	chromium	iron	manganese	total dissolved solids
GRW-3/GBR-29 or 43	5,388.77	58.3	34.5 - 50.2	6	Oct 2018	43.13	99	640	NT	18	0.80	2,190
					Dec 2017		74	1,400	NT	54	1.9	2,920
					Jan 2017		74	1,200	NT	150	2.9	2,730
					Aug 2015		38	1,900	NT	0.89	0.69	3,320
					Nov 2014		26	2,200	NT	0.86	0.44	3,680
					Jan 2013		59	1,300	NT	2.8	0.54	2,620
					Jan 2012		54	1,300	NT	2.8	0.67	2,660
					Jan 2011		95	480	NT	NT	NT	1,810
					Jan 2010		NT	NT	NT	NT	NT	NT
GRW-6/GBR-44	5,390.81	58.6	32.6 - 48.3	6	Oct 2018	40.89	100	1,300	NT	**890**	**45**	2,390
					Dec 2017		120	1,200	NT	40	**9.1**	2,570
					Jan 2017		89	1,500	NT	11	**17**	2,580
					Aug 2015		88	1,400	NT	15	**18**	3,220
					Nov 2014		86	1,600	NT	35	**8.5**	3,170
					Jan 2013		100	1,500	NT	2.4	1.2	2,760
					Apr 2012		80	1,900	NT	0.47	1.0	2,740
					Jan 2011		110	1,400	NT	NT	NT	2,490
					Jan 2010		NT	NT	NT	NT	NT	NT
GBR-17	5,402.69	51	31 - 51	2	Oct 2018	34.00	49	1,200	NT	**100**	3.0	2,180
					Dec 2017		50	1,000	NT	9.3	0.25	2,110
					Jan 2017		46	1,100	NT	15	0.35	1,890
					Aug 2015		43	1,100	NT	3.6	<0.00200	1,960
					Nov 2014		44	1,200	NT	3.7	0.13	1,980
					Jan 2013		47	1,300	NT	1.2	0.045	2,700
					Jan 2012		46	1,400	NT	3.9	0.15	2,150
					Jan 2011		47	1,300	NT	NT	NT	2,140
					Jan 2010		NT	NT	NT	NT	NT	NT

Exploration Location	Wellhead Elevation (feet)	Well Depth (feet)	Screened Interval (depth in feet)	Well Diameter (inches)	Sample Date	Depth to Water (feet BTOC)	USEPA Method 300.0: Anions	chloride	sulfate	USEPA Method 200.7: Total Metals	chromium	iron	manganese	USEPA Method SM2540C Modified: Total Dissolved Solids	total dissolved solids
NMWQCC Standard								**250**	**600**		**0.05**	**1.0**	**0.2**		**1,000**
GBR Background Threshold Values (1)								**560**	**2,546**		**1.553**	**97.06**	**6.42**		**4,566**
Regional Background Levels (Stone, et al. 1983) (2)								**2 - 34,000**	**1.9 - 14,000**		**0.001 - 0.06**	**0.01 - 16**	**0 - 2.6**		NA
Lee Acres RI Background Concentrations - Alluvial Aquifer (1992) (3)								**6.4 - 404**	**420 - 2,120**		**0.0144 - 0.113**	**0 - 1.48**	**0.0161 - 0.423**		**760 - 3,600**
Lee Acres RI/ROD Remedial Goals (1992/2004) (4)								**34,000**	**14,000**		**0.06**	**16**	**0.346**		**10,000**
Units								mg/L	mg/L		mg/L	mg/L	mg/L		mg/L
GBR-24D	5,396.77	46.3	33 - 43	2	Oct 2018	30.92		130	2,300		NT	9.1	1.8		3,780
					Dec 2017			140	1,800		NT	11	1.8		3,560
					Jan 2017			130	1,900		NT	14	1.8		3,390
					Aug 2015			160	2,100		NT	11	1.8		3,380
					Nov 2014			210	1,800		NT	12	1.7		3,410
					Jan 2013			200	1,700		NT	3.6	1.8		3,430
					Jan 2012			200	2,000		NT	2.4	1.7		3,320
					Jan 2011			170	2,400		NT	NT	NT		3,410
					Jan 2010			NT	NT		NT	NT	NT		NT
GBR-30	5,395.59	45	25 - 40	2	Oct 2018	32.31		250	1,500		NT	28	0.76		3,000
					Dec 2017			220	1,300		NT	38	1.4		2,770
					Jan 2017			220	1,400		NT	64	2.3		2,580
					Aug 2015			310	1,600		NT	7.6	0.5		3,020
					Nov 2014			270	1,400		NT	88	2.2		2,520
					Jan 2013			310	1,500		NT	**130**	6.1		3,340
					Jan 2012			390	1,700		NT	2.9	0.29		3,240
					Jan 2011			320	1,600		NT	NT	NT		3,340
					Jan 2010			NT	NT		NT	NT	NT		NT
GBR-31	5,396.58	45	24.6 - 39.6	2	Oct 2018	32.27		220	1,400		NT	13	3.1		2,660
					Dec 2017			93	1,700		NT	21	4.2		2,940
					Jan 2017			84	1,700		NT	1.9	0.18		2,970
					Aug 2015			250	1,700		NT	2.4	0.45		3,170
					Nov 2014			230	1,500		NT	12	1.6		3,100
					Jan 2013			79	1,600		NT	15	0.77		2,720
					Jan 2012			74	1,700		NT	3.8	0.27		2,760
					Jan 2011			97	1,800		NT	NT	NT		2,740
					Jan 2010			NT	NT		NT	NT	NT		NT
GBR-51	5,389.68	59.5	38.5 - 54.25	6	Oct 2018	NM		54	1,300		NT	0.059	<0.0020		2,330
					Dec 2017			51	1,200		NT	0.080	<0.020		2,250
					Jan 2017			45	990		NT	9.1	0.47		2,080
					Aug 2015			54	1,600		NT	17	0.42		2,430
					Nov 2014			54	1,400		NT	16	0.47		2,320
					Jan 2013			56	1,500		NT	9.7	0.88		2,540
					Jan 2012			53	1,600		NT	3.1	0.16		2,440
					Jan 2011			53	1,600		NT	NT	NT		2,380
					Jan 2010			NT	NT		NT	NT	NT		NT

Exploration Location	Wellhead Elevation (feet)	Well Depth (feet)	Screened Interval (depth in feet)	Well Diameter (inches)	Sample Date	Depth to Water (feet BTOC)	USEPA Method 300.0: Anions	chloride	sulfate	USEPA Method 200.7: Total Metals	chromium	iron	manganese	USEPA Method SM2540C Modified: Total Dissolved Solids	total dissolved solids
NMWQCC Standard								**250**	**600**		**0.05**	**1.0**	**0.2**		**1,000**
GBR Background Threshold Values (1)								**560**	**2,546**		**1.553**	**97.06**	**6.42**		**4,566**
Regional Background Levels (Stone, et al. 1983) (2)								**2 - 34,000**	**1.9 - 14,000**		**0.001 - 0.06**	**0.01 - 16**	**0 - 2.6**		NA
Lee Acres RI Background Concentrations - Alluvial Aquifer (1992) (3)								**6.4 - 404**	**420 - 2,120**		**0.0144 - 0.113**	**0 - 1.48**	**0.0161 - 0.423**		**760 - 3,600**
Lee Acres RI/ROD Remedial Goals (1992/2004) (4)								**34,000**	**14,000**		**0.06**	**16**	**0.346**		**10,000**
Units								mg/L	mg/L		mg/L	mg/L	mg/L		mg/L
GBR-52	5,387.74	50.78	30.08 - 45.75	6	Oct 2018	NM		54	1,500		NT	0.12	0.0028		2,580
					Dec 2017			54	1,500		NT	0.048	<0.0020		2,640
					Jan 2017			58	1,400		NT	18	0.46		2,540
					Aug 2015			65	1,400		NT	8.2	0.15		2,840
					Nov 2014			65	1,700		NT	12	0.25		2,540
					Jan 2013			63	1,700		NT	2.3	0.036		2,770
					Jan 2012			60	1,800		NT	2.2	0.032		2,720
					Jan 2011			62	1,900		NT	NT	NT		2,700
					Jan 2010			NT	NT		NT	NT	NT		NT
<u>GBR Sampling, Downgradient Wells</u>															
SHS-1	5,383.54	50.97	35.67 - 45.67	4	June 2017	P&A		100	1,300		NT	NT	NT		2,400
					Jan 2011			NT	NT		NT	NT	NT		NT
SHS-2	5,381.66	41.28	30.98 - 40.98	4	June 2017	P&A		310	2,200		NT	NT	NT		4,100
					Jan 2011			NT	NT		NT	NT	NT		NT
SHS-4	5,383.62	55	37 - 47	2	June 2017	P&A		59	1,600		NT	NT	NT		2,270
SHS-5	5,378.36	53.33	37.62 - 48.0	4	June 2017	P&A		50	1,200		NT	NT	NT		2,030
					Jan 2011			NT	NT		NT	NT	NT		NT
SHS-6	5,378.17	47.88	32.48 - 42.85	4	Jan 2018	37.85		NT	NT		NT	NT	NT		NT
SHS-8	5,380.25	52.5	30.83 - 46.60	4	Oct 2018	38.25		130	890		NT	50	3.1		2,730
SHS-8					Dec 2017			110	1,200		NT	10	3.6		2,730
SHS-8					Jan 2017			100	720		NT	66	3.0		2,210
SHS-8					Aug 2015			120	47		NT	8.6	0.41		1,300
SHS-8					Nov 2014			110	350		NT	**260**	5.0		1,400
SHS-8					Jan 2013			120	770		0.099	**100**	4.7		1,800
SHS-8					Jan 2012			170	430		NT	15	2.3		2,040
SHS-8					Jan 2011			150	150		0.0063	NT	NT		1,440
SHS-8					Jan 2010			NT	NT		NT	NT	NT		NT
SHS-9	5,380.79	49.88	34.46 - 44.46	4	Jan 2018	37.43		NT	NT		NT	NT	NT		NT
SHS-13	5,367.81	47.4	27 - 42	4	Jan 2018	35.85		NT	NT		NT	NT	NT		NT
SHS-14	5,367.07	54	28.70 - 48.70	4	Jan 2018	34.18		NT	NT		NT	NT	NT		NT
SHS-15	5,366.21	47.8	27.40 - 42.40	4	Jan 2018	33.00		NT	NT		NT	NT	NT		NT

Exploration Location	Wellhead Elevation (feet)	Well Depth (feet)	Screened Interval (depth in feet)	Well Diameter (inches)	Sample Date	Depth to Water (feet BTOC)	USEPA Method 300.0: Anions	chloride	sulfate	USEPA Method 200.7: Total Metals	chromium	iron	manganese	USEPA Method SM2540C Modified: Total Dissolved Solids	total dissolved solids
NMWQCC Standard								**250**	**600**		**0.05**	**1.0**	**0.2**		**1,000**
GBR Background Threshold Values (1)								**560**	**2,546**		**1.553**	**97.06**	**6.42**		**4,566**
Regional Background Levels (Stone, et al. 1983) (2)								**2 - 34,000**	**1.9 - 14,000**		**0.001 - 0.06**	**0.01 - 16**	**0 - 2.6**		NA
Lee Acres RI Background Concentrations - Alluvial Aquifer (1992) (3)								**6.4 - 404**	**420 - 2,120**		**0.0144 - 0.113**	**0 - 1.48**	**0.0161 - 0.423**		**760 - 3,600**
Lee Acres RI/ROD Remedial Goals (1992/2004) (4)								**34,000**	**14,000**		**0.06**	**16**	**0.346**		**10,000**
Units								mg/L	mg/L		mg/L	mg/L	mg/L		mg/L
SHS-16	5,362.58	42.6	22.2 - 37.2	4	Jan 2018	32.68		NT	NT		NT	NT	NT		NT
SHS-17	5,364.35	46.21	35.67 - 45.67	4	Jan 2018	32.63		NT	NT		NT	NT	NT		NT
SHS-18	5,373.64	47.36	37.36 - 47.36	4	Jan 2018	39.24		NT	NT		NT	NT	NT		NT
SHS-19	5,378.89	52.4	32.40 - 52.40	4	Jan 2018	37.77		NT	NT		NT	NT	NT		NT

Notes

(1) Background Concentrations Proposed for the Giant Bloomfield Refinery Site. Based on Statistical Analysis Prepared by LT Environmental and Submitted to New Mexico Oil Conservation District in an Email Dated June 10, 2019.
(2) Regional Background Concentrations Established in Document Titled *Hydrogeology and Water Resources of San Juan Basin, New Mexico,* Stone et al., dated 1983
(3) "Background" Concentration Proposed in Lee Acres DRAFT *Remedial Investigation Report* Prepared for the US Bureau of Land Management (dated February 1992)
(4) Contaminant Concentrations Established as the "Remedial Goals" or "Background" Concentrations for the Lee Acres Superfund Site. Based on the Lee Acres DRAFT *Remedial Investigation Report* and *Record of Decision* (dated May 2004).
(5) The Lee Acres *Remedial Investigation Report* Presents Analytical Data for Areas of the Site and Not Data for Individual Wells
(6) Well Location Used for Statistical Analysis of Background Concentrations
* Top-of-Casing Elevation is Unknown
NM Not Measured
P&A Plugged and Abandoned
µg/L micrograms per liter
BOLD Indicates Concentration Exceeds the Greater Value of the NMWQCC Water-Quality Standards or Background Threshold Values Proposed for the Giant Bloomfield Refinery
mg/L milligrams per liter
NMWQCC New Mexico Water Quality Control Commission
NT Not Tested
USEPA United States Environmental Protection Agency

APPENDIX A: BACKGROUND CONCENTRATIONS IN UPGRADIENT WELLS

LT Environmental, Inc.
848 East Second Avenue
Durango, Colorado 81301
970.385.1096

October 4, 2019

Nelly Smith, Remedial Project Manager
Superfund and Emergency Division – Remedial Branch (6SEDRL)
U.S. Environmental Protection Agency – Region 6
1445 Ross Avenue, Suite 1200, Dallas, TX 75202

**RE: EPA-Requested Information
Giant Bloomfield Refinery GW-40 Site
Western Refining Southwest, Inc. (Marathon Petroleum Company, LP)
Bloomfield, New Mexico**

Dear Ms. Smith:

At the request of the United States Environmental Protection Agency (USEPA), in conjunction with the New Mexico Oil Conservation Division (NMOCD), LT Environmental has prepared the attached table (Table 1) to provide requested well information and analytical data for the former Giant Bloomfield Refinery, "GW-40" site (the "Site"). Specifically, the table provides well information that includes wellhead elevation, well depth, well-screen interval, well diameter, and depth to water measurements. The table also presents analytical results for select constituents requested by the USEPA, collected during annual sampling events between 2010 and 2018 (chloride, sulfate, chromium, iron, manganese, and total dissolved solids). In addition, the *2018 Annual Report* prepared for the Site is attached for your review. The report includes analytical results for the 2018 groundwater-sampling event, as well as figures presenting well locations, cross sections, and groundwater potentiometric surface maps with interpreted groundwater-flow directions. We understand that this information will be used as part of the upcoming five-year review for the upgradient Lee Acres Superfund Site.

Please contact us if you have questions regarding the attached information.

Sincerely,

LT ENVIRONMENTAL, INC.

Devin Hencmann
Project Geologist

Stuart Hyde, LG
Project Geologist

cc: Greg McCartney, Marathon Petroleum Company, LP
Carl Chavez, NMOCD

TABLE 1
2010 to 2018 - ANNUAL COMPLIANCE GROUNDWATER LABORATORY ANALYTICAL RESULTS

FORMER GIANT BLOOMFIELD REFINERY
SAN JUAN COUNTRY, NEW MEXICO
WESTERN REFINING PIPELINE, LLC.

							USEPA Method 300.0: Anions		USEPA Method 200.7: Total Metals			USEPA Method SM2540C Modified: Total Dissolved Solids
Exploration Location	Wellhead Elevation (feet)	Well Depth (feet)	Screened Interval (depth in feet)	Well Diameter (inches)	Sample Date	Depth to Water (feet BTOC)	chloride	sulfate	chromium	iron	manganese	total dissolved solids
NMWQCC Standard							**250**	**600**	**0.05**	**1.0**	**0.2**	**1,000**
GBR Background Threshold Values (1)							**560**	**2,546**	**1.553**	**97.06**	**6.42**	**4,566**
Regional Background Levels (Stone, et al. 1983) (2)							**2 - 34,000**	**1.9 - 14,000**	**0.001 - 0.06**	**0.01 - 16**	**0 - 2.6**	NA
Lee Acres RI Background Concentrations - Alluvial Aquifer (1992) (3)							**6.4 - 404**	**420 - 2,120**	**0.0144 - 0.113**	**0 - 1.48**	**0.0161 - 0.423**	**760 - 3,600**
Lee Acres RI/ROD Remedial Goals (1992/2004) (4)							**34,000**	**14,000**	**0.06**	**16**	**0.346**	**10,000**
Units							mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Lee Acres Sampling, 1992 RI Report (5)												
Lee Acres Site 1, Subarea 2, OU 2 - Alluvial Aquifer							**8.8 - 730**	**195 - 4,370**	**0.0108 - 0.124**	**0.118 - 1.71**	**0.0161 - 8.62**	**943 - 6,560**
Lee Acres Site 1, Subarea 3, OU 2 - Southern Area - Alluvial Aquifer							**19 - 2,110**	**830 - 2,610**	**0.0145 - 0.0406**	**0.148 - 23.9**	**0.0214 - 4.23**	**622 - 5,300**
Lee Acres Site 2, Subarea 4 - Alluvial Aquifer							**3.5 - 604**	**310 - 3,220**	**0.043 - 0.110**	**0.0749 - 64.1**	**0.0131 - 3.4**	**616 - 6,370**
GBR Sampling, Upgradient Wells (6)												
GBR-32	5,414.86	45	25 - 40	2	Oct 2018	33.95	200	1,700	0.074	2.7	1.9	3,110
					Dec 2017		290	1,600	0.13	2.3	1.2	3,210
					Jan 2017		NT	NT	NT	NT	NT	NT
					Aug 2015		NT	NT	NT	NT	NT	NT
					Nov 2014		380	1,900	1.4	5.9	0.70	3,800
					Jan 2013		400	2,200	0.098	1.2	0.40	4,320
					Jan 2012		500	**2,800**	0.030	0.88	0.50	4,290
					Jan 2011		420	2,300	0.13	NT	NT	4,010
					Jan 2010		NT	NT	NT	NT	NT	NT
GBR-48	5,413.90	43.6	28.4 - 38.4	2	Oct 2018	35.62	300	1,800	0.036	18	0.49	3,580
					Dec 2017		350	1,900	0.13	40	1.7	3,690
					Jan 2017		NT	NT	NT	NT	NT	NT
					Aug 2015		NT	NT	NT	NT	NT	NT
					Nov 2014		420	2,100	0.92	52	2.0	4,030
					Jan 2013		230	2,200	0.52	17	0.94	4,020
					Jan 2012		200	1,700	0.63	15	0.83	2,940
					Jan 2011		390	2,200	0.71	9.3	NT	3,510
					Jan 2010		NT	NT	NT	NT	NT	NT
GBR-49	*	38.5	25.9 - 36.3	2	Oct 2018	32.06	180	1,800	1.2	23	0.98	3,010
					Dec 2017		150	1,300	0.018	0.44	0.30	2,720
					Jan 2017		NT	NT	NT	NT	NT	NT
					Aug 2015		NT	NT	NT	NT	NT	NT
					Nov 2014		63	1,400	0.060	41	3.9	2,340
					Jan 2013		240	1,600	0.041	4.6	1.3	3,290
					Jan 2012		260	2,000	0.018	0.23	0.34	3,470
					Jan 2011		310	2,000	0.48	NT	NT	3,390
					Jan 2010		NT	NT	NT	NT	NT	NT

Exploration Location	Wellhead Elevation (feet)	Well Depth (feet)	Screened Interval (depth in feet)	Well Diameter (inches)	Sample Date	Depth to Water (feet BTOC)	USEPA Method 300.0: Anions	chloride	sulfate	USEPA Method 200.7: Total Metals	chromium	iron	manganese	USEPA Method SM2540C Modified: Total Dissolved Solids	total dissolved solids
NMWQCC Standard								**250**	**600**		**0.05**	**1.0**	**0.2**		**1,000**
GBR Background Threshold Values (1)								**560**	**2,546**		**1.553**	**97.06**	**6.42**		**4,566**
Regional Background Levels (Stone, et al. 1983) (2)								**2 - 34,000**	**1.9 - 14,000**		**0.001 - 0.06**	**0.01 - 16**	**0 - 2.6**		NA
Lee Acres RI Background Concentrations - Alluvial Aquifer (1992) (3)								**6.4 - 404**	**420 - 2,120**		**0.0144 - 0.113**	**0 - 1.48**	**0.0161 - 0.423**		**760 - 3,600**
Lee Acres RI/ROD Remedial Goals (1992/2004) (4)								**34,000**	**14,000**		**0.06**	**16**	**0.346**		**10,000**
Units								mg/L	mg/L		mg/L	mg/L	mg/L		mg/L
GBR-50	*	42.5	26.91 - 37.26		Oct 2018	31.26		59	1,700		0.044	4.0	0.13		2,770
					Dec 2017			54	1,500		0.16	5.8	0.32		2,590
					Jan 2017			NT	NT		NT	NT	NT		NT
					Aug 2015			NT	NT		NT	NT	NT		NT
					Nov 2014			52	1,700		0.013	3.6	0.22		2,800
					Jan 2013			49	1,600		<0.0060	1.3	0.12		2,830
					Jan 2012			49	1,800		0.0069	0.72	0.041		2,730
					Jan 2011			46	1,800		0.023	NT	NT		2,640
					Jan 2010			NT	NT		NT	NT	NT		NT
<u>GBR Sampling, Source-Area Wells</u>															
GRW-3/GBR-29 or 43	5,388.77	58.3	34.5 - 50.2	6	Oct 2018	43.13		99	640		NT	18	0.80		2,190
					Dec 2017			74	1,400		NT	54	1.9		2,920
					Aug 2015			NT	NT		NT	NT	NT		NT
					Jan 2017			NT	NT		NT	NT	NT		NT
					Nov 2014			26	2,200		NT	0.86	0.44		3,680
					Jan 2013			59	1,300		NT	2.8	0.54		2,620
					Jan 2012			54	1,300		NT	2.8	0.67		2,660
					Jan 2011			95	480		NT	NT	NT		1,810
					Jan 2010			NT	NT		NT	NT	NT		NT
GRW-6/GBR-44	5,390.81	58.6	32.6 - 48.3	6	Oct 2018	40.89		100	1,300		NT	**890**	**45**		2,390
					Dec 2017			120	1,200		NT	40	**9.1**		2,570
					Jan 2017			NT	NT		NT	NT	NT		NT
					Aug 2015			NT	NT		NT	NT	NT		NT
					Nov 2014			86	1,600		NT	35	**8.5**		3,170
					Jan 2013			100	1,500		NT	2.4	1.2		2,760
					Apr 2012			80	1,900		NT	0.47	1.0		2,740
					Jan 2011			110	1,400		NT	NT	NT		2,490
					Jan 2010			NT	NT		NT	NT	NT		NT
GBR-17	5,402.69	51	31 - 51	2	Oct 2018	34.00		49	1,200		NT	**100**	3.0		2,180
					Dec 2017			50	1,000		NT	9.3	0.25		2,110
					Jan 2017			NT	NT		NT	NT	NT		NT
					Aug 2015			NT	NT		NT	NT	NT		NT
					Nov 2014			44	1,200		NT	3.7	0.13		1,980
					Jan 2013			47	1,300		NT	1.2	0.045		2,700
					Jan 2012			46	1,400		NT	3.9	0.15		2,150
					Jan 2011			47	1,300		NT	NT	NT		2,140
					Jan 2010			NT	NT		NT	NT	NT		NT

Exploration Location	Wellhead Elevation (feet)	Well Depth (feet)	Screened Interval (depth in feet)	Well Diameter (inches)	Sample Date	Depth to Water (feet BTOC)	USEPA Method 300.0: Anions		USEPA Method 200.7: Total Metals			USEPA Method SM2540C Modified: Total Dissolved Solids
							chloride	sulfate	chromium	iron	manganese	total dissolved solids
NMWQCC Standard							**250**	**600**	**0.05**	**1.0**	**0.2**	**1,000**
GBR Background Threshold Values (1)							**560**	**2,546**	**1.553**	**97.06**	**6.42**	**4,566**
Regional Background Levels (Stone, et al. 1983) (2)							**2 - 34,000**	**1.9 - 14,000**	**0.001 - 0.06**	**0.01 - 16**	**0 - 2.6**	NA
Lee Acres RI Background Concentrations - Alluvial Aquifer (1992) (3)							**6.4 - 404**	**420 - 2,120**	**0.0144 - 0.113**	**0 - 1.48**	**0.0161 - 0.423**	**760 - 3,600**
Lee Acres RI/ROD Remedial Goals (1992/2004) (4)							**34,000**	**14,000**	**0.06**	**16**	**0.346**	**10,000**
Units							mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
GBR-24D	5,396.77	46.3	33 - 43	2	Oct 2018	30.92	130	2,300	NT	9.1	1.8	3,780
					Dec 2017		140	1,800	NT	11	1.8	3,560
					Jan 2017		NT	NT	NT	NT	NT	NT
					Aug 2015		NT	NT	NT	NT	NT	NT
					Nov 2014		210	1,800	NT	12	1.7	3,410
					Jan 2013		200	1,700	NT	3.6	1.8	3,430
					Jan 2012		200	2,000	NT	2.4	1.7	3,320
					Jan 2011		170	2,400	NT	NT	NT	3,410
					Jan 2010		NT	NT	NT	NT	NT	NT
GBR-30	5,395.59	45	25 - 40	2	Oct 2018	32.31	250	1,500	NT	28	0.76	3,000
					Dec 2017		220	1,300	NT	38	1.4	2,770
					Jan 2017		NT	NT	NT	NT	NT	NT
					Aug 2015		NT	NT	NT	NT	NT	NT
					Nov 2014		270	1,400	NT	88	2.2	2,520
					Jan 2013		310	1,500	NT	**130**	6.1	3,340
					Jan 2012		390	1,700	NT	2.9	0.29	3,240
					Jan 2011		320	1,600	NT	NT	NT	3,340
					Jan 2010		NT	NT	NT	NT	NT	NT
GBR-31	5,396.58	45	24.6 - 39.6	2	Oct 2018	32.27	220	1,400	NT	13	3.1	2,660
					Dec 2017		93	1,700	NT	21	4.2	2,940
					Jan 2017		NT	NT	NT	NT	NT	NT
					Aug 2015		NT	NT	NT	NT	NT	NT
					Nov 2014		230	1,500	NT	12	1.6	3,100
					Jan 2013		79	1,600	NT	15	0.77	2,720
					Jan 2012		74	1,700	NT	3.8	0.27	2,760
					Jan 2011		97	1,800	NT	NT	NT	2,740
					Jan 2010		NT	NT	NT	NT	NT	NT
GBR-51	5,389.68	59.5	38.5 - 54.25	6	Oct 2018	NM	54	1,300	NT	0.059	<0.0020	2,330
					Dec 2017		51	1,200	NT	0.080	<0.020	2,250
					Jan 2017		NT	NT	NT	NT	NT	NT
					Aug 2015		NT	NT	NT	NT	NT	NT
					Nov 2014		54	1,400	NT	16	0.47	2,320
					Jan 2013		56	1,500	NT	9.7	0.88	2,540
					Jan 2012		53	1,600	NT	3.1	0.16	2,440
					Jan 2011		53	1,600	NT	NT	NT	2,380
					Jan 2010		NT	NT	NT	NT	NT	NT

Exploration Location	Wellhead Elevation (feet)	Well Depth (feet)	Screened Interval (depth in feet)	Well Diameter (inches)	Sample Date	Depth to Water (feet BTOC)	USEPA Method 300.0: Anions		USEPA Method 200.7: Total Metals			USEPA Method SM2540C Modified: Total Dissolved Solids
							chloride	sulfate	chromium	iron	manganese	total dissolved solids
NMWQCC Standard							**250**	**600**	**0.05**	**1.0**	**0.2**	**1,000**
GBR Background Threshold Values (1)							**560**	**2,546**	**1.553**	**97.06**	**6.42**	**4,566**
Regional Background Levels (Stone, et al. 1983) (2)							**2 - 34,000**	**1.9 - 14,000**	**0.001 - 0.06**	**0.01 - 16**	**0 - 2.6**	NA
Lee Acres RI Background Concentrations - Alluvial Aquifer (1992) (3)							**6.4 - 404**	**420 - 2,120**	**0.0144 - 0.113**	**0 - 1.48**	**0.0161 - 0.423**	**760 - 3,600**
Lee Acres RI/ROD Remedial Goals (1992/2004) (4)							**34,000**	**14,000**	**0.06**	**16**	**0.346**	**10,000**
Units							mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
GBR-52	5,387.74	50.78	30.08 - 45.75	6	Oct 2018	NM	54	1,500	NT	0.12	0.0028	2,580
					Dec 2017		54	1,500	NT	0.048	<0.0020	2,640
					Jan 2017		NT	NT	NT	NT	NT	NT
					Aug 2015		NT	NT	NT	NT	NT	NT
					Nov 2014		65	1,700	NT	12	0.25	2,540
					Jan 2013		63	1,700	NT	2.3	0.036	2,770
					Jan 2012		60	1,800	NT	2.2	0.032	2,720
					Jan 2011		62	1,900	NT	NT	NT	2,700
					Jan 2010		NT	NT	NT	NT	NT	NT
<u>GBR Sampling, Downgradient Wells</u>												
SHS-1	5,383.54	50.97	35.67 - 45.67	4	June 2017	P&A	100	1,300	NT	NT	NT	2,400
					Jan 2011		NT	NT	NT	NT	NT	NT
SHS-2	5,381.66	41.28	30.98 - 40.98	4	June 2017	P&A	310	2,200	NT	NT	NT	4,100
					Jan 2011		NT	NT	NT	NT	NT	NT
SHS-4	5,383.62	55	37 - 47	2	June 2017	P&A	59	1,600	NT	NT	NT	2,270
SHS-5	5,378.36	53.33	37.62 - 48.0	4	June 2017	P&A	50	1,200	NT	NT	NT	2,030
					Jan 2011		NT	NT	NT	NT	NT	NT
SHS-6	5,378.17	47.88	32.48 - 42.85	4	Jan 2018	37.85	NT	NT	NT	NT	NT	NT
SHS-8	5,380.25	52.5	30.83 - 46.60	4	Oct 2018	38.25	130	890	NT	50	3.1	2,730
SHS-8					Jan 2018		NT	NT	NT	NT	NT	NT
SHS-8					Dec 2017		110	1,200	NT	10	3.6	2,730
SHS-8					Jan 2017		NT	NT	NT	NT	NT	NT
SHS-8					Aug 2015		NT	NT	NT	NT	NT	NT
SHS-8					Nov 2014		110	350	NT	**260**	5.0	1,400
SHS-8					Jan 2013		120	770	0.099	**100**	4.7	1,800
SHS-8					Jan 2012		170	430	NT	15	2.3	2,040
SHS-8					Jan 2011		150	150	0.0063	NT	NT	1,440
SHS-8					Jan 2010		NT	NT	NT	NT	NT	NT
SHS-9	5,380.79	49.88	34.46 - 44.46	4	Jan 2018	37.43	NT	NT	NT	NT	NT	NT
SHS-13	5,367.81	47.4	27 - 42	4	Jan 2018	35.85	NT	NT	NT	NT	NT	NT
SHS-14	5,367.07	54	28.70 - 48.70	4	Jan 2018	34.18	NT	NT	NT	NT	NT	NT
SHS-15	5,366.21	47.8	27.40 - 42.40	4	Jan 2018	33.00	NT	NT	NT	NT	NT	NT

Exploration Location	Wellhead Elevation (feet)	Well Depth (feet)	Screened Interval (depth in feet)	Well Diameter (inches)	Sample Date	Depth to Water (feet BTOC)	USEPA Method 300.0: Anions	chloride	sulfate	USEPA Method 200.7: Total Metals	chromium	iron	manganese	USEPA Method SM2540C Modified: Total Dissolved Solids	total dissolved solids
NMWQCC Standard								**250**	**600**		**0.05**	**1.0**	**0.2**		**1,000**
GBR Background Threshold Values (1)								**560**	**2,546**		**1.553**	**97.06**	**6.42**		**4,566**
Regional Background Levels (Stone, et al. 1983) (2)								**2 - 34,000**	**1.9 - 14,000**		**0.001 - 0.06**	**0.01 - 16**	**0 - 2.6**		NA
Lee Acres RI Background Concentrations - Alluvial Aquifer (1992) (3)								**6.4 - 404**	**420 - 2,120**		**0.0144 - 0.113**	**0 - 1.48**	**0.0161 - 0.423**		**760 - 3,600**
Lee Acres RI/ROD Remedial Goals (1992/2004) (4)								**34,000**	**14,000**		**0.06**	**16**	**0.346**		**10,000**
Units								mg/L	mg/L		mg/L	mg/L	mg/L		mg/L
SHS-16	5,362.58	42.6	22.2 - 37.2	4	Jan 2018	32.68		NT	NT		NT	NT	NT		NT
SHS-17	5,364.35	46.21	35.67 - 45.67	4	Jan 2018	32.63		NT	NT		NT	NT	NT		NT
SHS-18	5,373.64	47.36	37.36 - 47.36	4	Jan 2018	39.24		NT	NT		NT	NT	NT		NT
SHS-19	5,378.89	52.4	32.40 - 52.40	4	Jan 2018	37.77		NT	NT		NT	NT	NT		NT

Notes

(1) Background Concentrations Proposed for the Giant Bloomfield Refinery Site. Based on Statistical Analysis Prepared by LT Environmental and Submitted to New Mexico Oil Conservation District in an Email Dated June 10, 2019.
(2) Regional Background Concentrations Established in Document Titled *Hydrogeology and Water Resources of San Juan Basin, New Mexico,* Stone et al., dated 1983
(3) "Background" Concentration Proposed in Lee Acres DRAFT *Remedial Investigation Report* Prepared for the US Bureau of Land Management (dated February 1992)
(4) Contaminant Concentrations Established as the "Remedial Goals" or "Background" Concentrations for the Lee Acres Superfund Site. Based on the Lee Acres DRAFT *Remedial Investigation Report* and *Record of Decision* (dated May 2004).
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(6) Well Location Used for Statistical Analysis of Background Concentrations
* Top-of-Casing Elevation is Unknown
NM Not Measured
P&A Plugged and Abandoned
µg/L micrograms per liter
BOLD Indicates Concentration Exceeds the Greater Value of the NMWQCC Water-Quality Standards or Background Threshold Values Proposed for the Giant Bloomfield Refinery
mg/L milligrams per liter
NMWQCC New Mexico Water Quality Control Commission
NT Not Tested
USEPA United States Environmental Protection Agency

PROPOSED FACILITY-SPECIFIC BACKGROUND THRESHOLD VALUES FOR INORGANICS IN GROUNDWATER
FORMER GIANT BLOOMFIELD REFINERY
BLOOMFIELD, NEW MEXICO

												Original Reported UTL	NDs replaced with PQL - Analyzed as Detections (per Agency's request)				Original Dataset with NDs (Statistic based on Gamma distribution for previously lognormal cases)					
Analyte	**Units**	**Number of Samples**	**Percent ND**	**Non-Detects**	**Detections**	**ND EM**	**Distribution**	**Min**	**Max**	**Mean**	**Std Deviation**	**95%UTL 95% Coverage**	**CV**	**ND EM**	**Distribution**	**95%UTL 95% Coverage**	**CV**	**ND EM**	**Distribution**	**95%UTL 95% Coverage**	**Proposed Background Threshold Values (BTVs)**	**Comments**
Chloride	mg/L	40	0	0	40	NA	Non-Parametric\Max	44	560	232.3	153.4	560									560	No Change. Dataset do not follow a discernible distribution, use Max value as UTL
Chromium	mg/L	32	3.125	1	31	ROS	Lognormal	0.006	1.4	0.318	0.379	4.46	1.19	PQL	Gamma-WH	1.59	0.145	KM	Gamma-WH	1.553	1.553	Calculated UTL based on lognormal distribution is disproportionately high when compared to maximum detection= 1.4 due to highly variable sample data, recommend using UTL based on Gamma distribution with WH approximation
Iron	mg/L	33	6	2	31	ROS	Lognormal	0.1	170	16.62	33.37	261.7	2.008	PQL	Gamma-HW	100.1	1168	KM	Gamma-HW	97.06	97.06	Calculated UTL based on lognormal distribution is disproportionately high when compared to maximum detection= 170 due to highly variable sample data, recommend using UTL based on Gamma distribution with HW approximation
Manganese	mg/L	24	0	0	24	NA	Lognormal	0.041	6.4	0.765	1.578	10.63					1.226	NA	Gamma-HW	6.42	6.42	Calculated UTL based on lognormal distribution is disproportionately high when compared to maximum detection= 6.4 due to highly variable sample data, recommend using UTL based on Gamma distribution with HW approximation
Sulfate	mg/L	40	0	0	40	NA	Normal	698	2800	1801	351.9	2546									2546	Low coefficient of variation, use UTL based on normal distribution
Total Dissolved Solids	mg/L	40	0	0	40	NA	Normal	1460	4320	3234	629	4566									4566	Low coefficient of variation, use UTL based on normal distribution

Notes:
CV - Coefficient of Variation
HW - Hawkins–Wixley approximation
KM - Kaplan-Meier method
NA - Not Applicable
ND - Non-detect
ND EM - Non-detect estimation method
ROS - Regression on order statistics
WH - Wilson-Hilferty approximation

STAGE 1 ABATEMENT PLAN

FORMER GIANT BLOOMFIELD REFINERY
BLOOMFIELD, NEW MEXICO

MARCH 2020

Prepared for:

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A proud member of WSP

STAGE 1 ABATEMENT PLAN

FORMER GIANT BLOOMFIELD REFINERY
BLOOMFIELD, NEW MEXICO

Project Number: 095820002

Prepared by: ______________________ March 27, 2020

Stuart Hyde, LG
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Date

Reviewed by: ______________________ March 27, 2020

Ashley Ager, P.G.
LTE Senior Geologist

Date

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APPENDICES

STAGE 1 ABATEMENT PLAN

LT Environmental, Inc. (LTE), on behalf of Western Refining Southwest, Inc. (Western), presents the following Stage 1 Abatement Plan (Plan) associated with subsurface hydrocarbon impacts encountered at the Former Giant Bloomfield Refinery (Site). This plan is being submitted concurrently with a Discharge Permit application for the Site (separate document). This plan details the site description and background, existing/historical data for the Site, and Site geologic and hydrologic characteristics. The Plan proposes additional groundwater monitoring at the Site to update historical data and assess current groundwater conditions and is being prepared per the New Mexico Administrative Code (NMAC) 20.6.2.4205(A)(6).

1.0 SITE DESCRIPTION AND BACKGROUND

The Site is on the northeast corner of United States Highway 64 and County Road 3500, approximately five miles west of Bloomfield, New Mexico, in the southwest quarter of Section 22 and the northwest quarter of Section 27, Township 29 North, Range 12 West in San Juan County, New Mexico (Figure 1). The former refinery, under ownership of Giant Industries (Giant), Arizona, produced leaded and unleaded gasoline, diesel, kerosene, and other refined petroleum products from 1974 to 1982 and has been inactive since closure in 1982.

1.1 SITE HISTORY

In April 1985, a breach in a lagoon dike on the former Lee Acres Landfill property (located north-adjacent to the Site and further discussed in Section 1.1.2), which had been retaining liquids in the lagoons, released liquid wastes into an arroyo west of the Site. The arroyo drains south toward the Lee Acres Subdivision (located south-adjacent to the Site), where the New Mexico Oil Conservation Division (NMOCD) and the New Mexico Environment Department (NMED) identified impacted groundwater in domestic water wells in 1986. In response, the NMOCD required Giant to investigate petroleum hydrocarbon impacts to groundwater downgradient of the refinery in the Lee Acres Subdivision, and the NMED conducted a separate investigation to identify potential impacts from the landfill. The investigations identified two separate plumes of impacted groundwater that commingled across the Site and flowed downgradient into the Lee Acres Subdivision. Groundwater contaminants detected in the refinery plume included phase-separated hydrocarbon (PSH) and dissolved-phase petroleum hydrocarbons (described below). Further details regarding the Lee Acres Landfill investigation are presented in Section 1.1.2 below.

During their investigation, Geoscience Consultants, Ltd. (GCL), consultants retained by Giant, concluded that several releases had occurred at the Site related to refining operations and subsequent truck loading and unloading activities. Specifically, the investigations identified the following three source areas at the Site:

- **Northern Area (Diesel Spill Area):** 10,000 to 15,000 gallons of diesel fuel were released from a pipeline in 1985;
- **Central Area (Truck Fueling Area):** 15,000 gallons of diesel fuel were released from a pipeline in 1986; and
- **Southern Area:** Historical releases from a former firefighting drill area east and upgradient of the Site that may have collected in a former seep and a stormwater catchment area. Firefighting drills consisted of igniting one to two barrels of crude oil/gasoline and using water to extinguish the flames.

Details of a subsurface investigation and initial remediation efforts conducted by Giant are contained in a 1987 report prepared by GCL titled *Soil and Groundwater Investigations and Remedial Action Plan*, Giant Industries, Inc. Bloomfield Refinery, Bloomfield, New Mexico.

1.1.1 Site Investigation and Remediation Activities

In the spring of 1986, Giant performed remedial excavations of petroleum-hydrocarbon contaminated soil in several areas of the Site (based on their investigation results). Approximately 4,500 cubic yards of soil were excavated from the Site as an immediate remedial measure. Once complete, confirmation-soil samples were collected from the open excavations to assess remaining in-place soils. Results from the remedial excavations also are presented in the 1987 GCL report.

Beginning in 1988, Giant installed a groundwater recovery, treatment, and disposal system to restrict migration of contaminants and to remediate groundwater impacts caused by Giant's former operations. A total of 45 monitoring wells were initially installed and designated GBR monitoring wells (Figure 2). Of these 45 monitoring wells, 11 were converted to recovery wells and re-named with GRW designations. An additional 17 monitoring wells were installed in the Lee Acres Subdivision and designated as SHS monitoring and recovery wells. Four SHS wells initially operated as recovery wells. Giant pumped groundwater from the recovery wells into storage tanks, treated the groundwater with an air stripper and carbon filtration, and re-injected treated groundwater into the subsurface through two infiltration trenches. The initial discharge permit for the Site was approved by the NMOCD in 1988 and the Site was given a Discharge Permit Number GW-040.

1.1.2 Adjacent Lee Acres Landfill Superfund Site

Concurrent with refinery operations, the former Lee Acres Landfill (located upgradient of the Site) operated as a San Juan County landfill from 1962 to 1986 (Figure 1). Landfill operations included solid waste disposal in trenches and liquid waste disposal in a series of lagoons. The NMOCD sampled the lagoons in 1985 and demonstrated that the liquids in the impoundments contained a variety of chlorinated solvents, petroleum hydrocarbon constituents, heavy metals, and salts. As stated above, a breach in the lagoon dike occurred in 1985 and released liquid wastes into an arroyo west of the Site, prompting an investigation by the NMED in conjunction with the United States Bureau of Land Management (BLM) and United States Geological Survey (USGS).

Initial investigations conducted by the NMED, BLM, and USGS identified that landfill contaminants originating from the landfill included total dissolved solids (TDS), chloride, sulfate, manganese, metals, BTEX constituents (benzene, toluene, ethylbenzene, and xylenes), naphthalene, 1,1-dichloroethane, cis-1,2-dichloroethene, trans-1,2-dichloroethene, tetrachloroethene (PCE), 1,1,1-trichloroethane, trichloroethene (TCE), and vinyl chloride. Comprehensive investigation results for the Lee Acres Landfill site are summarized in the *Remedial Investigation Report* (BLM, 1992).

Investigations of the landfill reported elevated levels of chloride present in the water sampled from the liquid waste lagoons (McQuillan, 1986) and the landfill accepted produced water from natural gas well operations in the San Juan Basin. During initial landfill investigations, the area near wells GBR-32, GBR-48, GBR-49, and GBR-50 (upgradient of the Site) was identified as the "northern containment slug." Groundwater representative of this area contained TDS concentrations ranging from 2,125 milligrams per kilogram (mg/kg) to 6,068 mg/kg, chloride concentrations ranging from 14.7 mg/kg to 2,110 mg/kg, and sulfate concentrations ranging from 1,920 mg/kg to 5,830 mg/kg (BLM, 1992).

The *Record of Decision* (2004), prepared by the United State Environmental Protection Agency (EPA), presented a human health and ecological risk assessment prepared for the landfill and developed remedial action objectives for soil and groundwater pathways. Based on their assessment, final contaminants of concern (COCs) for the landfill included manganese, nickel, 1,2-dichloroethene, trans-1,2-dichloroethene, PCE, TCE, and vinyl chloride. Other constituents associated with the landfill, including chloride, chromium, iron, sulfate, and TDS, were determined to be either within natural "background" concentrations or did not present a human health or ecological risk. Based on their results, the *Record of Decision* outlined the selected remedy to remediate and/or manage residual contamination originating from the Lee Acres Landfill site.

1.2 SITE GEOLOGY AND HYDROGEOLOGY

The Site is located on weathered outcrops of the Nacimiento Formation, which is comprised of shales, sandstones, and siltstones of Cretaceous-Tertiary age. The San Juan River is approximately 2,000 feet south of the Site. Immediately west is a large unnamed arroyo, which is underlain by 30 feet to 60 feet of Quaternary alluvial sediments. Older Quaternary terrace deposits of cobbles and boulders were observed on the interfluvial ridges adjacent to the arroyo. These terrace deposits may have been used as fill on the Site. The outcropping surfaces of the Nacimiento Formation have been eroded to form a paleochannel that appears to be similar in morphology to the existing surface arroyo located to the west of the Site. The bedrock is overlain by recent alluvial deposits (gravel, sand, silt, and clay), which thicken toward the south-southwest as illustrated on the cross sections on Figures 3 and 4.

The subsurface geology is a controlling feature for groundwater flow direction and potential contaminant migration. Shallow groundwater is generally unconfined with some local areas potentially under semi-confined conditions. There are two aquifers of concern that are in direct hydraulic communication: a shallow aquifer composed of recent alluvial materials contained within the bedrock paleochannel and a bedrock aquifer that exists in the underlying Nacimiento Formation (Figures 3 and 4, respectively). The alluvial aquifer generally has the higher permeability of the two aquifers, and recovery wells completed within this aquifer have higher yields with larger radii of influence.

1.3 LAND AND WATER USE

The land in the area of the Site is largely public land used as open rangeland for livestock and wildlife. Other uses of land in this area include: the Lee Acres Landfill Superfund site, of which the property is owned by the BLM and currently unoccupied; a residential neighborhood, Lee Acres Subdivision, to the south of the Site and across State Highway 64; and the San Juan County Fairgrounds located to the southwest of the Site (west of Lee Acres Subdivision). There are no schools, prisons, or hospitals within one miles of the site.

Surface water runoff in the area of the Site drain to an unnamed arroyo located west-adjacent to the Site. This arroyo system ultimately flows to the San Juan River located approximately one mile south of the Site. As stated above, shallow groundwater at the Site is located within Quaternary alluvial sediments that have accumulated in a bedrock paleochannel underlying the arroyo. At this time, there are no known uses of the shallow groundwater in the area of the Site.

2.0 HISTORICAL GROUNDWATER REMEDIATION AND MONITORING

Beginning in 1988, Giant had installed, operated, and maintained the groundwater remediation system at the Site. In June 2007, Western Refining Southwest, Inc. (Western) acquired the Site from Giant and continued to operate the remediation system. As groundwater quality improved over time, the remediation system was gradually simplified to optimize areas of residual hydrocarbon impacts. The air stripper was eliminated in the 1980s once product accumulation declined. In 2008, Western conducted a supplemental evaluation of the remedial operations, which included shutting down the remediation system and sampling groundwater wells under static conditions to redefine the area of impact and assess effectiveness of the remediation system. Existing equipment was inspected and repaired to optimize performance. Results from the sampling event were included in the *2008 Annual Report* prepared by LTE and submitted to the NMOCD. Pumping and treating operations were resumed in February 2009.

Western stopped recovering groundwater south of Highway 64 in 2009, as groundwater sampling results indicated no change to contaminant concentrations. Aboveground storage of groundwater was eliminated in 2014 based on reduced groundwater recovery volumes. By 2015, the system consisted of only 9 active groundwater recovery wells that pumped groundwater directly into the carbon filtration tanks, with the treated effluent discharged into the water infiltration trench.

2.1 REMEDIATION SYSTEM SHUTDOWN

Prior to August 2015, the groundwater recovery system had been in operation for approximately 27 years and had significantly improved groundwater conditions over that time. During operation, treated groundwater was discharged through infiltration trenches located on the GBR property. During operation, water entering (influent) and exiting (effluent) the remediation system was sampled and analyzed for volatile organic compounds (VOCs) in order to assess the efficacy of the system and monitor compliance with the Site discharge permit. Following 13 years of regular sampling without the detection of VOCs, Western conducted another extensive assessment of site groundwater conditions in 2015. Western sampled and monitored select wells to characterize groundwater under active pumping conditions, then shut down the recovery system to allow groundwater to equilibrate. A second sampling and monitoring event was conducted on the same groundwater monitoring wells to compare active groundwater recovery to post-shutdown static conditions.

In August 2015, additional groundwater samples were collected from select monitoring wells to establish a reference for groundwater conditions when the remediation system was operational. Historical documentation was reviewed to determine which wells had the most potential to contain impacted groundwater or to exhibit a change in water quality before and after the remediation system was inactivated. Monitoring wells GBR-8, GBR-11, GBR-20, GBR-21D, GBR-22, GBR-25, GBR-26, GBR-34, SHS-2, SHS-8, and SHS-9 were selected due to radius of influence of actively pumping recovery wells and/or historical documentation of PSH measured in the monitoring wells. Samples from these monitoring wells were collected and analyzed for chloride by United States Environmental Protection Agency (EPA) Method 300.0, BTEX by EPA Method 8260B, total petroleum hydrocarbon (TPH)-gasoline range organics (GRO) by EPA Method 8015D, and TPH-diesel range organics (DRO) by EPA Method 8015M/D. Follow-up samples were collected after the system was turned off and groundwater conditions were allowed to equilibrate.

Assessment results suggested the remediation system had successfully remediated the groundwater impact it was originally designed to address but was no longer an effective method for remediating residual impacts at the Site. As such, Western did not turn the recovery system back on, focusing instead on monitoring existing site conditions to better characterize the residual impact. Results of the assessment were included in the *2015 Annual Report*. Sampling from these monitoring wells under equilibrium conditions continued in March, July, and October of 2016 and were documented in the *2016 Annual Report*. Components of the former remediation system still on Site include two control buildings, two carbon filtration tanks, an aboveground storage tank, an infiltration trench, groundwater monitoring wells, and groundwater recovery wells (Figure 2).

2.2 SHS SYSTEM ABANDONMENT

At the request of the New Mexico Department of transportation (NMDOT), Western submitted Well Plugging Plans of Operations to the New Mexico Office of State Engineer (NMOSE) to plug and abandon SHS-1, SHS-2, SHS-3, SHS-4, and SHS-5 on June 5, 2017, approved on June 7, 2017. These wells were in the right of way of the highway and in the way of pending construction. On June 14, 2017, each well was cemented to the surface and the well vault was removed per the NMOSE requirements. Sampling and P&A activities were documented in the *2017 Annual Report*.

Western again conducted semi-annual gauging and annual compliance sampling at the Site in 2018. Results from these activities were documented in the *2018 Annual Report.* In addition, based on historical groundwater conditions and sample results for wells in the SHS area (results below NMWQCC standards), additional sampling was conducted with the intent of plugging and abandoning the monitoring and recovery wells associated with the SHS recovery and monitoring system. LTE submitted a *Partial Remediation System Closure Approval Request* (dated November 27, 2018) to NMOCD with the results of the additional sampling and the request to plug and abandon wells SHS-6, SHS-8, and SHS-14 through SHS-19 (wells SHS-9 and SHS-13 were left in place for future monitoring). NMOCD granted approval of the closure plan in an email dated May 9, 2019. Results of the P&A work are included in the *2019 Annual Report.*

2.3 ONGOING GROUNDWATER MONITORING

Although no discharge has occurred on the Site since 2015, Western has continued to conduct annual compliance sampling in accordance with Discharge Permit GW-040. Specifically, groundwater from wells GRW-3, GRW-6, GBR-17, GBR-24D, GBR-30, GBR-31, GBR-32, GBR-48, GBR-49, GBR-50, GBR-52, and SHS-9 is sampled and analyzed for one or more of the following: VOCs, polycyclic aromatic hydrocarbons (PAHs), general water chemistry (GWC) parameters, anions/cations, and several metals. Groundwater analytical results collected in 2019 are included in Table 1.

Western also has continued to collect depth to groundwater measurements semi-annually in 53 monitoring wells and 15 former recovery wells to monitor potential migration of PSH (data presented in Table 2). Groundwater potentiometric surface maps displaying interpreted groundwater contours and flow direction for March and November, 2019 are presented in Figures 5 and 6, respectively. Annual reports summarizing the sampling and gauging activities are submitted to NMOCD.

3.0 CURRENT SITE CONDITIONS

By 2015, Western had documented over 13 years of pumping and treating groundwater that did not contain detectable concentrations of VOCs. Western shut down the pump and treatment system in August 2015, to evaluate its effectiveness at addressing residual impacts at the Site and assess potential rebound of contaminant concentrations. Continued monitoring and sampling conducted under equilibrium conditions suggested that the remediation system had become asymptotic and was no longer actively remediating contaminants of concern at the Site. With these results, Western did not reactivate the system.

Conclusions from the continued monitoring of static groundwater conditions between 2015 and 2019 at the Site include:

- PSH accumulation has not changed significantly in recent years compared to observations collected prior to 2015 (during active pump and treat remediation).
    - There has been no PSH migration into monitoring wells where PSH had not previously been observed;
    - Groundwater impacted by petroleum hydrocarbons is characterized by presence of PSH and little to no dissolved-phase hydrocarbons regulated by the NMWQCC; and
    - Field observations and laboratory analytical results indicate impacted areas are consistent with previously identified source areas and do not appear to have been affected by the cessation of pump and treat remediation efforts.
- Annual compliance sampling was conducted in November 2019. Contaminants of concern were either not detected in groundwater samples or, if detected, can be attributed to an upgradient source and/or naturally occurring background conditions. Annual groundwater samples collected from monitoring and recovery wells did not contain VOCs or PAHs exceeding NMWQCC standards.

Annual groundwater monitoring well sampling results are consistently compliant with standards for general chemistry parameters and metals, with the exception of TDS, chloride, and sulfate. Elevated TDS, chloride, and sulfate are historically characteristic of groundwater conditions at the Site and are most likely related to historical releases at the Lee Acres Landfill. These analytes were identified in earlier studies as constituents within the groundwater contaminant plume that originated from the landfill.

Heavy metals, including chromium, iron, manganese, and nickel were detected in groundwater monitoring wells and former recovery wells during the annual sampling in November 2019. Additionally, chromium, iron, and manganese concentrations exceeded NMWQCC standards. Previous studies conducted for the Lee Acres Landfill identified chromium, iron, lead, manganese, nickel, and selenium in groundwater sampled upgradient of the Site. The Remedial Investigation Report for Lee Acres Landfill, Volume 1 (BLM, 1992)states that the upgradient background alluvial aquifer contains elevated levels of chromium and manganese and suggests an unidentified source that is unrelated to the landfill or the Site. Additional information regarding "background" concentrations of certain constituents is provided in Section 3.1 below.

It is apparent that the remediation system successfully remediated petroleum hydrocarbon impacts as designed. Following the reduction in petroleum hydrocarbon concentrations, the remediation system's primary purpose was to provide hydraulic control and restrict migration of potential contaminants off site. By shutting down the system to re-establish equilibrium conditions, Western has demonstrated the remediation system has no effect on existing petroleum hydrocarbon groundwater impacts or the migration of impacts off site. Residual impacts at the Site consist of PSH accumulations, which based on thicknesses measured and locations consistent with original source areas, are likely to be adsorbed by soil in the three original source areas. With no active source, the residual contaminants are not likely to migrate with or without the hydraulic barrier introduced by the remediation system.

3.1 BACKGROUND CONCENTRATIONS

As stated in Section 1.1.2 above, several constituents detected at the Lee Acres Landfill Superfund site were considered to be within natural "background" concentrations and were not included as COCs for the site. Specifically, chloride, chromium, iron, sulfate, and TDS were and remain present at and downgradient of the landfill at concentrations above NMWQCC standards; however, these constituents were not considered during the remediation-selection process outlined in the *Record of Decision* (EPA, 2004). In addition to these constituents, manganese (considered a COC for the Lee Acres Landfill Superfund site) also is found at concentrations above NMWQCC standards. These constituents have long been detected at the Site in wells GBR-32, GBR-48, GBR-49, and GBR-50, located hydrogeologically upgradient of the source areas at the Site (identified on Figure 2) and downgradient of the Lee Acres Landfill Superfund site.

In June 2019, LTE performed a statistical analysis using EPA ProUCL software to develop "background" concentrations for the following constituents migrating onto the Site: chloride, chromium, iron, manganese, sulfate, and TDS. Table 3 presents the results of the statistical analysis and groundwater analytical results for these constituents detected between 2010 and 2018. Table 3 also presents the cleanup standards (or "remedial goals") established for the Lee Acres Landfill Superfund site in their *Remedial Investigation Report* (BLM, 1992) and *Record of Decision* (EPA, 2004). Appendix A presents the assumptions and inputs used for the statistical analysis. Appendix A also includes a letter prepared by LTE summarizing our findings that was provided to the EPA for their five-year review of the Lee Acres Landfill Superfund site (conducted in 2019).

4.0 RECOMMENDATIONS

Ongoing groundwater monitoring and sampling conducted at the Site suggests that the existing remediation system has effectively remediated a majority of the petroleum-hydrocarbon contaminants that it was originally designed to address. Over the years, contaminant concentrations in a majority of the were below NMWQCC groundwater standards and/or were below the background concentrations established for the Site. However, based on the requirements of Discharge Permit GW-040, not all wells associated with the Site have been sampled for laboratory analysis.

Based on historical analytical results collected at the Site, LTE proposes to alter and expand the groundwater monitoring program. Specifically, LTE will cease the sampling of wells that have at least eight quarters of analytical results with no exceedances of NMWQCC standards and/or background concentrations. LTE will begin sampling wells that historically have not been sampled in order to assess groundwater conditions across the Site. In addition, LTE proposes to plug and abandon (P&A) several wells at the Site that have either been dry and/or are damaged and are no longer viable for groundwater monitoring.

Based on the lack of analytical data for many of the wells located at the Site, groundwater will be sampled from all viable wells at the Site. Based on the released constituents (gasoline fuel, diesel fuel, and crude oil), groundwater will be analyzed for VOCs by EPA 8260 and PAHs by EPA 8270. Based on ongoing monitoring, the following wells are either dry or damaged and will be plugged and abandoned: GBR-17, GBR-21S, GBR-31, GBR-40, and GBR-52. Activities to be performed at the Site are further discussed below.

4.1 GROUNDWATER SAMPLING

To assess groundwater conditions across the Site, LTE will sample the following monitoring wells in the spring of 2020:

- GRW-1, GRW-2, GRW-3, GRW-4, GRW-5, GRW-6, GRW-9, GRW-10, GRW-11, GRW-12, GRW-13, GBR-5, GBR-7, GBR-8, GBR-9, GBR-10, GBR-11, GBR-13, GBR-15, GBR-17, GBR-18, GBR-20, GBR-21D, GBR-22, GBR-23, GBR-24S, GBR-24D, GBR-25, GBR-26, GBR-30, GBR-31, GBR-32, GBR-33, GBR-34, GBR-35, GBR-39, GBR40, GBR-41, GBR-48, GBR-49, GBR-50, and GBR-52.

Prior to sampling, LTE will utilize a water/oil interface probe to gauge water and PSH levels in all forty-six monitoring wells associated with the site. The volume of water will be calculated for each monitoring well. Groundwater-quality parameters, including pH, electrical conductivity, dissolved oxygen, temperature, and oxidation-reduction potential, will be monitored during purging. Purging will be performed until groundwater-quality parameters stabilize, or once three well-casing volumes of water have been removed (unless the well is purged dry prior). Purging and sampling will be performed using a disposable polyvinyl chloride (PVC) bailer or a submersible pump.

Once each monitoring well has been sufficiently purged, groundwater samples will be collected by filling the appropriate laboratory supplied containers. Samples will be labeled with the date and time of collection, well designation, project name, collector's name, and parameters to be analyzed. They will be immediately sealed, packed on ice, and shipped to Hall Analytical Laboratories in Albuquerque, New Mexico for analysis of VOCs by EPA Method 8260 and PAHs by EPA Method 8270. Proper chain-of-custody

(COC) procedures will be followed documenting the date and time sampled, sample number, type of sample, sampler's name, preservative used, analyses required, and sampler's signature.

4.2 PLUGGING AND ABANDONMENT OF DRY/DAMAGED WELLS

As stated above, dry or damaged wells at the Site will be plugged and abandoned during this work and include wells GBR-17, GBR-21S, GBR-31, GBR-40, and GBR-52. Western will coordinate, conduct oversight, and document the plugging and abandonment process. The groundwater monitoring wells will be abandoned by a New Mexico state-licensed driller to comply with the standards for plugging wells. Well casing will be cut to at least 1-foot below grade, and wells will be filled with bentonite and/or cement grout from total depth to top of casing. LTE will file appropriate paperwork with the New Mexico Office of the State Engineer including a well plugging plan of operations in advance of plugging operations. The abandonment procedures will be initiated following approval by NMOCD that the abandonment plans for monitoring wells is acceptable.

4.3 PREPARATION OF STAGE 2 ABATEMENT PLAN

Based on the analytical results of the proposed groundwater sampling, a *Stage 2 Abatement Plan* will be prepared to address potential contamination remaining at the Site. The *Stage 2 Abatement Plan* will be submitted to NMOCD for review and approval.

5.0 References

EPA. (2004). *Record of Decision for the Lee Acres Landfill Superfund Site, Farmington, New Mexico.*

Geoscience Consultants, Ltd (GCL). (1987). *Soil and Ground Water Investigation and Remedial Action Plan.* Albuquerque.

McQuillan, D. and Longmire, P. (1986). *Water Quality Investigations at the Lee Acres Landfill and Vicinity.* San Juan County, New Mexico.

United States Bureau of Land Management (BLM. (1992). *Remedial Investigation Report for the Lee Acres Landfill.* Albuquerque: US Bureau of Land Management.

FIGURES

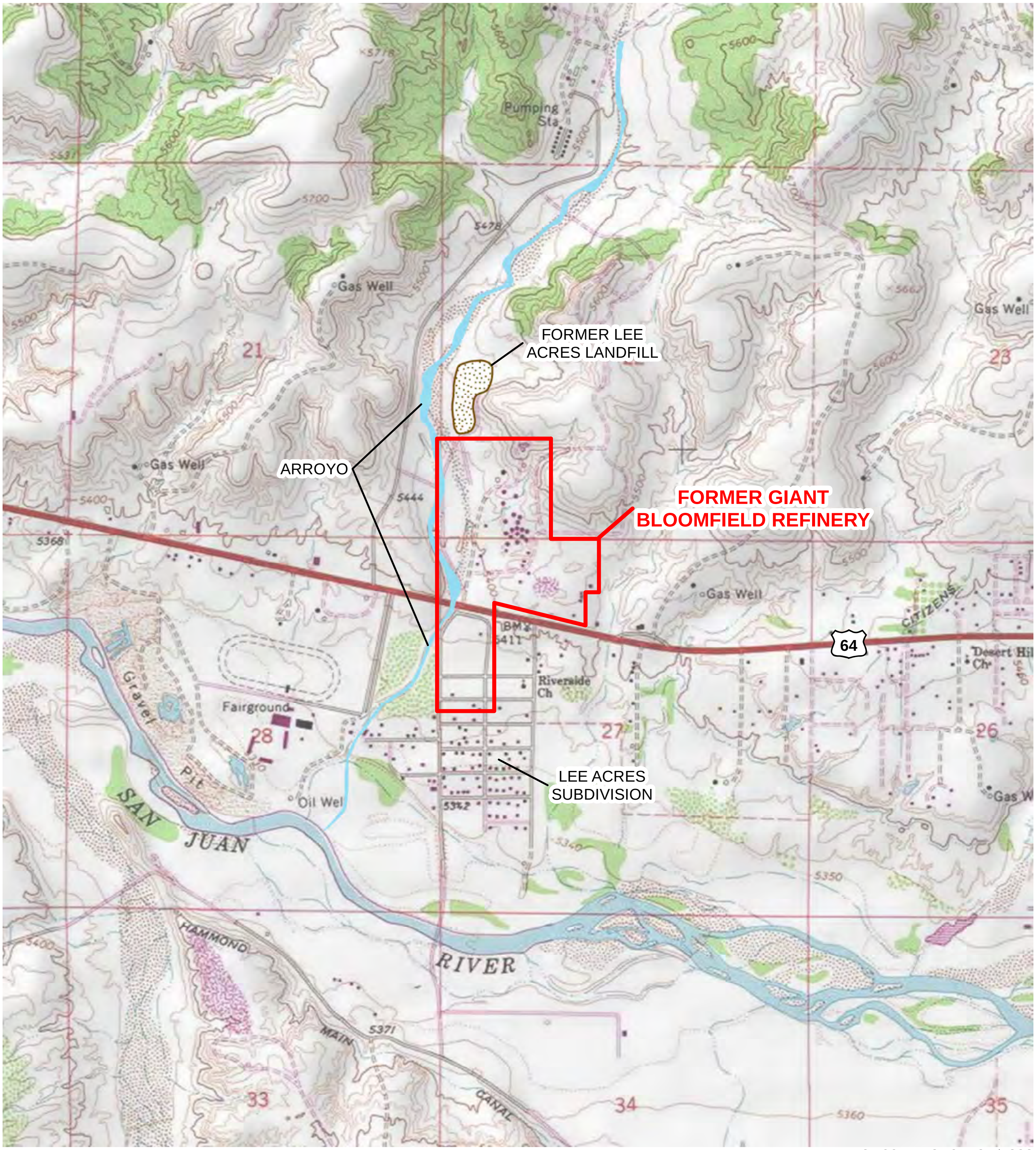


IMAGE COURTESY OF ESRI/USGS

LEGEND

- SITE LOCATION
- ARROYO
- FORMER LEE ACRES LANDFILL

0 2,000 4,000
Feet

N

FIGURE 1
SITE LOCATION MAP
FORMER GIANT BLOOMFIELD REFINERY
SW SEC 22 & NW SEC 27 T29N R12W
SAN JUAN COUNTY, NEW MEXICO
WESTERN REFINING SOUTHWEST, INC.

P:\Western Refining\GIS\MXD\029519002_GBR\029518010_GIANT_FIG01_SL.mxd

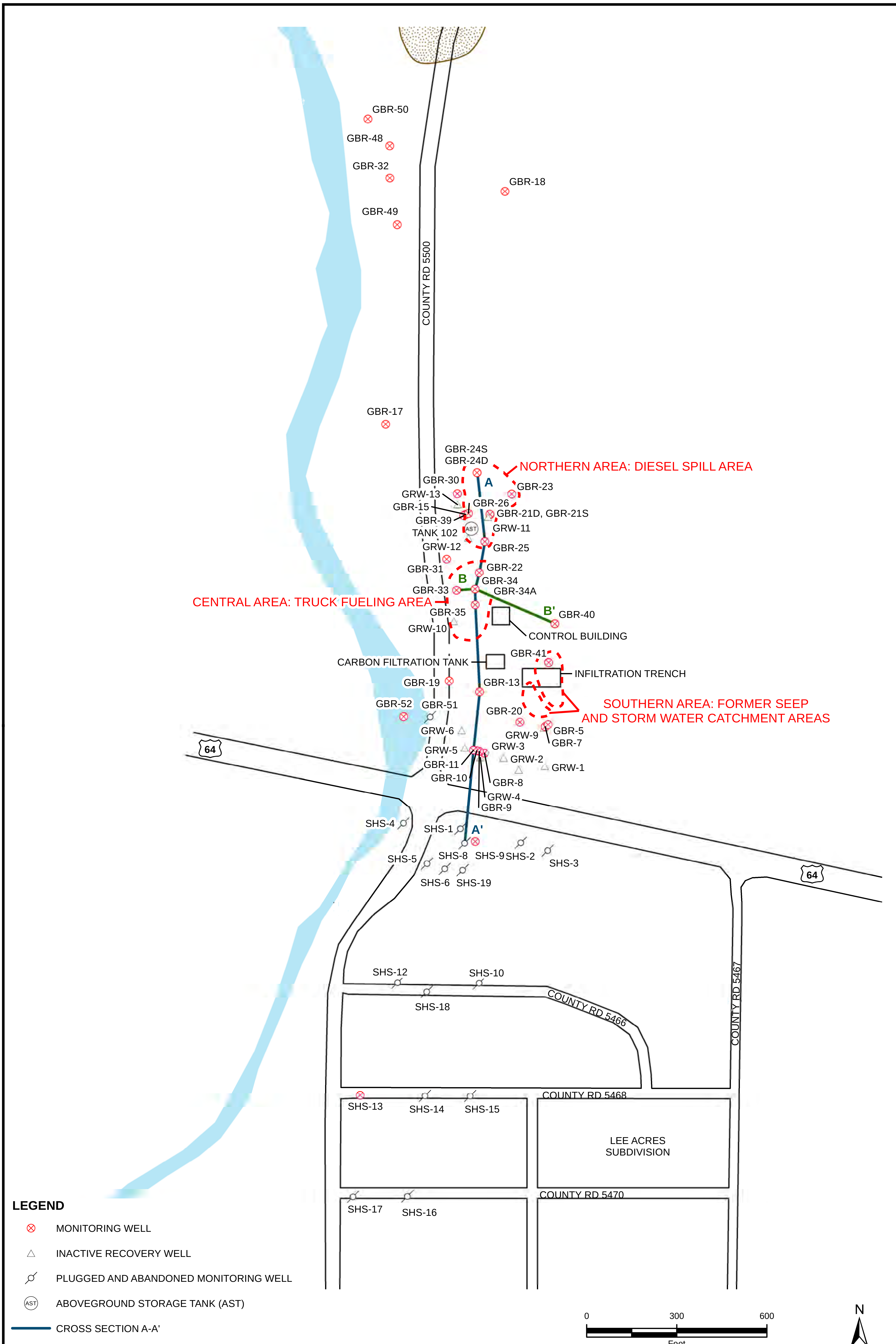
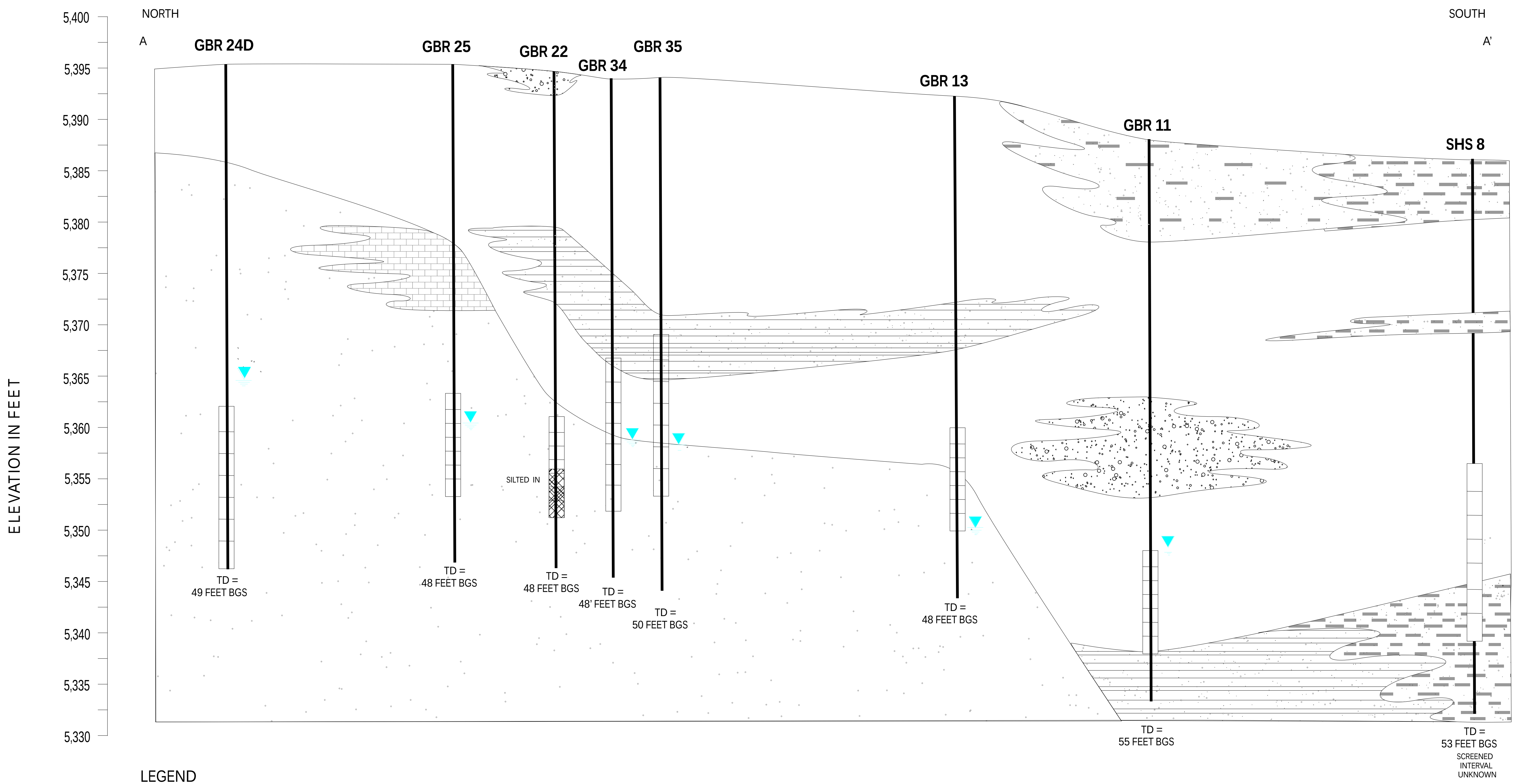


FIGURE 2
SITE MAP
FORMER GIANT BLOOMFIELD REFINERY
SW SEC 22 & NW SEC 27 T29N R12W
SAN JUAN COUNTY, NEW MEXICO
WESTERN REFINING SOUTHWEST, INC.

P:\Western Refining\GIS\MXD\029519002_GBR\029518010_GIANT_FIG02_SITE_XSEC.mxd



LEGEND

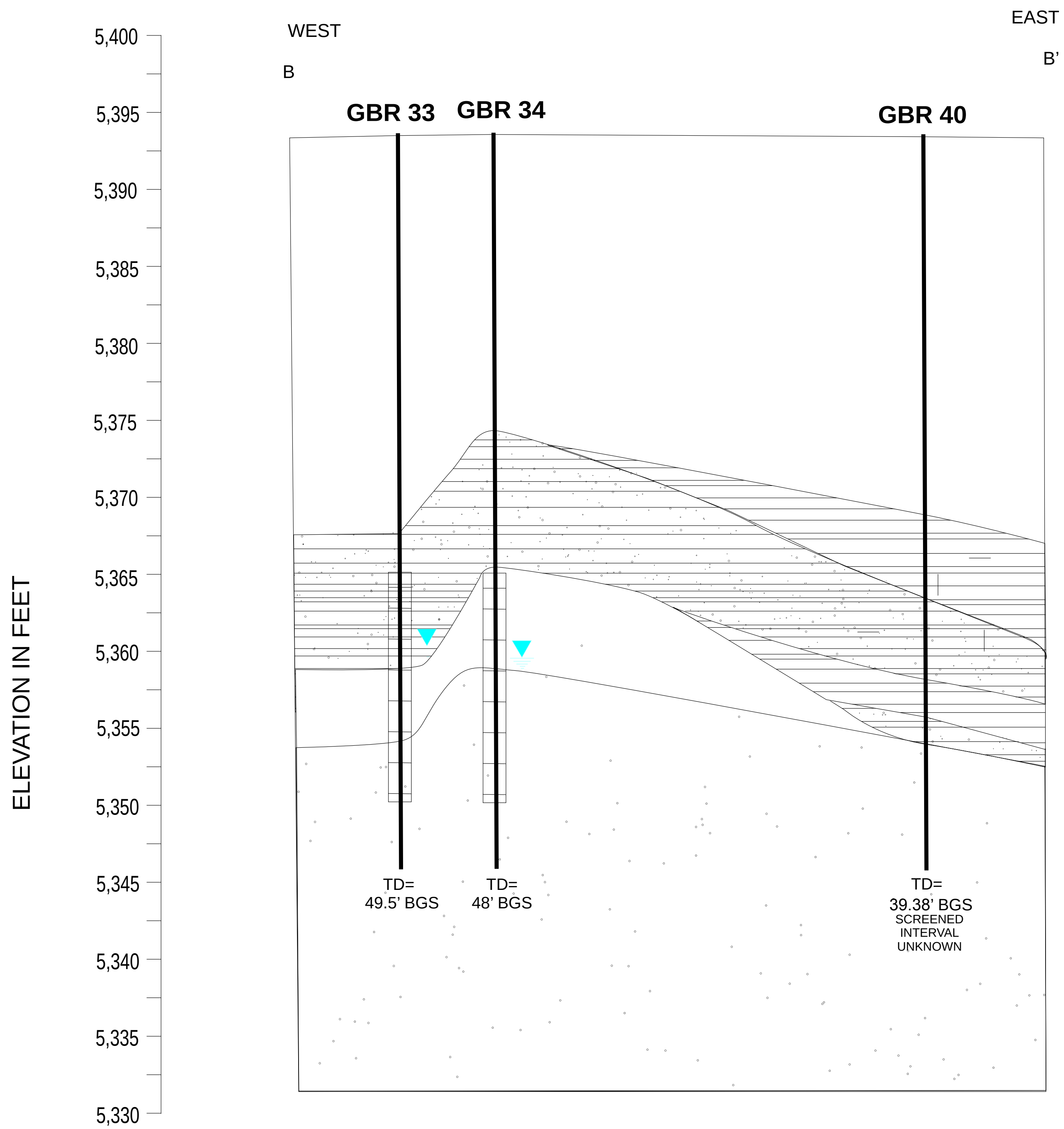
- SANDY SILT
- CLAYEY SAND
- SILTY SAND
- SAND
- PEBBLES/GRAVEL
- NACIMIENTO SHALE
- NACIMIENTO SANDSTONE
- BOREHOLE
- SCREENED INTERVAL
- BGS BELOW GROUND SURFACE
- TD TOTAL DEPTH IN FEET
- ▼ GROUNDWATER ELEVATION FROM OCTOBER 2018

HORIZONTAL SCALE
1" = 10 FEET

VERTICAL SCALE
1" = 90 FEET

FIGURE 3
CROSS SECTION A-A'
FORMER GIANT BLOOMFIELD REFINERY
SWSW SEC 22 &WNW SEC 27 T29N R12W
WESTERN REFINING SOUTHWEST, INC.

WR1009 1/16



LEGEND

- CLAYEY SAND
- CLAY
- SAND
- NACIMIENTO SANDSTONE
- DRY
- GROUNDWATER ELEVATION OCTOBER 2017

- BOREHOLE
- SCREENED INTERVAL
- BGS BELOW GROUND SURFACE
- TD TOTAL DEPTH IN FEET

HORIZONTAL SCALE
1" = 10 FEET

VERTICAL SCALE
1" = 90 FEET

FIGURE 4
CROSS SECTION B-B'
FORMER GIANT BLOOMFIELD REFINERY
SWSW SEC 22 &WNW SEC 27 T29N R12W
WESTERN REFINING SOUTHWEST, INC.

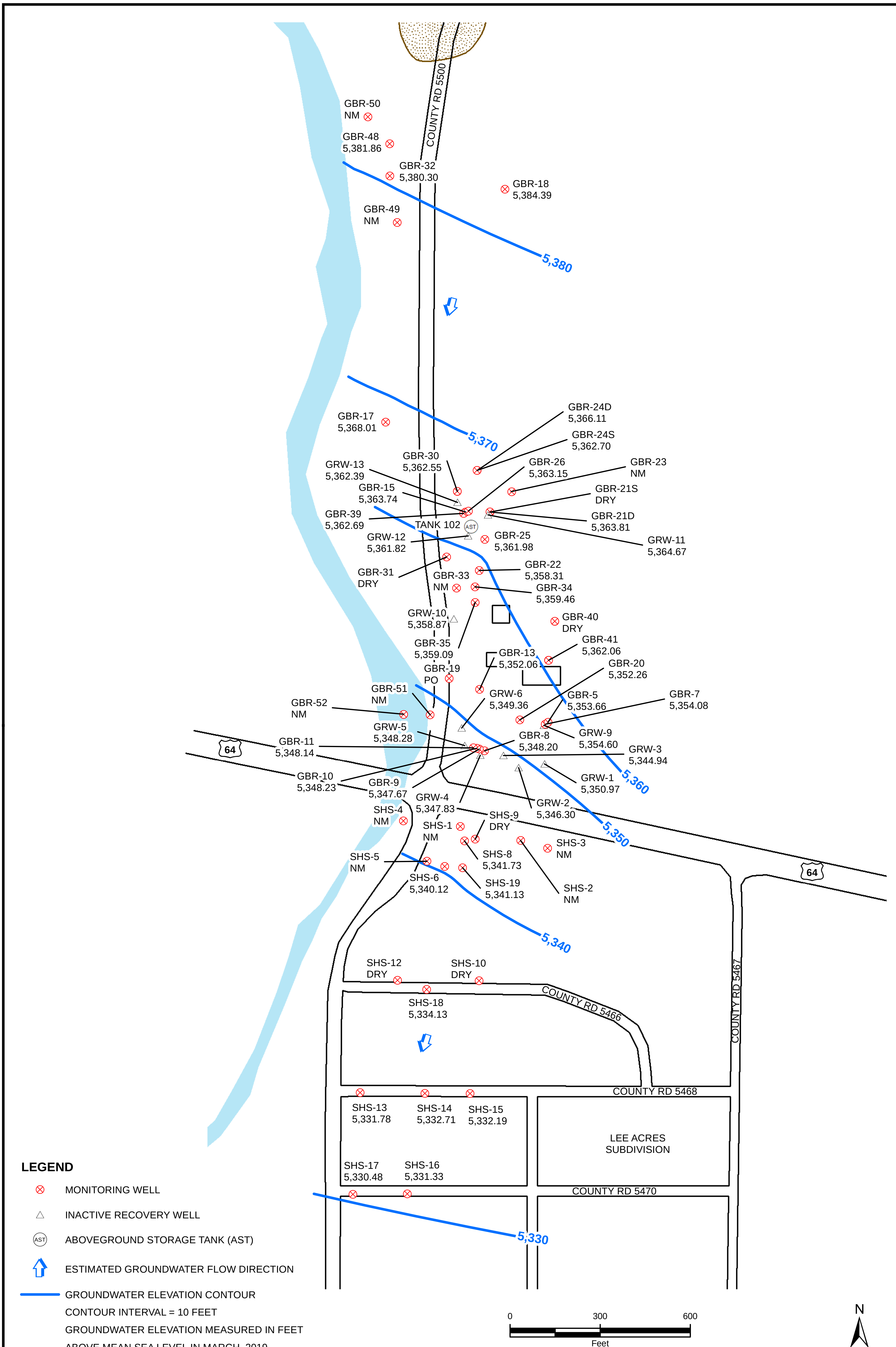


FIGURE 5
GROUNDWATER POTENTIOMETRIC SURFACE MAP (MARCH 2019)
FORMER GIANT BLOOMFIELD REFINERY
SW SEC 22 & NW SEC 27 T29N R12W
SAN JUAN COUNTY, NEW MEXICO
WESTERN REFINING SOUTHWEST, INC.

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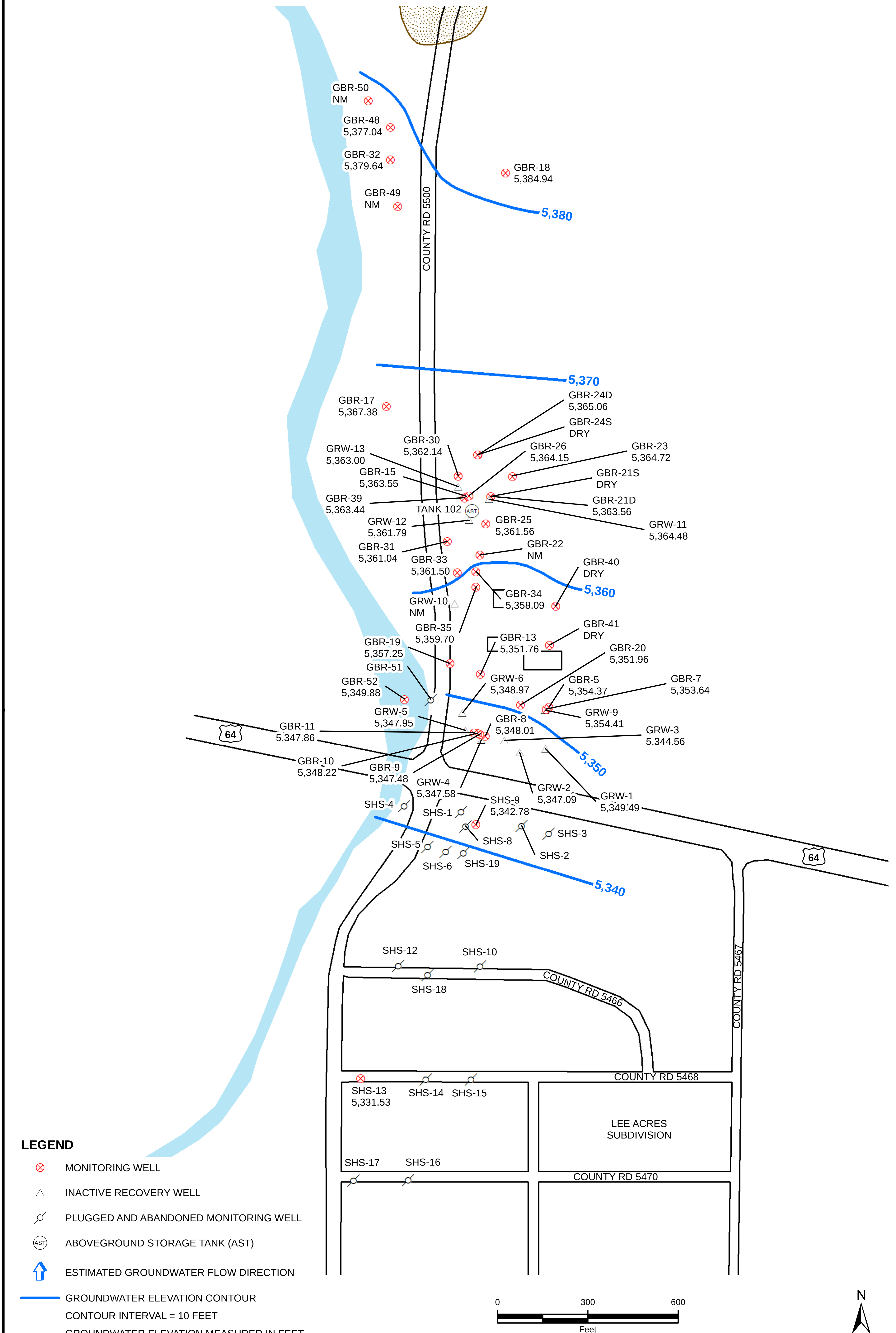

LEGEND

- MONITORING WELL
- INACTIVE RECOVERY WELL
- PLUGGED AND ABANDONED MONITORING WELL
- ABOVEGROUND STORAGE TANK (AST)
- ESTIMATED GROUNDWATER FLOW DIRECTION
- GROUNDWATER ELEVATION CONTOUR

CONTOUR INTERVAL = 10 FEET

GROUNDWATER ELEVATION MEASURED IN FEET ABOVE MEAN SEA LEVEL IN NOVEMBER, 2019

- ARROYO
- FORMER LEE ACRES LANDFILL

NM: NOT MEASURED

FIGURE 6
GROUNDWATER POTENTIOMETRIC SURFACE MAP (NOVEMBER 2019)
FORMER GIANT BLOOMFIELD REFINERY
SW SEC 22 & NW SEC 27 T29N R12W
SAN JUAN COUNTY, NEW MEXICO
WESTERN REFINING SOUTHWEST, INC.

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TABLES

TABLE 1
2019 ANNUAL COMPLIANCE - GROUNDWATER LABORATORY ANALYTICAL RESULTS

FORMER GIANT BLOOMFIELD REFINERY
WESTERN REFINING SOUTHWEST, INC.
SAN JUAN COUNTRY, NEW MEXICO

Analyte	NMWQCC Standard	Unit	GRW-3	GRW-6	GBR-17	GBR-24D	GBR-30	GBR-31	GBR-32	GBR-48	GBR-49	GBR-50	GBR-52	SHS-9
			7-Nov	7-Nov	5-Nov	6-Nov	6-Nov	7-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov
USEPA Method 8260B - Volatiles														
benzene	**10**	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.5
toluene	**750**	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
ethylbenzene	**750**	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	18
methyl tert-butyl ether (MTBE)	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,2,4-trimethylbenzene	**620**	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,3,5-trimethylbenzene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,2-dichloroethane (EDC)	**10**	µg/L	<1.0	<1.0	<1.0	1.6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,2-dibromoethane (EDB)	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
naphthalene	NE	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10
1-methylnaphthalene	NE	µg/L	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<20
2-methylnaphthalene	NE	µg/L	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<20
acetone	NE	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<50
bromobenzene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
bromodichloromethane	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
bromoform	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
bromomethane	NE	µg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<15
2-butanone	NE	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<50
carbon disulfide	NE	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<50
carbon tetrachloride	**10**	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
chlorobenzene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
chloroethane	NE	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10
chloroform	**100**	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
chloromethane	NE	µg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<15
2-chlorotoluene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
4-chlorotoluene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
cis-1,2-DCE	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
cis-1,3-dichloropropene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,2-dibromo-3-chloropropane	NE	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10
dibromochloromethane	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
dibromomethane	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,2-dichlorobenzene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,3-dichlorobenzene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,4-dichlorobenzene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
dichlorodifluoromethane	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,1-dichloroethane	**25**	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,1-dichloroethene	**5**	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,2-dichloropropane	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,3-dichloropropane	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
2,2-dichloropropane	NE	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10

TABLE 1
2019 ANNUAL COMPLIANCE - GROUNDWATER LABORATORY ANALYTICAL RESULTS

FORMER GIANT BLOOMFIELD REFINERY
WESTERN REFINING SOUTHWEST, INC.
SAN JUAN COUNTRY, NEW MEXICO

Analyte	NMWQCC Standard	Unit	GRW-3	GRW-6	GBR-17	GBR-24D	GBR-30	GBR-31	GBR-32	GBR-48	GBR-49	GBR-50	GBR-52	SHS-9
			7-Nov	7-Nov	5-Nov	6-Nov	6-Nov	7-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov
1,1-dichloropropene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
hexachlorobutadiene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
2-hexanone	NE	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<50
isopropylbenzene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	6.1
4-isopropytoluene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
4-methyl-2-pentanone	NE	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<50
methylene chloride	**100**	µg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<15
n-butylbenzene	NE	µg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<15
n-propylbenzene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	8.1
sec-butylbenzene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
styrene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
tert-butylbenzene	NE	µg/L	2.7	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,1,1,2-tetrachloroethane	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,1,2,2-tetrachloroethane	**10**	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10
tetrachloroethene (PCE)	**20**	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
trans-1,2-DCE	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
trans-1,3-dichloropropene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,2,3-trichlorobenzene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,2,4-trichlorobenzene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,1,1-trichloroethane	**60**	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,1,2-trichloroethane	**10**	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
trichloroethene (TCE)	**100**	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
trichlorofluoromethane	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
1,2,3-trichloropropane	NE	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<10
vinyl chloride	**1**	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0
xylenes, total	**620**	µg/L	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<7.5
USEPA Method 8270C: Polycylic Aromatic Hydrocarbons														
naphthalene	**30**	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
1-methylnaphthalene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NT	NT	NT	NT	NT	NT
2-methylnaphthalene	NE	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NT	NT	NT	NT	NT	NT
acenaphthylene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
acenaphthene	NE	µg/L	0.98	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
fluorene	NE	µg/L	4.3	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
phenanthrene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
anthracene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
fluoranthene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
pyrene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
benz(a)anthracene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
chrysene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT

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FORMER GIANT BLOOMFIELD REFINERY
WESTERN REFINING SOUTHWEST, INC.
SAN JUAN COUNTRY, NEW MEXICO

Analyte	NMWQCC Standard	Unit	GRW-3	GRW-6	GBR-17	GBR-24D	GBR-30	GBR-31	GBR-32	GBR-48	GBR-49	GBR-50	GBR-52	SHS-9
			7-Nov	7-Nov	5-Nov	6-Nov	6-Nov	7-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov
benzo(b)fluoranthene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
benzo(k)fluoranthene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
benzo(a)pyrene	**0.7**	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
dibenz(a,h)anthracene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
benzo(g,h,i)perylene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
indeno(1,2,3-cd)pyrene	NE	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NT	NT	NT	NT	NT	NT
USEPA Method 300.0: Anions														
bromide	NE	mg/L	0.53	<0.50	<0.50	<0.50	<0.50	0.98	<0.50	<0.50	<0.50	<0.50	<0.50	0.78
chloride	**250**	mg/L	100	94	55	170	**280**	**290**	190	**270**	97	69	60	130
sulfate	**600**	mg/L	450	**1,200**	**1,200**	**2,100**	**1,700**	**1,600**	**1,700**	**2,000**	**1,500**	**1,700**	**1,500**	35
fluoride	**1.6**	mg/L	<0.50	0.60	<0.50	0.58	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.70
nitrate + nitrite as N	NE	mg/L	<0.50	<0.50	5.2	<1.0	1.4	<0.50	<1.0	1.9	<1.0	6.9	6.9	<1.0
phosphorus, orthophosphate (As P)	NE	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
USEPA Method 200.7: Total Metals														
barium	NE	mg/L	NT	NT	NT	NT	NT	NT	0.034	0.31	0.021	0.018	NT	NT
beryllium	NE	mg/L	NT	NT	NT	NT	NT	NT	<0.010	0.0038	<0.0020	<0.0020	NT	NT
cadmium	**0.01**	mg/L	NT	NT	NT	NT	NT	NT	<0.010	<0.0020	<0.0020	<0.0020	NT	NT
calcium	NE	mg/L	180	370	450	470	540	530	470	550	400	530	470	150
chromium	**0.05**	mg/L	NT	NT	NT	NT	NT	NT	**0.097**	**0.23**	**0.10**	0.039	NT	NT
iron	**1.0**	mg/L	**2.3**	**8.0**	**120**	**8.3**	**43**	**15**	**3.6**	**48**	**1.4**	**2.2**	**1.4**	**74**
magnesium	NE	mg/L	53	39	53	40	52	49	48	58	37	39	36	36
manganese	**0.2**	mg/L	**1.4**	**5.9**	**3.8**	**1.4**	**4.2**	**2.7**	**2.1**	**1.8**	**0.87**	0.14	0.026	**0.91**
nickel	**0.2**	mg/L	NT	NT	NT	NT	NT	NT	0.074	0.098	0.12	0.055	NT	NT
potassium	NE	mg/L	<5.0	2.1	9.4	7.0	7.0	3.4	<5.0	10	2.9	2.3	1.2	4.7
silver	**0.05**	mg/L	NT	NT	NT	NT	NT	NT	<0.025	<0.0050	0.0063	0.0079	NT	NT
sodium	NE	mg/L	480	380	240	7.0	490	430	480	560	410	330	310	450
zinc	**10**	mg/L	NT	NT	NT	NT	NT	NT	<0.050	0.097	0.013	<0.010	NT	NT
USEPA Method 200.8: Total Metals														
antimony	NE	mg/L	NT	NT	NT	NT	NT	NT	<0.0050	<0.0010	<0.0010	<0.0010	NT	NT
arsenic	**0.1**	mg/L	NT	NT	NT	NT	NT	NT	<0.0010	0.0076	<0.0010	<0.0010	NT	NT
copper	**1.0**	mg/L	NT	NT	NT	NT	NT	NT	0.0085	0.048	0.0043	0.0024	NT	NT
lead	**0.05**	mg/L	NT	NT	NT	NT	NT	NT	0.0012	0.031	0.00083	0.00096	NT	NT
selenium	**0.05**	mg/L	NT	NT	NT	NT	NT	NT	0.0029	0.018	0.0011	0.0083	NT	NT
thallium	NE	mg/L	NT	NT	NT	NT	NT	NT	<0.00050	0.00053	<0.00050	<0.00050	NT	NT
USEPA Method 245.1: Mercury														
mercury	**0.002**	mg/L	NT	NT	NT	NT	NT	NT	<0.00020	<0.00020	<0.00020	<0.00020	NT	NT

TABLE 1
2019 ANNUAL COMPLIANCE - GROUNDWATER LABORATORY ANALYTICAL RESULTS

FORMER GIANT BLOOMFIELD REFINERY
WESTERN REFINING SOUTHWEST, INC.
SAN JUAN COUNTRY, NEW MEXICO

Analyte	NMWQCC Standard	Unit	GRW-3	GRW-6	GBR-17	GBR-24D	GBR-30	GBR-31	GBR-32	GBR-48	GBR-49	GBR-50	GBR-52	SHS-9
			7-Nov	7-Nov	5-Nov	6-Nov	6-Nov	7-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov	5-Nov
SM 2340B: Hardness														
hardness (as CaCO3)	NE	mg/L	680	1,100	1,300	1,300	1,600	1,500	1,400	1,600	1,200	1,500	1,300	520
USEPA Method SM 2320B: Alkalinity														
alkalinity, total (As CaCO3)	NE	mg/L CaCO3	1,083	342.8	208.8	238.8	259.1	300.8	267.7	272.6	244.2	195.3	210.1	1128
carbonate	NE	mg/L CaCO3	<2.000	<2.000	<2.000	<2.000	<2.000	<2.000	<2.000	<2.000	<2.000	<2.000	<2.000	<5.000
bicarbonate	NE	mg/L CaCO3	1,083	342.8	208.8	238.8	259.1	300.8	267.7	272.6	244.2	195.3	210.1	1128
USEPA Method 120.1: Specific Conductance														
specific conductance	NE	µmhos/cm	2,900	3,100	2,700	4,300	4,000	4,000	3,900	4,400	3,400	3,400	3,100	2,500
USEPA Method SM4500-H+B: pH														
pH	**6-9**	pH units	7.89	7.97	7.75	7.87	7.76	7.75	7.73	7.66	7.58	7.65	7.83	7.91
USEPA Method SM2540C Modified: Total Dissolved Solids														
total dissolved solids	**1,000**	mg/L	**1,990**	**2,470**	**2,150**	**3,420**	**3,040**	**3,220**	**3,200**	**3,450**	**2,710**	**2,910**	**2,600**	**1,470**

Notes:
µg/L - micrograms per liter
BOLD - indicates concentration exceeds the NMWQCC standard
mg/L - milligrams per liter
NE - not established
NMWQCC - New Mexico Water Quality Control Commission
NT - not tested
USEPA - United States Environmental Protection Agency

TABLE 2
GROUNDWATER ELEVATIONS AND THICKNESS OF PHASE-SEPARATED HYDROCARBONS

FORMER GIANT BLOOMFIELD REFINERY
WESTERN REFINING SOUTHWEST, INC.
SAN JUAN COUNTY, NEW MEXICO

Well Number	Wellhead Elevation (feet)	Total Depth (feet)	March 2019				November 2019			
			Depth to Water (feet BTOC)	Depth to Product (feet)	PSH Thickness (feet)	Adjusted GWEL (feet)	Depth to Water (feet BTOC)	Depth to Product (feet)	PSH Thickness (feet)	Adjusted GWEL (feet)
GRW-1	5,394.30	73.35	43.33	-	-	5,350.97	44.81	-	-	5,349.49
GRW-2	5,391.28	61.00	44.98	-	-	5,346.30	44.19	-	-	5,347.09
GRW-3	5,388.77	58.30	43.83	-	-	5,344.94	44.21	-	-	5,344.56
GRW-4	5,390.02	60.00	42.19	-	-	5,347.83	42.44	-	-	5,347.58
GRW-5	5,390.56	68.30	42.28	-	-	5,348.28	42.61	-	-	5,347.95
GRW-6	5,390.81	53.80	41.45	-	-	5,349.36	41.84	-	-	5,348.97
GRW-9	5,395.70	54.40	41.10	-	-	5,354.60	41.29	-	-	5,354.41
GRW-10	5,395.02	66.02	36.15	-	-	5,358.87	NM - Well blocked at 5 feet			
GRW-11	5,397.85	64.00	33.18	-	-	5,364.67	33.37	-	-	5,364.48
GRW-12	5,397.24	48.00	35.42	-	-	5,361.82	35.45	-	-	5,361.79
GRW-13	5,396.90	61.30	34.51	-	-	5,362.39	33.90	-	-	5,363.00
GBR-5	5,395.07	47.08	41.41	-	-	5,353.66	40.70	-	-	5,354.37
GBR-7	5,395.85	51.65	41.91	41.74	0.17	5,354.08	42.35	42.18	0.17	5,353.64
GBR-8	5,390.50	50.90	42.30			5,348.20	42.49			5,348.01
GBR-9	5,389.92	67.22	42.25	-	-	5,347.67	42.44	-	-	5,347.48
GBR-10	5,390.57	47.56	42.34	-	-	5,348.23	42.35	-	-	5,348.22
GBR-11	5,389.43	51.87	41.29	-	-	5,348.14	41.57	-	-	5,347.86
GBR-13	5,393.04	45.47	40.98	-	-	5,352.06	41.28	-	-	5,351.76
GBR-15	5,397.99	58.42	34.25	-	-	5,363.74	34.44	-	-	5,363.55
GBR-17	5,402.69	43.20	34.68	-	-	5,368.01	35.31	-	-	5,367.38
GBR-18	5,421.68	47.85	37.29	-	-	5,384.39	37.74	-	-	5,383.94
GBR-19 (1)	5,393.83	46.23	-	-	-	-	-	-	-	-
GBR-20	5,393.47	54.57	41.21	-	-	5,352.26	41.51	-	-	5,351.96
GBR-21D	5,400.19	49.77	36.38	-	-	5,363.81	36.63	-	-	5,363.56
GBR-21S	5,400.65	49.77	Dry				Dry			
GBR-22	5,395.91	38.73	37.60	-	-	5,358.31	NM - Cap glued onto well casing			
GBR-23 (2)	5,403.72	39.45	37.54	-	-	-	39.00	-	-	5,364.72
GBR-24D	5,396.77	51.40	30.66	-	-	5,366.11	31.71	-	-	5,365.06
GBR-24S	5,396.08	37.05	33.38	-	-	5,362.70	Dry			
GBR-25	5,397.03	37.12	35.05	-	-	5,361.98	35.47	-	-	5,361.56
GBR-26	5,396.72	41.29	33.57	-	-	5,363.15	32.57	-	-	5,364.15
GBR-30	5,395.59	41.66	33.04	-	-	5,362.55	33.45	-	-	5,362.14
GBR-31	5,396.58	43.50	Dry				35.54	-	-	5,361.04
GBR-32	5,414.86	47.83	34.56	-	-	5,380.30	35.22	-	-	5,379.64
GBR-33	5,396.28	45.72	-	-	-	-	34.78	-	-	5,361.50
GBR-34	5,394.00	42.20	34.54	-	-	5,359.46	35.91	-	-	5,358.09
GBR-35	5,393.66	42.35	34.57	-	-	5,359.09	34.96	-	-	5,358.70
GBR-39	5,397.55	41.42	34.86	-	-	5,362.69	34.11	-	-	5,363.44
GBR-40	5,400.76	39.38	Dry				Dry			
GBR-41	5,396.35	34.28	34.29	-	-	5,362.06	Dry			
GBR-48	5,413.90	43.54	32.04	-	-	5,381.86	36.86	-	-	5,377.04
GBR-49	(3)	40.30	32.96	-	-	-	33.34	-	-	-
GBR-50	(3)	44.37	32.12	-	-	-	32.59	-	-	-
GBR-51	5,389.68	57.07	39.76	-	-	-	P&A	-	-	-
GBR-52	5,387.74	52.73	37.88	-	-	-	37.86	-	-	5,349.88

TABLE 2
GROUNDWATER ELEVATIONS AND THICKNESS OF PHASE-SEPARATED HYDROCARBONS

FORMER GIANT BLOOMFIELD REFINERY
WESTERN REFINING SOUTHWEST, INC.
SAN JUAN COUNTY, NEW MEXICO

Well Number	Wellhead Elevation (feet)	Total Depth (feet)	March 2019				November 2019			
			Depth to Water (feet BTOC)	Depth to Product (feet)	PSH Thickness (feet)	Adjusted GWEL (feet)	Depth to Water (feet BTOC)	Depth to Product (feet)	PSH Thickness (feet)	Adjusted GWEL (feet)
SHS-1	5,383.54	50.40	P&A	-	-	-	P&A	-	-	-
SHS-2	5,381.66	44.56	P&A	-	-	-	P&A	-	-	-
SHS-3 (4)	5,383.33	-	P&A	-	-	-	P&A	-	-	-
SHS-4	5,383.62	52.16	P&A	-	-	-	P&A	-	-	-
SHS-5	5,378.36	47.85	P&A	-	-	-	P&A	-	-	-
SHS-6	5,378.17	52.78	38.05	-	-	5,340.12	P&A	-	-	-
SHS-8	5,380.25	50.92	38.52	-	-	5,341.73	P&A	-	-	-
SHS-9	5,380.79	46.25	Dry				38.01	-	-	5,342.78
SHS-10	5,373.80	45.80	Dry				P&A	-	-	-
SHS-12	5,373.94	52.41	Dry				P&A	-	-	-
SHS-13	5,367.81	47.51	36.03	-	-	5,331.78	36.28	-	-	5,331.53
SHS-14	5,367.07	52.71	34.36	-	-	5,332.71	P&A	-	-	-
SHS-15 (5)	5,366.21	47.78	34.02	-	-	5,332.19	P&A	-	-	-
SHS-16	5,362.58	42.20	31.25	-	-	5,331.33	P&A	-	-	-
SHS-17	5,364.35	46.21	33.87	-	-	5,330.48	P&A	-	-	-
SHS-18	5,373.64	47.36	39.51	-	-	5,334.13	P&A	-	-	-
SHS-19	5,378.89	52.40	37.76	-	-	5,341.13	P&A	-	-	-

Notes:
BTOC - below top of casing
D - designates that the well screen is deep
GWEL - groundwater elevation
NM - not measured
P&A - plugged and abandoned
PSH - phase-separated hydrocarbon
S - designates that the well screen is shallow

(1) Well was paved over in June 2010
(2) Well hit by a vehicle May 2014
(3) Top-of-casing elevation is unknown
(4) Well is damaged by a tree root
(5) Well visibly broken/buried January 2016
- indicates no GWEL or PSH measured
When PSH is detected, the GWEL is corrected using an estimated density correction factor of 0.8

TABLE 3
2010 to 2018 - ANNUAL COMPLIANCE GROUNDWATER LABORATORY ANALYTICAL RESULTS

FORMER GIANT BLOOMFIELD REFINERY
WESTERN REFINING SOUTHWEST, INC.
SAN JUAN COUNTRY, NEW MEXICO

Exploration Location	Wellhead Elevation (feet)	Well Depth (feet)	Screened Interval (depth in feet)	Well Diameter (inches)	Sample Date	Depth to Water (feet BTOC)	USEPA Method 300.0: Anions		USEPA Method 200.7: Total Metals			USEPA Method SM2540C Modified: Total Dissolved Solids
							chloride	sulfate	chromium	iron	manganese	total dissolved solids
NMWQCC Standard							**250**	**600**	**0.05**	**1.0**	**0.2**	**1,000**
GBR Background Threshold Values (1)							**560**	**2,546**	**1.553**	**97.06**	**6.42**	**4,566**
Regional Background Levels (Stone, et al. 1983) (2)							**2 - 34,000**	**1.9 - 14,000**	**0.001 - 0.06**	**0.01 - 16**	**0 - 2.6**	NA
Lee Acres RI Background Concentrations - Alluvial Aquifer (1992) (3)							**6.4 - 404**	**420 - 2,120**	**0.0144 - 0.113**	**0 - 1.48**	**0.0161 - 0.423**	**760 - 3,600**
Lee Acres RI/ROD Remedial Goals (1992/2004) (4)							**34,000**	**14,000**	**0.06**	**16**	**0.346**	**10,000**
Units							mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Lee Acres Sampling, 1992 RI Report (5)												
Lee Acres Site 1, Subarea 2, OU 2 - Alluvial Aquifer							**8.8 - 730**	**195 - 4,370**	**0.0108 - 0.124**	**0.118 - 1.71**	**0.0161 - 8.62**	**943 - 6,560**
Lee Acres Site 1, Subarea 3, OU 2 - Southern Area - Alluvial Aquifer							**19 - 2,110**	**830 - 2,610**	**0.0145 - 0.0406**	**0.148 - 23.9**	**0.0214 - 4.23**	**622 - 5,300**
Lee Acres Site 2, Subarea 4 - Alluvial Aquifer							**3.5 - 604**	**310 - 3,220**	**0.043 - 0.110**	**0.0749 - 64.1**	**0.0131 - 3.4**	**616 - 6,370**
GBR Sampling, Upgradient Wells (6)												
GBR-32	5,414.86	45	25 - 40	2	Oct 2018	33.95	200	1,700	0.074	2.7	1.9	3,110
					Dec 2017		290	1,600	0.13	2.3	1.2	3,210
					Jan 2017		320	2,000	0.33	11	1.2	3,500
					Aug 2015		370	2,000	0.02	0.26	0.56	3,830
					Nov 2014		380	1,900	1.4	5.9	0.70	3,800
					Jan 2013		400	2,200	0.098	1.2	0.40	4,320
					Jan 2012		500	**2,800**	0.030	0.88	0.50	4,290
					Jan 2011		420	2,300	0.13	NT	NT	4,010
					Jan 2010		NT	NT	NT	NT	NT	NT
GBR-48	5,413.90	43.6	28.4 - 38.4	2	Oct 2018	35.62	300	1,800	0.036	18	0.49	3,580
					Dec 2017		350	1,900	0.13	40	1.7	3,690
					Jan 2017		340	2,000	0.42	89	4.8	3,360
					Aug 2015		370	2,100	0.95	170	6.4	3,730
					Nov 2014		420	2,100	0.92	52	2.0	4,030
					Jan 2013		230	2,200	0.52	17	0.94	4,020
					Jan 2012		200	1,700	0.63	15	0.83	2,940
					Jan 2011		390	2,200	0.71	9.3	NT	3,510
					Jan 2010		NT	NT	NT	NT	NT	NT
GBR-49	*	38.5	25.9 - 36.3	2	Oct 2018	32.06	180	1,800	1.2	23	0.98	3,010
					Dec 2017		150	1,300	0.018	0.44	0.30	2,720
					Jan 2017		210	1,900	0.2	11	1.1	3,160
					Aug 2015		180	1,500	0.38	7.1	0.54	2,840
					Nov 2014		63	1,400	0.060	41	3.9	2,340
					Jan 2013		240	1,600	0.041	4.6	1.3	3,290
					Jan 2012		260	2,000	0.018	0.23	0.34	3,470
					Jan 2011		310	2,000	0.48	NT	NT	3,390
					Jan 2010		NT	NT	NT	NT	NT	NT

Exploration Location	Wellhead Elevation (feet)	Well Depth (feet)	Screened Interval (depth in feet)	Well Diameter (inches)	Sample Date	Depth to Water (feet BTOC)	USEPA Method 300.0: Anions	chloride	sulfate	USEPA Method 200.7: Total Metals	chromium	iron	manganese	USEPA Method SM2540C Modified: Total Dissolved Solids	total dissolved solids
NMWQCC Standard								**250**	**600**		**0.05**	**1.0**	**0.2**		**1,000**
GBR Background Threshold Values (1)								**560**	**2,546**		**1.553**	**97.06**	**6.42**		**4,566**
Regional Background Levels (Stone, et al. 1983) (2)								**2 - 34,000**	**1.9 - 14,000**		**0.001 - 0.06**	**0.01 - 16**	**0 - 2.6**		NA
Lee Acres RI Background Concentrations - Alluvial Aquifer (1992) (3)								**6.4 - 404**	**420 - 2,120**		**0.0144 - 0.113**	**0 - 1.48**	**0.0161 - 0.423**		**760 - 3,600**
Lee Acres RI/ROD Remedial Goals (1992/2004) (4)								**34,000**	**14,000**		**0.06**	**16**	**0.346**		**10,000**
Units								mg/L	mg/L		mg/L	mg/L	mg/L		mg/L
GBR-50	*	42.5	26.91 - 37.26		Oct 2018	31.26		59	1,700		0.044	4.0	0.13		2,770
					Dec 2017			54	1,500		0.16	5.8	0.32		2,590
					Jan 2017			59	1,500		0.36	6.8	1.3		2,580
					Aug 2015			44	1,700		0.073	2.2	0.19		2,760
					Nov 2014			52	1,700		0.013	3.6	0.22		2,800
					Jan 2013			49	1,600		<0.0060	1.3	0.12		2,830
					Jan 2012			49	1,800		0.0069	0.72	0.041		2,730
					Jan 2011			46	1,800		0.023	NT	NT		2,640
					Jan 2010			NT	NT		NT	NT	NT		NT
<u>GBR Sampling, Source-Area Wells</u>															
GRW-3/GBR-29 or 43	5,388.77	58.3	34.5 - 50.2	6	Oct 2018	43.13		99	640		NT	18	0.80		2,190
					Dec 2017			74	1,400		NT	54	1.9		2,920
					Jan 2017			74	1,200		NT	150	2.9		2,730
					Aug 2015			38	1,900		NT	0.89	0.69		3,320
					Nov 2014			26	2,200		NT	0.86	0.44		3,680
					Jan 2013			59	1,300		NT	2.8	0.54		2,620
					Jan 2012			54	1,300		NT	2.8	0.67		2,660
					Jan 2011			95	480		NT	NT	NT		1,810
					Jan 2010			NT	NT		NT	NT	NT		NT
GRW-6/GBR-44	5,390.81	58.6	32.6 - 48.3	6	Oct 2018	40.89		100	1,300		NT	**890**	**45**		2,390
					Dec 2017			120	1,200		NT	40	**9.1**		2,570
					Jan 2017			89	1,500		NT	11	**17**		2,580
					Aug 2015			88	1,400		NT	15	**18**		3,220
					Nov 2014			86	1,600		NT	35	**8.5**		3,170
					Jan 2013			100	1,500		NT	2.4	1.2		2,760
					Apr 2012			80	1,900		NT	0.47	1.0		2,740
					Jan 2011			110	1,400		NT	NT	NT		2,490
					Jan 2010			NT	NT		NT	NT	NT		NT
GBR-17	5,402.69	51	31 - 51	2	Oct 2018	34.00		49	1,200		NT	**100**	3.0		2,180
					Dec 2017			50	1,000		NT	9.3	0.25		2,110
					Jan 2017			46	1,100		NT	15	0.35		1,890
					Aug 2015			43	1,100		NT	3.6	<0.00200		1,960
					Nov 2014			44	1,200		NT	3.7	0.13		1,980
					Jan 2013			47	1,300		NT	1.2	0.045		2,700
					Jan 2012			46	1,400		NT	3.9	0.15		2,150
					Jan 2011			47	1,300		NT	NT	NT		2,140
					Jan 2010			NT	NT		NT	NT	NT		NT

Exploration Location	Wellhead Elevation (feet)	Well Depth (feet)	Screened Interval (depth in feet)	Well Diameter (inches)	Sample Date	Depth to Water (feet BTOC)	USEPA Method 300.0: Anions	chloride	sulfate	USEPA Method 200.7: Total Metals	chromium	iron	manganese	USEPA Method SM2540C Modified: Total Dissolved Solids	total dissolved solids
NMWQCC Standard								**250**	**600**		**0.05**	**1.0**	**0.2**		**1,000**
GBR Background Threshold Values (1)								**560**	**2,546**		**1.553**	**97.06**	**6.42**		**4,566**
Regional Background Levels (Stone, et al. 1983) (2)								**2 - 34,000**	**1.9 - 14,000**		**0.001 - 0.06**	**0.01 - 16**	**0 - 2.6**		NA
Lee Acres RI Background Concentrations - Alluvial Aquifer (1992) (3)								**6.4 - 404**	**420 - 2,120**		**0.0144 - 0.113**	**0 - 1.48**	**0.0161 - 0.423**		**760 - 3,600**
Lee Acres RI/ROD Remedial Goals (1992/2004) (4)								**34,000**	**14,000**		**0.06**	**16**	**0.346**		**10,000**
Units								mg/L	mg/L		mg/L	mg/L	mg/L		mg/L
GBR-24D	5,396.77	46.3	33 - 43	2	Oct 2018	30.92		130	2,300		NT	9.1	1.8		3,780
					Dec 2017			140	1,800		NT	11	1.8		3,560
					Jan 2017			130	1,900		NT	14	1.8		3,390
					Aug 2015			160	2,100		NT	11	1.8		3,380
					Nov 2014			210	1,800		NT	12	1.7		3,410
					Jan 2013			200	1,700		NT	3.6	1.8		3,430
					Jan 2012			200	2,000		NT	2.4	1.7		3,320
					Jan 2011			170	2,400		NT	NT	NT		3,410
					Jan 2010			NT	NT		NT	NT	NT		NT
GBR-30	5,395.59	45	25 - 40	2	Oct 2018	32.31		250	1,500		NT	28	0.76		3,000
					Dec 2017			220	1,300		NT	38	1.4		2,770
					Jan 2017			220	1,400		NT	64	2.3		2,580
					Aug 2015			310	1,600		NT	7.6	0.5		3,020
					Nov 2014			270	1,400		NT	88	2.2		2,520
					Jan 2013			310	1,500		NT	**130**	6.1		3,340
					Jan 2012			390	1,700		NT	2.9	0.29		3,240
					Jan 2011			320	1,600		NT	NT	NT		3,340
					Jan 2010			NT	NT		NT	NT	NT		NT
GBR-31	5,396.58	45	24.6 - 39.6	2	Oct 2018	32.27		220	1,400		NT	13	3.1		2,660
					Dec 2017			93	1,700		NT	21	4.2		2,940
					Jan 2017			84	1,700		NT	1.9	0.18		2,970
					Aug 2015			250	1,700		NT	2.4	0.45		3,170
					Nov 2014			230	1,500		NT	12	1.6		3,100
					Jan 2013			79	1,600		NT	15	0.77		2,720
					Jan 2012			74	1,700		NT	3.8	0.27		2,760
					Jan 2011			97	1,800		NT	NT	NT		2,740
					Jan 2010			NT	NT		NT	NT	NT		NT
GBR-51	5,389.68	59.5	38.5 - 54.25	6	Oct 2018	NM		54	1,300		NT	0.059	<0.0020		2,330
					Dec 2017			51	1,200		NT	0.080	<0.020		2,250
					Jan 2017			45	990		NT	9.1	0.47		2,080
					Aug 2015			54	1,600		NT	17	0.42		2,430
					Nov 2014			54	1,400		NT	16	0.47		2,320
					Jan 2013			56	1,500		NT	9.7	0.88		2,540
					Jan 2012			53	1,600		NT	3.1	0.16		2,440
					Jan 2011			53	1,600		NT	NT	NT		2,380
					Jan 2010			NT	NT		NT	NT	NT		NT

Exploration Location	Wellhead Elevation (feet)	Well Depth (feet)	Screened Interval (depth in feet)	Well Diameter (inches)	Sample Date	Depth to Water (feet BTOC)	USEPA Method 300.0: Anions		USEPA Method 200.7: Total Metals			USEPA Method SM2540C Modified: Total Dissolved Solids
							chloride	sulfate	chromium	iron	manganese	total dissolved solids
NMWQCC Standard							**250**	**600**	**0.05**	**1.0**	**0.2**	**1,000**
GBR Background Threshold Values (1)							**560**	**2,546**	**1.553**	**97.06**	**6.42**	**4,566**
Regional Background Levels (Stone, et al. 1983) (2)							**2 - 34,000**	**1.9 - 14,000**	**0.001 - 0.06**	**0.01 - 16**	**0 - 2.6**	NA
Lee Acres RI Background Concentrations - Alluvial Aquifer (1992) (3)							**6.4 - 404**	**420 - 2,120**	**0.0144 - 0.113**	**0 - 1.48**	**0.0161 - 0.423**	**760 - 3,600**
Lee Acres RI/ROD Remedial Goals (1992/2004) (4)							**34,000**	**14,000**	**0.06**	**16**	**0.346**	**10,000**
Units							mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
GBR-52	5,387.74	50.78	30.08 - 45.75	6	Oct 2018	NM	54	1,500	NT	0.12	0.0028	2,580
					Dec 2017		54	1,500	NT	0.048	<0.0020	2,640
					Jan 2017		58	1,400	NT	18	0.46	2,540
					Aug 2015		65	1,400	NT	8.2	0.15	2,840
					Nov 2014		65	1,700	NT	12	0.25	2,540
					Jan 2013		63	1,700	NT	2.3	0.036	2,770
					Jan 2012		60	1,800	NT	2.2	0.032	2,720
					Jan 2011		62	1,900	NT	NT	NT	2,700
					Jan 2010		NT	NT	NT	NT	NT	NT
GBR Sampling, Downgradient Wells												
SHS-1	5,383.54	50.97	35.67 - 45.67	4	June 2017	P&A	100	1,300	NT	NT	NT	2,400
					Jan 2011		NT	NT	NT	NT	NT	NT
SHS-2	5,381.66	41.28	30.98 - 40.98	4	June 2017	P&A	310	2,200	NT	NT	NT	4,100
					Jan 2011		NT	NT	NT	NT	NT	NT
SHS-4	5,383.62	55	37 - 47	2	June 2017	P&A	59	1,600	NT	NT	NT	2,270
SHS-5	5,378.36	53.33	37.62 - 48.0	4	June 2017	P&A	50	1,200	NT	NT	NT	2,030
					Jan 2011		NT	NT	NT	NT	NT	NT
SHS-6	5,378.17	47.88	32.48 - 42.85	4	Jan 2018	37.85	NT	NT	NT	NT	NT	NT
SHS-8	5,380.25	52.5	30.83 - 46.60	4	Oct 2018	38.25	130	890	NT	50	3.1	2,730
SHS-8					Dec 2017		110	1,200	NT	10	3.6	2,730
SHS-8					Jan 2017		100	720	NT	66	3.0	2,210
SHS-8					Aug 2015		120	47	NT	8.6	0.41	1,300
SHS-8					Nov 2014		110	350	NT	**260**	5.0	1,400
SHS-8					Jan 2013		120	770	0.099	**100**	4.7	1,800
SHS-8					Jan 2012		170	430	NT	15	2.3	2,040
SHS-8					Jan 2011		150	150	0.0063	NT	NT	1,440
SHS-8					Jan 2010		NT	NT	NT	NT	NT	NT
SHS-9	5,380.79	49.88	34.46 - 44.46	4	Jan 2018	37.43	NT	NT	NT	NT	NT	NT
SHS-13	5,367.81	47.4	27 - 42	4	Jan 2018	35.85	NT	NT	NT	NT	NT	NT
SHS-14	5,367.07	54	28.70 - 48.70	4	Jan 2018	34.18	NT	NT	NT	NT	NT	NT
SHS-15	5,366.21	47.8	27.40 - 42.40	4	Jan 2018	33.00	NT	NT	NT	NT	NT	NT

Exploration Location	Wellhead Elevation (feet)	Well Depth (feet)	Screened Interval (depth in feet)	Well Diameter (inches)	Sample Date	Depth to Water (feet BTOC)	USEPA Method 300.0: Anions	chloride	sulfate	USEPA Method 200.7: Total Metals	chromium	iron	manganese	USEPA Method SM2540C Modified: Total Dissolved Solids	total dissolved solids
NMWQCC Standard								**250**	**600**		**0.05**	**1.0**	**0.2**		**1,000**
GBR Background Threshold Values (1)								**560**	**2,546**		**1.553**	**97.06**	**6.42**		**4,566**
Regional Background Levels (Stone, et al. 1983) (2)								**2 - 34,000**	**1.9 - 14,000**		**0.001 - 0.06**	**0.01 - 16**	**0 - 2.6**		NA
Lee Acres RI Background Concentrations - Alluvial Aquifer (1992) (3)								**6.4 - 404**	**420 - 2,120**		**0.0144 - 0.113**	**0 - 1.48**	**0.0161 - 0.423**		**760 - 3,600**
Lee Acres RI/ROD Remedial Goals (1992/2004) (4)								**34,000**	**14,000**		**0.06**	**16**	**0.346**		**10,000**
Units								mg/L	mg/L		mg/L	mg/L	mg/L		mg/L
SHS-16	5,362.58	42.6	22.2 - 37.2	4	Jan 2018	32.68		NT	NT		NT	NT	NT		NT
SHS-17	5,364.35	46.21	35.67 - 45.67	4	Jan 2018	32.63		NT	NT		NT	NT	NT		NT
SHS-18	5,373.64	47.36	37.36 - 47.36	4	Jan 2018	39.24		NT	NT		NT	NT	NT		NT
SHS-19	5,378.89	52.4	32.40 - 52.40	4	Jan 2018	37.77		NT	NT		NT	NT	NT		NT

Notes

(1) Background Concentrations Proposed for the Giant Bloomfield Refinery Site. Based on Statistical Analysis Prepared by LT Environmental and Submitted to New Mexico Oil Conservation District in an Email Dated June 10, 2019.
(2) Regional Background Concentrations Established in Document Titled *Hydrogeology and Water Resources of San Juan Basin, New Mexico,* Stone et al., dated 1983
(3) "Background" Concentration Proposed in Lee Acres DRAFT *Remedial Investigation Report* Prepared for the US Bureau of Land Management (dated February 1992)
(4) Contaminant Concentrations Established as the "Remedial Goals" or "Background" Concentrations for the Lee Acres Superfund Site. Based on the Lee Acres DRAFT *Remedial Investigation Report* and *Record of Decision* (dated May 2004).
(5) The Lee Acres *Remedial Investigation Report* Presents Analytical Data for Areas of the Site and Not Data for Individual Wells
(6) Well Location Used for Statistical Analysis of Background Concentrations
* Top-of-Casing Elevation is Unknown
NM Not Measured
P&A Plugged and Abandoned
µg/L micrograms per liter
BOLD Indicates Concentration Exceeds the Greater Value of the NMWQCC Water-Quality Standards or Background Threshold Values Proposed for the Giant Bloomfield Refinery
mg/L milligrams per liter
NMWQCC New Mexico Water Quality Control Commission
NT Not Tested
USEPA United States Environmental Protection Agency

APPENDIX A: BACKGROUND CONCENTRATIONS IN UPGRADIENT WELLS

Advancing Opportunity

LT Environmental, Inc.

848 East Second Avenue
Durango, Colorado 81301
970.385.1096

October 4, 2019

Nelly Smith, Remedial Project Manager
Superfund and Emergency Division – Remedial Branch (6SEDRL)
U.S. Environmental Protection Agency – Region 6
1445 Ross Avenue, Suite 1200, Dallas, TX 75202

RE: EPA-Requested Information
Giant Bloomfield Refinery GW-40 Site
Western Refining Southwest, Inc. (Marathon Petroleum Company, LP)
Bloomfield, New Mexico

Dear Ms. Smith:

At the request of the United States Environmental Protection Agency (USEPA), in conjunction with the New Mexico Oil Conservation Division (NMOCD), LT Environmental has prepared the attached table (Table 1) to provide requested well information and analytical data for the former Giant Bloomfield Refinery, "GW-40" site (the "Site"). Specifically, the table provides well information that includes wellhead elevation, well depth, well-screen interval, well diameter, and depth to water measurements. The table also presents analytical results for select constituents requested by the USEPA, collected during annual sampling events between 2010 and 2018 (chloride, sulfate, chromium, iron, manganese, and total dissolved solids). In addition, the *2018 Annual Report* prepared for the Site is attached for your review. The report includes analytical results for the 2018 groundwater-sampling event, as well as figures presenting well locations, cross sections, and groundwater potentiometric surface maps with interpreted groundwater-flow directions. We understand that this information will be used as part of the upcoming five-year review for the upgradient Lee Acres Superfund Site.

Please contact us if you have questions regarding the attached information.

Sincerely,

LT ENVIRONMENTAL, INC.

Devin Hencmann
Project Geologist

Stuart Hyde, LG
Project Geologist

cc: Greg McCartney, Marathon Petroleum Company, LP
Carl Chavez, NMOCD

LT ENVIRONMENTAL 25 YEARS ADVANCING OPPORTUNITY 1992 2017

TABLE 1
2010 to 2018 - ANNUAL COMPLIANCE GROUNDWATER LABORATORY ANALYTICAL RESULTS

FORMER GIANT BLOOMFIELD REFINERY
SAN JUAN COUNTRY, NEW MEXICO
WESTERN REFINING PIPELINE, LLC.

Exploration Location	Wellhead Elevation (feet)	Well Depth (feet)	Screened Interval (depth in feet)	Well Diameter (inches)	Sample Date	Depth to Water (feet BTOC)	USEPA Method 300.0: Anions – chloride	USEPA Method 300.0: Anions – sulfate	USEPA Method 200.7: Total Metals – chromium	USEPA Method 200.7: Total Metals – iron	USEPA Method 200.7: Total Metals – manganese	USEPA Method SM2540C Modified: Total Dissolved Solids – total dissolved solids
NMWQCC Standard							**250**	**600**	**0.05**	**1.0**	**0.2**	**1,000**
GBR Background Threshold Values (1)							**560**	**2,546**	**1.553**	**97.06**	**6.42**	**4,566**
Regional Background Levels (Stone, et al. 1983) (2)							**2 - 34,000**	**1.9 - 14,000**	**0.001 - 0.06**	**0.01 - 16**	**0 - 2.6**	NA
Lee Acres RI Background Concentrations - Alluvial Aquifer (1992) (3)							**6.4 - 404**	**420 - 2,120**	**0.0144 - 0.113**	**0 - 1.48**	**0.0161 - 0.423**	**760 - 3,600**
Lee Acres RI/ROD Remedial Goals (1992/2004) (4)							**34,000**	**14,000**	**0.06**	**16**	**0.346**	**10,000**
Units							mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Lee Acres Sampling, 1992 RI Report (5)												
Lee Acres Site 1, Subarea 2, OU 2 - Alluvial Aquifer							**8.8 - 730**	**195 - 4,370**	**0.0108 - 0.124**	**0.118 - 1.71**	**0.0161 - 8.62**	**943 - 6,560**
Lee Acres Site 1, Subarea 3, OU 2 - Southern Area - Alluvial Aquifer							**19 - 2,110**	**830 - 2,610**	**0.0145 - 0.0406**	**0.148 - 23.9**	**0.0214 - 4.23**	**622 - 5,300**
Lee Acres Site 2, Subarea 4 - Alluvial Aquifer							**3.5 - 604**	**310 - 3,220**	**0.043 - 0.110**	**0.0749 - 64.1**	**0.0131 - 3.4**	**616 - 6,370**
GBR Sampling, Upgradient Wells (6)												
GBR-32	5,414.86	45	25 - 40	2	Oct 2018	33.95	200	1,700	0.074	2.7	1.9	3,110
					Dec 2017		290	1,600	0.13	2.3	1.2	3,210
					Jan 2017		NT	NT	NT	NT	NT	NT
					Aug 2015		NT	NT	NT	NT	NT	NT
					Nov 2014		380	1,900	1.4	5.9	0.70	3,800
					Jan 2013		400	2,200	0.098	1.2	0.40	4,320
					Jan 2012		500	**2,800**	0.030	0.88	0.50	4,290
					Jan 2011		420	2,300	0.13	NT	NT	4,010
					Jan 2010		NT	NT	NT	NT	NT	NT
GBR-48	5,413.90	43.6	28.4 - 38.4	2	Oct 2018	35.62	300	1,800	0.036	18	0.49	3,580
					Dec 2017		350	1,900	0.13	40	1.7	3,690
					Jan 2017		NT	NT	NT	NT	NT	NT
					Aug 2015		NT	NT	NT	NT	NT	NT
					Nov 2014		420	2,100	0.92	52	2.0	4,030
					Jan 2013		230	2,200	0.52	17	0.94	4,020
					Jan 2012		200	1,700	0.63	15	0.83	2,940
					Jan 2011		390	2,200	0.71	9.3	NT	3,510
					Jan 2010		NT	NT	NT	NT	NT	NT
GBR-49	*	38.5	25.9 - 36.3	2	Oct 2018	32.06	180	1,800	1.2	23	0.98	3,010
					Dec 2017		150	1,300	0.018	0.44	0.30	2,720
					Jan 2017		NT	NT	NT	NT	NT	NT
					Aug 2015		NT	NT	NT	NT	NT	NT
					Nov 2014		63	1,400	0.060	41	3.9	2,340
					Jan 2013		240	1,600	0.041	4.6	1.3	3,290
					Jan 2012		260	2,000	0.018	0.23	0.34	3,470
					Jan 2011		310	2,000	0.48	NT	NT	3,390
					Jan 2010		NT	NT	NT	NT	NT	NT

Exploration Location	Wellhead Elevation (feet)	Well Depth (feet)	Screened Interval (depth in feet)	Well Diameter (inches)	Sample Date	Depth to Water (feet BTOC)	USEPA Method 300.0: Anions	chloride	sulfate	USEPA Method 200.7: Total Metals	chromium	iron	manganese	USEPA Method SM2540C Modified: Total Dissolved Solids	total dissolved solids
NMWQCC Standard								**250**	**600**		**0.05**	**1.0**	**0.2**		**1,000**
GBR Background Threshold Values (1)								**560**	**2,546**		**1.553**	**97.06**	**6.42**		**4,566**
Regional Background Levels (Stone, et al. 1983) (2)								**2 - 34,000**	**1.9 - 14,000**		**0.001 - 0.06**	**0.01 - 16**	**0 - 2.6**		NA
Lee Acres RI Background Concentrations - Alluvial Aquifer (1992) (3)								**6.4 - 404**	**420 - 2,120**		**0.0144 - 0.113**	**0 - 1.48**	**0.0161 - 0.423**		**760 - 3,600**
Lee Acres RI/ROD Remedial Goals (1992/2004) (4)								**34,000**	**14,000**		**0.06**	**16**	**0.346**		**10,000**
Units								mg/L	mg/L		mg/L	mg/L	mg/L		mg/L
GBR-50	*	42.5	26.91 - 37.26		Oct 2018	31.26		59	1,700		0.044	4.0	0.13		2,770
					Dec 2017			54	1,500		0.16	5.8	0.32		2,590
					Jan 2017			NT	NT		NT	NT	NT		NT
					Aug 2015			NT	NT		NT	NT	NT		NT
					Nov 2014			52	1,700		0.013	3.6	0.22		2,800
					Jan 2013			49	1,600		<0.0060	1.3	0.12		2,830
					Jan 2012			49	1,800		0.0069	0.72	0.041		2,730
					Jan 2011			46	1,800		0.023	NT	NT		2,640
					Jan 2010			NT	NT		NT	NT	NT		NT
<u>GBR Sampling, Source-Area Wells</u>															
GRW-3/GBR-29 or 43	5,388.77	58.3	34.5 - 50.2	6	Oct 2018	43.13		99	640		NT	18	0.80		2,190
					Dec 2017			74	1,400		NT	54	1.9		2,920
					Aug 2015			NT	NT		NT	NT	NT		NT
					Jan 2017			NT	NT		NT	NT	NT		NT
					Nov 2014			26	2,200		NT	0.86	0.44		3,680
					Jan 2013			59	1,300		NT	2.8	0.54		2,620
					Jan 2012			54	1,300		NT	2.8	0.67		2,660
					Jan 2011			95	480		NT	NT	NT		1,810
					Jan 2010			NT	NT		NT	NT	NT		NT
GRW-6/GBR-44	5,390.81	58.6	32.6 - 48.3	6	Oct 2018	40.89		100	1,300		NT	**890**	**45**		2,390
					Dec 2017			120	1,200		NT	40	**9.1**		2,570
					Jan 2017			NT	NT		NT	NT	NT		NT
					Aug 2015			NT	NT		NT	NT	NT		NT
					Nov 2014			86	1,600		NT	35	**8.5**		3,170
					Jan 2013			100	1,500		NT	2.4	1.2		2,760
					Apr 2012			80	1,900		NT	0.47	1.0		2,740
					Jan 2011			110	1,400		NT	NT	NT		2,490
					Jan 2010			NT	NT		NT	NT	NT		NT
GBR-17	5,402.69	51	31 - 51	2	Oct 2018	34.00		49	1,200		NT	**100**	3.0		2,180
					Dec 2017			50	1,000		NT	9.3	0.25		2,110
					Jan 2017			NT	NT		NT	NT	NT		NT
					Aug 2015			NT	NT		NT	NT	NT		NT
					Nov 2014			44	1,200		NT	3.7	0.13		1,980
					Jan 2013			47	1,300		NT	1.2	0.045		2,700
					Jan 2012			46	1,400		NT	3.9	0.15		2,150
					Jan 2011			47	1,300		NT	NT	NT		2,140
					Jan 2010			NT	NT		NT	NT	NT		NT

Exploration Location	Wellhead Elevation (feet)	Well Depth (feet)	Screened Interval (depth in feet)	Well Diameter (inches)	Sample Date	Depth to Water (feet BTOC)	USEPA Method 300.0: Anions		USEPA Method 200.7: Total Metals			USEPA Method SM2540C Modified: Total Dissolved Solids
							chloride	sulfate	chromium	iron	manganese	total dissolved solids
NMWQCC Standard							**250**	**600**	**0.05**	**1.0**	**0.2**	**1,000**
GBR Background Threshold Values (1)							**560**	**2,546**	**1.553**	**97.06**	**6.42**	**4,566**
Regional Background Levels (Stone, et al. 1983) (2)							**2 - 34,000**	**1.9 - 14,000**	**0.001 - 0.06**	**0.01 - 16**	**0 - 2.6**	NA
Lee Acres RI Background Concentrations - Alluvial Aquifer (1992) (3)							**6.4 - 404**	**420 - 2,120**	**0.0144 - 0.113**	**0 - 1.48**	**0.0161 - 0.423**	**760 - 3,600**
Lee Acres RI/ROD Remedial Goals (1992/2004) (4)							**34,000**	**14,000**	**0.06**	**16**	**0.346**	**10,000**
Units							mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
GBR-24D	5,396.77	46.3	33 - 43	2	Oct 2018	30.92	130	2,300	NT	9.1	1.8	3,780
					Dec 2017		140	1,800	NT	11	1.8	3,560
					Jan 2017		NT	NT	NT	NT	NT	NT
					Aug 2015		NT	NT	NT	NT	NT	NT
					Nov 2014		210	1,800	NT	12	1.7	3,410
					Jan 2013		200	1,700	NT	3.6	1.8	3,430
					Jan 2012		200	2,000	NT	2.4	1.7	3,320
					Jan 2011		170	2,400	NT	NT	NT	3,410
					Jan 2010		NT	NT	NT	NT	NT	NT
GBR-30	5,395.59	45	25 - 40	2	Oct 2018	32.31	250	1,500	NT	28	0.76	3,000
					Dec 2017		220	1,300	NT	38	1.4	2,770
					Jan 2017		NT	NT	NT	NT	NT	NT
					Aug 2015		NT	NT	NT	NT	NT	NT
					Nov 2014		270	1,400	NT	88	2.2	2,520
					Jan 2013		310	1,500	NT	**130**	6.1	3,340
					Jan 2012		390	1,700	NT	2.9	0.29	3,240
					Jan 2011		320	1,600	NT	NT	NT	3,340
					Jan 2010		NT	NT	NT	NT	NT	NT
GBR-31	5,396.58	45	24.6 - 39.6	2	Oct 2018	32.27	220	1,400	NT	13	3.1	2,660
					Dec 2017		93	1,700	NT	21	4.2	2,940
					Jan 2017		NT	NT	NT	NT	NT	NT
					Aug 2015		NT	NT	NT	NT	NT	NT
					Nov 2014		230	1,500	NT	12	1.6	3,100
					Jan 2013		79	1,600	NT	15	0.77	2,720
					Jan 2012		74	1,700	NT	3.8	0.27	2,760
					Jan 2011		97	1,800	NT	NT	NT	2,740
					Jan 2010		NT	NT	NT	NT	NT	NT
GBR-51	5,389.68	59.5	38.5 - 54.25	6	Oct 2018	NM	54	1,300	NT	0.059	<0.0020	2,330
					Dec 2017		51	1,200	NT	0.080	<0.020	2,250
					Jan 2017		NT	NT	NT	NT	NT	NT
					Aug 2015		NT	NT	NT	NT	NT	NT
					Nov 2014		54	1,400	NT	16	0.47	2,320
					Jan 2013		56	1,500	NT	9.7	0.88	2,540
					Jan 2012		53	1,600	NT	3.1	0.16	2,440
					Jan 2011		53	1,600	NT	NT	NT	2,380
					Jan 2010		NT	NT	NT	NT	NT	NT

							USEPA Method 300.0: Anions		USEPA Method 200.7: Total Metals			USEPA Method SM2540C Modified: Total Dissolved Solids
Exploration Location	**Wellhead Elevation (feet)**	**Well Depth (feet)**	**Screened Interval (depth in feet)**	**Well Diameter (inches)**	**Sample Date**	**Depth to Water (feet BTOC)**	chloride	sulfate	chromium	iron	manganese	total dissolved solids
NMWQCC Standard							**250**	**600**	**0.05**	**1.0**	**0.2**	**1,000**
GBR Background Threshold Values (1)							**560**	**2,546**	**1.553**	**97.06**	**6.42**	**4,566**
Regional Background Levels (Stone, et al. 1983) (2)							**2 - 34,000**	**1.9 - 14,000**	**0.001 - 0.06**	**0.01 - 16**	**0 - 2.6**	NA
Lee Acres RI Background Concentrations - Alluvial Aquifer (1992) (3)							**6.4 - 404**	**420 - 2,120**	**0.0144 - 0.113**	**0 - 1.48**	**0.0161 - 0.423**	**760 - 3,600**
Lee Acres RI/ROD Remedial Goals (1992/2004) (4)							**34,000**	**14,000**	**0.06**	**16**	**0.346**	**10,000**
Units							mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
GBR-52	5,387.74	50.78	30.08 - 45.75	6	Oct 2018	NM	54	1,500	NT	0.12	0.0028	2,580
					Dec 2017		54	1,500	NT	0.048	<0.0020	2,640
					Jan 2017		NT	NT	NT	NT	NT	NT
					Aug 2015		NT	NT	NT	NT	NT	NT
					Nov 2014		65	1,700	NT	12	0.25	2,540
					Jan 2013		63	1,700	NT	2.3	0.036	2,770
					Jan 2012		60	1,800	NT	2.2	0.032	2,720
					Jan 2011		62	1,900	NT	NT	NT	2,700
					Jan 2010		NT	NT	NT	NT	NT	NT
GBR Sampling, Downgradient Wells												
SHS-1	5,383.54	50.97	35.67 - 45.67	4	June 2017	P&A	100	1,300	NT	NT	NT	2,400
					Jan 2011		NT	NT	NT	NT	NT	NT
SHS-2	5,381.66	41.28	30.98 - 40.98	4	June 2017	P&A	310	2,200	NT	NT	NT	4,100
					Jan 2011		NT	NT	NT	NT	NT	NT
SHS-4	5,383.62	55	37 - 47	2	June 2017	P&A	59	1,600	NT	NT	NT	2,270
SHS-5	5,378.36	53.33	37.62 - 48.0	4	June 2017	P&A	50	1,200	NT	NT	NT	2,030
					Jan 2011		NT	NT	NT	NT	NT	NT
SHS-6	5,378.17	47.88	32.48 - 42.85	4	Jan 2018	37.85	NT	NT	NT	NT	NT	NT
SHS-8	5,380.25	52.5	30.83 - 46.60	4	Oct 2018	38.25	130	890	NT	50	3.1	2,730
SHS-8					Jan 2018		NT	NT	NT	NT	NT	NT
SHS-8					Dec 2017		110	1,200	NT	10	3.6	2,730
SHS-8					Jan 2017		NT	NT	NT	NT	NT	NT
SHS-8					Aug 2015		NT	NT	NT	NT	NT	NT
SHS-8					Nov 2014		110	350	NT	**260**	5.0	1,400
SHS-8					Jan 2013		120	770	0.099	**100**	4.7	1,800
SHS-8					Jan 2012		170	430	NT	15	2.3	2,040
SHS-8					Jan 2011		150	150	0.0063	NT	NT	1,440
SHS-8					Jan 2010		NT	NT	NT	NT	NT	NT
SHS-9	5,380.79	49.88	34.46 - 44.46	4	Jan 2018	37.43	NT	NT	NT	NT	NT	NT
SHS-13	5,367.81	47.4	27 - 42	4	Jan 2018	35.85	NT	NT	NT	NT	NT	NT
SHS-14	5,367.07	54	28.70 - 48.70	4	Jan 2018	34.18	NT	NT	NT	NT	NT	NT
SHS-15	5,366.21	47.8	27.40 - 42.40	4	Jan 2018	33.00	NT	NT	NT	NT	NT	NT

Exploration Location	Wellhead Elevation (feet)	Well Depth (feet)	Screened Interval (depth in feet)	Well Diameter (inches)	Sample Date	Depth to Water (feet BTOC)	USEPA Method 300.0: Anions	chloride	sulfate	USEPA Method 200.7: Total Metals	chromium	iron	manganese	USEPA Method SM2540C Modified: Total Dissolved Solids	total dissolved solids
NMWQCC Standard								**250**	**600**		**0.05**	**1.0**	**0.2**		**1,000**
GBR Background Threshold Values (1)								**560**	**2,546**		**1.553**	**97.06**	**6.42**		**4,566**
Regional Background Levels (Stone, et al. 1983) (2)								**2 - 34,000**	**1.9 - 14,000**		**0.001 - 0.06**	**0.01 - 16**	**0 - 2.6**		NA
Lee Acres RI Background Concentrations - Alluvial Aquifer (1992) (3)								**6.4 - 404**	**420 - 2,120**		**0.0144 - 0.113**	**0 - 1.48**	**0.0161 - 0.423**		**760 - 3,600**
Lee Acres RI/ROD Remedial Goals (1992/2004) (4)								**34,000**	**14,000**		**0.06**	**16**	**0.346**		**10,000**
Units								mg/L	mg/L		mg/L	mg/L	mg/L		mg/L
SHS-16	5,362.58	42.6	22.2 - 37.2	4	Jan 2018	32.68		NT	NT		NT	NT	NT		NT
SHS-17	5,364.35	46.21	35.67 - 45.67	4	Jan 2018	32.63		NT	NT		NT	NT	NT		NT
SHS-18	5,373.64	47.36	37.36 - 47.36	4	Jan 2018	39.24		NT	NT		NT	NT	NT		NT
SHS-19	5,378.89	52.4	32.40 - 52.40	4	Jan 2018	37.77		NT	NT		NT	NT	NT		NT

Notes

(1) Background Concentrations Proposed for the Giant Bloomfield Refinery Site. Based on Statistical Analysis Prepared by LT Environmental and Submitted to New Mexico Oil Conservation District in an Email Dated June 10, 2019.
(2) Regional Background Concentrations Established in Document Titled *Hydrogeology and Water Resources of San Juan Basin, New Mexico,* Stone et al., dated 1983
(3) "Background" Concentration Proposed in Lee Acres DRAFT *Remedial Investigation Report* Prepared for the US Bureau of Land Management (dated February 1992)
(4) Contaminant Concentrations Established as the "Remedial Goals" or "Background" Concentrations for the Lee Acres Superfund Site. Based on the Lee Acres DRAFT *Remedial Investigation Report* and *Record of Decision* (dated May 2004).
(5) The Lee Acres *Remedial Investigation Report* Presents Analytical Data for Areas of the Site and Not Data for Individual Wells
(6) Well Location Used for Statistical Analysis of Background Concentrations
* Top-of-Casing Elevation is Unknown
NM Not Measured
P&A Plugged and Abandoned
µg/L micrograms per liter
BOLD Indicates Concentration Exceeds the Greater Value of the NMWQCC Water-Quality Standards or Background Threshold Values Proposed for the Giant Bloomfield Refinery
mg/L milligrams per liter
NMWQCC New Mexico Water Quality Control Commission
NT Not Tested
USEPA United States Environmental Protection Agency

PROPOSED FACILITY-SPECIFIC BACKGROUND THRESHOLD VALUES FOR INORGANICS IN GROUNDWATER
FORMER GIANT BLOOMFIELD REFINERY
BLOOMFIELD, NEW MEXICO

												Original Reported UTL	NDs replaced with PQL - Analyzed as Detections (per Agency's request)				Original Dataset with NDs (Statistic based on Gamma distribution for previously lognormal cases)					
Analyte	**Units**	**Number of Samples**	**Percent ND**	**Non-Detects**	**Detections**	**ND EM**	**Distribution**	**Min**	**Max**	**Mean**	**Std Deviation**	**95%UTL 95% Coverage**	**CV**	**ND EM**	**Distribution**	**95%UTL 95% Coverage**	**CV**	**ND EM**	**Distribution**	**95%UTL 95% Coverage**	**Proposed Background Threshold Values (BTVs)**	**Comments**
Chloride	mg/L	40	0	0	40	NA	Non-Parametric\Max	44	560	232.3	153.4	560									560	No Change. Dataset do not follow a discernible distribution, use Max value as UTL
Chromium	mg/L	32	3.125	1	31	ROS	Lognormal	0.006	1.4	0.318	0.379	4.46	1.19	PQL	Gamma-WH	1.59	0.145	KM	Gamma-WH	1.553	1.553	Calculated UTL based on lognormal distribution is disproportionately high when compared to maximum detection= 1.4 due to highly variable sample data, recommend using UTL based on Gamma distribution with WH approximation
Iron	mg/L	33	6	2	31	ROS	Lognormal	0.1	170	16.62	33.37	261.7	2.008	PQL	Gamma-HW	100.1	1168	KM	Gamma-HW	97.06	97.06	Calculated UTL based on lognormal distribution is disproportionately high when compared to maximum detection= 170 due to highly variable sample data, recommend using UTL based on Gamma distribution with HW approximation
Manganese	mg/L	24	0	0	24	NA	Lognormal	0.041	6.4	0.765	1.578	10.63					1.226	NA	Gamma-HW	6.42	6.42	Calculated UTL based on lognormal distribution is disproportionately high when compared to maximum detection= 6.4 due to highly variable sample data, recommend using UTL based on Gamma distribution with HW approximation
Sulfate	mg/L	40	0	0	40	NA	Normal	698	2800	1801	351.9	2546									2546	Low coefficient of variation, use UTL based on normal distribution
Total Dissolved Solids	mg/L	40	0	0	40	NA	Normal	1460	4320	3234	629	4566									4566	Low coefficient of variation, use UTL based on normal distribution

Notes:
CV - Coefficient of Variation
HW - Hawkins–Wixley approximation
KM - Kaplan-Meier method
NA - Not Applicable
ND - Non-detect
ND EM - Non-detect estimation method
ROS - Regression on order statistics
WH - Wilson-Hilferty approximation