December 30, 2022

Mr. Rick Shean
Chief, Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505

Re: Crossgradient Well Installation Work Plan
HF Sinclair Navajo Refining LLC – Artesia Refinery
EPA ID NO. NMD048918817
HWB-NRC-22-001

Dear Mr. Shean:

HF Sinclair Navajo Refining LLC (HFSNR), formerly HollyFrontier Navajo Refining LLC, is submitting this letter work plan (Work Plan) for the installation of two monitoring wells at the HFSNR refinery located at 501 East Main Street in Artesia, New Mexico (the Refinery). The location of the Refinery is shown on **Figure 1**. The Work Plan was prepared at the request of the New Mexico Environment Department (NMED) in Comment #6 of the letter dated September 6, 2022 (NMED 2022).

INTRODUCTION

This Work Plan details the proposed monitoring well installation and sampling activities to be implemented at the Refinery to better define the crossgradient extent of phase-separated hydrocarbons (PSH) and dissolved volatile organic compounds (VOCs) in exceedance of critical groundwater screening levels (CGWSLs) in groundwater. The wells were recommended to be installed based on the results of the desktop groundwater receptor survey detailed in the December 30, 2021, memorandum "Artesia Refinery, Desktop Groundwater Receptor Survey and Vapor Intrusion Evaluation of Off-Site Receptors – Revised" (December 2021 Revised Receptor Survey Memo; TRC 2021b), and subsequent NMED comments provided in a letter dated September 6, 2022.

This Work Plan is presented as a letter work plan consistent with NMAC 20.4.2.7.L, as the corrective action activities described herein do not constitute the initial field investigation at the Refinery and is of limited scope where the field work can be completed in less than 7 days.

The applicable content requirements of Appendix E.2 of the Post-Closure Care (PCC) Permit (NMED 2010) are included in this Work Plan.

BACKGROUND

TRC Environmental Corporation (TRC) completed a desktop groundwater receptor survey on behalf of HFSNR, which included (1) identification of potential off-site receptors that may or could be affected by dissolved-phase hydrocarbon and PSH plumes present downgradient of the Refinery and (2) evaluation of the on-going NMED-approved facility-wide groundwater monitoring network and program. The receptor survey results and recommendations were most recently documented in the December 2021 Revised Receptor Survey Memo. No receptors were identified to be at risk for direct exposure to PSH or dissolved-phase hydrocarbons in exceedance of CGWSLs. The crossgradient extent of PSH and the benzene and methyl tert-butyl ether (MTBE) CGWSL exceedance areas are not fully defined on HFSNR property to the south of Highway 82 (specifically to the south of one or more of the following monitoring wells: MW-58, MW-109, MW-110, MW-130, MW-132, and KWB-6). Although HFSNR owns the land to at least 0.75 miles south of this area and maintains the position that additional monitoring wells are not required to monitor or control the plumes, HFSNR proposed to install two shallow groundwater monitoring wells to better define the crossgradient extent of the PSH and benzene and MTBE CGWSL exceedance areas.

SITE CONDITIONS

The current surface and subsurface conditions at and surrounding the Refinery are described in the subsections below.

Refinery Location and Surrounding Land Use

The Refinery is located immediately east of Highway 285 (North 1st Street) and north of Highway 82 (East Main Street) in Artesia, New Mexico. HFSNR owns property that extends to the north, east, and south of the main plant. The Refinery and surrounding properties are shown on **Figure 1**. Property to the west (upgradient) of the Refinery is used for commercial/industrial or residential purposes. Property to the north (crossgradient) of the Refinery is used for commercial/industrial, residential, or agricultural purposes. Property to the east (downgradient) of the Refinery is primarily used for agricultural purposes. Property to the south (crossgradient) of the Refinery is primarily used for commercial/industrial and agricultural purposes. HFSNR's parent corporation, HF Sinclair, constructed a Pretreatment Unit (PTU) and rail loading area as part of a renewable diesel project on the south side of Highway 82. The historical extent of target volatile organic compounds (VOCs), benzene, toluene, ethylbenzene, xylenes (BTEX), naphthalene, and methyl tert-butyl ether (MTBE), present in shallow

groundwater at concentrations in exceedance of their respective CGWSLs is also shown on **Figure 1**.

Groundwater Conditions – Hydrogeology

The principal aquifers in the Artesia area are within the valley fill alluvium (Quaternary alluvium) and the San Andres Formation. Two distinct water-bearing zones within the valley fill alluvium in the vicinity of the Refinery are referred to as the "shallow saturated zone" and the "valley fill zone." The deeper carbonate aquifer within the San Andres Formation is referred to as the "deep artesian aquifer." The hydrogeology of each of these aquifers is summarized below.

- Shallow Saturated Zone: Occurs in interbedded sand and gravel channels at 10 to 30 feet below ground surface (bgs). Overlying clays, silts, and caliche undulate at and near the Refinery and create intermittent confined and unconfined groundwater conditions in the shallow saturated zone. Groundwater in this zone generally flows to the east and is highly variable in quality and volume. The shallow saturated zone is not generally used for domestic or agricultural purposes.

- Valley Fill Zone: Underlies the shallow saturated zone and occurs in alluvial deposits of sand, silt, clay, and gravel that are approximately 300 feet thick near the Refinery. Irrigation and water production wells completed in this zone are typically screened across one to five water-producing intervals ranging in thickness from 20 to 170 feet, with most being approximately 20 feet thick. Production intervals are non-continuous, consist principally of sand and gravel, and are separated by less permeable lenses of silt and clay of varying thickness. In the immediate vicinity of the Refinery, irrigation wells completed in this zone are typically screened between 240 to 320 feet bgs (e.g., irrigation wells RA-3723 and RA-04196). Groundwater in this zone generally flows to the east and is under confined conditions, with static water levels in monitoring wells completed in this zone being similar to or higher than that observed in shallow saturated zone wells. The valley fill zone has been developed for domestic and agricultural use.

- Deep Artesian Aquifer: Primarily occurs in the upper portion of San Andres Formation (limestone and dolomite with irregular and erratic solution cavities). The San Andres Formation underlies the Queen and Grayburg Formations, which primarily act as a confining bed between this aquifer and the valley fill zone. However, near the City of Artesia, the deep artesian aquifer includes the lower section of the Queen and Grayburg Formations (in localized fractures and secondary porosity). Near the Refinery, the depth to the top of the water-producing interval is approximately 440 feet bgs. The deep

artesian aquifer has been extensively developed for industrial, municipal, and agricultural use, but not domestic use.

The Refinery's current facility-wide groundwater monitoring program includes 203 monitoring and recovery wells screened within the shallow saturated zone; 19 monitoring wells screened within the valley fill zone; and 5 irrigation wells screened within either the valley fill zone or deep artesian aquifer. Monitoring wells and recovery wells are gauged and sampled on a regular basis (primarily semiannually or annually, but a few select wells biennially). Groundwater monitoring results indicate that PSH is present in the shallow saturated zone and dissolved-phase hydrocarbons are present at concentrations exceeding their respective CGWSLs in the shallow saturated zone and the valley fill zone. The historical extent of target VOCs (BTEX, naphthalene, and MTBE) present in shallow groundwater at concentrations in exceedance of their respective CGWSLs is shown on **Figure 1**. Target VOCs have not been detected in the valley fill zone in exceedance of their respective CGWSLs over at least the last six semi-annual groundwater monitoring events conducted since April 2019. Dissolved-phase hydrocarbons have not been detected above the CGWSLs in any of the irrigation wells screened within the lower valley fill zone or deep artesian aquifer that have been sampled for VOCs since 2006.

Groundwater Conditions – Hydrocarbon Plumes

Concentrations of dissolved-phase hydrocarbons, specifically the target VOCs in the shallow saturated zone and valley fill zone, have generally exhibited a stable or decreasing trend over time, as documented in Annual Groundwater Monitoring Reports since at least 2016. The most prevalent target VOCs in shallow groundwater downgradient of the Refinery are benzene and MTBE; concentrations of these target VOCs during the April 2021 semiannual monitoring event (i.e., the most comprehensive recent monitoring event reported to NMED) are shown on **Figures 2** and **3**, respectively. The April 2021 extent of benzene and MTBE detections in shallow groundwater are generally consistent with the historical target VOC CGWSLs exceedance area shown on **Figure 1**.

The extent of PSH in the shallow saturated zone between April 2016 through April 2021 is shown on **Figures 1** through **3**. Apparent PSH thicknesses in wells screened in the shallow saturated zone are generally inversely affected by fluctuations in groundwater elevations. As shown on **Figure 2**, the current extent of PSH and benzene detections in shallow groundwater are primarily contained within the Refinery and a downgradient commercial pecan orchard (the Pecan Orchard). As shown on **Figure 3**, the current extent of MTBE detections in shallow groundwater is primarily contained within the Refinery, the Pecan Orchard, and a portion of property to the northeast of the Refinery that is primarily used for oilfield or pipeline surface facilities. Dissolved-phase hydrocarbon concentrations have generally exhibited a stable or

decreasing trend over time, as shown on concentration time-series plots that are provided in the 2021 Annual Groundwater Monitoring Report dated February 2022.

SCOPE OF SERVICES

This Work Plan includes the following scope:

- Advancement of two soil borings in the shallow saturated zone for conversion to monitoring wells.
- Installation, development, sampling, and surveying of two shallow monitoring wells.
- Decontamination of non-dedicated equipment.
- Management of investigation-derived waste (IDW).

The locations of the proposed monitoring wells are shown on **Figures 2** and **3**. The locations are consistent with those proposed in the December 2021 Revised Receptor Survey Memo. In Comment #6 of the letter dated September 6, 2022, NMED stated "*it is not clear whether the location of the proposed well south of KWB-6 and MW-132 is appropriate to investigate the crossgradient extent of the plumes. The well should be placed further northeast of the proposed location so that the location of the well will follow along the plume contours based on the plume shape and potential future plume movement caused by dispersion and diffusion. Revise the location of the proposed well south of KWB-6 and MW-132 or provide justification for why the location of the proposed well south of KWB-6 and MW-132 is appropriate for the investigation of the crossgradient extent of the plumes*." The location of the proposed well south of KWB-6 and MW-132 cannot be moved further northeast due to the presence of the new PTU and Rail Loading area. HFSNR believes the proposed well locations provide a crossgradient boundary with existing wells KWB-12A and KWB-13 that will ensure the crossgradient extent of PSH and the benzene and MTBE CGWSL exceedance areas are delineated within HFSNR property. Further, this boundary will allow monitoring the movement of VOCs at concentrations below the CGWSL caused by dispersion and diffusion as benzene has occasionally been detected at estimated J-flagged concentrations in well KWB-13.

INVESTIGATION METHODS

The proposed field investigation activities and methods are described in the subsections below.

Soil Boring Advancement and Sampling

Two soil borings will be advanced for conversion to monitoring wells at the locations shown on **Figures 2** and **3**. The New Mexico One Call System (New Mexico 811) will be contacted at least 48 hours prior to soil boring advancement to verify the location of any underground lines near the proposed monitoring well locations. The locations of the soil borings will be modified in the field as necessary to remain clear of underground and overhead utilities.

The soil borings will be advanced using hollow-stem auger (HSA) drilling methods by a New Mexico licensed driller under a New Mexico Office of the State Engineer (NMOSE) permit. All soil drilling activities will be completed under the direction of a qualified engineer or geologist. Each soil boring will be advanced to a total depth of approximately 15 feet below the water table. Soil samples will be continuously collected using a split-spoon or equivalent sampling tool and logged for lithology, moisture content, and any indication of hydrocarbon impacts (staining, odor, and photoionization detector [PID] readings). Up to two soil samples from each boring will be submitted for laboratory analysis: (1) a soil sample immediately above the water table and 2) a soil sample from the depth with the greatest indication of impacts from field screening (if not from the groundwater interface).

Monitoring Well Installation

A monitoring well will be installed in each soil boring. The monitoring wells will be constructed of 2-inch diameter schedule 40 polyvinyl chloride (PVC) threaded pipe. Each monitoring well will be screened across the water table with an expected screen length of 15 feet. The screen will consist of 0.020-inch slotted schedule 40 PVC threaded pipe. The annular space will be filled with either an 8/12- or 10/20-grade quartz sand filter pack to two feet above the screen and sealed with 3/8-inch hydrated bentonite chips to three feet above the sand pack. The remaining annular space will be filled with Portland cement to the ground surface. The wells will be installed with either flush-mount or aboveground surface completions, which will include a 3-foot square concrete surface pad and protective cover (either traffic-rated flushmount cover or lockable steel aboveground casing). An expandable watertight plug will be placed at the top of each wellhead.

Monitoring Well Development

All wells will be developed to create an effective filter pack around the well screen, remove fine particles from the formation near the borehole, and assist in restoring the natural water quality of the shallow saturated zone in the vicinity of the well. Wells will be developed using surging and bailing or pumping techniques. Each monitoring well will be developed until a minimum of five well volumes is removed, the water recovered from the well is free of visible sediment, and the pH, temperature, turbidity, and specific conductivity have stabilized. If the well is pumped dry during development, the water level will be allowed to sufficiently recover before the next development period is initiated. The volume of water withdrawn from each well during development will be recorded.

Monitoring Well Sampling

A groundwater sample will be collected from each newly installed and developed monitoring well. Groundwater will be purged and sampled using low-flow methods in accordance with the

NMED Hazardous Waste Bureau (HWB) Position Paper "Use of Low-Flow and Other Non-Traditional Sampling Techniques for Compliance Groundwater Monitoring" (NMED 2001). Data collected during the purging and sampling of each well will be recorded. Samples will not be collected from a well if PSH is present in the well at a thickness of 0.03 feet or greater, in accordance with the *2021 Facility-Wide Groundwater Monitoring Work Plan* (2021 FWGMWP; TRC, 2021a).

Groundwater will be purged and sampled using either a peristaltic pump (for sampling depths of approximately 25 feet bgs or less) or a stainless steel submersible pump (for sampling depth greater than 25 feet bgs). An oil/water interface probe will be lowered into the monitoring well to record the depth to water.

A multi-parameter water quality meter with flow-through cell and hand-held turbidity meter will be used during the purging process to monitor for field water quality parameters (pH, temperature, conductivity, TDS, ORP, DO, and turbidity) and demonstrate stabilization. Water quality parameters will be recorded approximately every three minutes during purging. The turbidity meter test cell will be triple rinsed with groundwater from the next sample aliquot prior to each reading. The water quality parameters and depth to water will be recorded on a groundwater sampling form. A description of the water quality (e.g., turbidity, sheen, odor) will be recorded during the purging process.

The purging process will be considered complete and groundwater sampling will commence when at least four of the seven water quality parameters achieve stabilization within ten percent for three consecutive readings. All seven water quality parameters will be recorded during each consecutive reading. If the well goes dry during purging, a sample will be collected as soon after the water level recovers to a level from which a sample can be collected.

Sample Handling

All soil and groundwater samples will be collected in clean, labeled, laboratory-supplied containers prepared with the appropriate amount and type of preservative. Neoprene or nitrile gloves will be worn during sample collection and while handling sample containers. New disposable gloves will be used to collect each sample. The sample containers will be labeled, secured with bubble wrap, placed in a resealable plastic bag, and immediately placed on ice in a cooler and stored below 4° Celsius. The sample labels will include the Permittee name (HFSNR), site name (Artesia Refinery), unique sample identification, sample collection time and date, preservatives, and the name(s) of the sampler(s). The samples will be secured with packing material and kept below 4° Celsius with wet ice in accordance with laboratory cooler shipping guidelines. The cooler will be secured with packing tape, and a signed and dated custody seal will be placed over the cooler lid and secured with tape. The samples and a completed chain-of-

custody documentation will be shipped via priority overnight delivery to the analytical laboratory. The chain-of-custody forms are to be maintained as a record of sample collection, transfer, shipment, and receipt by the laboratory. At a maximum, all samples will be submitted to the laboratory within 48 hours after collection. The laboratory will be informed that samples are being submitted for analysis and it will be confirmed that the samples were received the following day. If samples are shipped on Friday for Saturday delivery, the receiving laboratory will be contacted so provisions can be made for laboratory sample receipt.

Quality Assurance/Quality Control

Field quality assurance/quality control (QA/QC) samples will be collected as follows:

- Duplicates: Collected at a frequency of ten percent at the same time and from the same location as the original sample (i.e., one duplicate sample collected for every ten parent samples collected).
- Equipment blanks: Collected from non-dedicated, decontaminated equipment at a frequency of five percent (i.e., one equipment blank sample collected for every twenty parent samples collected). Equipment blank samples will be collected by pouring distilled water over the sampling equipment and collecting the sample in the appropriate laboratory containers.
- Trip blanks: One included in each cooler shipped to the laboratory that contains samples for VOC laboratory analyses. The trip blank consists of two 40-milliliter (mL) vials of reagent water provided by the laboratory and stored in the sample cooler at all times.

Laboratory QA/QC samples will be performed according to test methodologies specified for each analytical method. The laboratory QA/QC samples may include reagent or method blanks, surrogates, matrix spike/matrix spike duplicates, blank spike/blank spike duplicates and/or laboratory duplicates, as appropriate for each method. The laboratory QA/QC samples will be run at the frequency specified by each method.

Equipment Decontamination

Downhole drilling equipment (hollow-stem augers and drilling bits) will be decontaminated after construction of each monitoring well using a high-pressure washer and a mixture of potable water and non-phosphate detergent (Alconox™). The decontamination will be completed over a temporary pad that will contain the decontamination water.

Any other equipment that contacts groundwater (e.g., oil/water interface probe used for gauging water and PSH levels, submersible pump used for development, etc.) will be

decontaminated between uses at each well to prevent cross-contamination using the following procedure:

1. PSH, if present, will be removed with an absorbent pad.
2. Any solids will be removed to the degree possible with a brush and tap or distilled water.
3. The outer body of equipment, including any attached measuring tape or electrical cords, will be washed with a brush, laboratory-grade non-phosphate detergent (e.g., Liquinox, Alconox), and potable tap or distilled water. The outer body of the equipment will then be double rinsed with distilled water.
4. The interior of the submersible pump will also be washed by re-circulating the detergent mixture through the pump for at least three minutes and then double rinsed by recirculating distilled water through the pump twice for three minutes each.

Investigation Derived Waste Management

IDW (e.g., soil cuttings, purge/development water, decontamination water) generated during field activities will be collected, stored, and disposed appropriately. Soil will be contained in labeled 55-gallon drums or other suitable containers and stored on-site pending disposal. Water will be disposed of in the Refinery wastewater treatment plant (WWTP), upstream of the oil-water separator. Miscellaneous IDW (e.g., gloves, bailers) in contact with investigative material deemed to have no or de minimis contamination will be disposed of in a general refuse container. Any IDW deemed to have greater than de minimis contamination will be stored in labeled drums and disposed appropriately on a per case basis.

Monitoring Well Surveying

Each newly installed monitoring well will be surveyed by a New Mexico licensed professional surveyor for the following:

- top of casing elevation (on the north side),
- natural ground surface elevation,
- concrete pad surface elevation, and
- the coordinates of the top of casing.

The survey data will be tied into existing facility-wide monitoring network survey data.

SAMPLING PROGRAM

Soil samples will be submitted for laboratory analysis of total petroleum hydrocarbons (TPH) diesel range organics (DRO), gasoline range organics (GRO), and oil range organics (ORO) by Method 8015M. No additional analysis is warranted at the proposed well locations as there has

been no historical industrial activity at these locations. The proposed analytical testing for soil is consistent with previous investigations conducted at the Refinery at locations with no historical industrial activity.

Groundwater samples collected from the new wells after completion of installation and development activities will be submitted for laboratory analysis of VOCs by Method 8260. Additional sampling and analysis of the new wells will be proposed in the subsequent FWGMWP, which is submitted to NMED by June 30 of each year.

SCHEDULE

This Work Plan will be implemented upon approval of the Work Plan by NMED and issuance of drilling permits by the NMOSE. HFSNR will notify NMED prior to commencing field activities. Field activities are expected to be completed in less than five days.

A letter report will be prepared documenting the field activities and results, and will include a description of field activities, discussion of field screening and analytical results, and the following attachments:

- Figure(s) showing the well locations and analytical results.
- Tables summarizing well construction information, gauging results, water quality field measurements, and analytical data.
- Soil boring and well construction logs.
- Laboratory analytical reports and data validation.

The letter report will be submitted to the NMED within 60 days of receipt of final laboratory data.

CLOSING

If you should have any questions or comments regarding this Work Plan, please contact me at (575) 746-5487 or Michael Holder at (575) 308-115.

Sincerely,

Kawika Tupou
Environmental Manager
HF Sinclair Navajo Refining LLC

cc: NMED: D. Cobrain, L Tsinnajinnie, M. Suzuki
OCD: S. Wells
HF Sinclair: M. Holder
TRC: J. Speer, D. Helbert, S. Hoover

ATTACHMENTS

Figure 1 – Historical Target VOC CGWSL Exceedance Area and Surrounding Property Map

Figure 2 – Proposed Shallow Groundwater Monitoring Wells and Benzene Isoconcentration Map (First 2021 Semiannual Event)

Figure 3 – Proposed Shallow Groundwater Monitoring Wells and MTBE Isoconcentration Map (First 2021 Semiannual Event)

REFERENCES

NMED 2001. Use of Low-Flow and Other Non-traditional Sampling Techniques for RCRA Compliant Groundwater Monitoring. October 30, 2001.

NMED 2010. Navajo Refining Company Artesia Refinery Post-Closure Care Permit. December 2010.

NMED 2022. Second Disapproval, Response to Comments, July 15, 2021 Disapproval, Desktop Groundwater Receptor Survey and Vapor Intrusion Evaluation of Off-Site Receptors, April 2019. September 6, 2022.

TRC 2021a. 2021 Facility-Wide Groundwater Monitoring Work Plan. June 30, 2021

TRC 2021b. Desktop Groundwater Receptor Survey and Vapor Intrusion Evaluation of Off-Site Receptors – Revised. December 30, 2021.

Coordinate System: NAD 1983 2011 StatePlane New Mexico East FIPS 3001 Ft US (Foot US)
Map Rotation: 0
Plot Date: 12/12/2022, 13:32:06 PM by MJAGOE -- LAYOUT: ANSI B (11"x17")
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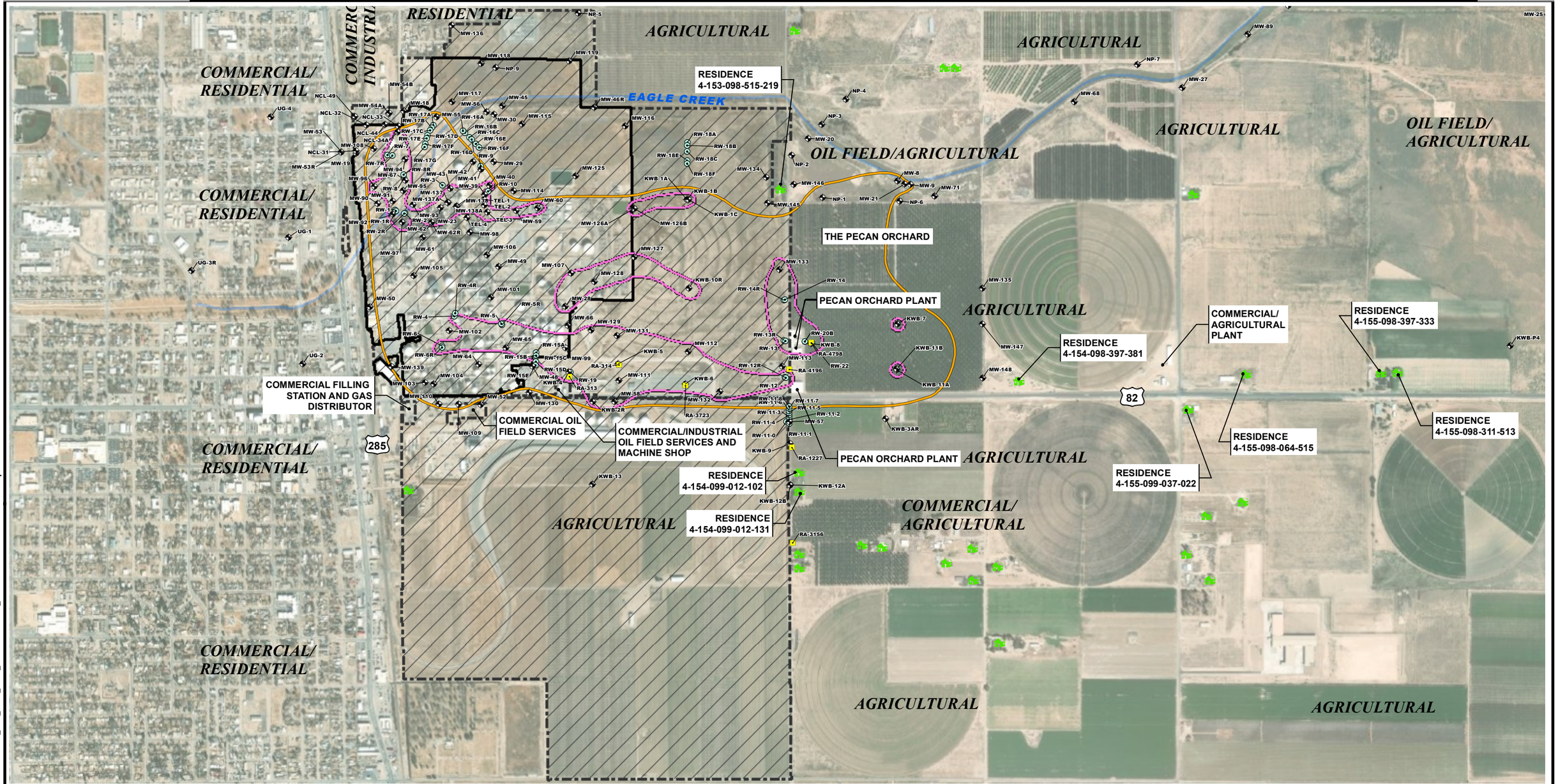


LEGEND

- MONITORING WELL
- RECOVERY WELL
- IRRIGATION WELL IN MONITORING PROGRAM
- RESIDENCE
- REFINERY FENCELINE
- FACILITY PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)
- PSH PRESENCE APRIL 2016-APRIL 2021
- HISTORICAL EXTENT OF TARGET VOCs IN EXCEEDANCE OF CGWSLs (SEE NOTE 2)

NOTES:

1. TARGET VOCs = BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, MTBE, AND NAPHTHALENE.
2. HISTORICAL EXTENT SHOWN BASED ON MORE THAN ONE CGWSL EXCEEDANCE IN WELL OVER TIME. ANALYTICAL DATA AVAILABLE FOR MOST WELLS SINCE AT LEAST 2010 (FOR MANY WELLS SINCE 2006) OR THE WELL INSTALLATION DATE (WELLS MW-125 THROUGH MW-137 INSTALLED IN 2014; WELLS MW-53R, MW-62R, MW-137A, MW-138A, MW-139, AND MW-145 THROUGH MW-148 INSTALLED IN 2019-2020).THE FOLLOWING PERIMETER WELLS HAD ONE ISOLATED HISTORICAL CGWSL EXCEEDANCE AND THUS WERE NOT INCLUDED IN THE EXCEEDANCE AREA: MW-21 (BENZENE, OCT. 2006), MW-29 (BENZENE, OCT. 2006), MW-54A (XYLENES, APRIL 2011), MW-57 (BENZENE, NOV. 2014), NCL-33 (BENZENE, SEPT. 2006), AND NP-6 (BENZENE, OCT. 2006).
3. VOCs = VOLATILE ORGANIC COMPOUNDS
4. CGWSL = CRITICAL GROUNDWATER SCREENING LEVEL, SEE ANNUAL GROUNDWATER MONITORING REPORTS FOR SELECTION CRITERIA.
5. MTBE = METHYL TERT-BUTYL ETHER

AERIAL IMAGERY SOURCE: ESRI WORLD IMAGERY (10/1/20).

N

0 0.25 0.5 Miles

1 INCH = 0.25 MILE

1:15,840

PROJECT:
CROSSGRADIENT WELL INSTALLATION WORK PLAN
HF SINCLAIR NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

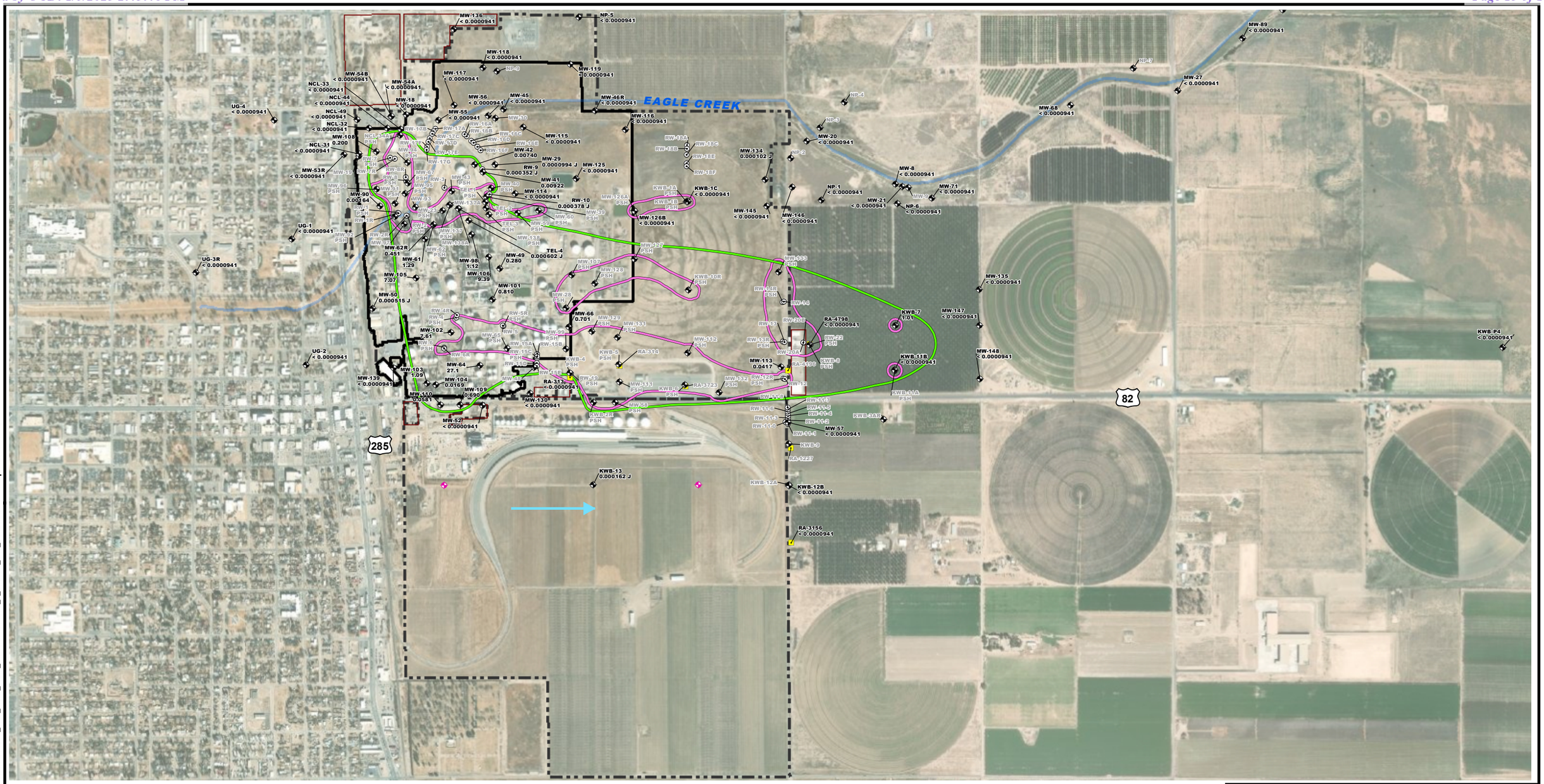
TITLE:
HISTORICAL TARGET VOC CGWSL EXCEEDANCE AREA AND SUROUNDING PROPERTY MAP

DRAWN BY:	J. CRAHAN	PROJ. NO.:	514673
CHECKED BY:	J. SPEER		
APPROVED BY:	JSPEER		
DATE:	DECEMBER 2022		

FIGURE 1

TRC
505 East Huntland Drive, Suite 250
Austin, TX 78752
Phone: 512.329.6080
www.trcsolutions.com

FILE NO.: 514673_1.mxd



LEGEND

- MONITORING WELL
- IRRIGATION WELL IN MONITORING PROGRAM
- RECOVERY WELL
- PROPOSED MONITORING WELL
- **1.75** BENZENE CONCENTRATION
- **<0.000331** BENZENE NOT DETECTED ABOVE METHOD DETECTION LIMIT
- **PSH** PHASE-SEPARATED HYDROCARBON PRESENT IN WELL (≥ 0.03 FEET THICK)
- **KWB-9** WELL NOT SAMPLED
- REFINERY FENCELINE
- FACILITY PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)
- GROUNDWATER FLOW
- PSH PRESENCE APRIL 2016-APRIL 2021
- FIRST 2021 SEMIANNUAL EVENT BENZENE CGWSL EXCEEDANCE AREA

NOTES:

1. ALL CONCENTRATIONS ARE IN MILLIGRAMS PER LITER (mg/L).
2. J = CONCENTRATION QUALIFIED AS AN ESTIMATED VALUE.
3. ALL MONITORING AND RECOVERY WELLS ARE SCREENED IN THE SHALLOW SATURATED OR VALLEY FILL ZONES. IRRIGATION WELLS INCLUDED IN THE MONITORING PROGRAM ARE SCREENED IN EITHER THE VALLEY FILL ZONE OR THE DEEP ARTESIAN AQUIFER.
4. BENZENE CRITICAL GROUNDWATER SCREENING LEVEL (CGWSL) = 0.005 mg/L

AERIAL IMAGERY SOURCE: ESRI WORLD IMAGERY (10/1/20).

N

0 1,320 2,640 Feet

1 INCH = 0.25 MILE

1:15,840

PROJECT:
CROSSGRADIENT WELL INSTALLATION WORK PLAN
HF SINCLAIR NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

TITLE:
PROPOSED SHALLOW GROUNDWATER MONITORING WELLS AND BENZENE ISOCONCENTRATION MAP (FIRST 2021 SEMIANNUAL EVENT)

DRAWN BY:	MJAGOE	PROJ. NO.:	456061
CHECKED BY:	DHELBERT		
APPROVED BY:	JSPEER		**FIGURE 2**
DATE:	DECEMBER 2022		

TRC
505 East Huntland Drive, Suite 250
Austin, TX 78752
Phone: 512.329.6080
www.trcsolutions.com

FILE NO.: 514673_2_Shallow_GW_Benz.mxd

Coordinate System: NAD 1983 2011 StatePlane New Mexico East FIPS 3001 Ft US (Foot US)
Map Rotation: 0
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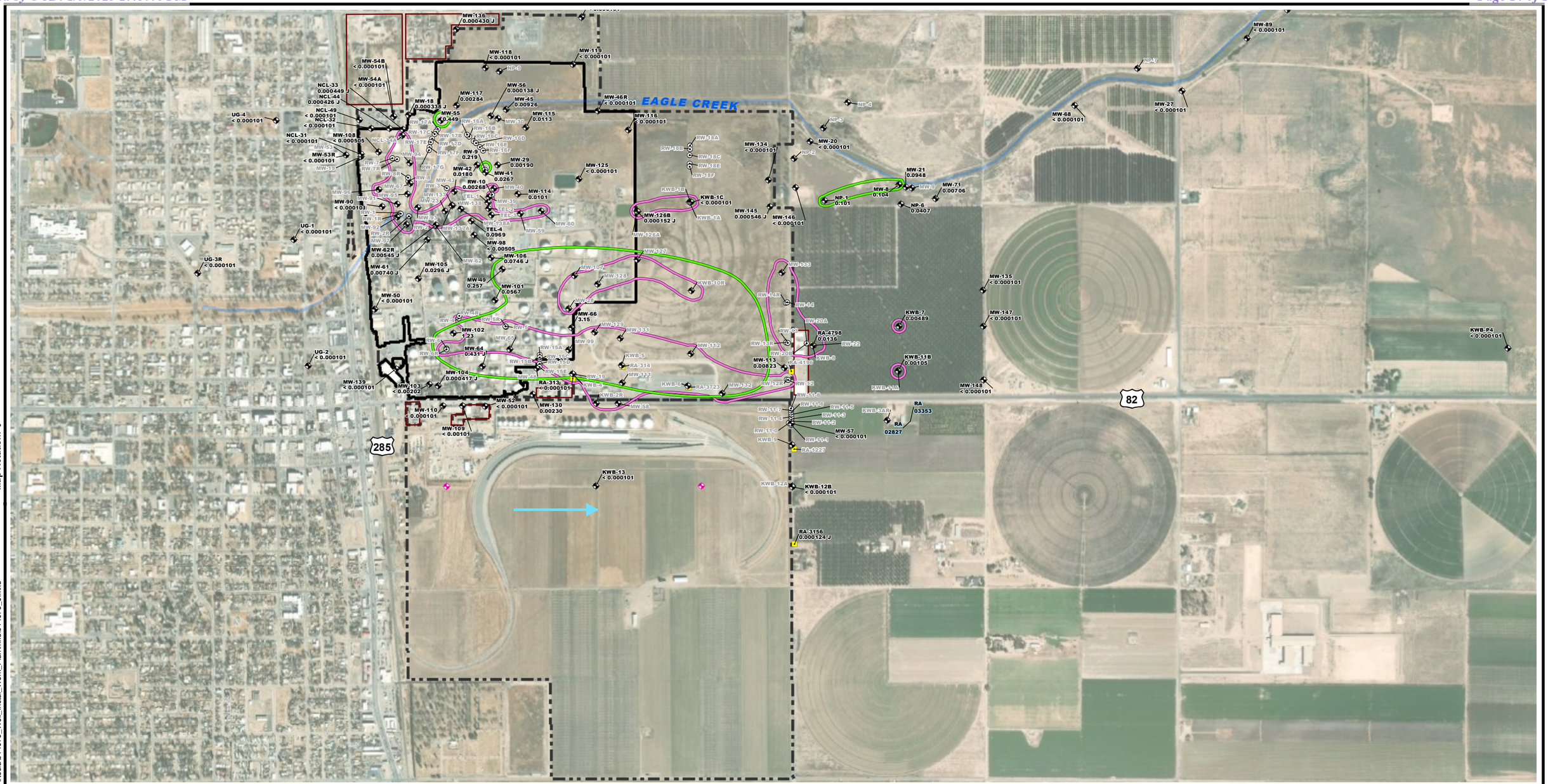

LEGEND

- MONITORING WELL
- IRRIGATION WELL IN MONITORING PROGRAM
- RECOVERY WELL
- PROPOSED MONITORING WELL
- **1.19** MTBE CONCENTRATION
- **<0.000367** MTBE NOT DETECTED ABOVE METHOD DETECTION LIMIT
- **PSH** PHASE-SEPARATED HYDROCARBON PRESENT IN WELL (≥ 0.03 FEET THICK)
- **KWB-9** WELL NOT SAMPLED
- REFINERY FENCELINE
- FACILITY PROPERTY BOUNDARY (FENCELINE SHOWN WHERE COINCIDENT)
- GROUNDWATER FLOW DIRECTION
- PSH PRESENCE APRIL 2016-APRIL 2021
- FIRST 2021 SEMIANNUAL EVENT MTBE CGWSL EXCEEDANCE AREA

NOTES:

1. ALL CONCENTRATIONS ARE IN MILLIGRAMS PER LITER (mg/L).
2. POTENTIAL SHALLOW WELLS IDENTIFIED IN RECORDS SEARCH BY ATKINS ENGINEERING ASSOCIATES INC. LOCATION SHOWN CONSISTENT WITH RECORDS.
3. J = CONCENTRATION QUALIFIED AS AN ESTIMATED VALUE.
4. MTBE = METHYL TERT-BUTYL ETHER
5. ALL MONITORING AND RECOVERY WELLS ARE SCREENED IN THE SHALLOW SATURATED OR VALLEY FILL ZONES. IRRIGATION WELLS INCLUDED IN THE MONITORING PROGRAM ARE SCREENED IN EITHER THE VALLEY FILL ZONE OR THE DEEP ARTESIAN AQUIFER.
6. MTBE CRITICAL GROUNDWATER SCREENING LEVEL (CGWSL) = 0.100 mg/L

AERIAL IMAGERY SOURCE: ESRI WORLD IMAGERY (10/1/20).

0 1,320 2,640 Feet

1 INCH = 0.25 MILE
1:15,840

PROJECT:
CROSSGRADIENT WELL INSTALLATION WORK PLAN
HF SINCLAIR NAVAJO REFINING LLC
ARTESIA REFINERY, EDDY COUNTY, NEW MEXICO

TITLE:
PROPOSED SHALLOW GROUNDWATER MONITORING WELLS AND MTBE ISOCONCENTRATION MAP (FIRST 2021 SEMIANNUAL EVENT)

DRAWN BY:	MJAGOE	PROJ. NO.:	456061
CHECKED BY:	DHELBERT		
APPROVED BY:	JSPEER		**FIGURE 3**
DATE:	DECEMBER 2022		

TRC
505 East Huntland Drive, Suite 250
Austin, TX 78752
Phone: 512.329.6080
www.trccompanies.com

FILE NO.: 514673_3.mxd

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Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 173172

CONDITIONS

Operator: NAVAJO REFINING COMPANY, L.L.C. P.O. Box 159 Artesia, NM 88211	OGRID: 15694
	Action Number: 173172
	Action Type: [UF-DP] Discharge Permit (DISCHARGE PERMIT)

CONDITIONS

Created By	Condition	Condition Date
scwells	Accepted for Record Retention Purposes-Only	1/5/2023