APPENDIX A
PUMP AND REUSE SYSTEM PERFORMANCE ASSESSMENT
DEL ORO DAIRY, ANTHONY, NEW MEXICO
JULY - OCTOBER 2024

This quarterly performance assessment of the Del Oro Pump and Reuse System has been prepared in compliance with the Stage 2 Abatement Plan (S2AP) Modification Performance Plan (EA Engineering, Science, and Technology, Inc., PBC [EA] 2022). Note that references are included in the main document text.

The performance assessment evaluates pumping rates, total volume pumped, mass removed, and plume capture by the five extraction wells installed along the downgradient perimeter of the Del Oro Dairy property. A site background summary is included in the main report.

Pump and Reuse System

The pump and reuse system is shown in plan view on Figure A-1. The system consists of:

- Five, 4-inch diameter groundwater extraction wells completed in the perched aquifer (EW-01 through EW-05). The submerged screens in each well were installed at 14 to 15 feet below the water table, representing the perched aquifer thickness (water table to confining clay).

- Four submersible solar groundwater pumps supplied by Rural Pumping Systems, complete with controllers and 4 x 100-watt (400-watt total) solar panels installed at the well heads of EW-01, EW-02, EW-04, and EW-05. The pump at EW-03 was removed after the pump repeatedly malfunctioned due to the low permeability of the surrounding aquifer.

- Well head completions consisting of valves, flow meters, sample ports, and steel pipe fence and bollards to isolate from cattle.

- Main conveyance line consisting of 1.5-inch diameter high density polyethylene (HDPE) pipe connecting the extraction wells to HDPE storage tanks located at the milking parlor.

- Two 6,000 HDPE storage tanks plumbed in parallel.

- Transfer pump and pressure tank for delivery to the milking parlor.

A process flow diagram of the system is provided as Drawing P-1.

System Background

Wells were installed and sampled in October 2022. Startup testing for the pumping system began in late December 2022 following pump and solar panel installation. After several iterations of trouble-shooting, all pumps were pumping at capacity by April 2023 except for extraction well EW-3. After the pump in this well repeated malfunctioned due to low permeability of the aquifer, it was removed. The pump was placed in the higher yielding EW-1 when its pump failed. Samples have not been collected since February 2023. Permeability at well EW-3 is an order of magnitude less than the other wells. The well produced a maximum of 0.05 gallons per minute. Because of the low

permeability, the well has limited potential to contribute to nitrate mass removal and cleanup time of the system. The omission of EW-3 from the well network is not expected to negatively impact system efficacy. Del Oro Dairy performs weekly meter reading and relays data to EA for record keeping and reporting.

Yields in EW-04 and EW-05 have been decreasing over the course of the most recent quarter. The pumps were placed in a lower position within EW-05 on October 14, 2024, and within EW-04 on October 20, 2024. Improved performance has been observed since pumps were lowered.

Quarterly Performance Assessment

Performance assessment will be used to evaluate average pumping rates, mass removal of nitrate, and plume capture by the five extraction wells. The performance assessment consists of three components: 1) tracking and reporting of extracted groundwater volume, 2) collection of groundwater samples from extraction wells and analysis of mass removal, and 3) capture analysis.

Extracted Groundwater Volume

Totalizing flow meters measure the volume of extracted groundwater from each extraction well as reported in Table A1. The aggregate volume of water pumped from operating wells is also measured at the storage tanks with a totalizing meter located just before outfall into the storage tanks. Weekly liquid depth measurements for the Del Oro lagoon cells (ultimate destination of extraction water) are provided in Attachment 1. Stable to decreasing liquid levels in the lagoon cells indicate that extracted groundwater that is used to wash down the milking parlor and then is transported to the lagoons for disposal does not exceed the capacity of the lagoons.

Groundwater Sampling Results and Trends

Table A2 summarizes groundwater analytical results from the extraction wells. The highest nitrate concentration of 130 milligrams per liter (mg/L) was detected in extraction wells EW-01 and EW-02. The highest chloride and total dissolved solids (TDS) concentrations this quarter were detected in EW-01 at concentrations of 1,000 mg/L and 4,000 mg/L, respectively. Nitrate concentrations in EW-01 generally fluctuate, but decreased significantly relative to last quarter. Nitrate also generally fluctuates in EW-04. This quarter's concentration is higher than the previous quarter, but the nitrate concentrations appear to be generally decreasing. Nitrate concentrations have decreased slightly in EW-05 and remained consistent in EW-02. Chloride fluctuates in EW-01 and is currently lower than the concentration detected at startup. Chloride in EW-04 and EW-05 has increased since startup. Chloride in EW-02 has decreased relative to last quarter, but also relative to the concentration at startup. Since system startup, TDS concentrations initially decreased, but then increased in EW-01 and EW-02; however, in the last quarter, TDS concentrations were lower than those at startup. TDS fluctuates in EW-04 and EW-05, but concentrations appear to have an increasing trend. Nitrate, chloride, and TDS concentration trends for downgradient and key monitoring wells are provided in Attachment 3.

Nitrate Mass Removal

Groundwater samples are collected from each extraction well on a quarterly basis. Analytical results for extraction well samples are provided in Table A2 and laboratory reports are provided in Attachment 2.

Nitrate mass removal rates are the product of flow rate and chemical concentrations, which yield total mass removed per quarter. The nitrate mass removed this quarter was 201.6 pounds. Cumulative mass removed since startup is 1,891 pounds. A summary of nitrate mass removal is provided in Table A3.

Capture Analysis

Capture analysis is a function of flow rate, permeability (hydraulic conductivity), and hydraulic gradient. Flow rates are measured weekly via flow meters, and hydraulic gradient is calculated from quarterly water level measurements. Hydraulic conductivity for the perched aquifer was estimated based on observed grain size and typical values. For fine to medium sand, 10^{-2} to 10^{-3} centimeters per second (cm/s) is typical, and this range equates to 27 to 2.7 feet per day (ft/day). Since the sand was logged as "poorly graded fine sand," permeability was assigned as 10 ft/day in higher yielding wells EW-1, EW-2, EW-4, and EW-5, and 1 ft/day for low yielding well EW-3. The capture width for each well is calculated based on these permeabilities and measured flow rates and gradient. Capture widths for EW-01, EW-02, EW-04, and EW-05 were 150 feet (ft), 277 ft, 247 ft, and 77 ft, respectively. A summary of capture analysis is provided in Table A4.

Attachments:
- Figure A-1 – Extraction System Layout
- Drawing P-1 – Process Flow Diagram
- Table A1 – Pumping Volumes and Rates
- Table A2 – Del Oro Dairy Extraction Well Analytical Results
- Table A3 – Summary of Nitrate Mass Removal
- Table A4 – Capture Analysis for Pumping Wells
- Attachment 1 – Weekly Liquid Depth Measurements for Lagoons
- Attachment 2 – Analytical Laboratory Reports
- Attachment 3 – Concentration Trends for Del Oro Extraction Wells and Abatement Plan Monitoring Wells in the Perched Aquifer

FIGURE A-1 and DRAWING P-1

TABLES
(Provided Electronically via CD)

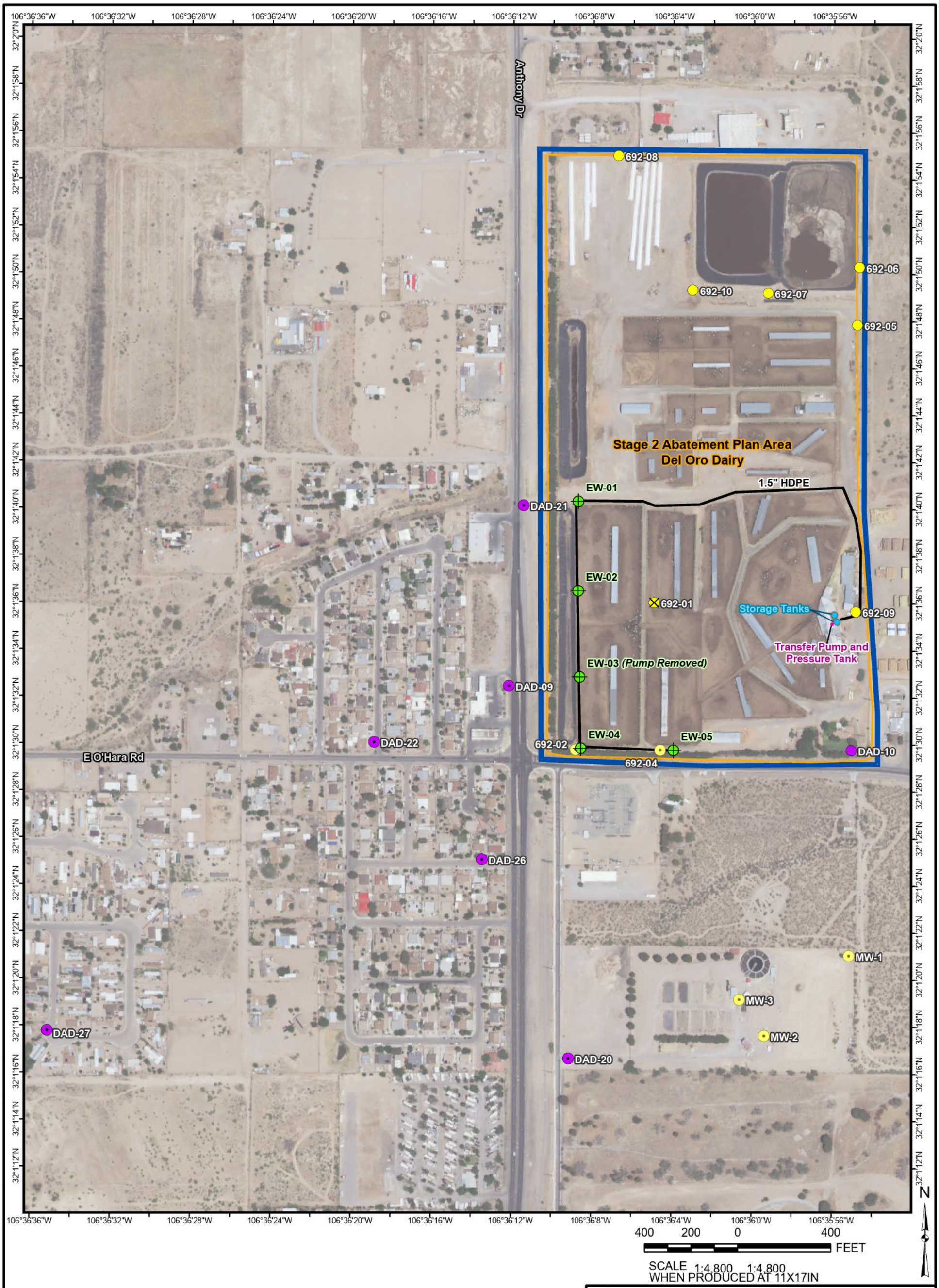
ATTACHMENTS

ATTACHMENT 1 – WEEKLY LIQUID DEPTH MEASUREMENTS FOR LAGOONS

ATTACHMENT 2 – ANALYTICAL LABORATORY REPORTS

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

ATTACHMENT 3 – CONCENTRATION TRENDS FOR DEL ORO EXTRACTION WELLS AND ABATEMENT PLAN MONITORING WELLS IN THE PERCHED AQUIFER



SCALE 1:4,800 1:4,800
WHEN PRODUCED AT 11X17IN

LEGEND:

- Extraction Well
- Conveyance Line

Perched Aquifer Monitoring Well

- Abatement Plan Monitoring Well
- Discharge Plan Monitoring Well
- Discharge Plan Monitoring Well
- 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

REFERENCES

Aerial Photography: NAIP, 2011
PLSS: BLM, 2000
Projection: State Plane NAD 83 New Mexico Central (feet)

PROJECT

DOÑA ANA DAIRIES
MESQUITE, NEW MEXICO

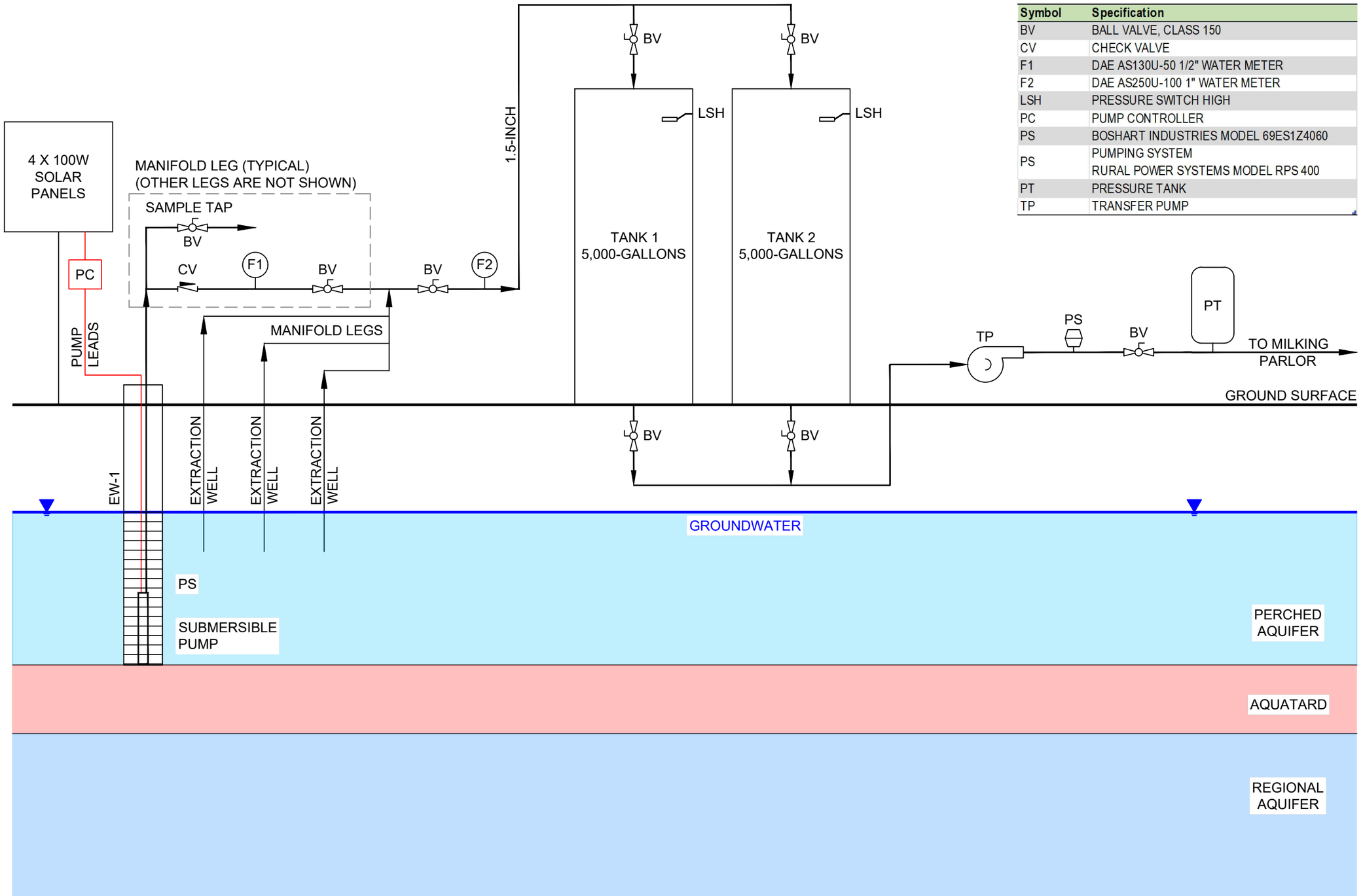
TITLE

EXTRACTION SYSTEM LAYOUT
DEL ORO DAIRY

PROJECT No. 14641-13			TASK: 2.1	
DESIGN	NA		SCALE AS SHOWN	REV 0
GIS	RM		Figure A-1	
CHECK				
REVIEW				

2024 -11-21 P:\gis2\Commercial\Dona Ana Dairies - 21464114\02 August 2024\Projects\DonaAnaQuarterly_202408.aprx EA-Dallas rmullen

Symbol	Specification
BV	BALL VALVE, CLASS 150
CV	CHECK VALVE
F1	DAE AS130U-50 1/2" WATER METER
F2	DAE AS250U-100 1" WATER METER
LSH	PRESSURE SWITCH HIGH
PC	PUMP CONTROLLER
PS	BOSHART INDUSTRIES MODEL 69ES1Z4060
PS	PUMPING SYSTEM RURAL POWER SYSTEMS MODEL RPS 400
PT	PRESSURE TANK
TP	TRANSFER PUMP



REV	DATE	DRAWN	CHECKED	REMARKS
0	2/10/23	JS		
	2/10/23			

REVISIONS

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.
320 GOLD AVENUE, SW SUITE 1300
ALBUQUERQUE, NM, 87102
505-224-9013, HTTPS://EAEST.COM

DESIGNED BY: JS
DRAWN BY: VM
CHECKED BY: JS

DEL ORO DAIRY, ANTHONY, NEW MEXICO
STAGE 2 ABATEMENT PLAN MODIFICATION

PROCESS FLOW DIAGRAM

PROJECT NUMBER:
1464110-01

DRAWING NO.:
P-1

TABLE A1. PUMPING VOLUMES AND RATES
DEL ORO DAIRY, ANTHONY, NEW MEXICO

Date	Time	Elapsed Time (min)	EW-1		EW-2		EW-3		EW-4		EW-5		Tank	
			Meter Reading[1]	Q_{avg}[2]	Meter Reading[1]	Q_{avg}[2]	Meter Reading[1]	Q_{avg}[2]	Meter Reading[1]	Q_{avg}[2]	Meter Reading[1]	Q_{avg}[2]	Meter Reading[1]	Q_{avg}[2]
12/22/2022	12:45:00 PM	--	13,504	--	13,740	--	6,750	--	6,203	--	12,120	--	31,259	--
1/3/2023	7:30:00 AM	16,980	21,885	0.49	24,744	0.65	0.0	0.0	7,280	0.06	16,337	0.25	54,046	1.34
1/9/2023	7:30:00 AM	8,640	27,541	0.65	33,425	1.00	0.0	0.0	8,274	0.12	21,870	0.64	73,388	2.24
1/13/2023	10:00:00 AM	5,910	31,657	0.70	40,030	1.12	0.0	0.0	8,792	0.09	25,957	0.69	87,851	2.45
1/16/2023	2:00:00 PM	4,560	33,565	0.42	42,838	0.62	0.0	0.0	9,047	0.06	27,529	0.34	94,214	1.40
1/23/2023	11:00:00 AM	9,900	38,695	0.52	51,625	0.89	0.0	0.0	9,470	0.04	32,586	0.51	116,170	2.22
1/30/2023	9:00:00 AM	9,960	40,325	0.16	63,627	1.21	0.0	0.0	9,471	0.00	38,804	0.62	138,126	2.20
2/6/2023	9:30:00 AM	10,110	41,955	0.16	75,629	1.19	0.0	0.0	9,471	0.00	43,822	0.50	160,082	2.17
2/13/2023	9:00:00 AM	10,050	43,585	0.16	87,631	1.19	0.0	0.0	9,471	0.00	49,440	0.56	182,038	2.18
2/20/2023	2:00:00 PM	10,380	44,562	0.09	95,584	0.77	0.0	0.0	9,645	0.02	49,841	0.04	193,391	1.09
2/27/2023	11:25:00 AM	9,925	46,355	0.18	105,471	1.00	1,000	0.0	9,846	0.02	49,857	0.00	206,255	1.30
3/6/2023	11:30:00 AM	10,085	48,796	0.24	118,557	1.30	143	-0.08	10,002	0.02	53,215	0.33	223,524	1.71
3/13/2023	10:00:00 AM	9,990	50,472	0.17	129,962	1.14	143	0.0	10,020	0.00	53,300	0.01	240,794	1.73
3/20/2023	9:45:00 AM	10,065	50,472	0.00	141,036	1.10	143	0.0	16,435	0.64	58,117	0.48	264,263	2.33
3/27/2023	9:00:00 AM	10,035	50,472	0.00	152,111	1.10	143	0.0	22,850	0.64	62,929	0.48	287,733	2.34
4/3/2023	10:30:00 AM	10,170	50,472	0.00	165,216	1.29	689	0.05	31,638	0.86	64,978	0.20	316,928	2.87
4/10/2023	10:00:00 AM	10,050	58,791	0.83	177,767	1.25	1,254	0.06	39,593	0.79	73,732	0.87	351,146	3.40
4/17/2023	9:00:00 AM	10,020	68,627	0.98	190,104	1.23	1,750	0.05	47,154	0.75	80,639	0.69	386,386	3.52
4/24/2023	9:00:00 AM	10,080	72,167	0.35	202,937	1.27	1,983	0.02	55,452	0.82	82,848	0.22	422,932	3.63
5/1/2023	10:30:00 AM	10,170	19,889	1.96	215,777	1.26	2,143	0.02	63,694	0.81	86,694	0.38	461,244	3.77
5/8/2023	10:30:00 AM	10,080	31,596	1.16	227,871	1.20	2,321	0.02	70,149	0.64	88,583	0.19	494,210	3.27
5/15/2023	10:00:00 AM	10,050	43,484	1.18	239,586	1.17	2,445	0.01	76,270	0.61	89,708	0.11	525,635	3.13
5/22/2023	10:45:00 AM	10,125	55,372	1.17	251,186	1.15	2,566	0.01	82,391	0.60	90,832	0.11	557,060	3.10
5/29/2023	9:30:00 AM	10,005	67,341	1.20	262,562	1.14	2,587	0.00	86,327	0.39	90,992	0.02	584,871	2.78
6/5/2023	10:00:00 AM	10,110	80,923	1.34	275,163	1.25	2,587	0.00	90,312	0.39	90,992	0.00	620,587	3.53
6/12/2023	10:00:00 AM	10,080	94,505	1.35	287,765	1.25	2,587	0.00	94,307	0.40	90,992	0.00	656,304	3.54
6/19/2023	10:30:00 AM	10,110	108,529	1.39	300,599	1.27	2,587	0.00	97,848	0.35	91,000	0.00	677,677	2.11
6/26/2023	10:00:00 AM	10,050	122,469	1.39	313,269	1.26	2,682	0.01	100,849	0.30	95,708	0.47	711,332	3.35
7/3/2023	4:15:00 PM	10,455	136,750	1.37	325,789	1.20	2,762	0.01	103,476	0.25	100,664	0.47	747,124	3.42
7/10/2023	11:00:00 AM	9,765	149,015	1.26	338,601	1.31	2,763	0.00	106,104	0.27	105,013	0.45	779,317	3.30
7/17/2023	11:15:00 AM	10,095	161,422	1.23	351,058	1.23	2,763	0.00	108,733	0.26	108,512	0.35	810,775	3.12
7/24/2023	10:30:00 AM	10,035	173,023	1.16	362,424	1.13	2,763	0.00	110,821	0.21	110,867	0.23	838,842	2.80
7/31/2023	9:00:00 AM	9,990	185,966	1.30	375,764	1.34	2,763	0.00	112,871	0.21	113,252	0.24	871,594	3.28
8/7/2023	9:30:00 AM	10,110	196,377	1.03	387,480	1.16	2,763	0.00	114,375	0.15	115,067	0.18	898,842	2.70
8/14/2023	9:00:00 AM	10,050	206,788	1.04	399,197	1.17	2,763	0.00	115,879	0.15	116,883	0.18	924,510	2.55
8/21/2023	10:00:00 AM	10,140	218,382	1.14	410,496	1.11	2,763	0.00	117,872	0.20	118,646	0.17	951,852	2.70
8/28/2023	11:00:00 AM	10,140	229,976	1.14	421,795	1.11	2,763	0.00	119,864	0.20	120,408	0.17	979,194	2.70
9/4/2023	11:00:00 AM	10,080	238,915	0.89	431,113	0.92	2,763	0.00	121,161	0.13	121,510	0.11	1,000,406	2.10
9/11/2023	11:00:00 AM	10,080	248,779	0.98	441,603	1.04	2,763	0.00	122,593	0.14	122,716	0.12	1,024,830	2.42
9/18/2023	11:00:00 AM	10,080	256,429	0.76	449,915	0.82	2,763	0.00	123,623	0.10	123,424	0.07	1,044,326	1.93
9/25/2023	10:00:00 AM	10,020	263,900	0.75	459,188	0.93	2,763	0.00	124,135	0.05	123,686	0.03	1,061,955	1.76
10/2/2023	11:00:00 AM	10,140	272,371	0.84	468,462	0.91	2,763	0.00	124,648	0.05	123,949	0.03	1,079,584	1.74
10/9/2023	10:45:00 AM	10,065	277,842	0.54	477,735	0.92	2,763	0.00	125,160	0.05	124,212	0.03	1,097,210	1.75
10/16/2023	10:30:00 AM	10,065	286,313	0.84	487,009	0.92	2,763	0.00	125,623	0.05	124,476	0.03	1,114,830	1.75
10/23/2023	10:00:00 AM	10,050	293,785	0.74	496,283	0.92	2,763	0.00	126,185	0.06	124,738	0.03	1,132,475	1.76
10/30/2023	10:00:00 AM	10,080	299,137	0.53	504,413	0.81	2,763	0.00	126,250	0.01	124,835	0.01	1,146,027	1.34
11/6/2023	11:00:00 AM	10,140	304,490	0.53	511,972	0.75	2,763	0.00	126,315	0.01	124,835	0.00	1,159,579	1.34
11/13/2023	11:00:00 AM	10,080	307,764	0.32	517,341	0.53	2,763	0.00	126,328	0.00	124,838	0.00	1,167,402	0.78
11/20/2023	11:00:00 AM	10,080	310,212	0.24	521,109	0.37	2,763	0.00	126,355	0.00	124,846	0.00	1,175,301	0.78
11/27/2023	2:15:00 PM	10,275	313,486	0.32	526,479	0.52	2,763	0.00	126,367	0.00	124,849	0.00	1,183,162	0.77
12/4/2023	2:00:00 PM	10,065	316,812	0.33	531,054	0.45	2,763	0.00	126,375	0.00	124,849	0.00	1,190,950	0.77
12/11/2023	2:20:00 PM	10,100	320,288	0.34	535,631	0.45	2,763	0.00	126,382	0.00	126,382	0.00	1,198,740	0.77
12/18/2023	2:20:00 PM	10,080	323,602	0.33	539,701	0.45	2,763	0.00	126,382	0.00	126,382	0.00	1,206,530	0.77
12/25/2018	2:10:00 PM	10,070	326,173	0.26	542,610	0.45	2,763	0.00	126,382	0.00	126,383	0.00	1,213,700	0.71
1/1/2024	10:00:00 AM	9,830	328,743	0.26	545,586	0.45	2,763	0.00	126,382	0.00	124,849	0.00	1,221,070	0.75
1/8/2024	10:30:00 AM	10,110	331,314	0.25	548,427	0.28	2,763	0.00	126,382	0.00	124,849	0.00	1,228,300	0.72
1/15/2024	11:15:00 AM	10,125	334,001	0.27	551,347	0.29	2,763	0.00	126,383	0.00	124,850	0.00	1,235,630	0.72
1/22/2024	10:30:00 AM	10,035	336,572	0.26	554,259	0.29	2,763	0.00	126,384	0.00	124,850	0.00	1,242,870	0.72
1/29/2024	10:30:00 AM	10,080	339,026	0.24	557,153	0.29	2,763	0.00	126,384	0.00	124,854	0.00	1,250,130	0.72
2/5/2024	10:30:00 AM	10,080	341,479	0.24	560,047	0.29	2,763	0.00	126,384	0.00	124,857	0.00	1,257,390	0.72
2/12/2024	11:00:00 AM	10,110	343,933	0.24	562,941	0.29	2,763	0.00	126,384	0.00	124,860	0.00	1,264,648	0.72
2/19/2024	11:00:00 AM	10,080	355,668	1.16	576,187	1.31	2,763	0.00	129,025	0.26	124,870	0.00	1,293,740	2.89
2/26/2024	10:20:00 AM	10,040	367,403	1.17	589,432	1.32	2,763	0.00	131,665	0.26	124,880	0.00	1,322,850	2.90
3/4/2024	10:30:00 AM	10,090	374,463	0.70	597,684	0.82	2,763	0.00	133,155	0.15	124,880	0.00	1,340,055	1.71
3/11/2024	11:00:00 AM	10,110	381,524	0.70	605,937	0.82	2,763	0.00	134,645	0.15	124,880	0.00	1,357,260	1.70
3/18/2024	10:30:00 AM	10,050	388,512	0.70	614,553	0.86	2,763	0.00	135,527	0.09	124,880	0.00	1,375,065	1.77
3/25/2024	10:30:00 AM	10,080	395,499	0.69	623,169	0.85	2,763	0.00	136,408	0.09	124,880	0.00	1,392,870	1.77
4/1/2024	10:30:00 AM	10,080	401,529	0.60	631,354	0.81	2,763	0.00	136,593	0.02	124,880	0.00	1,408,654	1.57
4/8/2024	10:00:00 AM	10,050	407,560	0.60	639,538	0.81	2,763	0.00	136,787	0.02	124,880	0.00	1,424,515	1.58
4/15/2024	10:00:00 AM	10,080	413,590	0.60	647,810	0.82	2,763	0.00	136,976	0.02	124,880	0.00	1,440,300	1.57
4/22/2024	11:00:00 AM	10,140	419,619	0.59	655,921	0.80	2,763	0.00	137,155	0.02	124,880	0.00	1,455,890	1.54
4/29/2024	10:30:00 AM	10,050	425,936	0.63	664,958	0.90	2,763	0.00	137,236	0.01	124,880	0.00	1,472,014	1.60
5/6/2024	10:30:00 AM	10,080	432,195	0.62	674,617	0.96	2,763	0.00	137,242	0.00	124,880	0.00	1,489,430	1.73
5/13/2024	10:30:00 AM	10,080	438,631	0.64	683,794	0.91	2,763	0.00	137,277	0.00	124,880	0.00	1,505,901	1.63
5/20/2024	10:15:00 AM	10,065	445,066	0.64	692,982	0.91	2,763	0.00	137,312	0.00	124,880	0.00	1,522,438	1.64
5/27/2024	10:30:00 AM	10,095	451,497	0.64	702,619	0.95	2,763	0.00	137,312	0.00	124,880	0.00	1,537,480	1.49
6/3/2024	11:00:00 AM	10,110	457,929	0.64	712,257	0.95	2,763	0.00	137,310	0.00	124,880	0.00	1,552,530	1.49
6/10/2024	11:00:00 AM	10,080	461,995	0.40	719,099	0.68	2,763	0.00	137,326	0.00	124,880	0.00	1,566,745	1.41
6/17/2024	10:30:00 AM	10,050	467,217	0.52	728,057	0.89	2,763	0.00	145,313	0.79	128,810	0.39	1,592,010	2.51
6/24/2024	11:30:00 AM	10,140	471,769	0.45	735,978	0.78	2,763	0.00	152,982	0.76	132,981	0.41	1,616,874	2.45

TABLE A1. PUMPING VOLUMES AND RATES
DEL ORO DAIRY, ANTHONY, NEW MEXICO

Date	Time	Elapsed Time (min)	EW-1		EW-2		EW-3		EW-4		EW-5		Tank	
			Meter Reading[1]	Q_{avg}[2]	Meter Reading[1]	Q_{avg}[2]	Meter Reading[1]	Q_{avg}[2]	Meter Reading[1]	Q_{avg}[2]	Meter Reading[1]	Q_{avg}[2]	Meter Reading[1]	Q_{avg}[2]
7/1/2024	11:30:00 AM	10,080	476,299	0.45	744,219	0.82	2,763	0.00	161,102	0.81	136,988	0.40	1,641,738	2.47
7/8/2024	11:30:00 AM	10,080	480,362	0.40	751,928	0.76	2,763	0.00	169,024	0.79	140,317	0.33	1,666,610	2.47
7/15/2024	11:00:00 AM	10,050	485,496	0.51	761,255	0.93	2,763	0.00	179,124	1.00	144,464	0.41	1,695,530	2.88
7/22/2024	1:00:00 PM	10,200	490,107	0.45	769,377	0.80	2,763	0.00	187,790	0.85	147,852	0.33	1,720,625	2.46
7/29/2024	12:00:00 PM	10,020	494,807	0.47	778,702	0.93	2,763	0.00	197,695	0.99	151,789	0.39	1,749,305	2.86
8/5/2024	10:20:00 AM	9,980	498,886	0.41	786,793	0.81	2,763	0.00	206,182	0.85	154,899	0.31	1,776,028	2.68
8/12/2024	1:40:00 PM	10,280	503,544	0.45	795,410	0.84	2,763	0.00	216,320	0.99	158,332	0.33	1,801,901	2.52
8/19/2024	10:50:00 AM	9,910	507,638	0.41	803,432	0.81	2,763	0.00	225,439	0.92	160,886	0.26	1,825,674	2.40
8/26/2024	10:30:00 AM	10,060	511,684	0.40	810,633	0.72	2,763	0.00	234,621	0.91	163,310	0.24	1,849,602	2.38
9/2/2024	10:30:00 AM	10,080	515,730	0.40	817,833	0.71	2,763	0.00	243,802	0.91	165,734	0.24	1,873,518	2.37
9/9/2024	10:30:00 AM	10,080	520,102	0.43	825,449	0.76	2,763	0.00	250,180	0.63	167,652	0.19	1,894,845	2.12
9/16/2024	10:30:00 AM	10,080	524,289	0.42	833,065	0.76	2,763	0.00	256,369	0.61	169,569	0.19	1,916,092	2.11
9/23/2024	10:15:00 AM	10,065	528,730	0.44	841,198	0.81	2,763	0.00	262,093	0.57	170,618	0.10	1,937,353	2.11
9/30/2024	10:30:00 AM	10,095	533,337	0.46	849,420	0.81	2,763	0.00	266,902	0.48	171,216	0.06	1,956,687	1.92
10/7/2024	2:00:00 PM	10,290	537,730	0.43	858,113	0.84	2,763	0.00	270,323	0.33	171,547	0.03	1,975,140	1.79
Pumping Period Averages:	--	--	--	0.44	--	0.81	--	0.00	--	0.77	--	0.24	--	2.35

Notes:

[1] Meter readings in total gallons

[2] Q_{avg} = Average discharge in gallons per minute (total volume pumped [end meter - beginning meter] / time in pumping period (minutes)

--- = Not applicable

ft = Feet

min = Minutes

Current pumping period

TABLE A2. DEL ORO DAIRY EXTRACTION WELL ANALYTICAL RESULTS
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO

Extraction Well	Date Sampled	Nitrate (mg/l)	TKN (mg/l)	Chloride (mg/l)	TDS (mg/l)
EW-01	9/6/2024	130	<0.50	1,000	4,000
	6/5/2024	190	<0.50	1,200	4,700
	2/29/2024	160	<0.50	980	4,190
	12/4/2023	190	<0.50	1,100	4,340
	8/29/2023	180	<5.0	1,100	4,280
	5/19/2023	190	<1.0	1,100	4,220
	3/1/2023	130	<5.0	820	3,400
	10/27/2022	160	<5.0	1,100	4,490
EW-02	9/6/2024	130	<0.50	730	3,000
	6/4/2024	130	<0.50	890	3,800
	2/29/2024	190	<0.50	1,100	4,140
	11/29/2023	130	<0.50	880	3,420
	8/30/2023	120	<5.0	810	3,340
	5/18/2023	130	<1.0	870	3,280
	3/1/2023	130	<5.0	820	3,190
	10/27/2022	150	<5.0	950	3,910
EW-03	9/4/2024	Not Sampled			
	6/4/2024				
	2/27/2024				
	11/29/2023				
	8/30/2023				
	5/18/2023				
	2/27/2023	74	<5.0	670	2,520
	10/27/2022	99	<5.0	710	3,180
EW-04	9/4/2024	23	<0.50	460	1,700
	6/4/2024	11	<0.50	400	1,500
	2/27/2024	24	<0.50	500	1,860
	11/29/2023	16	1.1	410	1,470
	8/25/2023	29	<5.0	420	1,580
	5/18/2023	28	<5.0	410	1,510
	2/27/2023	20	<5.0	430	1,450
	10/27/2022	25	<5.0	390	1,510
EW-05	9/4/2024	18	<0.50	470	1,800
	6/14/2024	20	<0.50	530	1,900
	2/27/2024	Not Sampled			
	11/29/2023	20	<0.50	490	1,820
	8/25/2023	14	<2.0	450	1,750
	5/18/2023	17	<2.0	490	1,820
	3/15/2023	15	14	510	1,800
	10/27/2022	12	<2.0	410	1,800
NMWQCC Standard		**10**	**NA**	**250**	**1,000**
Existing Conditions		**NA**	**NA**	**455**	**1,424**

NOTES:
* = Pre-August 2020 existing conditions were in place prior to August 2020. This condition is no longer applicable.
< = Analyte not detected above the displayed reporting limit.
NMWQCC = New Mexico Water Quality Control Commission
TDS = Total dissolved solids
TKN = Total Kjeldahl Nitrogen
Anomalous data. Samples suspected to have been switched.
Data from current quarter.
Highlight is at or above NMWQCC Standard.
Highlight is at or above relevant existing conditions value. Applicable to samples collected in or after August 2020.

TABLE A3. SUMMARY OF NITRATE MASS REMOVAL
DEL ORO DAIRY, ANTHONY, NEW MEXICO

Sampling Date	Pumping Period Start	Pumping Period End	Days Pumping	EW-1			EW-2			EW-3			EW-4			EW-5			Total Mass This Period[3]	Cumulative Mass Removed[4]
				Q_{avg}[1]	C[2]	M_{total}[3]	Q_{avg}	C	M_{total}[3]	Q_{avg}	C	M_{total}[3]	Q_{avg}	C	M_{total}[3]	Q_{avg}	C	M_{total}[3]		
3/1/2023	12/22/2023	2/27/2022	67	0.35	130	37.0	0.96	130	100.4	0	74	0.0	0.04	20	0.6	0.42	15	5.0	143.0	143.0
5/19/2023	3/6/2023	5/15/2023	79	0.62	190	109	1.21	130	145.1	0	NS	0.0	0.60	28	15.5	0.36	17	5.6	275.7	418.8
8/28/2023 - 8/30/23	5/22/2023	8/28/2023	98	1.23	180	279	1.20	120	182.1	0	NS	0.0	0.29	29	10.5	0.20	14	3.6	475.6	894.4
11/29/2023-12/4/2023	9/4/2023	12/4/2023	91	0.61	190	137	0.77	130	118.3	0	NS	0.0	0.05	16	0.9	0.03	20	0.7	257.4	1,152
2/27/2024-2/29/2024	12/11/2023	3/25/2024	105	0.49	160	105	0.59	190	151.6	0	NS	0.0	0.06	24	2.0	0.00	NS	0.0	258.4	1,410
6/4/2024-6/14/2024	4/1/2024	7/8/2024	98	0.56	190	134	0.85	130	139.4	0	NS	0.0	0.22	11	3.0	0.10	20	2.6	279.2	1,689
9/4/2024-9/6/2024	7/15/2024	10/7/2024	84	0.44	130	62	0.81	130	115	0	NS	0.0	0.77	23	19.3	0.24	18	4.7	201.6	1,891

Notes:

1 Q_{avg} Average discharge gallons per minute (total volume pumped / time in pumping period (minutes)

[2] C Nitrate concentration milligrams per liter (mg/L)

[3] M_{total} Total mass removed (pounds) this pumping period from all extraction wells

[4] Cumulative mass of nitrate removed (pounds) since start of pumping

NS = Not Sampled

Anomalous data. Samples suspected to have been switched.

Data from current quarter

TABLE A4. CAPTURE ANALYSIS FOR PUMPING WELLS
DEL ORO DAIRY, ANTHONY, NEW MEXICO

Pumping Period Start	Pumping Period End	Hydraulic Gradient (ft/ft)	EW-1		EW-2		EW-3		EW-4		EW-5	
			Q_{avg} [1]	Capture Width [2]	Q_{avg} [1]	Capture Width [2]	Q_{avg} [1]	Capture Width [2]	Q_{avg} [1]	Capture Width [2]	Q_{avg} [1]	Capture Width [2]
12/22/2023	2/27/2022	0.004	0.98	337	1.23	424	0.05	172	0.75	241	0.69	221
3/6/2023	5/15/2023	0.003	0.62	286	1.21	555	0.00	0	0.60	257	0.36	154
5/22/2023	8/28/2023	0.004	1.23	424	1.20	413	0.00	0	0.29	92	0.20	65
9/4/2023	12/4/2023	0.004	0.61	211	0.77	266	0.00	0	0.05	15	0.03	10
12/11/2023	3/25/2024	0.004	0.49	168	0.59	205	0.00	0	0.06	20	0.00	0
4/1/2024	7/8/2024	0.004	0.56	193	0.85	293	0.00	0	0.22	69	0.10	33
7/15/2024	10/7/2024	0.004	0.44	150	0.81	277	0.00	0	0.77	247	0.24	77

Notes:

Transmissivity (ft^2/day):

Well	K	b	T
EW-1	10	14	140
EW-2	10	14	140
EW-3	1	14	14
EW-4	10	15	150
EW-5	10	15	150

[1] Q (ft^3/day) = [Q_{avg}/7.48]*1,440 minutes/day = Average pumping rate this reporting period (gpm) divided by 7.48 gallons per cubic foot water times 1,440 minutes per day

[2] Capture Width = Capture width in feet. Q/(Ti) (Todd, David Keith 1980. Groundwater Hydrology, 2nd Edition. John Wiley and Sons.)

$_{avg}$ = Average

b = Aquifer thickness ≈ screen submergence (ft)

ft = Feet

i = Hydraulic gradient (ft/ft)

K = Hydraulic conductivity (ft/day)

Q = Discharge

T = Transmissivity (ft^2/day)

Data from current quarter

TABLE A1. PUMPING VOLUMES AND RATES
DEL ORO DAIRY, ANTHONY, NEW MEXICO

Date	Time	Elapsed Time (min)	EW-1		EW-2		EW-3		EW-4		EW-5		Tank	
			Meter Reading[1]	Q_{avg}[2]	Meter Reading[1]	Q_{avg}[2]	Meter Reading[1]	Q_{avg}[2]	Meter Reading[1]	Q_{avg}[2]	Meter Reading[1]	Q_{avg}[2]	Meter Reading[1]	Q_{avg}[2]
12/22/2022	12:45:00 PM	--	13,504	--	13,740	--	6,750	--	6,203	--	12,120	--	31,259	--
1/3/2023	7:30:00 AM	16,980	21,885	0.49	24,744	0.65	0.0	0.0	7,280	0.06	16,337	0.25	54,046	1.34
1/9/2023	7:30:00 AM	8,640	27,541	0.65	33,425	1.00	0.0	0.0	8,274	0.12	21,870	0.64	73,388	2.24
1/13/2023	10:00:00 AM	5,910	31,657	0.70	40,030	1.12	0.0	0.0	8,792	0.09	25,957	0.69	87,851	2.45
1/16/2023	2:00:00 PM	4,560	33,565	0.42	42,838	0.62	0.0	0.0	9,047	0.06	27,529	0.34	94,214	1.40
1/23/2023	11:00:00 AM	9,900	38,695	0.52	51,625	0.89	0.0	0.0	9,470	0.04	32,586	0.51	116,170	2.22
1/30/2023	9:00:00 AM	9,960	40,325	0.16	63,627	1.21	0.0	0.0	9,471	0.00	38,804	0.62	138,126	2.20
2/6/2023	9:30:00 AM	10,110	41,955	0.16	75,629	1.19	0.0	0.0	9,471	0.00	43,822	0.50	160,082	2.17
2/13/2023	9:00:00 AM	10,050	43,585	0.16	87,631	1.19	0.0	0.0	9,471	0.00	49,440	0.56	182,038	2.18
2/20/2023	2:00:00 PM	10,380	44,562	0.09	95,584	0.77	0.0	0.0	9,645	0.02	49,841	0.04	193,391	1.09
2/27/2023	11:25:00 AM	9,925	46,355	0.18	105,471	1.00	1,000	0.0	9,846	0.02	49,857	0.00	206,255	1.30
3/6/2023	11:30:00 AM	10,085	48,796	0.24	118,557	1.30	143	-0.08	10,002	0.02	53,215	0.33	223,524	1.71
3/13/2023	10:00:00 AM	9,990	50,472	0.17	129,962	1.14	143	0.0	10,020	0.00	53,300	0.01	240,794	1.73
3/20/2023	9:45:00 AM	10,065	50,472	0.00	141,036	1.10	143	0.0	16,435	0.64	58,117	0.48	264,263	2.33
3/27/2023	9:00:00 AM	10,035	50,472	0.00	152,111	1.10	143	0.0	22,850	0.64	62,929	0.48	287,733	2.34
4/3/2023	10:30:00 AM	10,170	50,472	0.00	165,216	1.29	689	0.05	31,638	0.86	64,978	0.20	316,928	2.87
4/10/2023	10:00:00 AM	10,050	58,791	0.83	177,767	1.25	1,254	0.06	39,593	0.79	73,732	0.87	351,146	3.40
4/17/2023	9:00:00 AM	10,020	68,627	0.98	190,104	1.23	1,750	0.05	47,154	0.75	80,639	0.69	386,386	3.52
4/24/2023	9:00:00 AM	10,080	72,167	0.35	202,937	1.27	1,983	0.02	55,452	0.82	82,848	0.22	422,932	3.63
5/1/2023	10:30:00 AM	10,170	19,889	1.96	215,777	1.26	2,143	0.02	63,694	0.81	86,694	0.38	461,244	3.77
5/8/2023	10:30:00 AM	10,080	31,596	1.16	227,871	1.20	2,321	0.02	70,149	0.64	88,583	0.19	494,210	3.27
5/15/2023	10:00:00 AM	10,050	43,484	1.18	239,586	1.17	2,445	0.01	76,270	0.61	89,708	0.11	525,635	3.13
5/22/2023	10:45:00 AM	10,125	55,372	1.17	251,186	1.15	2,566	0.01	82,391	0.60	90,832	0.11	557,060	3.10
5/29/2023	9:30:00 AM	10,005	67,341	1.20	262,562	1.14	2,587	0.00	86,327	0.39	90,992	0.02	584,871	2.78
6/5/2023	10:00:00 AM	10,110	80,923	1.34	275,163	1.25	2,587	0.00	90,312	0.39	90,992	0.00	620,587	3.53
6/12/2023	10:00:00 AM	10,080	94,505	1.35	287,765	1.25	2,587	0.00	94,307	0.40	90,992	0.00	656,304	3.54
6/19/2023	10:30:00 AM	10,110	108,529	1.39	300,599	1.27	2,587	0.00	97,848	0.35	91,000	0.00	677,677	2.11
6/26/2023	10:00:00 AM	10,050	122,469	1.39	313,269	1.26	2,682	0.01	100,849	0.30	95,708	0.47	711,332	3.35
7/3/2023	4:15:00 PM	10,455	136,750	1.37	325,789	1.20	2,762	0.01	103,476	0.25	100,664	0.47	747,124	3.42
7/10/2023	11:00:00 AM	9,765	149,015	1.26	338,601	1.31	2,763	0.00	106,104	0.27	105,013	0.45	779,317	3.30
7/17/2023	11:15:00 AM	10,095	161,422	1.23	351,058	1.23	2,763	0.00	108,733	0.26	108,512	0.35	810,775	3.12
7/24/2023	10:30:00 AM	10,035	173,023	1.16	362,424	1.13	2,763	0.00	110,821	0.21	110,867	0.23	838,842	2.80
7/31/2023	9:00:00 AM	9,990	185,966	1.30	375,764	1.34	2,763	0.00	112,871	0.21	113,252	0.24	871,594	3.28
8/7/2023	9:30:00 AM	10,110	196,377	1.03	387,480	1.16	2,763	0.00	114,375	0.15	115,067	0.18	898,842	2.70
8/14/2023	9:00:00 AM	10,050	206,788	1.04	399,197	1.17	2,763	0.00	115,879	0.15	116,883	0.18	924,510	2.55
8/21/2023	10:00:00 AM	10,140	218,382	1.14	410,496	1.11	2,763	0.00	117,872	0.20	118,646	0.17	951,852	2.70
8/28/2023	11:00:00 AM	10,140	229,976	1.14	421,795	1.11	2,763	0.00	119,864	0.20	120,408	0.17	979,194	2.70
9/4/2023	11:00:00 AM	10,080	238,915	0.89	431,113	0.92	2,763	0.00	121,161	0.13	121,510	0.11	1,000,406	2.10
9/11/2023	11:00:00 AM	10,080	248,779	0.98	441,603	1.04	2,763	0.00	122,593	0.14	122,716	0.12	1,024,830	2.42
9/18/2023	11:00:00 AM	10,080	256,429	0.76	449,915	0.82	2,763	0.00	123,623	0.10	123,424	0.07	1,044,326	1.93
9/25/2023	10:00:00 AM	10,020	263,900	0.75	459,188	0.93	2,763	0.00	124,135	0.05	123,686	0.03	1,061,955	1.76
10/2/2023	11:00:00 AM	10,140	272,371	0.84	468,462	0.91	2,763	0.00	124,648	0.05	123,949	0.03	1,079,584	1.74
10/9/2023	10:45:00 AM	10,065	277,842	0.54	477,735	0.92	2,763	0.00	125,160	0.05	124,212	0.03	1,097,210	1.75
10/16/2023	10:30:00 AM	10,065	286,313	0.84	487,009	0.92	2,763	0.00	125,623	0.05	124,476	0.03	1,114,830	1.75
10/23/2023	10:00:00 AM	10,050	293,785	0.74	496,283	0.92	2,763	0.00	126,185	0.06	124,738	0.03	1,132,475	1.76
10/30/2023	10:00:00 AM	10,080	299,137	0.53	504,413	0.81	2,763	0.00	126,250	0.01	124,835	0.01	1,146,027	1.34
11/6/2023	11:00:00 AM	10,140	304,490	0.53	511,972	0.75	2,763	0.00	126,315	0.01	124,835	0.00	1,159,579	1.34
11/13/2023	11:00:00 AM	10,080	307,764	0.32	517,341	0.53	2,763	0.00	126,328	0.00	124,838	0.00	1,167,402	0.78
11/20/2023	11:00:00 AM	10,080	310,212	0.24	521,109	0.37	2,763	0.00	126,355	0.00	124,846	0.00	1,175,301	0.78
11/27/2023	2:15:00 PM	10,275	313,486	0.32	526,479	0.52	2,763	0.00	126,367	0.00	124,849	0.00	1,183,162	0.77
12/4/2023	2:00:00 PM	10,065	316,812	0.33	531,054	0.45	2,763	0.00	126,375	0.00	124,849	0.00	1,190,950	0.77
12/11/2023	2:20:00 PM	10,100	320,288	0.34	535,631	0.45	2,763	0.00	126,382	0.00	126,382	0.00	1,198,740	0.77
12/18/2023	2:20:00 PM	10,080	323,602	0.33	539,701	0.45	2,763	0.00	126,382	0.00	126,382	0.00	1,206,530	0.77
12/25/2018	2:10:00 PM	10,070	326,173	0.26	542,610	0.45	2,763	0.00	126,382	0.00	126,383	0.00	1,213,700	0.71
1/1/2024	10:00:00 AM	9,830	328,743	0.26	545,586	0.45	2,763	0.00	126,382	0.00	124,849	0.00	1,221,070	0.75
1/8/2024	10:30:00 AM	10,110	331,314	0.25	548,427	0.28	2,763	0.00	126,382	0.00	124,849	0.00	1,228,300	0.72
1/15/2024	11:15:00 AM	10,125	334,001	0.27	551,347	0.29	2,763	0.00	126,383	0.00	124,850	0.00	1,235,630	0.72
1/22/2024	10:30:00 AM	10,035	336,572	0.26	554,259	0.29	2,763	0.00	126,384	0.00	124,850	0.00	1,242,870	0.72
1/29/2024	10:30:00 AM	10,080	339,026	0.24	557,153	0.29	2,763	0.00	126,384	0.00	124,854	0.00	1,250,130	0.72
2/5/2024	10:30:00 AM	10,080	341,479	0.24	560,047	0.29	2,763	0.00	126,384	0.00	124,857	0.00	1,257,390	0.72
2/12/2024	11:00:00 AM	10,110	343,933	0.24	562,941	0.29	2,763	0.00	126,384	0.00	124,860	0.00	1,264,648	0.72
2/19/2024	11:00:00 AM	10,080	355,668	1.16	576,187	1.31	2,763	0.00	129,025	0.26	124,870	0.00	1,293,740	2.89
2/26/2024	10:20:00 AM	10,040	367,403	1.17	589,432	1.32	2,763	0.00	131,665	0.26	124,880	0.00	1,322,850	2.90
3/4/2024	10:30:00 AM	10,090	374,463	0.70	597,684	0.82	2,763	0.00	133,155	0.15	124,880	0.00	1,340,055	1.71
3/11/2024	11:00:00 AM	10,110	381,524	0.70	605,937	0.82	2,763	0.00	134,645	0.15	124,880	0.00	1,357,260	1.70
3/18/2024	10:30:00 AM	10,050	388,512	0.70	614,553	0.86	2,763	0.00	135,527	0.09	124,880	0.00	1,375,065	1.77
3/25/2024	10:30:00 AM	10,080	395,499	0.69	623,169	0.85	2,763	0.00	136,408	0.09	124,880	0.00	1,392,870	1.77
4/1/2024	10:30:00 AM	10,080	401,529	0.60	631,354	0.81	2,763	0.00	136,593	0.02	124,880	0.00	1,408,654	1.57
4/8/2024	10:00:00 AM	10,050	407,560	0.60	639,538	0.81	2,763	0.00	136,787	0.02	124,880	0.00	1,424,515	1.58
4/15/2024	10:00:00 AM	10,080	413,590	0.60	647,810	0.82	2,763	0.00	136,976	0.02	124,880	0.00	1,440,300	1.57
4/22/2024	11:00:00 AM	10,140	419,619	0.59	655,921	0.80	2,763	0.00	137,155	0.02	124,880	0.00	1,455,890	1.54
4/29/2024	10:30:00 AM	10,050	425,936	0.63	664,958	0.90	2,763	0.00	137,236	0.01	124,880	0.00	1,472,014	1.60
5/6/2024	10:30:00 AM	10,080	432,195	0.62	674,617	0.96	2,763	0.00	137,242	0.00	124,880	0.00	1,489,430	1.73
5/13/2024	10:30:00 AM	10,080	438,631	0.64	683,794	0.91	2,763	0.00	137,277	0.00	124,880	0.00	1,505,901	1.63
5/20/2024	10:15:00 AM	10,065	445,066	0.64	692,982	0.91	2,763	0.00	137,312	0.00	124,880	0.00	1,522,438	1.64
5/27/2024	10:30:00 AM	10,095	451,497	0.64	702,619	0.95	2,763	0.00	137,312	0.00	124,880	0.00	1,537,480	1.49
6/3/2024	11:00:00 AM	10,110	457,929	0.64	712,257	0.95	2,763	0.00	137,310	0.00	124,880	0.00	1,552,530	1.49
6/10/2024	11:00:00 AM	10,080	461,995	0.40	719,099	0.68	2,763	0.00	137,326	0.00	124,880	0.00	1,566,745	1.41
6/17/2024	10:30:00 AM	10,050	467,217	0.52	728,057	0.89	2,763	0.00	145,313	0.79	128,810	0.39	1,592,010	2.51
6/24/2024	11:30:00 AM	10,140	471,769	0.45	735,978	0.78	2,763	0.00	152,982	0.76	132,981	0.41	1,616,874	2.45

TABLE A1. PUMPING VOLUMES AND RATES
DEL ORO DAIRY, ANTHONY, NEW MEXICO

Date	Time	Elapsed Time (min)	EW-1		EW-2		EW-3		EW-4		EW-5		Tank	
			Meter Reading[1]	Q_{avg}[2]	Meter Reading[1]	Q_{avg}[2]	Meter Reading[1]	Q_{avg}[2]	Meter Reading[1]	Q_{avg}[2]	Meter Reading[1]	Q_{avg}[2]	Meter Reading[1]	Q_{avg}[2]
7/1/2024	11:30:00 AM	10,080	476,299	0.45	744,219	0.82	2,763	0.00	161,102	0.81	136,988	0.40	1,641,738	2.47
7/8/2024	11:30:00 AM	10,080	480,362	0.40	751,928	0.76	2,763	0.00	169,024	0.79	140,317	0.33	1,666,610	2.47
7/15/2024	11:00:00 AM	10,050	485,496	0.51	761,255	0.93	2,763	0.00	179,124	1.00	144,464	0.41	1,695,530	2.88
7/22/2024	1:00:00 PM	10,200	490,107	0.45	769,377	0.80	2,763	0.00	187,790	0.85	147,852	0.33	1,720,625	2.46
7/29/2024	12:00:00 PM	10,020	494,807	0.47	778,702	0.93	2,763	0.00	197,695	0.99	151,789	0.39	1,749,305	2.86
8/5/2024	10:20:00 AM	9,980	498,886	0.41	786,793	0.81	2,763	0.00	206,182	0.85	154,899	0.31	1,776,028	2.68
8/12/2024	1:40:00 PM	10,280	503,544	0.45	795,410	0.84	2,763	0.00	216,320	0.99	158,332	0.33	1,801,901	2.52
8/19/2024	10:50:00 AM	9,910	507,638	0.41	803,432	0.81	2,763	0.00	225,439	0.92	160,886	0.26	1,825,674	2.40
8/26/2024	10:30:00 AM	10,060	511,684	0.40	810,633	0.72	2,763	0.00	234,621	0.91	163,310	0.24	1,849,602	2.38
9/2/2024	10:30:00 AM	10,080	515,730	0.40	817,833	0.71	2,763	0.00	243,802	0.91	165,734	0.24	1,873,518	2.37
9/9/2024	10:30:00 AM	10,080	520,102	0.43	825,449	0.76	2,763	0.00	250,180	0.63	167,652	0.19	1,894,845	2.12
9/16/2024	10:30:00 AM	10,080	524,289	0.42	833,065	0.76	2,763	0.00	256,369	0.61	169,569	0.19	1,916,092	2.11
9/23/2024	10:15:00 AM	10,065	528,730	0.44	841,198	0.81	2,763	0.00	262,093	0.57	170,618	0.10	1,937,353	2.11
9/30/2024	10:30:00 AM	10,095	533,337	0.46	849,420	0.81	2,763	0.00	266,902	0.48	171,216	0.06	1,956,687	1.92
10/7/2024	2:00:00 PM	10,290	537,730	0.43	858,113	0.84	2,763	0.00	270,323	0.33	171,547	0.03	1,975,140	1.79
Pumping Period Averages:	--	--	--	0.44	--	0.81	--	0.00	--	0.77	--	0.24	--	2.35

Notes:

[1] Meter readings in total gallons

[2] Q_{avg} = Average discharge in gallons per minute (total volume pumped [end meter - beginning meter] / time in pumping period (minutes)

--- = Not applicable

ft = Feet

min = Minutes

Current pumping period

TABLE A2. DEL ORO DAIRY EXTRACTION WELL ANALYTICAL RESULTS
DONA ANA DAIRIES, DONA ANA COUNTY, NEW MEXICO

Extraction Well	Date Sampled	Nitrate (mg/l)	TKN (mg/l)	Chloride (mg/l)	TDS (mg/l)
EW-01	9/6/2024	130	<0.50	1,000	4,000
	6/5/2024	190	<0.50	1,200	4,700
	2/29/2024	160	<0.50	980	4,190
	12/4/2023	190	<0.50	1,100	4,340
	8/29/2023	180	<5.0	1,100	4,280
	5/19/2023	190	<1.0	1,100	4,220
	3/1/2023	130	<5.0	820	3,400
	10/27/2022	160	<5.0	1,100	4,490
EW-02	9/6/2024	130	<0.50	730	3,000
	6/4/2024	130	<0.50	890	3,800
	2/29/2024	190	<0.50	1,100	4,140
	11/29/2023	130	<0.50	880	3,420
	8/30/2023	120	<5.0	810	3,340
	5/18/2023	130	<1.0	870	3,280
	3/1/2023	130	<5.0	820	3,190
	10/27/2022	150	<5.0	950	3,910
EW-03	9/4/2024	Not Sampled			
	6/4/2024				
	2/27/2024				
	11/29/2023				
	8/30/2023				
	5/18/2023				
	2/27/2023	74	<5.0	670	2,520
	10/27/2022	99	<5.0	710	3,180
EW-04	9/4/2024	23	<0.50	460	1,700
	6/4/2024	11	<0.50	400	1,500
	2/27/2024	24	<0.50	500	1,860
	11/29/2023	16	1.1	410	1,470
	8/25/2023	29	<5.0	420	1,580
	5/18/2023	28	<5.0	410	1,510
	2/27/2023	20	<5.0	430	1,450
	10/27/2022	25	<5.0	390	1,510
EW-05	9/4/2024	18	<0.50	470	1,800
	6/14/2024	20	<0.50	530	1,900
	2/27/2024	Not Sampled			
	11/29/2023	20	<0.50	490	1,820
	8/25/2023	14	<2.0	450	1,750
	5/18/2023	17	<2.0	490	1,820
	3/15/2023	15	14	510	1,800
	10/27/2022	12	<2.0	410	1,800
NMWQCC Standard		**10**	**NA**	**250**	**1,000**
Existing Conditions		**NA**	**NA**	**455**	**1,424**

NOTES:
* = Pre-August 2020 existing conditions were in place prior to August 2020. This condition is no longer applicable.
< = Analyte not detected above the displayed reporting limit.
NMWQCC = New Mexico Water Quality Control Commission
TDS = Total dissolved solids
TKN = Total Kjeldahl Nitrogen
Anomalous data. Samples suspected to have been switched.
Data from current quarter.
Highlight is at or above NMWQCC Standard.
Highlight is at or above relevant existing conditions value. Applicable to samples collected in or after August 2020.

TABLE A3. SUMMARY OF NITRATE MASS REMOVAL
DEL ORO DAIRY, ANTHONY, NEW MEXICO

Sampling Date	Pumping Period Start	Pumping Period End	Days Pumping	EW-1			EW-2			EW-3			EW-4			EW-5			Total Mass This Period[3]	Cumulative Mass Removed[4]
				Q_{avg}[1]	C[2]	M_{total}[3]	Q_{avg}	C	M_{total}[3]	Q_{avg}	C	M_{total}[3]	Q_{avg}	C	M_{total}[3]	Q_{avg}	C	M_{total}[3]		
3/1/2023	12/22/2023	2/27/2022	67	0.35	130	37.0	0.96	130	100.4	0	74	0.0	0.04	20	0.6	0.42	15	5.0	143.0	143.0
5/19/2023	3/6/2023	5/15/2023	79	0.62	190	109	1.21	130	145.1	0	NS	0.0	0.60	28	15.5	0.36	17	5.6	275.7	418.8
8/28/2023 - 8/30/23	5/22/2023	8/28/2023	98	1.23	180	279	1.20	120	182.1	0	NS	0.0	0.29	29	10.5	0.20	14	3.6	475.6	894.4
11/29/2023-12/4/2023	9/4/2023	12/4/2023	91	0.61	190	137	0.77	130	118.3	0	NS	0.0	0.05	16	0.9	0.03	20	0.7	257.4	1,152
2/27/2024-2/29/2024	12/11/2023	3/25/2024	105	0.49	160	105	0.59	190	151.6	0	NS	0.0	0.06	24	2.0	0.00	NS	0.0	258.4	1,410
6/4/2024-6/14/2024	4/1/2024	7/8/2024	98	0.56	190	134	0.85	130	139.4	0	NS	0.0	0.22	11	3.0	0.10	20	2.6	279.2	1,689
9/4/2024-9/6/2024	7/15/2024	10/7/2024	84	0.44	130	62	0.81	130	115	0	NS	0.0	0.77	23	19.3	0.24	18	4.7	201.6	1,891

Notes:

1 Q_{avg} Average discharge gallons per minute (total volume pumped / time in pumping period (minutes)

[2] C Nitrate concentration milligrams per liter (mg/L)

[3] M_{total} Total mass removed (pounds) this pumping period from all extraction wells

[4] Cumulative mass of nitrate removed (pounds) since start of pumping

NS = Not Sampled

Anomalous data. Samples suspected to have been switched.

Data from current quarter

TABLE A4. CAPTURE ANALYSIS FOR PUMPING WELLS
DEL ORO DAIRY, ANTHONY, NEW MEXICO

Pumping Period Start	Pumping Period End	Hydraulic Gradient (ft/ft)	EW-1		EW-2		EW-3		EW-4		EW-5	
			Q_{avg} [1]	Capture Width [2]	Q_{avg} [1]	Capture Width [2]	Q_{avg} [1]	Capture Width [2]	Q_{avg} [1]	Capture Width [2]	Q_{avg} [1]	Capture Width [2]
12/22/2023	2/27/2022	0.004	0.98	337	1.23	424	0.05	172	0.75	241	0.69	221
3/6/2023	5/15/2023	0.003	0.62	286	1.21	555	0.00	0	0.60	257	0.36	154
5/22/2023	8/28/2023	0.004	1.23	424	1.20	413	0.00	0	0.29	92	0.20	65
9/4/2023	12/4/2023	0.004	0.61	211	0.77	266	0.00	0	0.05	15	0.03	10
12/11/2023	3/25/2024	0.004	0.49	168	0.59	205	0.00	0	0.06	20	0.00	0
4/1/2024	7/8/2024	0.004	0.56	193	0.85	293	0.00	0	0.22	69	0.10	33
7/15/2024	10/7/2024	0.004	0.44	150	0.81	277	0.00	0	0.77	247	0.24	77

Notes:

Transmissivity (ft^2/day):

Well	K	b	T
EW-1	10	14	140
EW-2	10	14	140
EW-3	1	14	14
EW-4	10	15	150
EW-5	10	15	150

[1] Q (ft^3/day) = [Q_{avg}/7.48]*1,440 minutes/day = Average pumping rate this reporting period (gpm) divided by 7.48 gallons per cubic foot water times 1,440 minutes per day

[2] Capture Width = Capture width in feet. Q/(Ti) (Todd, David Keith 1980. Groundwater Hydrology, 2nd Edition. John Wiley and Sons.)

$_{avg}$ = Average

b = Aquifer thickness ≈ screen submergence (ft)

ft = Feet

i = Hydraulic gradient (ft/ft)

K = Hydraulic conductivity (ft/day)

Q = Discharge

T = Transmissivity (ft^2/day)

Data from current quarter