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February 26, 2021

Mr. Steve Perez New Mexico Environment Department Ground Water Quality Bureau Remediation Oversight Section 2301 Entrada Del Sol Las Cruces, NM 88001

Dear Mr. Perez:

On behalf of Doña Ana Dairies, Inc., EA Engineering, Science, and Technology, Inc., PBC is submitting this Quarterly Groundwater Monitoring Report for the dairies located in Mesquite, Vado, and Anthony, New Mexico. The report discusses the quarterly groundwater sampling event conducted to fulfill requirements of the Stage 2 Abatement Plan for Doña Ana Dairies.

Please let me know if you have any questions regarding the information provided in this report.

Sincerely,

Gina Mullen Project Manager

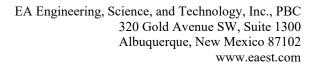
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Senior Hydrogeologist

Enclosure

Cc: Linda Armstrong, Doña Ana Dairies (electronic)

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### QUARTERLY GROUNDWATER MONITORING REPORT DOÑA ANA DAIRIES MESQUITE, NEW MEXICO

Prepared for:

Doña Ana Dairies Mesquite, New Mexico

Prepared by:

EA Engineering, Science, and Technology, Inc., PBC 320 Gold Avenue SW, Suite 1300 Albuquerque, New Mexico 87102

February 2021

EA Project No. 1464107.04

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Project Manager

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Date

Senior Hydrogeologist

Jay Snyder

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#### 1.0 INTRODUCTION

On behalf of Doña Ana Dairies (Dairies), EA Engineering, Science, and Technology, Inc., PBC (EA) has prepared this Quarterly Monitoring Report for Doña Ana Dairies located south of Las Cruces, New Mexico (Figure 1). The report was completed in accordance with the *Stage 2 Abatement Plan* and the *Sampling and Analysis Plan, Doña Ana Dairies, Doña Ana County, New Mexico* dated November 7, 2013 and August 11, 2008, respectively, and the Conceptual Work Plan (CWP) dated February 1, 2008. All were prepared to satisfy requirements stated in the New Mexico Administrative Code (NMAC), Title 20, Chapter 6, Part 2, Sections 4106 through 4110 (20.6.2.4106 – 20.6.2.4110 NMAC). The Sampling and Analysis Plan was approved by the New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) on September 25, 2008. On March 25, 2015, the stipulated agreement to additional requirements to the Dona Ana Dairies Stage 2 Abatement Plan was agreed upon by NMED, the Dairies, and the Rio Valle Concerned Citizens. The Stage 2 Abatement Plan was approved by NMED by Final Order on April 10, 2015. Document references are provided in Section 5.0.

#### 1.1 Objective and Monitoring Scope

The objective of this monitoring program is to satisfy the requirements set forth in the Stage 2 Abatement Plan and the Stipulated Agreement and to satisfy the requirements set forth in 20.6.2.4110 NMAC.

The following work was performed to meet the objectives of the monitoring program:

- Representatives from D&H Petroleum and Environmental Services, Inc. (D&H) gauged discharge plan (DP) monitoring wells, abatement plan (AP) monitoring wells, and Anthony Waste Water Treatment Plant (WWTP) wells from November 2 through November 4, 2020 except for Organ Dairy wells, which were gauged by Glorieta Geoscience, Inc. (Glorieta) on November 10, 2020.
- From November 10, 2020 through December 7, 2020, D&H representatives collected groundwater samples from all AP and DP wells that contained sufficient water. Organ Dairy wells were sampled by Glorieta on November 10, 2020. Well DAD-06 was the only AP well that was dry. The samples were analyzed for nitrate, chloride, total dissolved solids (TDS), and total Kjeldhal nitrogen (TKN). Field parameters including specific conductance, pH, temperature, oxidation reduction potential (ORP), and dissolved oxygen were monitored and recorded on field forms during sampling.

#### 1.2 Background

In correspondence dated April 7, 2006, NMED required a Stage 1 Abatement Plan for 13 dairies in Doña Ana County, based on analytical results from DP monitoring of on-site compliance monitoring wells that showed concentrations of nitrate, chloride and TDS exceeding ground water standards promulgated in New Mexico Water Quality Control Commission (NMWQCC) Regulations (20.6.2.3103 NMAC). On October 30, 2006, the Dairies notified NMED that they had reached an agreement to work as a group and submit a joint response to NMED's request

(Doña Ana Dairies 2006). The Dona Ana Dairies consortium consisted of the 11 dairies until the departure from the group by River Valley Dairy in April 2019 and Gonzalez Dairy in October 2020. As a result, the consortium currently consists of 9 dairies.

On December 11, 2006, on behalf of the Doña Ana Dairies, Golder Associates Inc. (Golder) submitted a Stage 1 and 2 Abatement Plan Proposal to address impacts to groundwater in the area of the Dairies (Golder 2006). The first major deliverable in the Abatement Plan Proposal was an Existing Data Report (EDR) to bring together in one document historical data and practices of the constituent dairies.

The EDR, submitted on February 1, 2008 (Golder 2008a), was intended to satisfy the Dairies commitment for compilation and submission of existing data identified in the 2006 Doña Ana Dairies response to the NMED requirement for Stage I Abatement Plans. Section 9 of the EDR outlined data gaps identified during the preparation of the report, as well as the actions recommended. To facilitate the discussion of the path forward after the submittal of the EDR and concurrent with the EDR submission, a CWP was prepared. (Golder 2008b).

On July 15, 2008, the Dairies, Golder and NMED met (Golder 2008c). During that meeting, plume maps presented in the EDR (Golder 2008a), new monitoring data, and knowledge of well locations and groundwater chemistry results at adjacent DP-regulated facilities were used to identify data gaps with respect to ground water flow direction and plume delineation. The agreed upon data gaps yielded well locations (including contingency locations) recorded in the meeting minutes (Golder 2008c) and depicted in the Sampling and Analysis Plan (SAP) dated August 8, 2008 (Golder 2008d). The SAP outlined the details of the field operations to be implemented for completion of data gaps, such that a Site Investigation Report (§4106.C.6) and Stage 2 Abatement Plan (§4106.D) could be prepared.

Groundwater gauging was conducted concurrent to discussions with NMED at the Dairies for four quarters, February 2008, June 2008, September 2008, and December 2008, to determine the current and historical site groundwater gradient.

In May 2009, field work was conducted as outlined in the SAP and ten (10) AP monitoring wells (DAD-01 through DAD-10) were installed. In July 2009, the Site Investigation Report was submitted to the NMED.

On February 9, 2012, the Final Site Investigation Report was submitted to NMED. The report summarized field activities that occurred from October 10 through October 14, 2011, and November 10 through 18, 2011, during which eleven soil borings were advanced at the site and converted into monitoring wells DAD-12 through DAD-14, DAD-16 through DAD-22, and DP well 177-03A.

On August 16, 2012, soil boring/monitoring well DAD-15 was installed and on August 20, 2012, well DAD-15 was sampled. An addendum to the Final Site Investigation Report was submitted to NMED on September 7, 2012, which summarized DAD-15 field activities.

A Stage 2 Abatement Plan was submitted to NMED on March 13, 2013. Based on an NMED response in August 2013, a Revision to the Stage 2 Abatement Plan was submitted on November 7, 2013.

On March 25, 2015, the stipulated agreement to additional requirements to the Dona Ana Dairies Stage 2 Abatement Plan was agreed to by NMED, Dona Ana Dairies, and the Rio Valle Concerned Citizens. On April 10, 2015 the Stage 2 Abatement Plan with the stipulated agreement was approved by NMED by Final Order.

EA began implementation of the Stage 2 Abatement Plan and stipulated agreement as directed by the Final Order in December 2015. In order to meet objectives, four monitoring wells were installed (DAD-23 through DAD-26) and Del Oro Dairy discharge plan (DP) well 692-01 was plugged and abandoned. Details on implementation of these tasks are included in the *Stage 2 Implementation and Quarterly Groundwater Monitoring Report*, July 2016.

In accordance with the approved Stage 2 Abatement Plan and stipulated agreement, a baseline compound specific isotope analysis (CSIA) for nitrogen 14 and nitrogen 15 ( $^{15}$ N/ $^{14}$ N [ $\delta^{15}$ N]) and total organic carbon (TOC) was completed for 16 wells in spring of 2016. Additionally, existing conditions concentrations were recalculated for the contaminants of concern. Results of these analyses are presented in the *Stage 2 Implementation and Quarterly Groundwater Monitoring Report*, July 2016. A five-year review containing results of repeated CSIA sampling and recalculated existing conditions concentrations was submitted to NMED in December 2020 (EA 2020).

Contaminant concentration trend analysis as well as geospatial analysis to evaluate changes in plume behavior are required on an annual basis and are provided in this report. Also presented in this report are the results of the annual sampling of irrigation and supply wells and concentration trends of analytes in AP and DP wells.

A Stage 2 Abatement Plan Modification proposal was submitted to NMED on August 10, 2018 to address plume instability in the perched aquifer nitrate plume at Del Oro Dairy. Following discussions with NMED, a revised Stage 2 Abatement Plan Modification proposal was submitted on May 1, 2019. A public meeting to discuss the plan was held in Anthony, New Mexico on May 17, 2019. The Stage 2 Abatement Plan Modification proposal was revised based on additional input from NMED and the public and submitted on July 26, 2019. Public notice for the proposal was initiated on October 23, 2019 and closed on December 31, 2019. An addendum to the Stage 2 Abatement Plan Modification proposal was submitted on July 13, 2020.

#### 2.0 GROUNDWATER MONITORING ACTIVITIES

Groundwater monitoring activities conducted by D&H included gauging DP and AP monitoring wells and Anthony WWTP monitoring wells. Groundwater samples were collected from DP and AP monitoring wells. Groundwater samples were analyzed for nitrate, chloride, TDS, and TKN. The resulting data from this groundwater monitoring event are compiled and are presented below.

#### 2.1 Well Gauging

From November 2 through November 4, 2020, representatives from D&H gauged DP monitoring wells, AP monitoring wells, and Anthony WWTP wells with an electronic water level indicator. Organ Dairy wells were gauged by Glorieta on November 10, 2020. Table 1 provides a summary of the groundwater gauging data collected from the monitoring network. Data obtained during gauging are shown on potentiometric surface maps included as Figures 2, 3, 4, and 5. Well gauging field forms are available in Appendix A.

#### 2.2 Groundwater Sampling

D&H sampled all AP monitoring wells with sufficient water from November 24, 2020 through December 7, 2020. Well DAD-06 has been dry since August 2013 and was not sampled. The Stage 2 Abatement Plan proposal discusses plans for a drilling company to attempt to remove silt at the bottom of the well through redevelopment. Redevelopment will occur when the plan is approved. Groundwater sampling from AP wells was accomplished with new, disposable bailers. Three well casing volumes were purged unless the well contained insufficient water.

D&H sampled the DP wells from November 10, 2020 through November 24, 2020. Glorieta sampled Organ Dairy DP wells on November 10, 2020. Prior to sampling, all DP wells were purged of three well casing volumes, if practicable, by (1) hand-bailing with new, disposable bailers and twine, (2) pumping with a submersible pump and new polyethylene tubing, or (3) pumping with a dedicated pump and new polyethylene tubing. Due to a lower water table, several DP wells were dry or contained insufficient water for sampling. Additionally, Dominguez 2 wells 42-07 and 42-09 were plugged and abandoned on November 10, 2020. The plugging and abandonment report is provided in Appendix B.

The wells were sampled from historically clean to dirty to the extent possible to minimize cross-contamination potential. All non-dedicated or disposable equipment was decontaminated between wells with an Alconox<sup>TM</sup> solution to further ensure sample quality. All meters were calibrated and/or checked with standards in accordance with the manufacturer's specifications prior to daily use. Purge water was ground discharged.

When sufficient water was available, field parameters including specific conductance, temperature, pH, and ORP were monitored using a Myron L Ultrameter II and recorded on field forms. Dissolved oxygen was measured using a YSI 556 MPS. Dissolved oxygen and ORP were only measured in the first set of readings. Field parameters from August 2015 to present are summarized in Table 2. The sampling field forms are presented in Appendix A.

All groundwater samples were collected immediately after purging. Sampling was either accomplished by carefully pouring groundwater from the bailer into the sample containers or by pumping groundwater through new polyethylene tubing into the sample container. Sample containers were provided by Hall Environmental Analysis Laboratory, Inc. (Hall). Container size, type, sample preservatives, analytical methods, and holding times are specified in Table 3. All samples were preserved in accordance with method requirements, labeled, then immediately cooled to <6°C with ice and delivered under chain-of-custody to Hall in Albuquerque, New Mexico. All analytical laboratory reports are provided in Appendix C.

#### 3.0 GROUNDWATER MONITORING RESULTS

#### 3.1 Hydraulic Gradient and Direction of Groundwater Flow

This quarter, groundwater was present beneath the site at depths ranging from 11.26 feet below top-of-casing (ft btoc) in Sunset well 257-03 to 133.95 ft btoc in Dominguez 2 well 42-12. Groundwater was encountered at shallower depths near the Mesquite Drain and at greater depths near I-10 where the topographic elevation increases.

AP monitoring well DAD-25 may have been completed in a perched aquifer, as groundwater elevations have consistently measured several feet higher than groundwater elevations in surrounding wells. As a result, this groundwater elevation has not been used in contouring for the central area potentiometric surface map.

Potentiometric surface maps were completed using the monitoring well gauging data for the northern, central, and southern portions (perched and regional aquifers) of the Dairies. Groundwater elevation data are provided in Table 1 and potentiometric surface maps are provided as Figures 2, 3, 4, and 5. Hydrographs were completed for select monitoring wells in each area and are provided in Appendix D. On average, groundwater elevations increased by one-half foot in the northern area. In the central area, groundwater elevations were on average similar to last quarter; however, many individual wells showed groundwater levels as higher or lower than the previous quarter with the southwest and eastern portions generally showing increased groundwater levels. In the southern area, groundwater elevations decreased by an average of one-half foot. Water levels in select monitoring wells in the southern perched aquifer are significantly higher than historical water levels as a result of a suspected water line leak located at the intersection of E O'Hara Road and Anthony Drive.

During the most recent gauging event, groundwater flow direction at the north and south ends of the northern area were to the southeast, but groundwater in the center of the northern area was flowing to the east. In the central and southern areas of the regional aquifer, groundwater flow direction was generally to the southeast. Flow direction in the southern perched aquifer is radiating out from the southwest corner of Del Oro Dairy to the west and south.

The hydraulic gradient across the Dairies in the regional aquifer was approximately 0.001 ft/ft and the hydraulic gradient in the perched aquifer in the southern area was approximately 0.008 ft/ft.

#### 3.2 Groundwater Field Parameters

Field parameters from the most recent monitoring event including specific conductance, pH, temperature, ORP, and dissolved oxygen were recorded on the sampling field forms (Appendix A) and are summarized in Table 2. Specific conductance, dissolved oxygen, and ORP trends for select wells are presented in Appendix E. Though dissolved oxygen and ORP measurements from wells containing a dedicated pump were recorded, these measurements are not considered representative of aquifer conditions. As noted in Section 2.2, dissolved oxygen and ORP are only recorded in the first set of readings. This is because hand bailing agitates the aquifer and the ORP and dissolved oxygen measurements are not considered representative once agitation begins.

#### 3.3 Groundwater Analytical Results

#### 3.3.1 Abatement Plan Well Results

Groundwater analyte concentrations were below the 10 milligram per liter (mg/L) NMWQCC standard for nitrate as nitrogen in 10 of the 25 AP monitoring wells sampled. The following 15 AP wells had nitrate concentrations at or above the standard: DAD-01, DAD-07, DAD-08, DAD-09, DAD-11 (vertical delineation well), DAD-12 (vertical delineation well), DAD-13, DAD-14, DAD-15, DAD-19 (vertical delineation), DAD-20, DAD-21, DAD-22, DAD-23, and DAD-26.

Nitrate concentrations decreased or were stable in AP wells DAD-01, DAD-03, DAD-05, DAD-08, DAD-14, DAD-16, DAD-17, DAD-20, DAD-21, DAD-22, DAD-24, and DAD-26 compared to the previous sampling event. The largest changes in nitrate concentrations occurred in the southern perched aquifer. The largest decrease in nitrate was observed in DAD-26 which decreased from 38 mg/L in September 2020 to 25 mg/L in December 2020. The largest increase was observed in DAD-04 which has not been detected above the laboratory reporting limit (RL) of 1.0 mg/L since 2017 but was detected at 4.4 mg/L in December 2020. During this sampling event, nitrate concentrations in the AP wells ranged from 120 mg/L in well DAD-21 to below the laboratory RL of 1.0 mg/L in wells DAD-03, DAD-05, DAD-16, and DAD-17.

Both chloride and TDS concentrations equaled or exceeded their respective NMWQCC standards in most AP wells. Exceptions include well DAD-17, where chloride was below the 250 mg/L standard at a concentration of 92 mg/L, and TDS remained below the standard of 1,000 mg/L at a concentration of 604 mg/L. The highest chloride and TDS concentrations in the AP wells were found in well DAD-08, where respective concentrations were 1,800 mg/L and 4,660 mg/L.

Table 4 and Figures 6 through 9 present the analytical results for AP monitoring wells. Analytical laboratory reports are provided in Appendix B. Nitrate, chloride, and TDS concentration trends for select AP wells are presented by area in Appendix F.

#### 3.3.2 Dairy Results by Area

DP groundwater analytical results are presented in Table 5. Nitrate, chloride, and TDS concentration trends for the AP wells by area are presented in Appendix F. Analytical data for all sampled wells are plotted on Figures 6 through 9. Analytical laboratory reports are included in Appendix C. Discussions of upgradient/downgradient conditions that reflect current groundwater flow directions are discussed in Section 3.1. The following discussions summarize the results by area at the Dairies.

#### Northern Portion

Upgradient well 86/340-01 (located to the north) has been below the nitrate standard since February 2018; historically, concentrations in this well were consistently above the nitrate standard. Upgradient well 70/86/340-01 (Northern Land Application area well) remained above the nitrate standard of 10 mg/L at a concentration of 12 mg/L, which is within the range of

historical results. Groundwater collected from upgradient Organ well 126-12 (located to the west) contained nitrate at a concentration below the standard at 8.9 mg/L. The nitrate concentration in the southern most AP well DAD-02 was below the NMWQCC standard of 10 mg/L at a concentration of 9.0 mg/L. Downgradient wells 42-10, 42-11, and 42-12 (located to the east) were also below the nitrate standard with a maximum detection of 1.4 mg/L in Dominguez 2 well 42-10; downgradient AP wells DAD-01 and DAD-13 (located to the east) contained nitrate above the standard at concentrations of 16 mg/L and 17 mg/L, respectively. The nitrate plume is delineated in all directions except to the east in the vicinity of DAD-01 and DAD-13.

The highest nitrate concentration in the northern portion was observed in Dominguez Dairy #2 well 42-06 with a concentration of 190 mg/L.

The chloride concentrations in DP wells were generally at or above the 250 mg/L standard in wells sampled within the northern portion of the Dairies. Exceptions include chloride detected below the standard at Northern Land Application Area well 86/340-01, Dominguez 2 well 42-08, and Organ Dairy well 126-09 at concentrations of 200 mg/L, 170 mg/L, and 200 mg/L, respectively. TDS concentrations were above the 1,000 mg/L standard in all wells sampled within the northern portion of the Dairies except at Organ Dairy well 126-09, where TDS was detected at 865 mg/L. The highest concentrations of chloride and TDS were observed in Northern Land Application area well 70-03 at concentrations of 1,900 mg/L and 5,050 mg/L, respectively.

#### Central Portion

The highest nitrate concentration in the central portion was 89 mg/L, observed in Big Sky Dairy well 833-02. The upgradient extent of the central portion nitrate plume is defined by Buena Vista Dairy II well 74-03 where nitrate was not detected above the laboratory RL. The downgradient extent is defined by Las Cruces Community Farms (formerly McAnally Enterprises) well MW-4, with a below-standard concentration of 1.1 mg/L. Historically, the eastern cross-gradient extent of the plume was defined by wells DAD-07 and DAD-15. Nitrate in these wells exceeded the standard at a concentration of 17 mg/L in both wells. The western extent is defined by AP wells DAD-04 and DAD-16; nitrate concentrations remain below the standard in these wells.

Chloride and TDS concentrations were generally above standards in wells within the central portion of the Dairies. Chloride was below the standard in downgradient AP well DAD-17 at a concentration of 92 mg/L. TDS was below the standard in AP well DAD-17 at a concentration of 604 mg/L. Anomalously high concentrations of TDS were detected in Buena Vista Dairy II wells 74-01 and 74-02 at concentrations of 9,800 mg/L and 18,900 mg/L, respectively. These concentrations are over three times historical results in well 74-01 and nearly eight times historical results in well 74-02. Excluding these suspect results for TDS, the highest chloride and TDS concentrations were observed at AP well DAD-08 at 1,800 mg/L and 4,660 mg/L, respectively. Well DAD-08 is located east of Sunset Dairy, adjacent to an irrigation well that is no longer in use. Concentrations of chloride and TDS have been decreasing since 2013/2014.

#### <u>Southern Portion – Regional and Perched Aquifers</u>

Wells completed in the regional aquifer in the southern portion of the dairies include AP well DAD-10 and Del Oro wells 692-05 through 692-09 (Figure 8). All of the sampled wells in the regional aquifer were below the NMWQCC standard for nitrate except for Del Oro well 692-05 which had a concentration of 14 mg/L, which remains the same as the previous quarter. Chloride concentrations were above the NMWQCC standard and ranged from 380 mg/L in Del Oro Dairy well 692-09 to 590 mg/L in Del Oro Dairy well 692-07. TDS ranged from 1,330 mg/L in AP well DAD-10 to 1,620 mg/L in Del Oro well 692-07.

Wells completed in the perched aquifer in the southern portion that are sampled on a quarterly basis by DAD include wells 692-02, 629-04, DAD-09, DAD-20, DAD-21, DAD-22, and DAD-26 (Figure 9). A water line located at the intersection of East O'Hara Road and Anthony Drive is suspected to be compromised. Based on groundwater elevation and groundwater concentration data, it is likely the water line started to leak before May 2019.

Nitrate was above the standard in monitoring wells in the perched aquifer with the exception of Del Oro well 692-02, which is located near the suspected water line leak. The highest concentration was detected at AP well DAD-21 with a concentration of 120 mg/L. The downgradient extent of the plume is not defined. A modified Abatement Plan proposal to address this has been submitted to NMED. Chloride concentrations ranged from 250 mg/L in Del Oro well 692-02 to 990 mg/L in AP well DAD-21. TDS in the perched aquifer ranged from 879 mg/L in Del Oro well 692-02 to 3,610 mg/L in AP well DAD-21.

#### 4.0 CONCLUSION AND RECOMMENDATIONS

This groundwater monitoring event included the gauging of all accessible DP and AP wells and sampling of all accessible wells that contained sufficient water. Based on the data collected, the following conclusions and recommendations are presented:

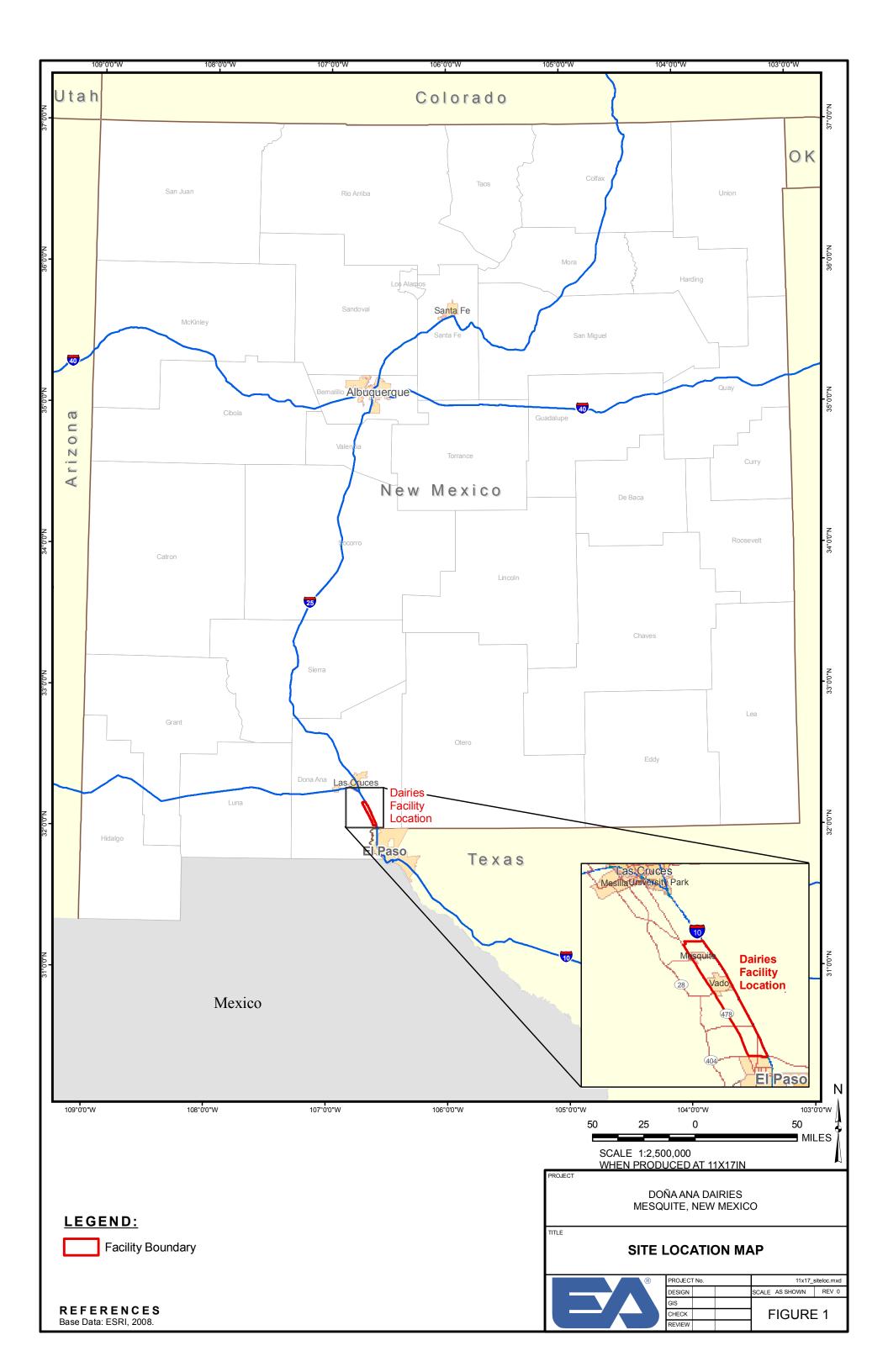
- Depth to groundwater ranged from 11.26 feet below top-of-casing (ft btoc) in Sunset well 257-03 to 133.95 ft btoc in Dominguez 2 well 42-12.
- On average, groundwater elevations increased in the northern area and decreased in the southern area. In the central area, groundwater elevation changes were variable.
- The groundwater flow direction in the northern area varied from southeast to east. In the central and southern area of the regional aquifer, groundwater flowed generally to the southeast. Groundwater flow direction in the southern perched aquifer varied from west to south, radiating out from a suspected water line leak located at the southwest corner of Del Oro Dairy. The hydraulic gradient across the Dairies in the regional aquifer was approximately 0.001 ft/ft and was approximately 0.008 ft/ft in the perched aquifer.
- Nitrate was below the NMWQCC standard of 10 mg/L in 10 of the 25 groundwater samples collected from the AP wells.
- Chloride and TDS remain at or above standards in wells upgradient of the northern, central, and southern portions of the plumes at the Dairies.
- The nitrate plume is no longer defined in the perched aquifer at Del Oro Dairy. A modified Abatement Plan proposal to address this has been submitted to NMED.
- When the Stage 2 Abatement Plan modification is approved, DAD-06 will be redeveloped to remove the silt that is in the bottom of the well so that groundwater can be collected for analysis.
- Elevated water levels in the southern perched aquifer are likely the result of a water line leak.
- Anomalous TDS concentrations found in Buena Vista Dairy II wells 74-01 and 74-02 will continue to be monitored.

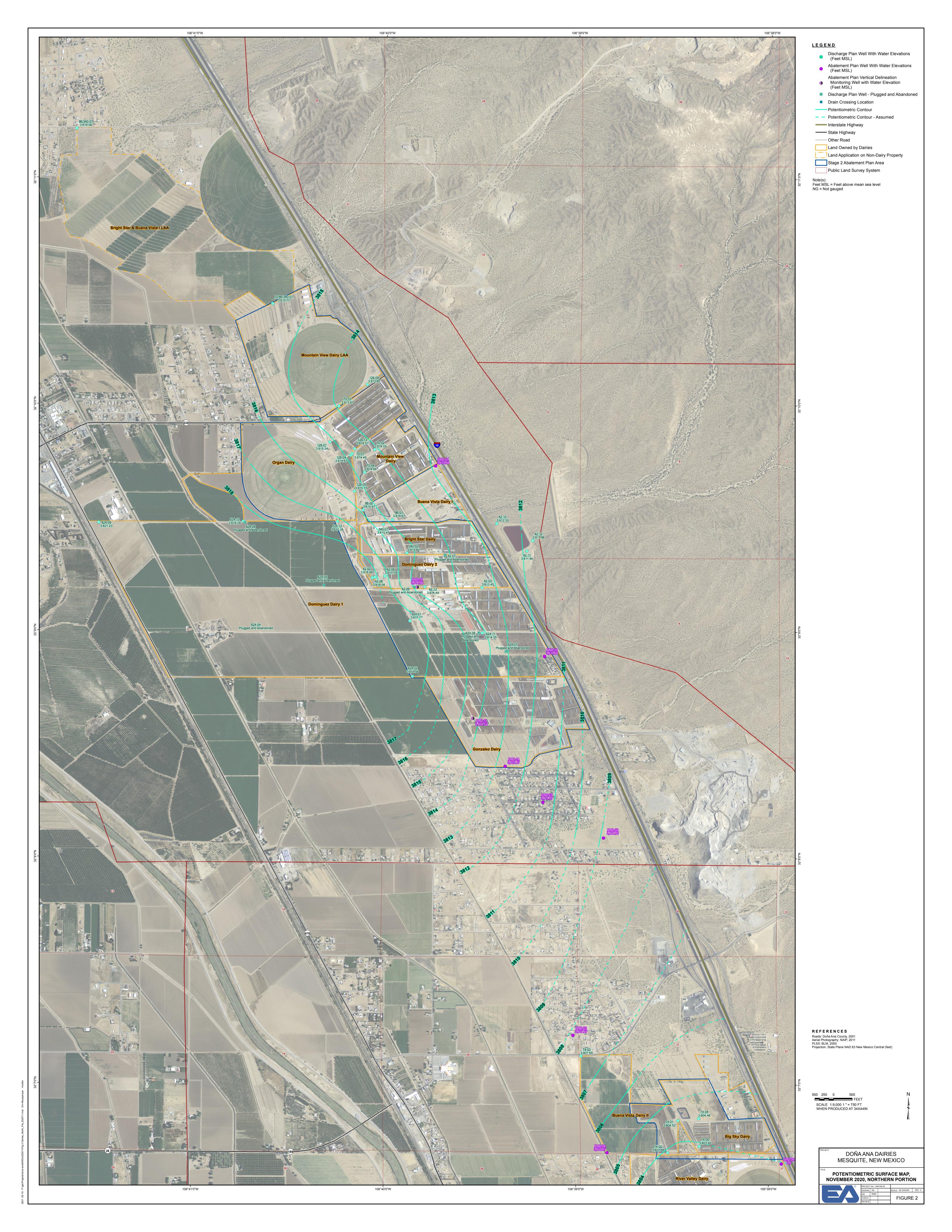
#### 5.0 REFERENCES

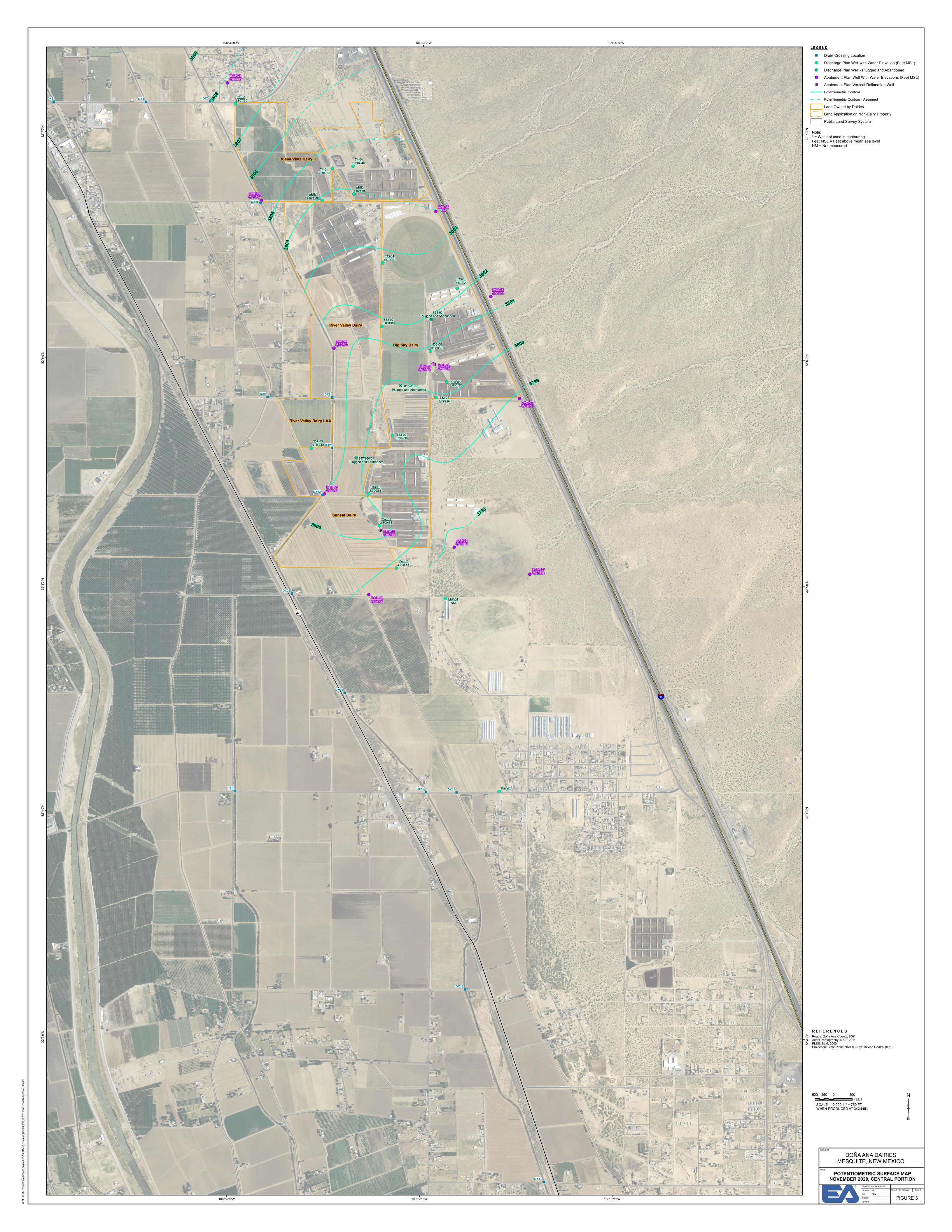
- Doña Ana Dairies. 2006. Letter Regarding Agreement for Joint Stage 1 and Stage 2 Abatement Plan and Storm Water and Wastewater Pond Upgrades. Letter from Mr. Michael Weatherly, Chairman, Doña Ana Dairies, to Mr. William Olson, Chief, Ground Water Quality Bureau. 30 October.
- EA. 2018. Annual Groundwater Monitoring Report, Doña Ana Dairies, Mesquite, New Mexico. July.
- EA. 2020. Five-Year Evaluation and Quarterly Groundwater Monitoring Report, Doña Ana Dairies, Mesquite, New Mexico. July.
- Golder Associates, Inc. (Golder). 2006. Stage 1 and 2 Abatement Plan Proposal, prepared for New Mexico Environment Department, Remediation Oversight Section, on behalf of Doña Ana Dairies. 11 December.
- Golder. 2008a. Existing Data Report and Conceptual Work Plan, Doña Ana Dairies, Mesquite, New Mexico. 1 February.
- Golder. 2008b. Conceptual Work Plan. Doña Ana Dairies, Mesquite, New Mexico. February 1.
- Golder. 2008c. Notes for the Meeting Regarding New Monitoring Well Installation. Meeting Participants: Doña Ana Dairy representative, DAD technical representatives, and NMED staff. 28 July.
- Golder. 2008d. Sampling and Analysis Plan. Doña Ana Dairies, Mesquite, New Mexico. 11 August.
- New Mexico Environment Department (NMED). 2015. Approval of Stage 2 Abatement Plan Proposal for Doña Ana Dairies. Final Order from Mr. Ryan Flynn, Secretary, Ground Water Quality Bureau. 10 April.
- NMED. 2008. Approval of Sampling and Analysis Plan for the Doña Ana Dairies, Stage 1 Abatement Plan, Doña Ana County, New Mexico. 25 September.
- NMED, Doña Ana Dairies, and Rio Valle Concerned Citizens. 2015. Stipulated Agreement, Dona Ana Dairies Stage 2 Abatement Plan. 25 March.

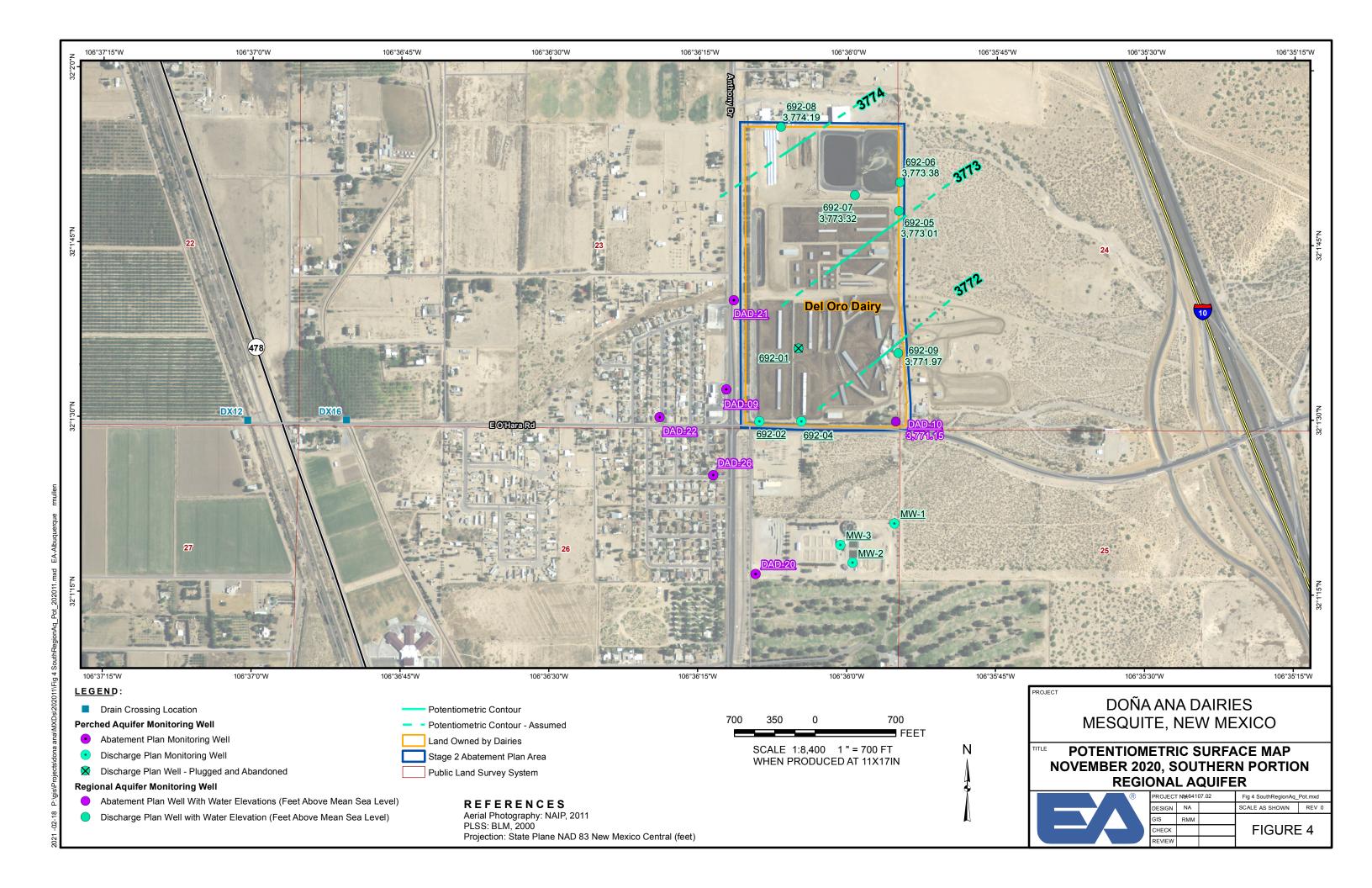
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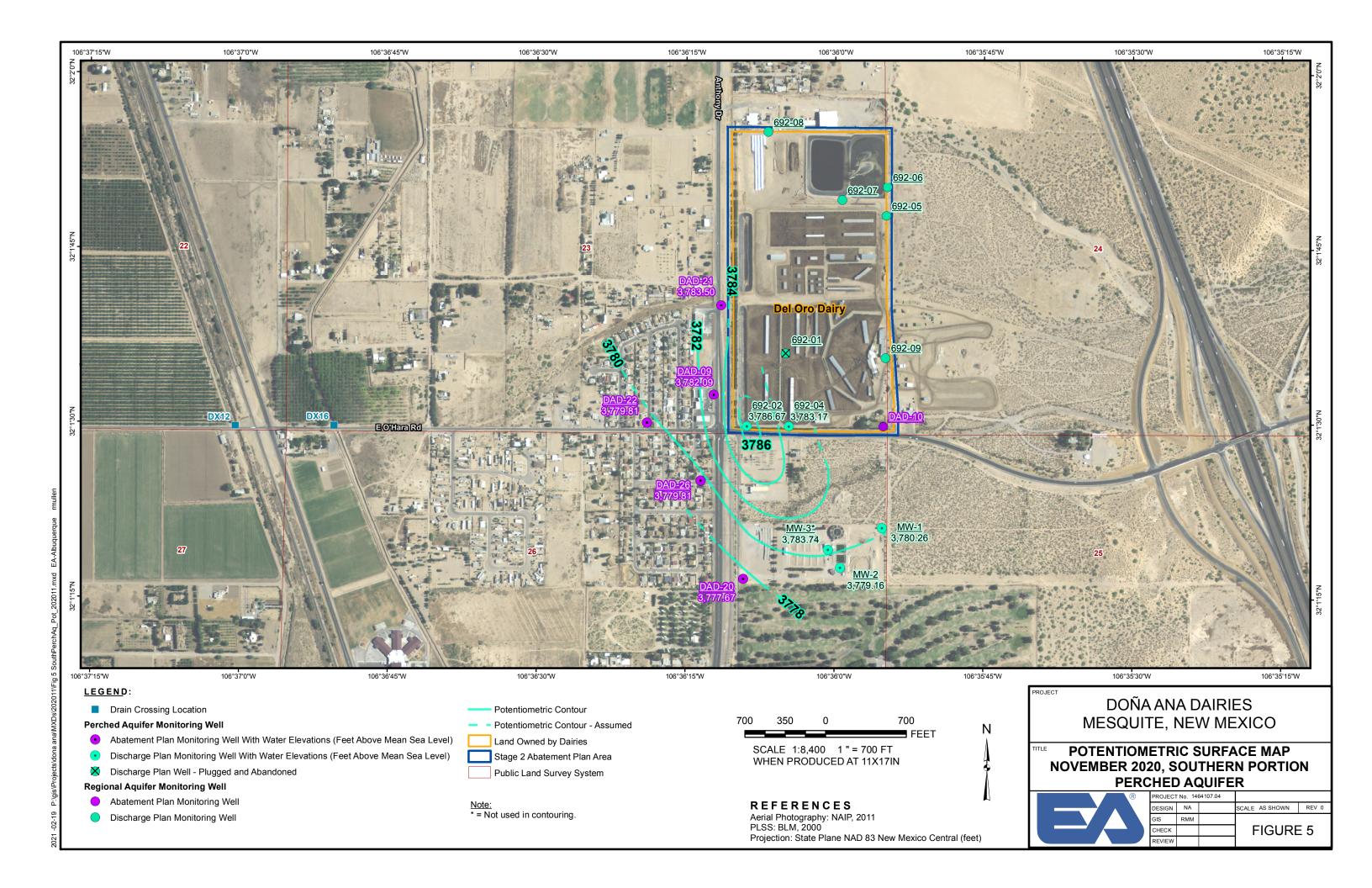
#### **FIGURES**

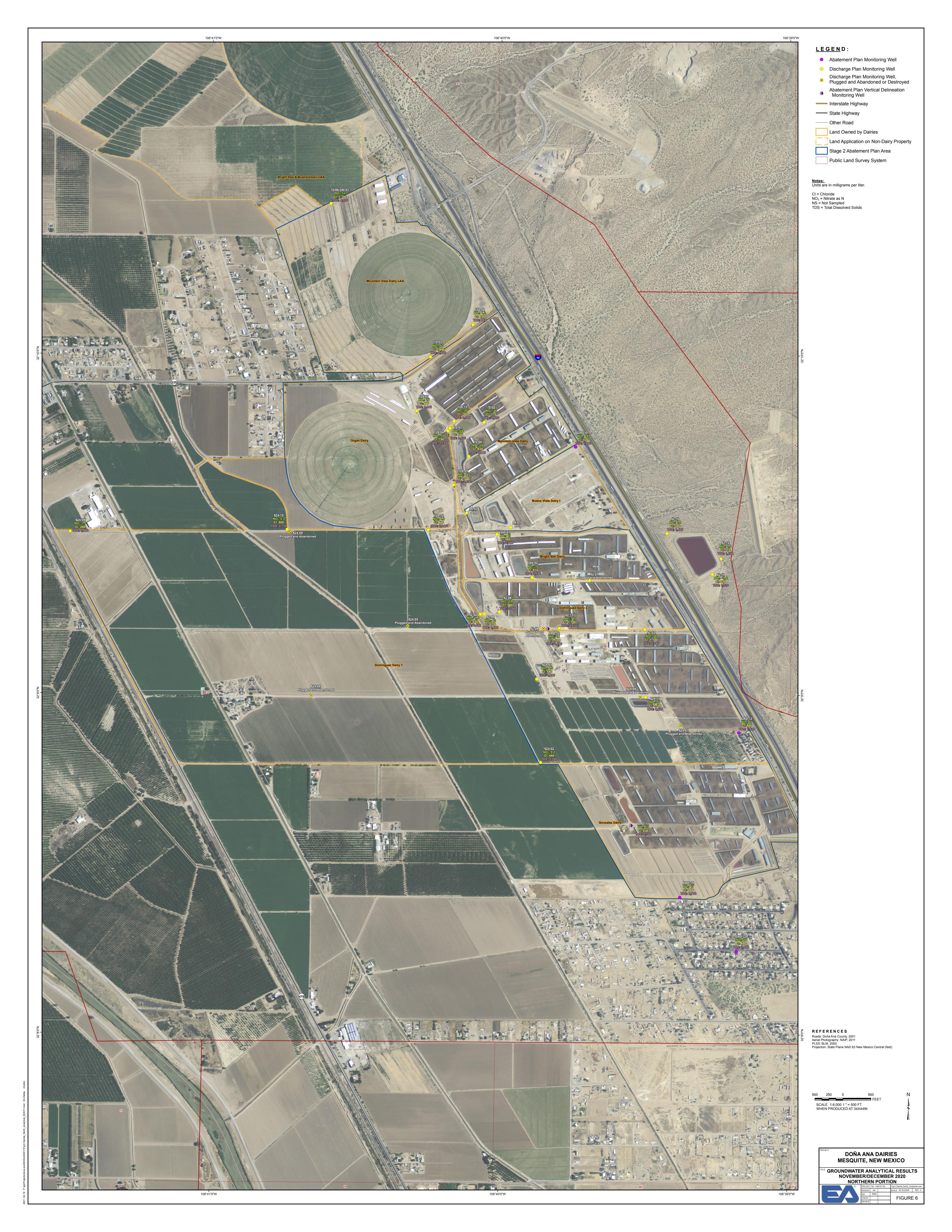














<u>LEGEN</u>D:

 Abatement Plan Monitoring Well Discharge Plan Monitoring Well

Discharge Plan Monitoring Well,

Plugged and Abandoned Abatement Plan Vertical Delineation Monitoring Well

Interstate Highway ---- State Highway

Land Owned by Dairies Land Application on Non-Dairy Property Stage 2 Abatement Plan Area

Public Land Survey System

Notes:
Units are in milligrams per liter. CI = Chloride NO<sub>3</sub> = Nitrate as N TDS = Total Dissolved Solids

REFERENCES

Roads: Doña Ana County, 2001

Aerial Photography: NAIP, 2011

PLSS: BLM, 2000

Projection: State Plane NAD 83 New Mexico Central (feet)

SCALE 1:4,800 1 " = 400 FT WHEN PRODUCED AT 34X44IN

DOÑA ANA DAIRIES MESQUITE, NEW MEXICO GROUNDWATER ANALYTICAL RESULTS
NOVEMBER/DECEMBER 2020
CENTRAL PORTION

B PROJECT No. 1464107 Fig 7 Dairies\_Central\_Analytical.m FIGURE 7

106°36'0"W



Discharge Plan Monitoring Well

106°36'15"W

Discharge Plan Monitoring Well -Plugged and Abandoned

#### Regional Aquifer Monitoring Well

- Abatement Plan Monitoring Well
- Discharge Plan Monitoring Well
- Land Owned by Dairies
- Stage 2 Abatement Plan Area
  - Public Land Survey System

### Notes: Units are in milligrams per liter.

CI = Chloride NO<sub>3</sub> = Nitrate as N TDS = Total Dissolved Solids

#### REFERENCES

Aerial Photography: NAIP, 2011 PLSS: BLM, 2000

Projection: State Plane NAD 83 New Mexico Central (feet)

**DOÑA ANA DAIRIES MESQUITE, NEW MEXICO** 

TITLE GROUNDWATER ANALYTICAL RESULTS **NOVEMBER/DECEMBER 2020** SOUTHERN PORTION, REGIONAL AQUIFER



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DESIGN	NA		SCALE	AS SHOWN	REV 0
GIS	RM				
CHECK			FIGURE 8		
REVIEW					

106°35'45"W

106°36'15"W

106°36'0"W

CALE AS SHOWN REV 0

FIGURE 9

DESIGN NA

RM

2021-02-19 P:\gis\Projects\dona ana\MXDs\202011\Fig 9 SouthPerchAq\_Analytical\_202011.mxd EA-Dallas rm

REFERENCES Aerial Photography: NAIP, 2011

Projection: State Plane NAD 83 New Mexico Central (feet)

PLSS: BLM, 2000

106°36'30"W

EA Engineering, Science, and Technology, Inc., PBC

#### **APPENDIX A**

# SAMPLING FIELD FORMS (Provided in Electronic Format via CD Located on Front Cover of Report)



#### **APPENDIX B**

WELL PLUGGING AND ABANDONMENT REPORTS (Provided in Electronic Format via CD Located on Front Cover of Report)

EA Engineering, Science, and Technology, Inc., PBC					

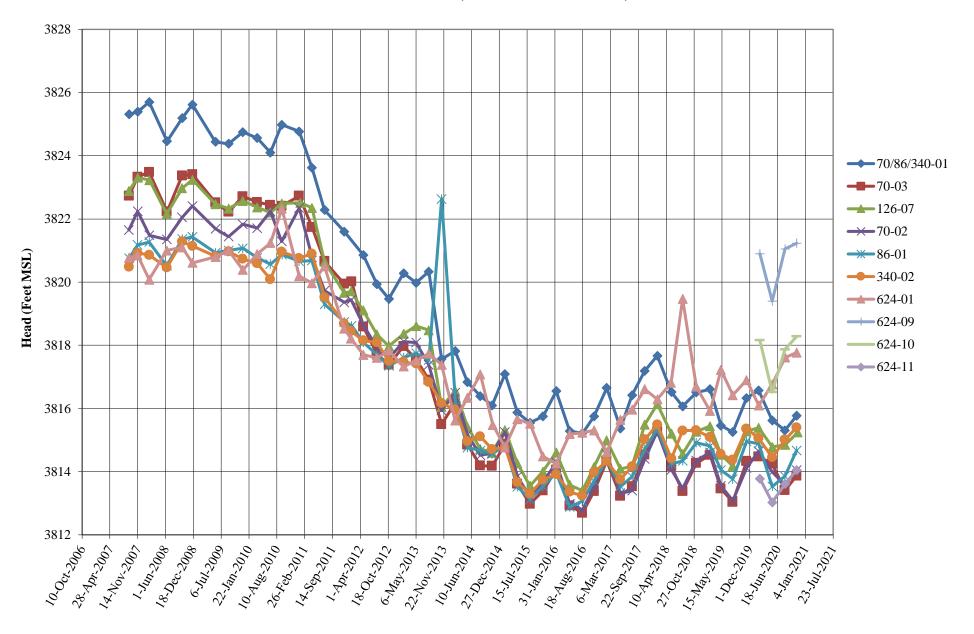
#### **APPENDIX C**

#### ANALYTICAL LABORATORY REPORTS

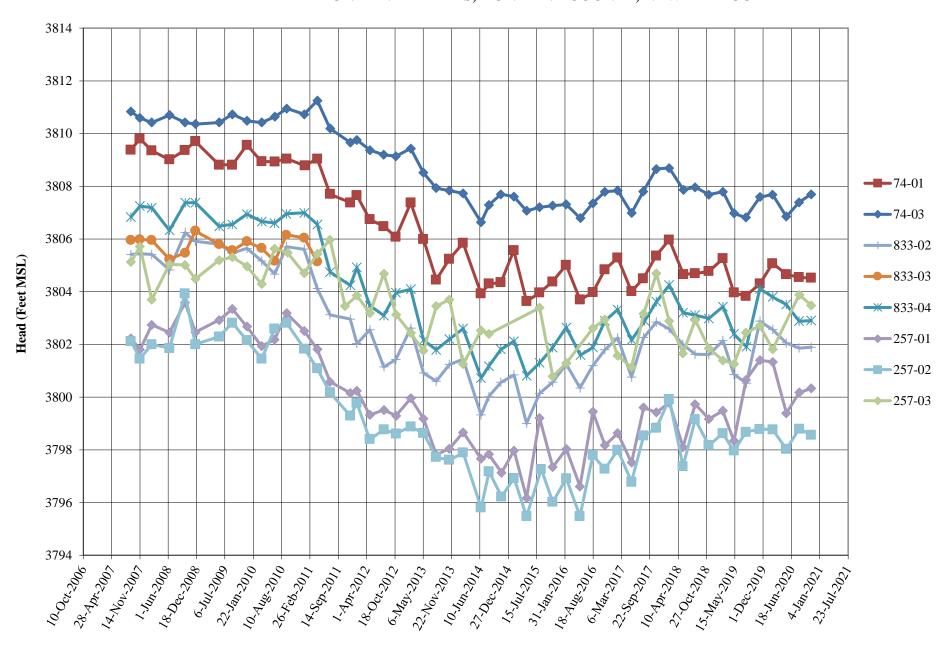
(Provided in Electronic Format via CD Located on Front Cover of Report)

# APPENDIX D HYDROGRAPHS BY AREA

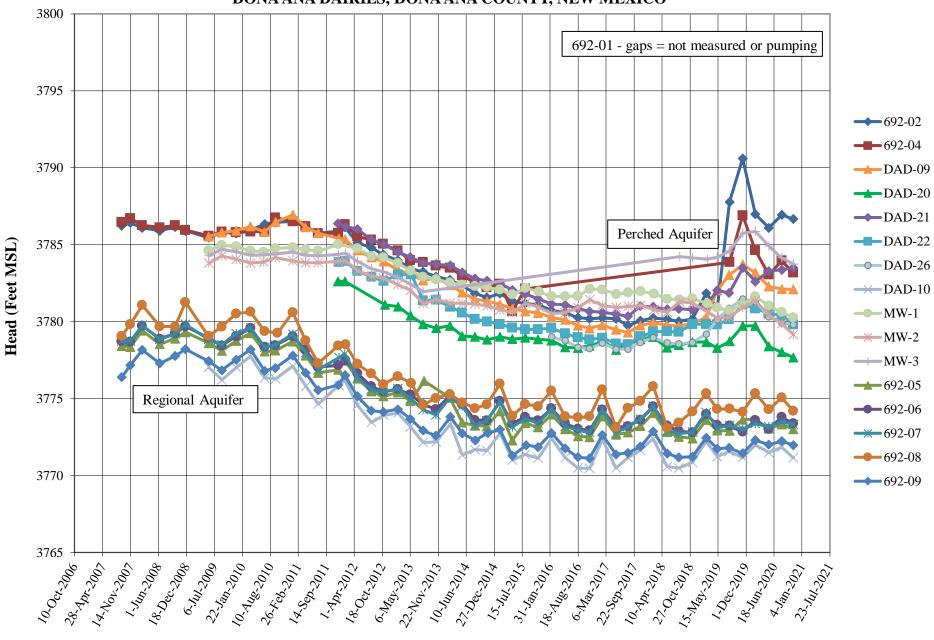
# HYDROGRAPHS FOR SELECT DP MONITORING WELLS NORTHERN PORTION DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



# HYDROGRAPHS FOR SELECT DP MONITORING WELLS CENTRAL PORTION DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO

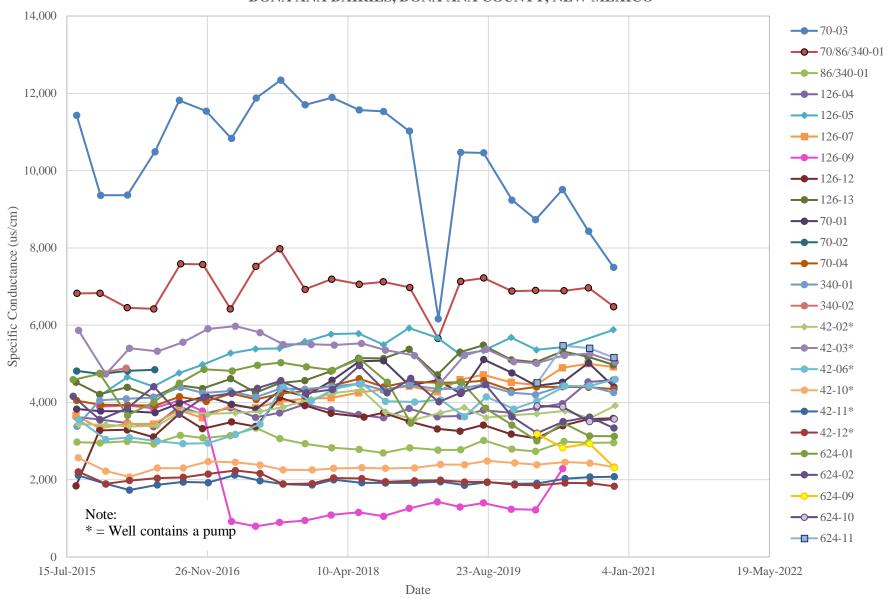


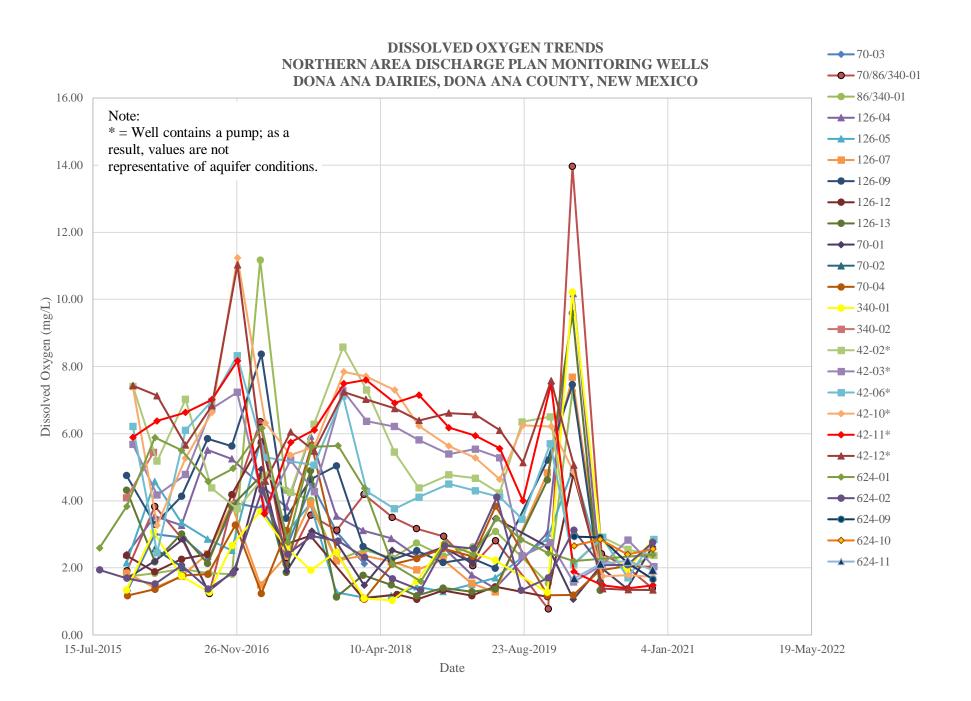
## HYDROGRAPHS FOR DP MONITORING WELLS SOUTHERN PORTION DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO

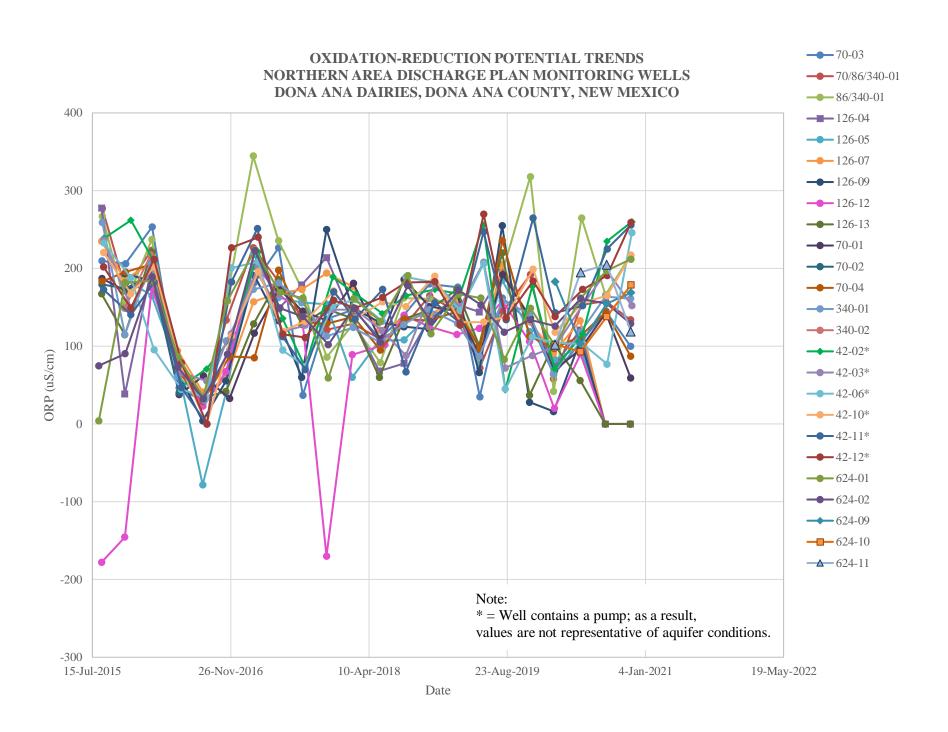


# APPENDIX E FIELD PARAMETER TRENDS BY AREA

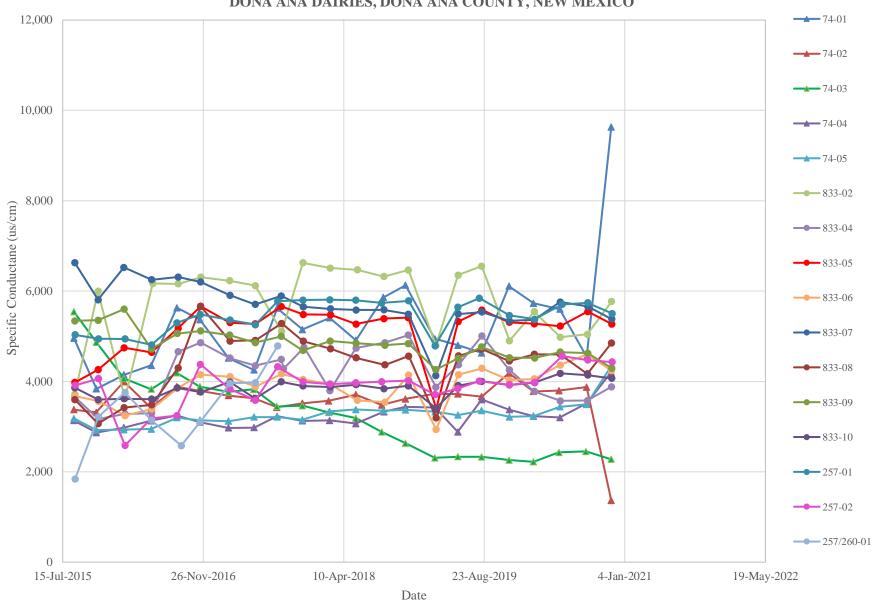
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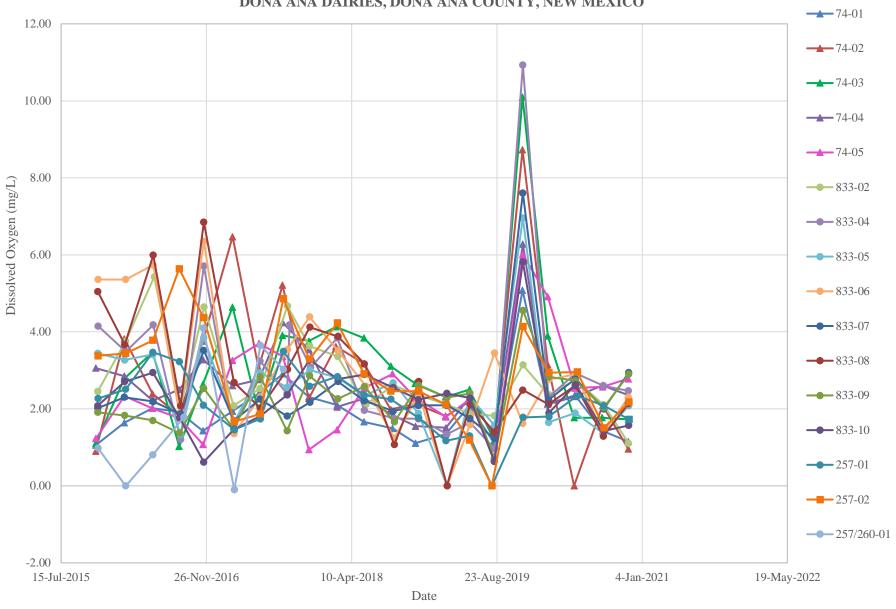




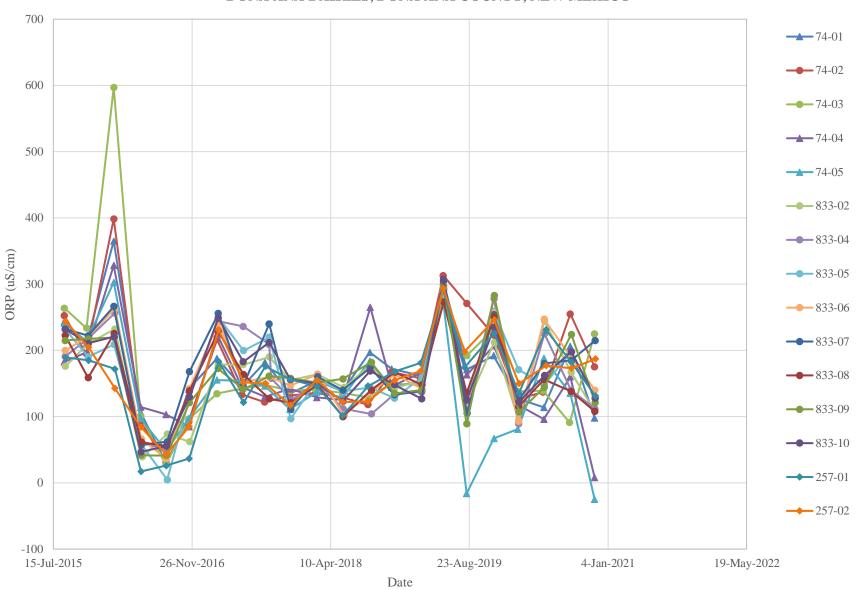
### SPECIFIC CONDUCTANCE TRENDS CENTRAL AREA DISCHARGE PLAN MONITORING WELLS DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



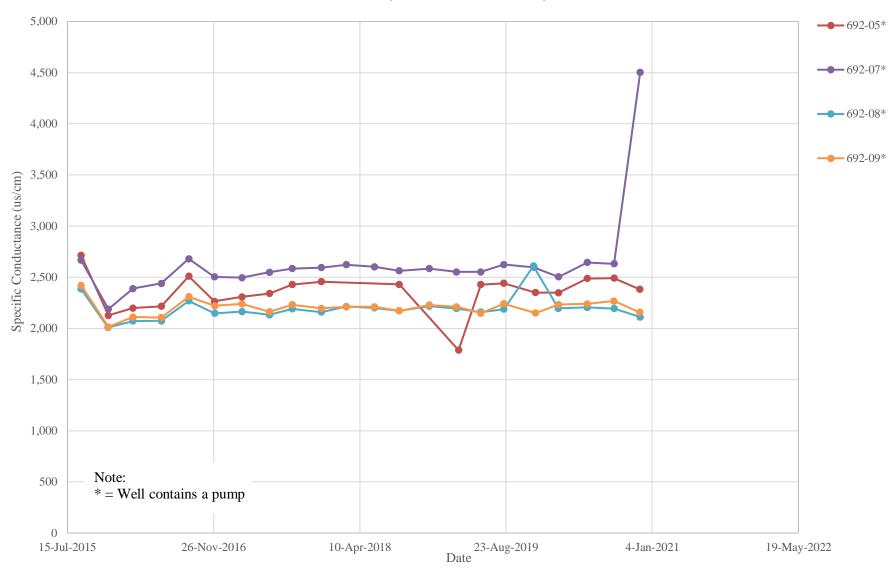
### DISSOLVED OXYGEN TRENDS CENTRAL AREA DISCHARGE PLAN MONITORING WELLS DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



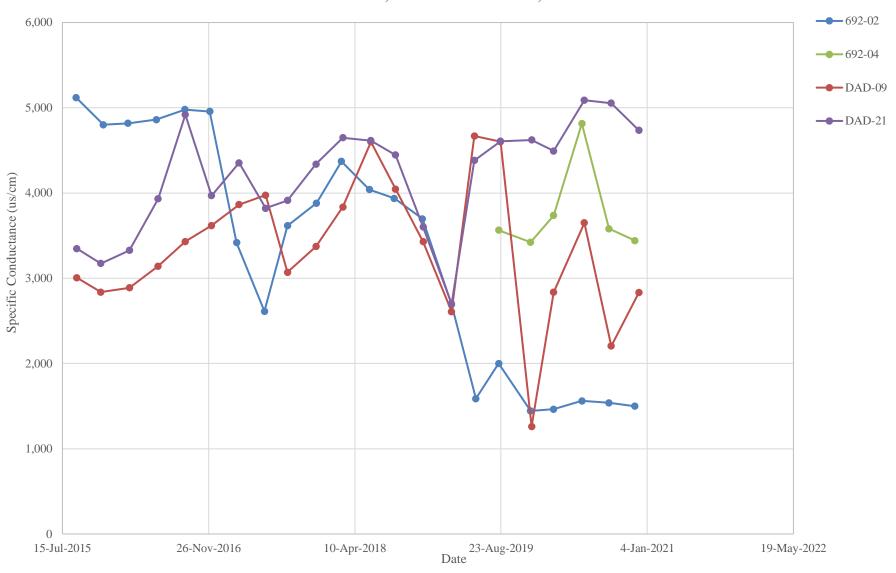
#### OXIDATION-REDUCTION POTENTIAL TRENDS CENTRAL AREA DISCHARGE PLAN MONITORING WELLS DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



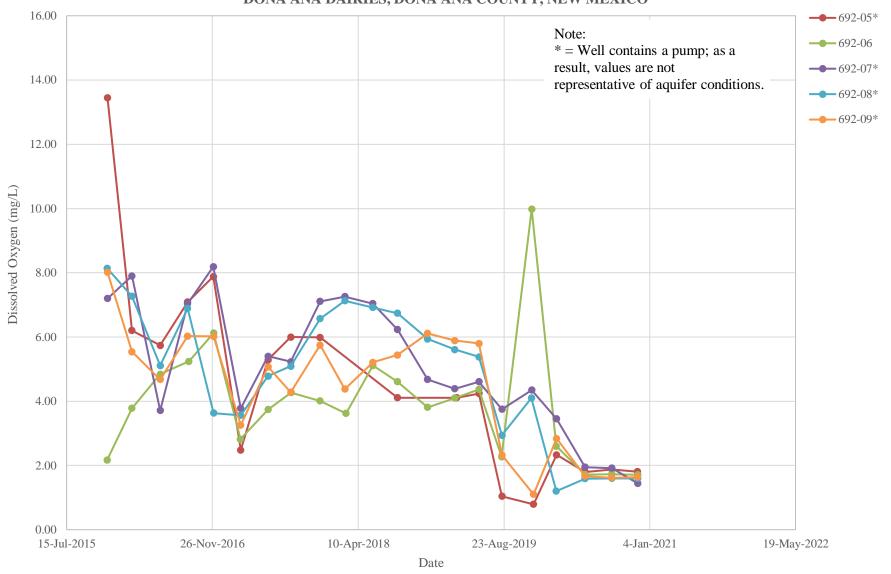
# SPECIFIC CONDUCTANCE TRENDS SOUTHERN AREA DISCHARGE PLAN MONITORING WELLS IN THE REGIONAL AQUIFER DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



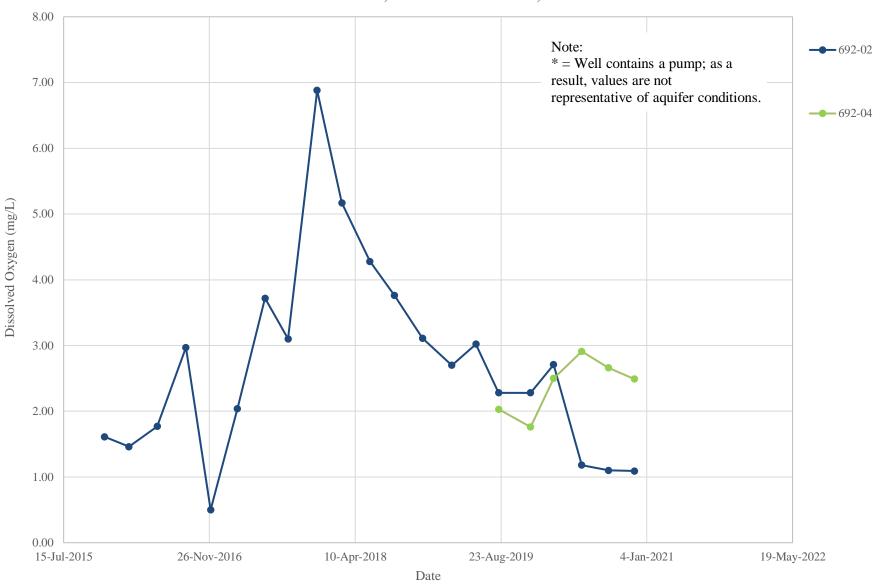
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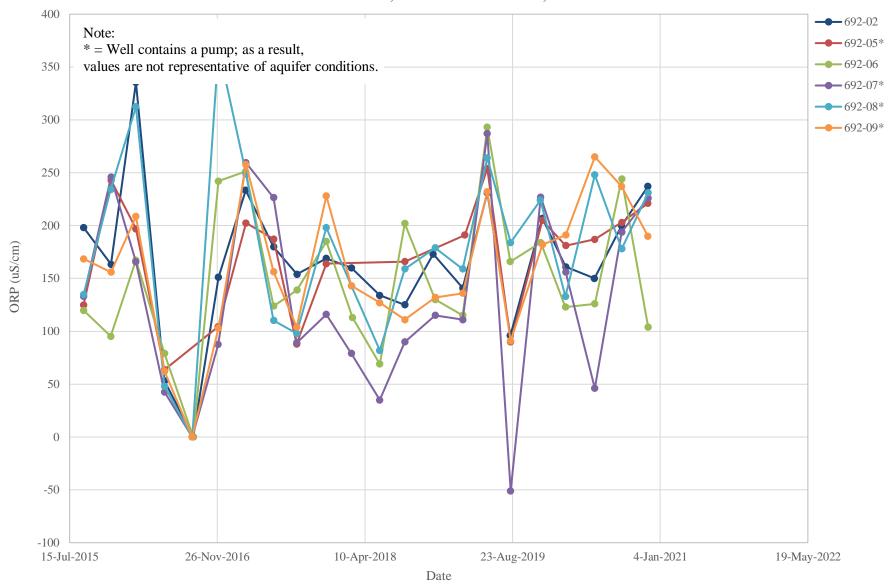
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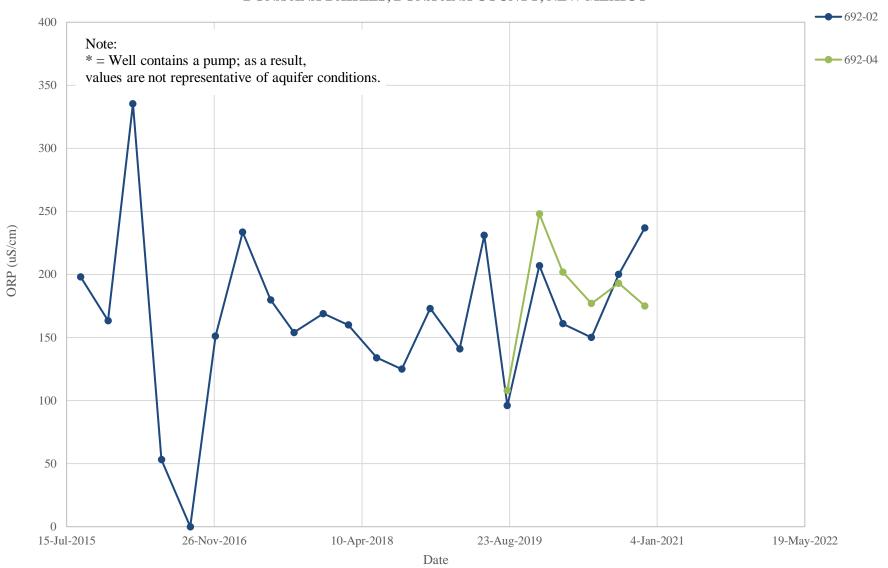
#### DISSOLVED OXYGEN TRENDS SOUTHERN AREA DISCHARGE PLAN MONITORING WELLS DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



#### OXIDATION-REDUCTION POTENTIAL TRENDS SOUTHERN AREA DISCHARGE PLAN MONITORING WELLS DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



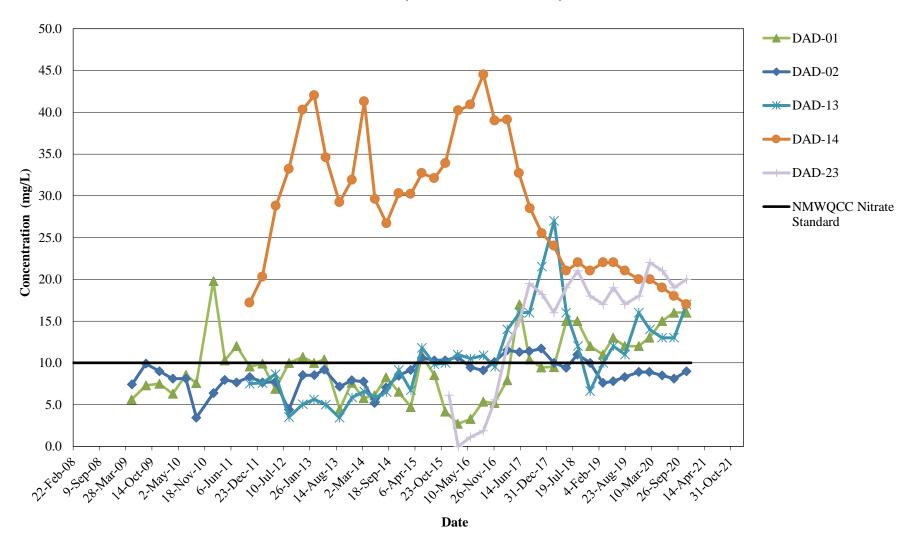
#### OXIDATION-REDUCTION POTENTIAL TRENDS SOUTHERN AREA DISCHARGE PLAN MONITORING WELLS IN THE PERCHED AQUIFER DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



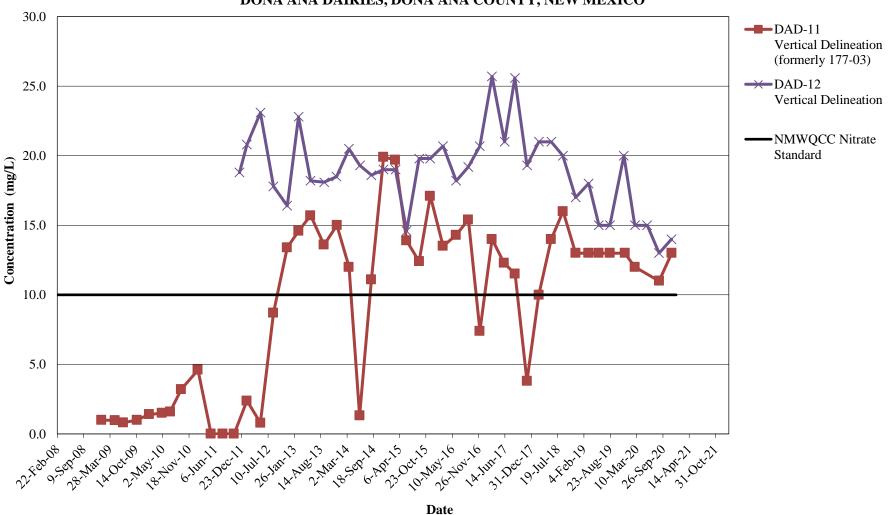
#### **APPENDIX F**

### CONCENTRATION TRENDS BY AREA - ABATEMENT PLAN WELLS

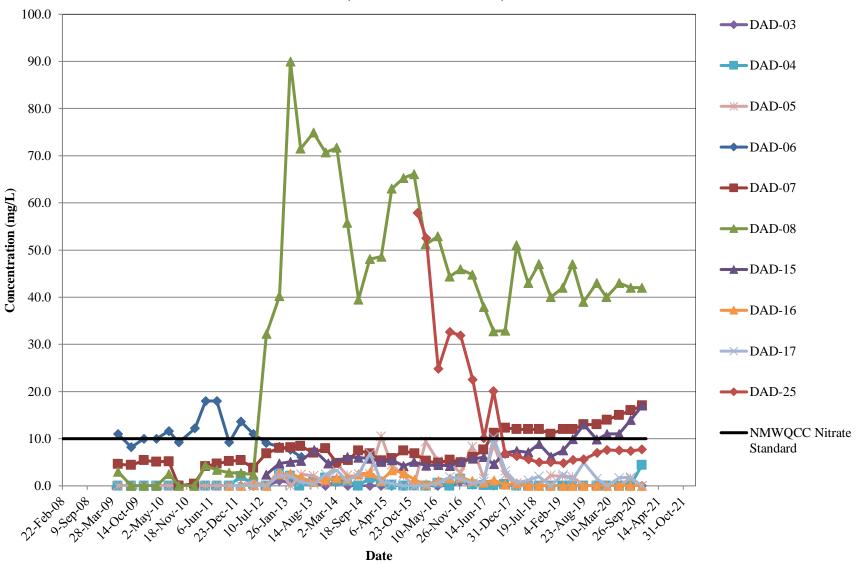
#### NITRATE CONCENTRATION TRENDS NORTHERN ABATEMENT PLAN MONITORING WELLS DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



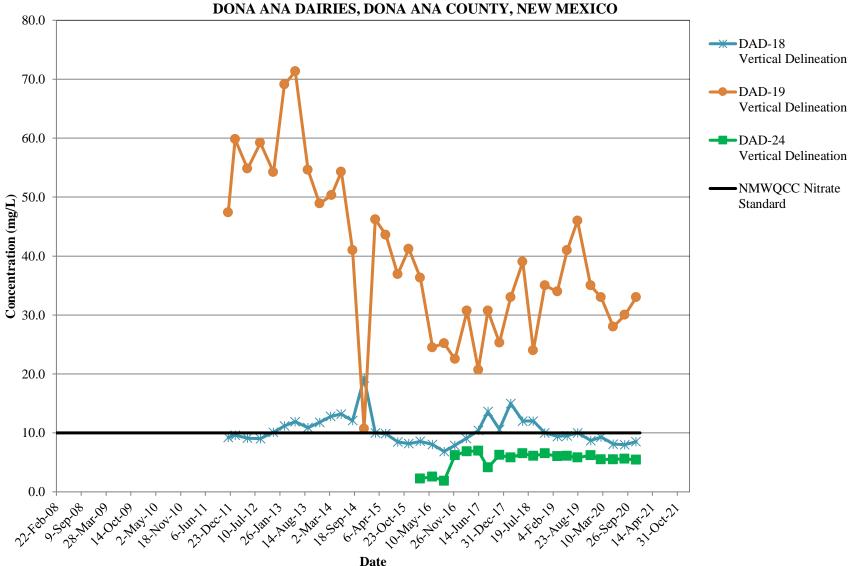
# NITRATE CONCENTRATION TRENDS NORTHERN ABATEMENT PLAN MONITORING WELLS VERTICAL DELINEATION DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



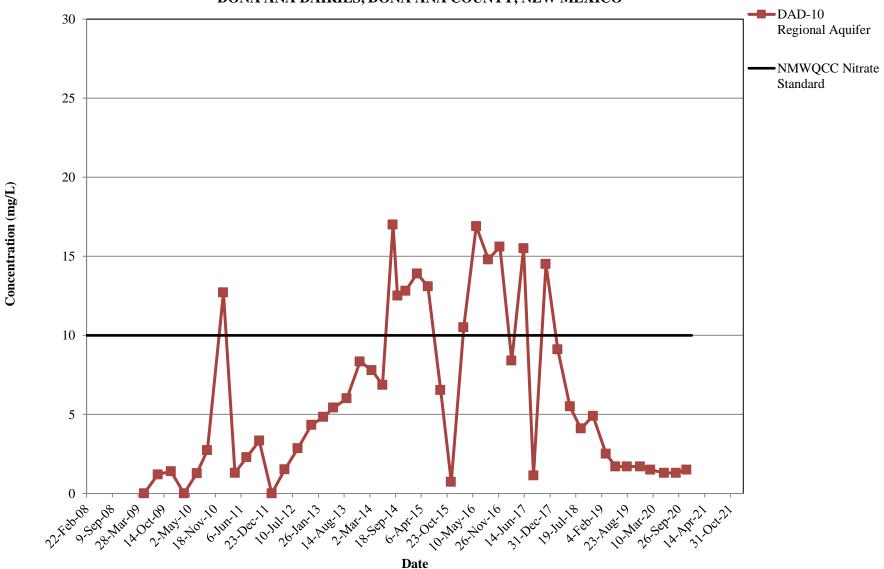
#### NITRATE CONCENTRATION TRENDS CENTRAL ABATEMENT PLAN MONITORING WELLS DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



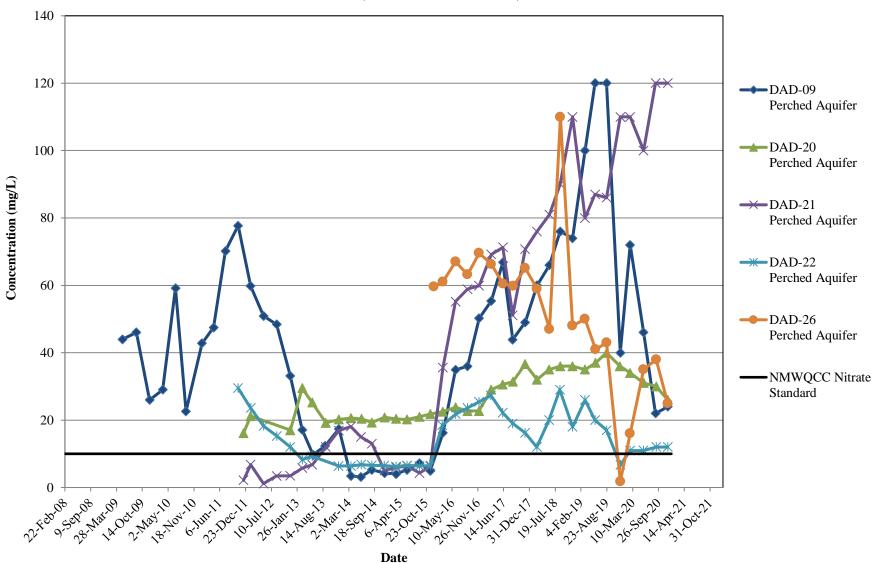
### NITRATE CONCENTRATION TRENDS CENTRAL ABATEMENT PLAN MONITORING WELLS VERTICAL DELINEATION



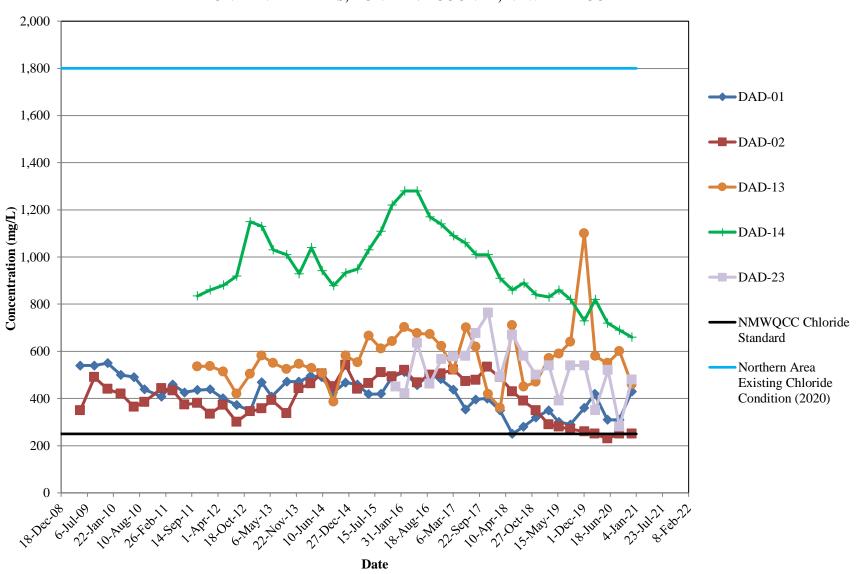
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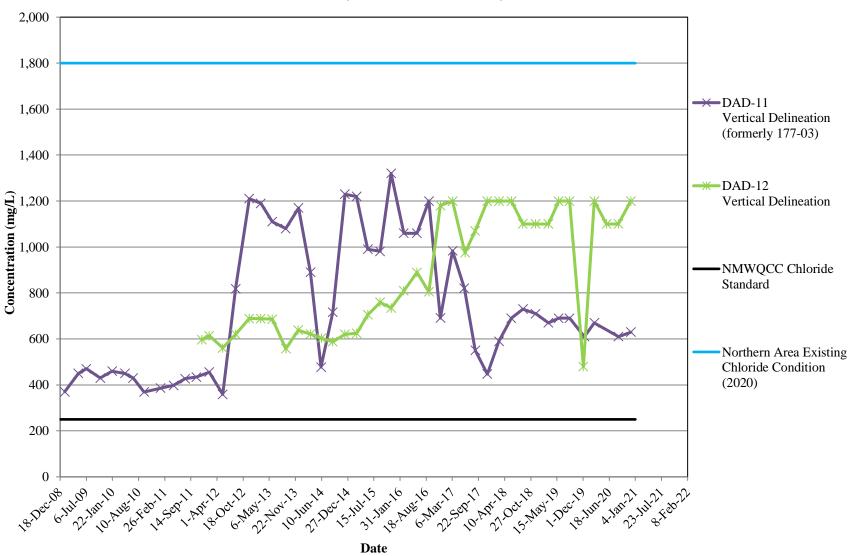
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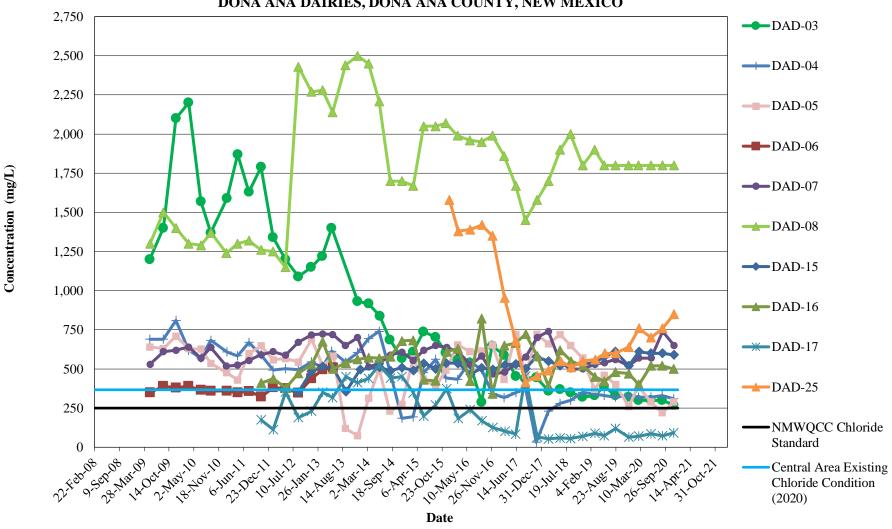
#### CHLORIDE CONCENTRATION TRENDS NORTHERN ABATEMENT PLAN MONITORING WELLS DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



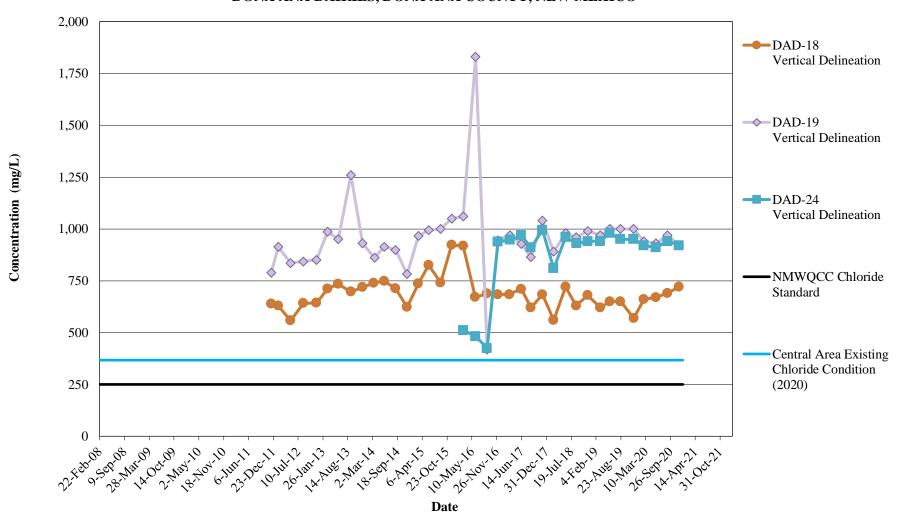
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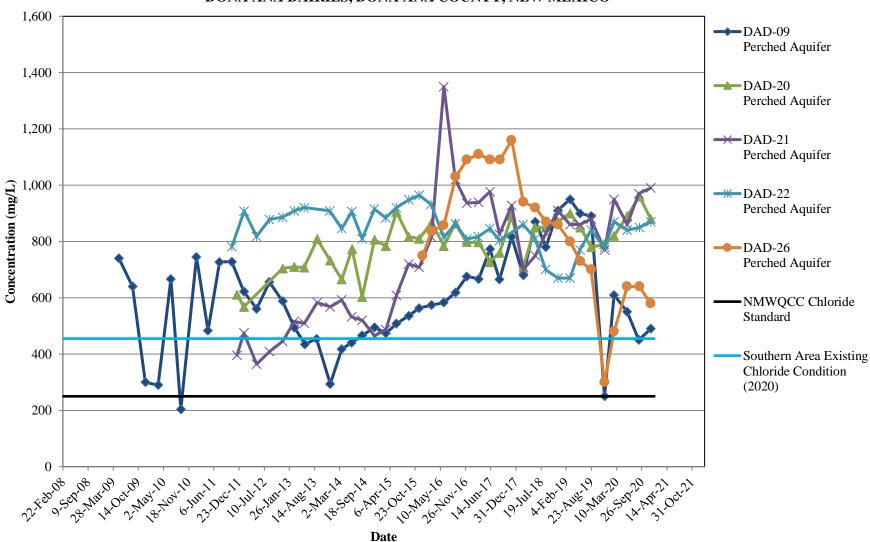
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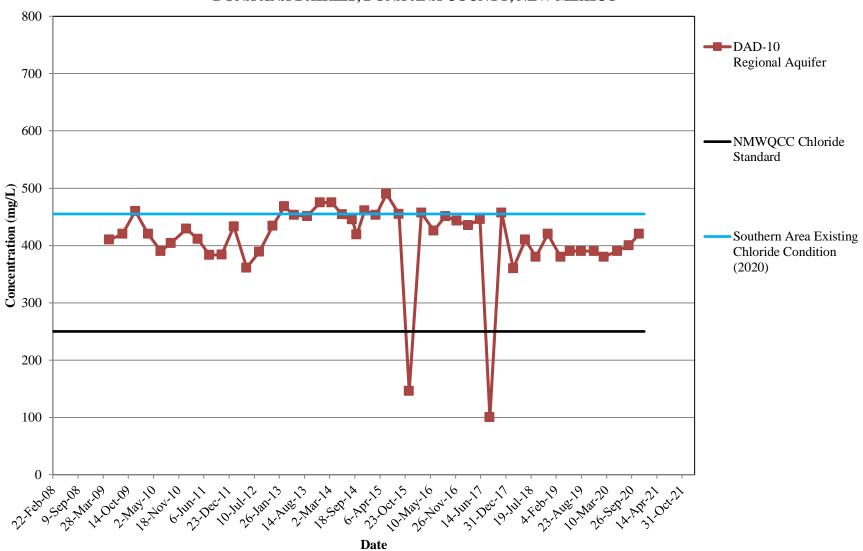
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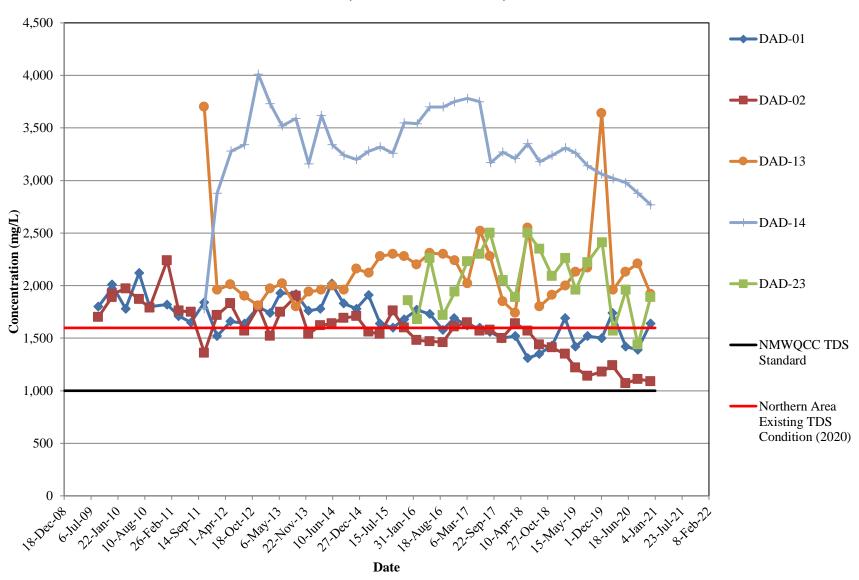
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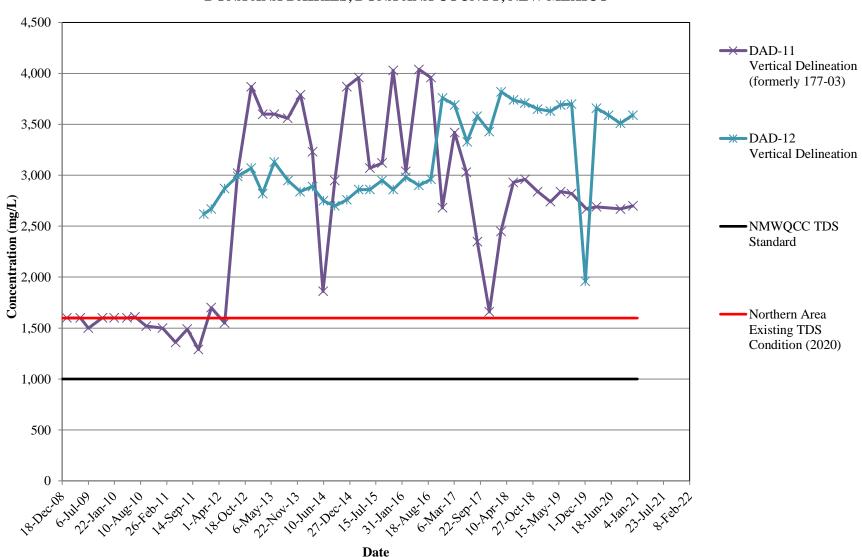
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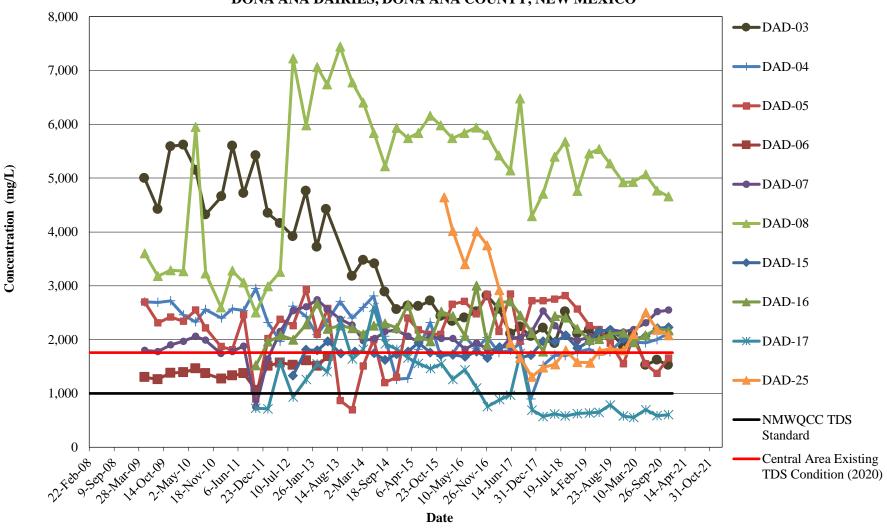
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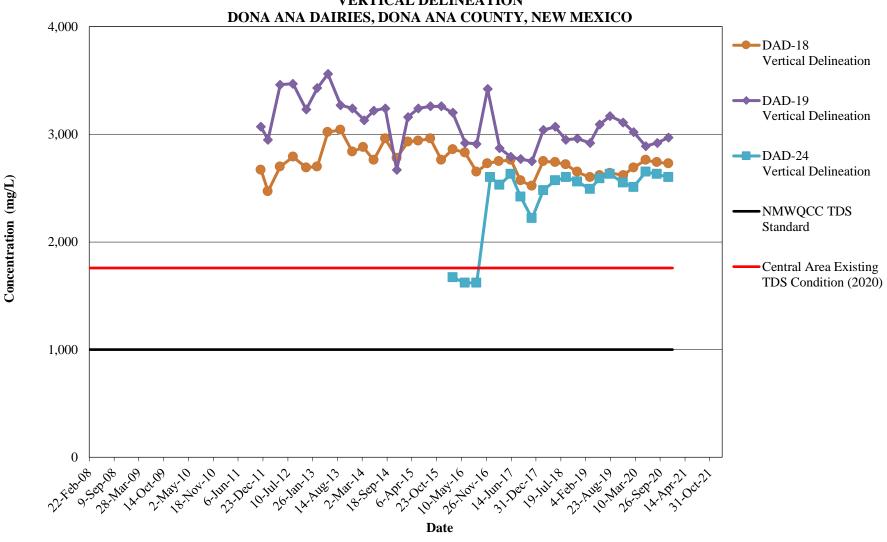
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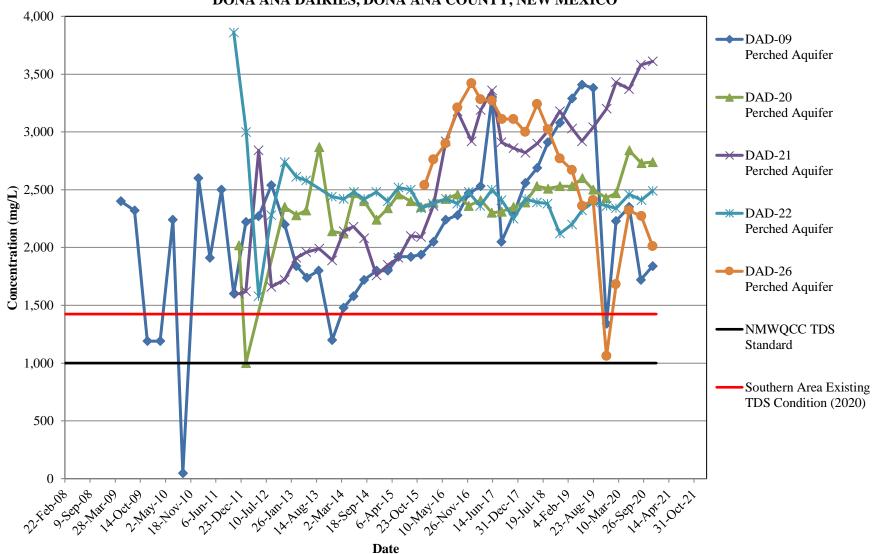
#### TDS CONCENTRATION TRENDS CENTRAL ABATEMENT PLAN MONITORING WELLS DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



### TDS CONCENTRATION TRENDS CENTRAL ABATEMENT PLAN MONITORING WELLS VERTICAL DELINEATION



## TDS CONCENTRATION TRENDS SOUTHERN ABATEMENT PLAN MONITORING WELLS IN THE PERCHED AQUIFER DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO



## TDS CONCENTRATION TRENDS SOUTHERN ABATEMENT PLAN MONITORING WELLS IN THE REGIONAL AQUIFER DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO

