8120 Gage Street - Frederick, CO 80516
Bus: (303) 666-6657 - Fax: (303) 666-6743

November 22, 2024

To: Patrick Lennberg
Environmental Protection Specialist
Colorado Division of Reclamation Mining and Safety
Office of Mined Land Reclamation (OMLR)
1313 Sherman Street, Room 215
Denver, Colorado 80203

From: Garrett Varra
Raptor Materials LLC
8120 Gage Street
Frederick, Colorado 80516

Subject: Parcel 124 – Two Rivers Sand, Gravel, and Reservoir Project, File No. M-2022-013; Additional Information Required, Groundwater Monitoring Data RESPONSE

Dear Mr. Lennberg,

The Division of Reclamation, Mining and Safety (Division/DRMS), Office of Mined Land Reclamation (OMLR), reviewed the baseline groundwater monitoring data submitted on July 5, 2024 for the P124 – Resource Development Project (RDP), File No. M-2022-013. Raptor Materials received a Request for Additional Information from the DRMS on October 31, 2024.

Raptor's responses below follow the comments from the Request for Additional Information and are highlighted in blue font for clarity.

DRMS Comment no.1
The water level data provided only has data from four months. In Section 2.2 of the Groundwater Monitoring Plan (March 2023) it is stated that water levels have been collected on a monthly basis since September 2015. Please provide the water level data that has been collected since September 2015.

All water level data collected since 2015 are submitted as an attachment to this memo.

DRMS Comment no.2
In Section 2.2, of the Groundwater Monitoring Plan, it is stated that groundwater levels will be measured monthly during dewatering operations. However, in Section 2.3 it is stated that water levels from all wells will be measured on a monthly basis and shown in Table 1. Again, in Section 2.5 it is stated that water levels will be measured on a monthly basis. The water levels provided are for four months that appear to be quarterly measurements. Please explain the discrepancy between what was provided and what is in the approved plan.

Groundwater levels were measured monthly starting in September 2015 by a technician internal to Raptor, whose employment ended in July 2023. During the transition in personnel, there was a miscommunication in reporting requirements. Raptor has since resumed monthly groundwater level measurements (see measurements from September and October 2024 in attachment).

DRMS Comment no.3

In Section 2.4 the average of monthly water level data over a one-year period was to be inputted into the geostatistical software package Surfer®. Variations in pre-mining groundwater levels were to be presented on a two-dimensional contour map and compared to numerical predictions and provided to the Division in the annual report which will be delivered during the first quarter after each sample year. All data and methods were to be presented in a report. This report was not submitted, please provide an update on the status of the report.

The average of the 2023-2024 groundwater levels for the annual reporting period (July 2023 – June 2024) for monitoring wells MW-1 through MW-12 were input into the geostatistical software package Surfer® and contours plotted on a two-dimensional contour map. The 2023-2024 contours were developed using the Kriging gridding method, the same method as was used for the 2015-2019 contours presented in the Two Rivers Dewatering Analysis (AWES, 2020) and included as an attachment to this memo. The 2023-2024 contour map and a comparison plot are also included as attachments. Finally, a table comparing the 2015-2019 average groundwater levels to 2023-2024 is attached.

As indicated in the attached Average Groundwater Levels Table, the difference between the 2015-2019 and 2023-2024 average levels is generally 0.5 ft or less, with the exception of MW-1, MW-2, and MW-12, which were +3.6ft, +1.9ft, and -1.7 ft different, respectively, between 2023-2024 and 2015-2019. MW-1 and MW-2 are located at the upgradient end of the site, close to the Big Thompson River; MW-12 is located at the downgradient end of the site, close to the South Platte River. All twelve monitoring wells are located in dynamic and highly transmissive (gravelly sand) environment. However, although hydraulic connection is expected throughout the site's subsurface, the individual effects from each of the two rivers has the potential to influence groundwater elevations differently on the north side of the site from the south side, as observed in the increase in groundwater level in MW-1 and MW-2, and a simultaneous decrease in groundwater level in MW-12.

Additionally, large annual variability can be expected from dynamic natural datasets, as indicated in the box plot for MW-12 groundwater levels, attached. The plot compares the range of average groundwater levels from 2015-2019, and for the reporting year 2023-2024. Data trends over longer time periods (in this case, 2015-2019, and for the entire monitoring period 2015-2024) are more indicative of expected groundwater elevation ranges at the site. For instance, the 4666.27' WSEL measurement at MW-12 in July 2023 heavily skews the 2023-2024 dataset, but is represented as an outlier in the larger 2015-2024 dataset.

Scraper operations to remove and stockpile topsoil began at the Two Rivers site in May 2024. As of the date of the most recently reported groundwater level data, June 2024, activity at the site was limited to the top 1-2 feet and had not encountered groundwater, which is located approximately 8 feet below ground surface. Therefore, the 2023-2024 groundwater levels presented in this memo reflect natural fluctuations in existing site conditions.

DRMS Comment no.4

The field testing results do not clearly identify the location the tests were collected. Please update and resubmit the table to identify the location the data was collected.

All groundwater quality results are collected from the designated compliance monitoring well, "MW-12". The groundwater quality field parameters form has been updated to indicate the location and is attached.

DRMS Comment no.5

The laboratory monitoring data submitted consisted of ten (10) laboratory data packages. A review of the associated chains-of-custody (COCs) indicate that not all the same locations were sampled. Data packages from March, June and September 2023 contain the results from samples collected from GW-12. However, in June 2023 there are two additional samples 1-GAP and 2-GAP. Data packages from December 2023 and March 2024 indicate samples were collected from sites 1 through 6 and 1 through 5, respectively. It is unclear which locations these samples correspond to. Please provide a detailed summary of the monitoring results, including but limited to appropriately identifying the locations the samples correspond to, a map showing the sample locations, any deviations from the approved sampling plan (e.g. samples not analyzed within the approved holding times), a table summarizing the samples results compared to the relevant water quality standards and a discussion of exceedances of

water quality standards and how those exceedances relate to future monitoring and mining at the site.

All samples were collected from monitoring well "MW-12" (see attached Map Exhibit G – Water Information map). The samples were incorrectly labeled on the COCs due to a misunderstanding in COC completion best practices. The location of MW-12 is indicated on the attached Exhibit G – Water Information Map.

Quarterly monitoring representing background water quality prior to surface disturbance included five sampling events (March, June, September and December 2023, and March 2024) (see attached Groundwater Quality Data Summary Table). We note that there are concerns about samples being past the holding time during the March 2023 sampling event. The only parameter affected by this QC review issue was nitrate, and the result is therefore considered an estimate. All other parameters were analyzed within the holding times and are considered accurate representations of background. This small deviation from holding times should not preclude the use of these samples in developing background water quality estimates.

The five background sampling events yielded uniform water quality, with the most notable results including consistent manganese concentrations above the water quality standards, and gross alpha particle exceeding the relative standard once (in March 2024). The detected concentrations of manganese are consistent with those observed in groundwater background concentrations at gravel ponds in Weld County (Adams, et. al, 2022). The pH of the groundwater was also measured during quarterly events, ranging from 7.54 to 7.58 (see attached Field Parameters Results Table).

Gross alpha particle was reported above the water quality standard only in March 2024. No corresponding increase in the dissolved uranium was observed at this time and the quality control summary accompanying this analysis indicates high variation in the matrix spike duplication (31%, which is above the acceptable difference of 20%), casting doubt that this was an accurate measurement.

These exceedances were not accompanied by elevated (or even detectable) concentrations of most other constituents. Only uranium, sulfate, and nitrate were regularly detected. The detectable concentrations of dissolved uranium are consistent with reported background concentrations in agricultural wells in the South Platte River Basin (USGS, 1998). Similarly, it is unsurprising to detect nitrate in groundwater that is presumably affected by regional agricultural practices, where fertilizer application and runoff is likely. Sulfate could also result from application of some fertilizers or agricultural products, but it also occurs naturally, and its source is less definitive.

The groundwater quality monitoring results at MW-12 from March 2023 through March 2024 are believed to be representative of background groundwater concentrations at the site due to an adherence to sampling protocol and to their collection prior to site disturbance.

DRMS Comment no.6

On the COCs it is indicated that the samples are grab samples. Please clarify if samples were collected following the purging three to five well volumes from the monitoring well(s). Include with the response any relevant field documentation.

All groundwater samples were collected in accordance with the Groundwater Sampling Field Protocol outlined in the Two Rivers Groundwater Monitoring Plan (AWES, 2023), including a purge of three to five well volumes prior to sampling. To date, a space for this information has not been included on a field form. A Groundwater Sampling Field Sheet is attached, which includes documentation of the well condition, sampling method, and field analyses, and will be completed as part of future sampling events.

DRMS Comment no.7

It does not appear, from the laboratory data provided, that any duplicate samples were collected during any of the field sampling. The Field and Laboratory Control section of the plan indicates a duplicate sample is to be taken. Please state whether duplicate samples were collected and if they were not, please clarify why.

At the time of sample collection and submission, duplicate samples were understood to be split

and analyzed at the lab as part of the lab's QA/QC procedures. In the Quality Control Summary portion of the lab reports, documentation of laboratory method blank, duplicate, and matrix spike samples are provided. In future sampling events, a separate field duplicate sample will be collected and analyzed for the same suite of parameters listed in Table 1 of the Groundwater Monitoring Plan.

DRMS Comment no.8
Were the samples filtered at the time of collection or filtered at the laboratory?

Samples were field filtered at the time of collection. A check box indicating filtration method is included on the Groundwater Sampling Field Sheet, attached, for future sampling events.

DRMS Comment no.9
A review of the permit file the Division was unable to determine where a formal point-of-compliance had been established and approved pursuant to Rule 3.1.7(6). If the Operator has that information, please provide it. Typically, the Division requires monitoring of up and down gradient wells to establish baseline conditions prior to establishing any point(s)-of-compliance.

MW-12, located between the hydrologically downgradient end of the disturbed area and the permit boundary, and identified in the attached Map Exhibit G – Water Information Map, has been monitored as the point of compliance for the Two Rivers site.

Please find attached the following documents to our response:
- Two Rivers Monthly Groundwater Level Data (2015 – 2024)
- Two Rivers Average Groundwater Level Comparison Table (2015-2019 vs. 2023-2024)
- Groundwater Elevation Contours Maps (2015-2019 Average, 2023-2024 Average, and Comparison)
- Map Exhibit G – Water Information Map
- Two Rivers Groundwater Quality Data Summary Table
- Annual Groundwater Monitoring Report Field Measurements
- Groundwater Sampling Field Form

References:

Adams, Joby and James W. Warner, 2022. Field Scale Study Results for the Beneficial Use of Coal Ash as Fill Material in Saturated Conditions, Varra Coal Ash Burial Project, Weld County, Colorado (CBRC #CRRCW02)

USGS, 1998. Water-quality assessment of the South Platte River basin, Colorado, Nebraska, and Wyoming, 1992-95. K.F. Dennehy, D.W. Litke, C.M. Tate, S.L. Qi, P.B. McMahon, B.W. Bruce, R.A. Kimbrough, and J.S. Heiny (U.S. Geological Survey circular; 1167)

Regards

Garrett Varra

Pit 124 Piezometers

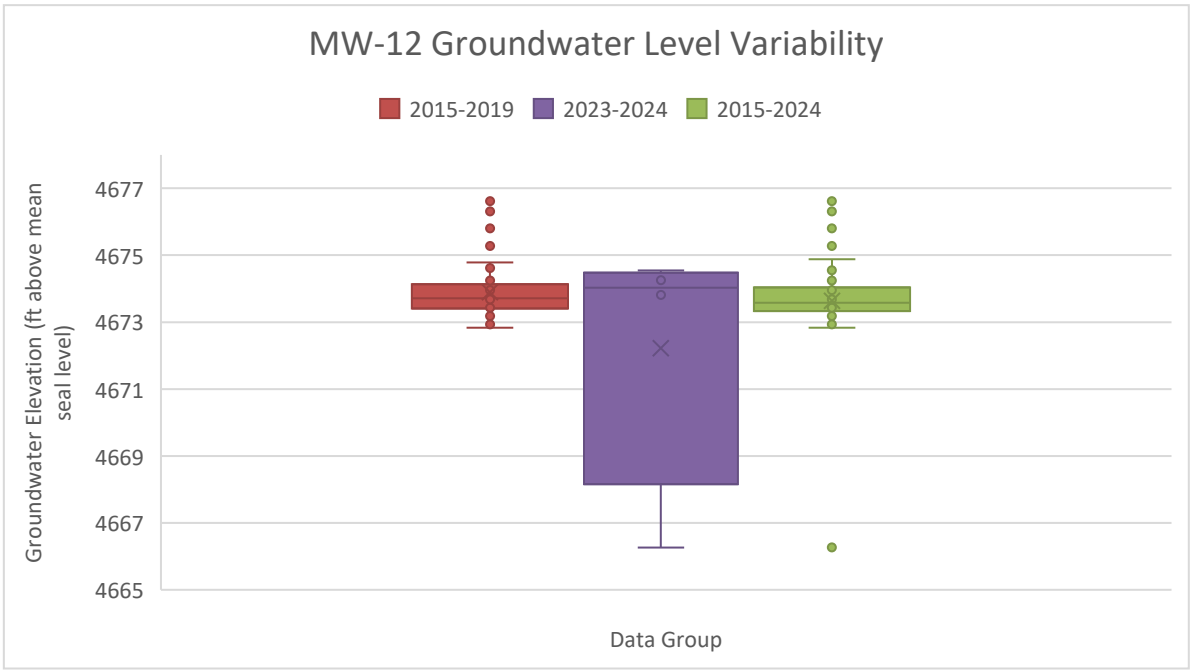
	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-12
Top of pipe (ft.)	4711.51	4690.59	4687.85	4685.07	4683.09	4692.07	4689.98	4682.23	4694.55	4697.09	4694.44	4683.49
Ground (ft.)	4708.61	4686.58	4683.82	4681.02	4678.95	4688.14	4686.04	4678.28	4690.60	4693.17	4690.37	4679.34
Measured Bottom Depth of Well (ft)	22.3	17.19	36.11	23.38	32.8	37.87	47.12	29.42	41.41	44.97	43.75	29.85
Elevation of Well Bottom (ft.)	4689.21	4673.40	4651.74	4661.69	4650.29	4654.20	4642.86	4652.81	4653.14	4652.12	4650.69	4653.64

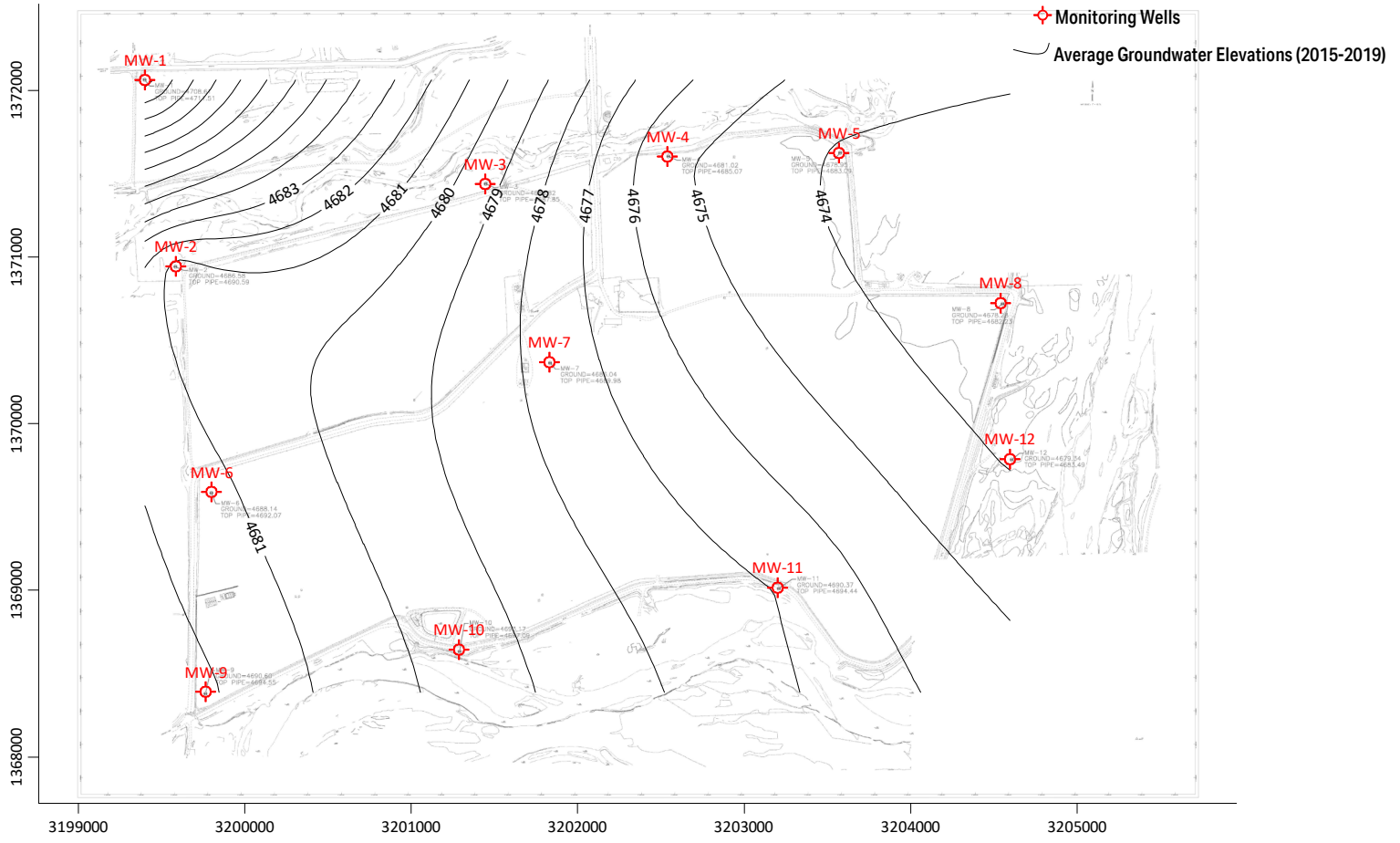
Elevation of Water (ft.)

Date	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-12
9/15/2015	4692.61	4681.28	4677.24	4675.45	4674.34	4682.13	4677.93	4673.45	4682.25	4679.12	4676.93	4674.03
10/14/2015	4692.43	4680.78	4677.05	4675.28	4674.19	4681.26	4677.69	4673.43	4681.89	4679.46	4677.15	4674.01
11/13/2015	4692.31	4681.08	4677.46	4675.76	4674.60	4681.61	4678.09	4674.10	4682.66	4680.53	4677.97	4674.78
12/11/2015	4692.19	4680.96	4677.34	4675.64	4674.47	4681.36	4677.95	4673.72	4682.09	4679.79	4677.27	4674.31
1/12/2016	4692.05	4680.93	dry	4675.73	4674.54	4681.26	4677.80	4673.61	4682.15	4679.83	4677.12	4674.24
2/12/2016	4691.97	4680.95	dry	4675.67	4674.47	4681.40	4677.90	4673.69	4682.40	4680.17	4677.40	4674.32
3/11/2016	4691.96	4680.94	dry	4675.58	4674.39	4681.42	4677.93	4673.53	4682.21	4679.77	4677.06	4674.05
4/12/2016	4691.96	4680.94	dry	4675.40	4674.27	4681.66	4678.06	4673.93	4682.91	4680.78	4677.90	4674.62
5/9/2016	4692.67	4681.40	4677.83	4675.70	4674.76	4683.10	4679.22	4675.61	4685.18	4683.28	4680.18	4676.62
6/9/2016	4692.94	4682.38	4679.24	4677.73	4676.27	4683.27	4679.64	4675.55	4685.03	4682.94	4679.98	4676.31
7/12/2016	4692.68	4681.09	4677.45	4675.17	4674.02	4682.46	4678.47	4673.72	4682.92	4679.33	4677.18	4674.11
8/12/2016	4692.44	4680.84	dry	4675.20	4673.90	4681.39	4677.76	4672.99	4681.58	4678.95	4676.25	4673.46
9/13/2016	4692.29	4680.95	dry	4675.35	4674.16	4681.97	4677.81	4673.63	4682.43	4679.10	4676.58	4673.84
10/10/2016	4692.30	4680.67	dry	4675.12	4673.90	4681.16	4677.50	4673.30	4681.93	4679.43	4676.93	4673.96
11/9/2016	4692.38	4680.68	dry	4675.34	4674.04	4681.27	4677.76	4673.46	4682.14	4679.86	4677.26	4674.12
12/2/2016	4692.42	4680.61	dry	4675.31	4674.04	4681.04	4677.63	4673.22	4681.74	4678.74	4676.89	4673.77
1/13/2017	4692.40	4680.54	dry	4675.22	4673.98	4680.44	4678.65	4673.47	4681.50	4679.41	4677.24	4674.16
2/10/2017	4692.40	4679.88	dry	4674.54	4673.33	4680.41	4676.97	4672.78	4681.31	4679.12	4676.48	4673.40
3/10/2017	4692.36	4679.82	dry	4674.41	4673.18	4680.28	4676.89	4672.65	4681.19	4678.92	4676.37	4673.28
4/11/2017	4691.70	4679.78	dry	4674.44	4673.16	4680.17	4676.75	4672.28	4680.63	4677.99	4675.75	4672.83
5/12/2017	4692.38	4680.41	dry	4675.21	4673.91	4681.03	4677.30	4673.45	4682.49	4680.09	4677.35	4674.26
6/9/2017	4693.43	4681.30	4677.70	4675.66	4674.42	4682.43	4678.85	4674.53	4683.50	4681.36	4678.61	4675.28
7/13/2017	4692.90	4680.97	dry	4675.18	4673.73	4681.98	4678.00	4673.05	4682.12	4678.88	4676.36	4673.46
8/11/2017	4692.76	4681.45	dry	4675.88	4674.51	4682.36	4678.24	4675.02	4683.25	4680.25	4678.05	4674.71
9/12/2017	4692.62	4680.61	dry	4674.99	4673.56	4681.30	4677.41	4672.85	4681.94	4678.88	4676.17	4673.45
10/13/2017	4692.74	4680.72	dry	4675.37	4673.97	4681.25	4677.67	4673.40	4682.09	4679.50	4676.93	4674.03
11/10/2017	4692.73	4680.73	dry	4675.48	4674.08	4681.19	4677.64	4673.50	4682.16	4679.78	4677.11	4674.14
12/8/2017	4692.65	4680.61	dry	4675.19	4673.84	4681.12	4677.64	4673.41	4681.99	4679.58	4676.99	4674.04
1/12/2018	4692.57	4680.56	dry	4675.29	4673.89	4680.93	4677.49	4673.26	4681.79	4679.37	4676.74	4673.86
2/9/2018	4692.51	4680.47	dry	4675.15	4673.73	4680.76	4677.35	4673.02	4681.49	4679.00	4676.35	4673.57
3/9/2018	4692.46	4680.32	dry	4674.95	4673.54	4680.68	4677.22	4672.97	4681.46	4678.97	4676.34	4673.53
4/12/2018	4692.42	4680.22	dry	4674.88	4673.40	4680.52	4677.11	4672.64	4681.18	4678.60	4675.88	4673.15
5/10/2018	4692.58	4680.28	dry	4674.82	4673.41	4680.86	4677.22	4672.97	4681.80	4679.06	4676.47	4673.55
6/6/2018	4692.64	4680.61	dry	4675.16	4673.76	4681.32	4677.67	4673.14	4681.99	4679.51	4676.76	4673.65
7/10/2018	4692.38	4680.52	dry	4674.84	4673.34	4681.23	4677.25	4672.45	4681.62	4677.82	4676.05	4672.97
8/10/2018	4692.36	4680.74	dry	4675.01	4673.48	4681.21	4677.35	4672.49	4681.68	4678.04	4675.66	4672.93
9/7/2018	4692.24	4680.26	dry	4674.54	4673.06	4680.82	4676.95	4672.70	4681.96	4679.38	4676.41	4673.38
10/12/2018	4692.20	4680.26	dry	4674.88	4673.40	4680.69	4677.02	4672.83	4681.72	4679.50	4676.52	4673.47
11/9/2018	4692.21	4680.50	dry	4675.26	4673.79	4680.96	4677.38	4673.11	4681.89	4679.61	4676.80	4673.68
12/7/2018	4692.16	4680.42	dry	4675.11	4673.63	4680.71	4677.26	4672.82	4681.45	4678.97	4676.30	4673.32
1/10/2019	4692.15	4680.30	dry	4674.96	4673.49	4680.56	4677.09	4672.74	4681.34	4678.85	4676.24	4673.28
2/12/2019	4692.11	4680.32	dry	4674.89	4673.47	4680.66	4677.18	4672.86	4681.52	4679.29	4676.43	4673.43
3/8/2019	4692.12	4680.30	dry	4674.94	4673.50	4680.68	4677.19	4672.88	4681.57	4679.33	4676.50	4673.48
4/10/2019	4692.15	4680.29	dry	4674.85	4673.42	4680.71	4677.25	4672.72	4681.29	4678.77	4676.25	4673.18
5/10/2019	4692.24	4680.16	dry	4674.82	4673.31	4680.50	4676.93	4672.77	4681.78	4679.77	4676.56	4673.56
6/7/2019	4692.39	4680.37	dry	4675.17	4673.60	4680.86	4677.20	4672.75	4681.67	4679.23	4676.36	4673.30
7/9/2019	4692.30	4681.23	dry	4675.92	4674.55	4683.08	4678.65	4674.87	4685.30	4682.35	4679.55	4675.80
8/9/2019	4692.22	4681.10	dry	4675.09	4673.60	4682.24	4677.99	4673.19	4683.07	4678.93	4676.68	4673.71
9/6/2019	4692.10	4680.65	dry	4675.00	4673.48	4681.31	4677.39	4672.54	4681.83	4678.75	4675.94	4673.13
10/9/2019	4692.11	4680.46	dry	4674.95	4673.48	4680.99	4677.23	4672.77	4681.75	4679.01	4676.33	4673.36
11/8/2019	4692.18	4680.62	dry	4675.39	4673.93	4681.05	4677.48	4673.12	4681.88	4679.17	4676.74	4673.72
12/6/2019	4692.20	4680.46	dry	4675.15	4673.72	4680.95	4677.38	4673.15	4681.97	4679.42	4676.89	4673.87
1/10/2020	4692.25	4680.40	dry	4675.04	4673.59	4680.81	4677.30	4673.02	4681.98	4679.02	4676.61	4673.69
2/7/2020	4692.32	4680.36	dry	4675.03	4673.58	4680.71	4677.20	4672.92	4681.55	4678.96	4676.42	4673.58
3/11/2020	4692.36	4680.35	dry	4674.99	4673.52	4680.66	4677.13	4672.86	4681.52	4678.94	4676.37	4673.52
4/9/2020	4692.44	4680.46	dry	4674.95	4673.52	4680.92	4677.38	4672.85	4681.59	4678.99	4676.49	4673.48

Date	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-12
5/8/2020	4692.57	4680.47	dry	4675.11	4673.58	4680.94	4677.39	4672.70	4681.66	4679.20	4676.56	4673.50
6/9/2020	4692.46	4680.57	dry	4675.14	4673.64	4681.43	4677.69	4673.15	4682.51	4680.02	4677.02	4674.03
7/10/2020	4692.39	4680.68	dry	4675.16	4673.63	4681.24	4677.45	4672.34	4681.83	4678.58	4675.74	4673.02
8/7/2020	4692.47	4680.56	dry	4675.01	4673.45	4681.29	4677.26	4672.26	4682.16	4678.87	4675.91	4672.97
9/11/2020	4692.37	4680.36	dry	4675.08	4673.50	4680.85	4677.02	4672.51	4682.19	4679.67	4676.51	4673.38
10/7/2020	4692.30	4680.19	dry	4674.79	4673.21	4680.68	4676.97	4672.20	4681.66	4678.78	4675.85	4672.94
11/13/2020	4692.37	4680.52	dry	4675.19	4673.68	4681.05	4677.36	4672.70	4682.17	4679.46	4676.74	4673.43
12/9/2020	4692.35	4680.54	dry	4675.15	4673.64	4681.19	4677.49	4672.80	4682.35	4679.71	4676.83	4673.57
1/8/2021	4692.33	4680.52	dry	4675.16	4673.77	4681.15	4677.51	4672.83	4682.29	4679.70	4676.77	4673.60
2/8/2021	4692.31	4680.36	dry	4674.99	4673.49	4680.77	4677.19	4672.34	4681.68	4679.03	4676.15	4673.07
3/9/2021	4692.34	4680.36	dry	4675.02	4673.54	4680.91	4677.22	4672.64	4682.12	4679.66	4676.73	4673.51
4/9/2021	4692.34	4680.48	dry	4675.05	4673.58	4680.99	4677.44	4672.52	4681.75	4678.91	4676.28	4673.24
5/7/2021	4692.36	4680.31	dry	4674.84	4673.42	4681.17	4677.34	4673.08	4682.54	4679.96	4677.21	4674.01
6/11/2021	4692.41	4682.32	4679.13	4677.41	4675.71	4682.77	4679.05	4673.89	4684.08	4681.01	4678.21	4674.88
7/8/2021	4692.27	4681.47	4677.76	4676.08	4674.41	4682.26	4678.42	4673.21	4682.89	4679.85	4677.31	4674.09
8/10/2021	4692.20	4680.80	dry	4675.36	4673.84	4681.48	4677.64	4672.78	4682.15	4679.03	4676.59	4673.58
9/10/2021	4692.14	4680.42	dry	4674.99	4673.42	4680.84	4677.22	4672.14	4681.39	4678.22	4675.54	4672.96
10/8/2021	4692.10	4680.28	dry	4674.99	4673.45	4680.60	4677.00	4672.24	4681.35	4678.41	4675.66	4673.06
11/10/2021	4692.15	4680.68	dry	4675.33	4673.86	4681.13	4677.56	4672.87	4682.10	4679.18	4676.62	4673.71
12/9/2021	4692.13	4680.52	dry	4675.22	4673.75	4681.00	4677.43	4672.79	4682.04	4679.36	4676.72	4673.63
1/10/2022	4692.10	4680.52	dry	4675.13	4673.60	4680.82	4677.29	4672.27	4681.59	4678.86	4675.99	4673.02
2/11/2022	4692.11	4680.37	dry	4675.04	4673.58	4680.81	4677.18	4672.54	4681.85	4679.29	4676.40	4673.33
3/14/2022	4692.11	4680.49	dry	4675.18	4673.70	4680.89	4677.35	4672.50	4681.79	4679.20	4676.35	4673.26
11/15/2022	no access	4675.51	dry	4674.95	4673.60	4680.99	4677.36	4671.15	4682.35	4679.57	4676.82	4673.96
12/19/2022	no access	4680.66	dry	4675.19	4673.51	4681.43	4679.34	4672.77	4682.01	4679.77	4676.72	4673.66
1/27/2023	no access	no access	dry	4678.97	4675.41	4681.43	4677.6	4675.99	4684.43	4679.93	4682.12	no access
2/21/2023	no access	no access	pipeline	4675.11	4673.74	4681.54	4677.55	4672.65	4684.59	4681.74	4677.09	no access
3/30/2023	no access	no access	pipeline	4674.95	4674.37	4681.95	4676.87	4672.27	4685.59	4679.69	4677.12	4666.48
4/24/2023	no access	4682.14	dry	4675.4	4674.67	4683.97	4676.74	4672.41	4683.15	4681.39	4676.87	4674.24
5/1/2023	no access	4681.72	dry	4675.05	4673.72	4683.6	4676.46	4672.36	4683.12	4681.23	4676.58	4673.91
6/1/2023	no access	4681.8	dry	4675.95	4674.22	4682.53	4679.14	4674.13	4684.88	4677.19	4679.34	4676.37
7/27/2023	4694.29	4684.34	4677.45	4675.10	4673.86	4682.84	4678.57	4673.03	4682.85	4679.35	4676.84	4666.27
12/14/2023	4703.62	no access	no access	mud	4673.77	4681.22	4677.63	4673.03	4682.33	4679.85	4677.13	4673.81
3/29/2024	4693.50	4680.70	Mud	4674.92	4673.80	4680.59	4677.92	4673.56	4682.92	4680.70	4677.92	4674.55
6/26/2024	4692.41	no access	no access	4675.49	4674.18	4681.68	4678.24	4673.88	4682.60	4680.30	4677.60	4674.25
9/27/2024	4692.74	no access	collapsed	collapsed	4673.44	4682.69	4677.01	4673.95	4681.87	4678.88	4676.32	4673.40
10/25/2024	4692.62	no access	collapsed	collapsed	4674.41	4680.68	4677.08	4672.58	4681.76	4678.72	4676.13	4673.31

P124 Average Groundwater Levels (ft above mean sea level)			
	2015-2019 AVERAGE	**2023-2024 AVERAGE**	**DIFFERENCE**
MW-1	4692.4	4696.0	3.6
MW-2	4680.7	4682.5	1.9
MW-3	4677.7	4677.5	-0.2
MW-4	4675.2	4675.2	-0.1
MW-5	4673.9	4673.9	0.0
MW-6	4681.3	4681.6	0.3
MW-7	4677.6	4678.1	0.4
MW-8	4673.3	4673.4	0.1
MW-9	4682.1	4682.7	0.5
MW-10	4679.5	4680.1	0.5
MW-11	4676.9	4677.4	0.4
MW-12	4673.9	4672.2	-1.7



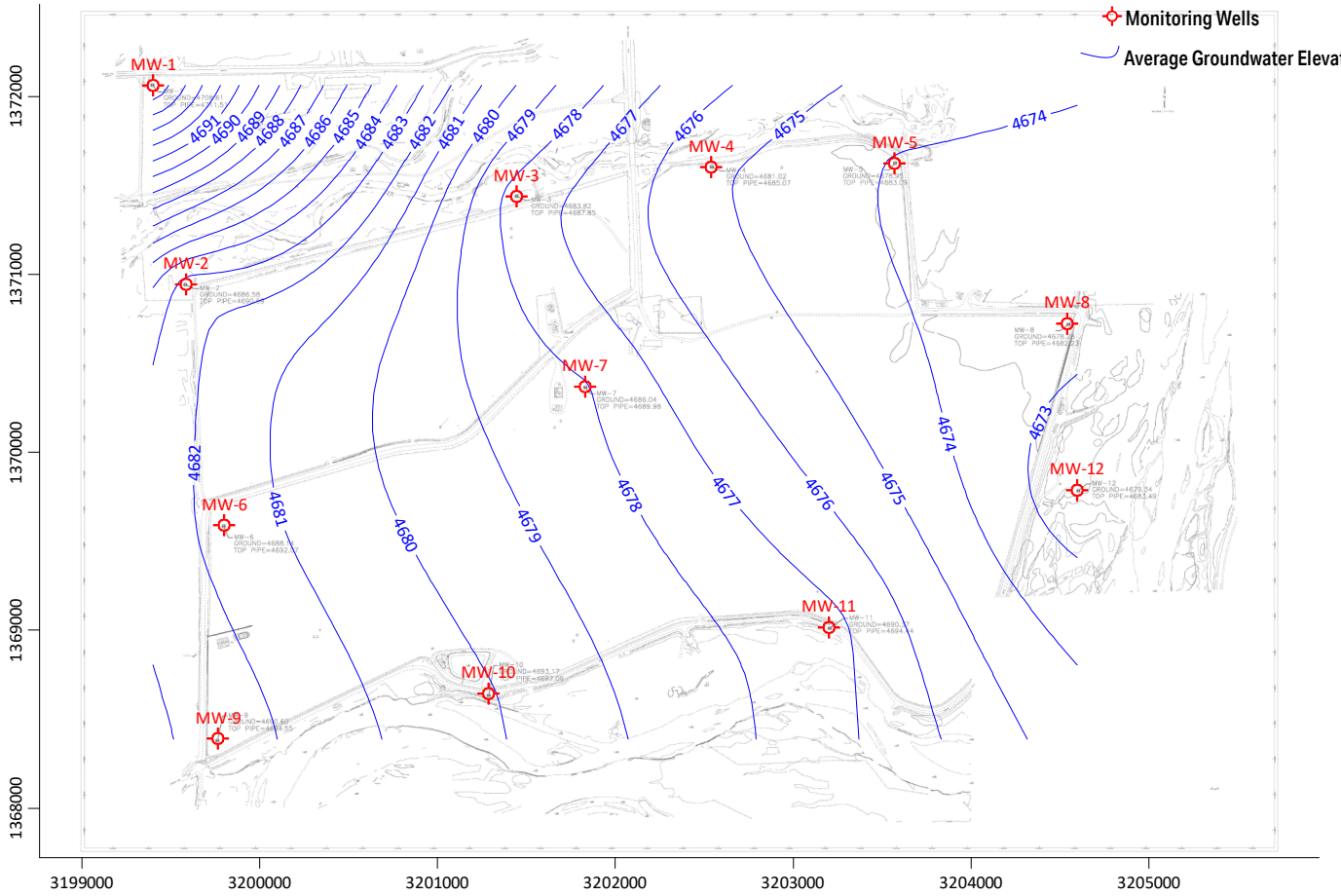


NAD 1983 (2011) State Plane Colorado North FIPS 0501

RAMA24001 11/19/2024

Feet

0 1000 2000

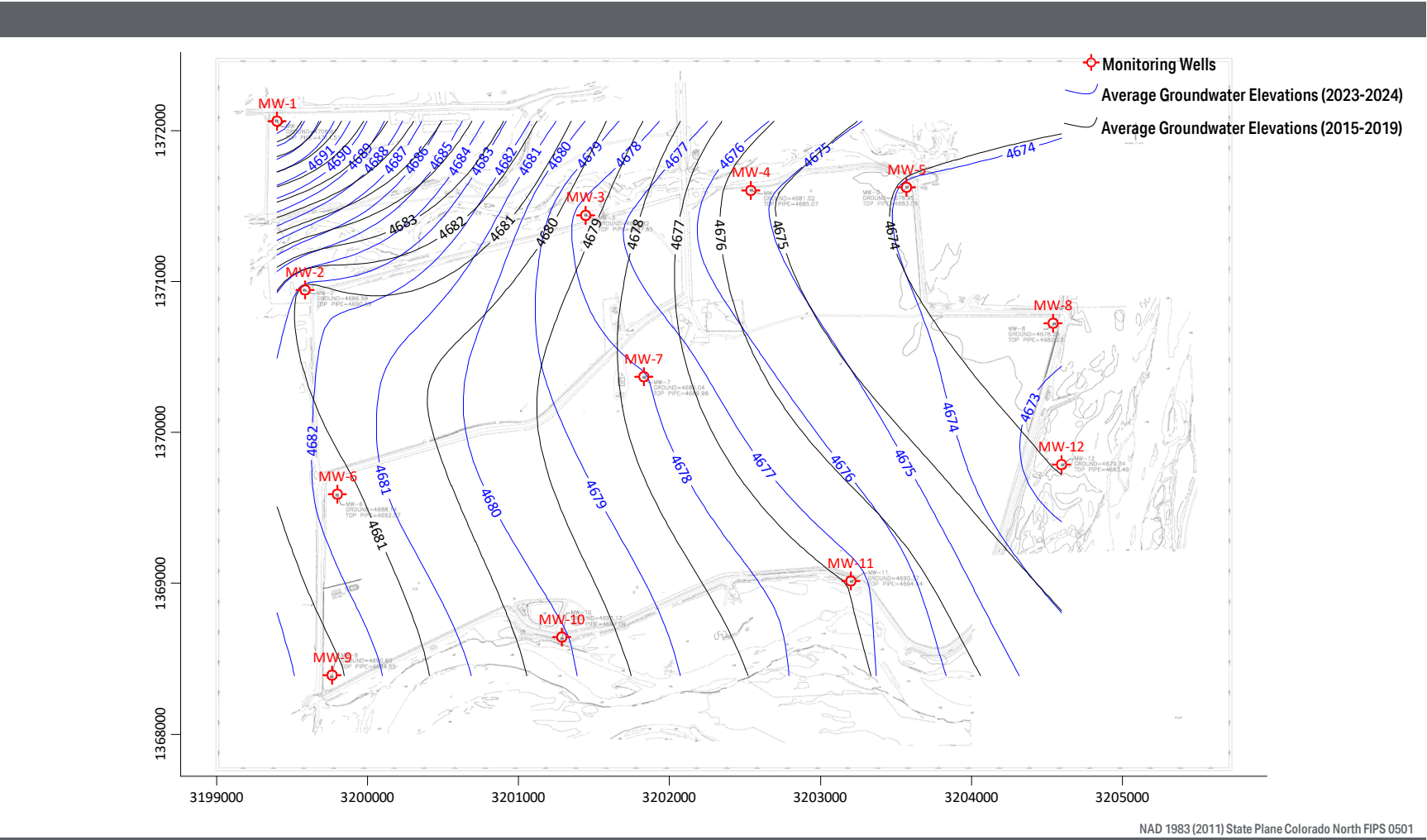


NAD 1983 (2011) State Plane Colorado North FIPS 0501

RAMA24002 11/19/2024

Feet

0 1000 2000



NAD 1983 (2011) State Plane Colorado North FIPS 0501

RAMA24003 11/19/2024

Feet

0 1000 2000

Water Well Detail

Permit Number	Latitude	Longitude	Owner	Permit Status	Construction Date	Permit Category	Use(s)
13950-R-R	40.352074	-104.769322	DOS RIOS ESTATES WTR CO	Well Constructed	10/11/1989	General Purpose	Irrigation
270-R	40.34165	-104.788031	SHABLE, ALVA L	Well Constructed	6/20/1955	General Purpose	Irrigation
8303-R-R	40.342074	-104.783461	VARRA COMPANIES INC (VARRA, GARRETT)	Well Constructed	11/14/1989	General Purpose	Irrigation
8304-R	40.343489	-104.779183	VARRA COMPANIES INC (VARRA, GARRETT)	Well Constructed	6/30/1952	General Purpose	Irrigation
320422-	40.339043	-104.78599	LAFARGEHOLCIM / AGGREGATE INDUSTRIES	Well Constructed	1/22/2021	Monitoring/Observation	Monitoring/Sampling
79087--A	40.339404	-104.776829	SORIN NATURAL RESOURCES PARTNERS LLC	Well Constructed	5/12/1975	Residential	Domestic
1282-R-R	40.340933	-104.762048	DIXIE WATER, LLC (WHITE, MICHAEL B.)	Well Constructed	4/23/1976	General Purpose	Irrigation
78568-F	40.349274	-104.761489	SORIN NATURAL RESOURCE PARTNERS LLC	Well Constructed	9/24/2014	General Purpose	Industrial

0' 150' 300' 600'

EVANS CANAL
THOMPSON
RIVER
BIG
PLATTE
SOUTH
SOUTH BANK OF BIG THOMPSON RIVER
NW FIELD= 41.04± ACRES
NW FIELD SURFACE WATER AREA = 34.99± ACRES AT ELEVATION 4675'
HOMESTEAD AREA = 4.09± ACRES
CENTRAL FIELD = 162.57± ACRES
CENTRAL FIELD SURFACE WATER AREA = 151.38± ACRES AT ELEVATION 4673'
SW WASH POND ~ 5.8 ACRES
SETTLING BASIN
SOUTH PLATTE RIVER
NORTH BANK OF SOUTH PLATTE RIVER
4650
4660
4670
4680
4684
4682
MW-11 GROUND=4690.37 TOP PIPE=4694.44
MW-1 GROUND=4608.61 TOP PIPE=4611.51
MW-2 GROUND=4688.18 TOP PIPE=4691.07
MW-3 GROUND=4691.02 TOP PIPE=4694.07
MW-4 GROUND=4691.02 TOP PIPE=4693.95
MW-5 GROUND=4688.29 TOP PIPE=4691.29
MW-6 GROUND=4679.24 TOP PIPE=4682.27
MW-7 GROUND=4684.04 TOP PIPE=4688.04
MW-10 GROUND=4693.17 TOP PIPE=4696.17
MW-12 GROUND=4679.34 TOP PIPE=4682.49
MW-13 GROUND=4679.34 TOP PIPE=4682.49
MW-14 GROUND=4688.14 TOP PIPE=4691.07
MW-15 GROUND=4693.17 TOP PIPE=4696.17
MW-16 GROUND=4688.14 TOP PIPE=4691.07
MW-17 GROUND=4693.17 TOP PIPE=4696.17
MW-18 GROUND=4688.14 TOP PIPE=4691.07
MW-19 GROUND=4693.17 TOP PIPE=4696.17
MW-20 GROUND=4688.14 TOP PIPE=4691.07
MW-21 GROUND=4693.17 TOP PIPE=4696.17
MW-22 GROUND=4688.14 TOP PIPE=4691.07
MW-23 GROUND=4693.17 TOP PIPE=4696.17

P124 Quarterly Groundwater Quality Monitoring Results

Parameter	Analytical Method	Units	Water Quality Standard	March 2023	June 2023	September 2023	December 2023	March 2024
Arsenic	EPA 200.8	ug/L	10	ND	ND	ND	ND	ND
Cadmium	EPA 200.8	ug/L	5	ND	ND	ND	ND	ND
Chromium	EPA 200.8	ug/L	10	ND	ND	ND	ND	ND
Copper	EPA 200.8	ug/L	200	ND	ND	ND	ND	13.2
Lead	EPA 200.8	ug/L	50	ND	ND	ND	ND	ND
Manganese	EPA 200.8	ug/L	50	114	182	147	109	124
Mercury	EPA 200.8	ug/L	2	ND	ND	ND	ND	ND
Nickel	EPA 200.8	ug/L	100	ND	ND	ND	ND	ND
Selenium	EPA 200.8	ug/L	50	ND	ND	ND	ND	ND
Uranium	EPA 200.8	ug/L	30	5.73	8.13	8.87	8.65	9.52
Zinc	EPA 200.8	ug/L	2,000	ND	ND	ND	ND	ND
Nitrate	EPA 300	mg/L	10	0.949	2.91	4.49	3.92	4.29
Sulfate	EPA 300	mg/L	250	165	207	218	189	211
Gross Alpha Particle	EPA 900	pCi/L	15	9.43	5.71	6.49	11.5	25.7
Total Dissolved Solids	EPA 160.1	mg/L	10,000	550	703	681	652	669

Note: ND - Not detected at the reporting limit or method detection limit

Field testing results
GW Monitoring
Location: MW-12

Readings Taken
using a Calibrated
APERA PC60 unit

	PH	Specific Conductance	Temperature (Farenheit)	TDS	Salinity
3/31/2023	7.54	1245 MicroSiemens	56.1	Not taken	Not taken
6/13/2023	7.56	1239 MicroSiemens	56	877 ppm	.62 ppt
9/27/2023	7.58	1241 MicroSiemens	55.9	889 ppm	.63 ppt
12/7/2023	7.57	1246 MicroSiemens	56.1	885 ppm	.63 ppt
3/29/2024	7.55	1240 MicroSiemens	56	880 pp,	.62 ppt

Groundwater Sampling Field Sheet

Site Name: _____ Permit No.: _____

Well/Piezometer: _____ Weather: _____

Date: _____ Sampler Name: _____

Monitoring Well Details

Construction Data

Borehole Diameter (in): _____ Depth to Tope of Screen (ft): _____

Casing Diameter (in): _____ Casing Material: _____

Top of Casing Elevation (ft. MSL): _____ Ground Surface Elevation (ft. MSL): _____

Field Observations

Locked: ☐ Yes ☐ No

	Before Purging	After Purging	Before Sampling
Depth to Water Level (ft.):			
Water Elevation (ft. MSL):			

Screen Submerged? (Depth to Water Level < Depth to Top of Screen) ☐ Yes ☐ No

	Start	End
Purge Date/Time		

Well Conditions Commentary: _____

Sampling Equipment (check one)

☐ Pump ☐ Interval Sampler

☐ Bailer ☐ Other (specify): _____

Equipment Name & Description: _____

Pump Types (check one)

☐ Submersible ☐ Peristaltic ☐ Bladder ☐ Inertial Lift Pump ☐ Other (specify): _____

Method (check one)

☐ Low Flow ☐ No Purge ☐ Purge

Filtered (check one)

☐ Field ☐ Lab ☐ Neither

Options (check one)

☐ Dedicated ☐ Disposable ☐ Portable

Decontamination Method: _____

Field Analysis

							Final Reading
Date/Time							
Depth to Water (ft)							
Volume Purged ( )							
Temp (°C)							
Sp. Cond (umhos/cm)							
pH							
DO (mg/l)							
ORP (mV)							
Turbidity (NTU)							

Equipment Depth: _____ Flow Rate: _____ Volume Removed: _____ Volume Sampled: _____

Odor? ☐ Yes ☐ No Color? ☐ Yes ☐ No

Comments: _____