



COLORADO

Division of Reclamation,
Mining and Safety

Department of Natural Resources

1313 Sherman St. Room 215
Denver, CO 80203

March 10, 2023

Steve Kelton
Ready Mixed Concrete / Brannon Companies
2500 Brannon Way
Denver CO 80229

RE: Permit M2001-046; Nix Sand and Gravel; Technical Revision 2 (TR2) –
Groundwater Monitoring Plan and Baseline Data Submittal, Adequacy Review 1

Mr. Kelton:

The Division of Reclamation, Mining and Safety received Technical Revision 2 (TR2) on March 2, 2023. **The decision date for this revision has been set for April 3, 2023. Please be advised that if you are unable to satisfactorily address any concerns identified in this review before the decision date, it will be your responsibility to request an extension of the review period.** If there are outstanding issues that have not been adequately addressed prior to the end of the review period, and no extension has been requested, the Division must deny this revision.

In order to fully understand the requirements of TR2, which itself is a result of the AM1 adequacy review process, a brief chronological summary has been provided.

During the AM1 adequacy process, DRMS provided the following comment to the AM1 submittal in Adequacy Review #3, dated June 23, 2021:

“As discussed during June 22 phone call, The operator will commit to submitting a technical revision containing the baseline analytical results compared to standards of Tables 1-4 of the Interim Narrative Standard prior to mining. The revision will also contain a detailed Sampling and Analysis plan describing how the operator will monitor groundwater conditions, as well as insure/document that the water quality will meet the Interim Narrative Standards during operation and prior to release - please acknowledge.” (emphasis added)

The permittee’s response to this adequacy item was provided in the adequacy response #3 letter to DRMS, also dated June 23, as follows:



“While the operator believes that there is no reasonable expectation that adverse impacts to water quality will occur, the operator will commit to performing annual water quality monitoring. I have attached an updated Groundwater Monitoring Plan with a Groundwater Quality Monitoring Plan section added. The operator will sample water quality from these piezometers: Nix-Owens-Mon 4, Nix-Owens-Mon 5A, Nix-RMCC-Mon 6, Nix-RMCC-Mon 7, and Nix-RMCC-Mon 8 annually in June. The samples will be analyzed for the analytes listed in Tables 1 through 4 of the Water Quality Control Commission’s “The Basic Standards for Ground Water,” excluding the radiological section of Table 1. In the event of an exceedance of the standards set forth in Tables 1 through 4, the operator will notify the Division of Reclamation, Mining and Safety (“The Division”) within 7 days of receiving the results. The water quality monitoring lab results will included in the site’s annual report sent to the Division.

As noted in the previous adequacy review response sent on June 17th, 2021, the operator has performed baseline water quality sampling on the wells listed above on June 3rd, 2021. The lab results of this sampling will be made available to the Division through a Technical Revision once the results are available.”

For reference, the Groundwater Quality Monitoring Plan provided in the June 23, 2021 adequacy response #3 text, essentially a restatement of previous material provided on June 1, 2021, is provided, in its entirety, as follows:

“Groundwater Quality Monitoring Plan

Since mining operations at the site will take place inside of slurry wall lined cells, except for establishing the Freshwater Pond and Siltation Pond, it is unlikely that these operations will have a negative effect on groundwater quality. To establish pre-mining groundwater quality for the site, RMCC sampled wells Nix-Owens-Mon 4, Nix-Owens-Mon 5A, Nix-RMCC-Mon 6, Nix-RMCC-Mon 7, and Nix-RMCC-Mon 8 on June 3rd, 2021. The samples collected were tested for the water quality analytes listed in Tables 1 through 4 of “The Basic Standards for Ground Water,” excluding the radiological section of Table 1.

To establish that mining has had no negative affect on water quality in the area, RMCC will sample the wells listed above annually during the month of June. The water quality samples will be tested for the analytes listed in Tables 1 through 4 of “The Basic Standards for Ground Water,” excluding the radiological section of Table 1. RMCC will notify DRMS within 7 days of receiving a lab report that indicates any of the standards set forth in Tables 1 through 4 have been exceeded. If a lab report indicates an exceedance, a new sample will be taken to verify the exceedance and discount lab contamination. Any water quality lab results will be included in the DRMS annual report for the site.

Annual groundwater testing will be conducted for the life of the mine unless the requirement has been reduced or eliminated through the Technical Revision process with the DRMS.”

TR2 was submitted by RMCC on March 2, 2023 with the presumed intent of satisfying the requirement for a “detailed sampling and analysis plan” as required by Adequacy Review 3, providing the baseline water level and water quality data collected by RMCC to-date, and comparing analytical data to the to the Interim Narrative Standards for Groundwater contained in Tables 1-4 of “The Basic Standards for Ground Water”.

DRMS has completed the initial adequacy review of TR2. As with most revisions of this nature, the provided revision will require some clarification of the provided information or submittal of additional information before it can be approved.

Please provide the following information/clarifications:

- 1) In AM1, RMCC committed to mining to final reclamation slopes (3:1) and working within installed slurry walls with the exception of the freshwater pond and settling pond areas. Have these slurry walls been installed at this time? If not, what is the projected schedule for installation?
- 2) The Groundwater Monitoring Plan, dated June 1, 2021, that was re-submitted as part of this TR submittal is not sufficient to ensure compliance with applicable federal and water quality laws and regulations. Please submit a Sampling and Analysis plan consistent with industry standards. An acceptable example of a Sampling and Analysis plan has been attached to illustrate the type of information that should be provided.
- 3) A component of the provided plan should be the identification of “Points of Compliance” and discussion as to why they have been chosen. Pursuant to Rule 3.1.7(6)(b)(i)(A), points of compliance shall be established at some distance hydrologically down-gradient from the facility or activity that is causing, or which has the potential to cause contamination, and selecting that distance closest to the facility or activity, considering the technological feasibility of meeting the requirements for protecting water quality:
 - (I) a specified distance, as determined by Rule 3.1.7(6)(b)(i)(B);
 - (II) the hydrologically down-gradient limit of the area in which contamination has been identified; or
 - (III) the facility permit boundary.
- 4) The raw data analytical data tables provided contain errors and do not include any analysis or discussion with respect to the data collected, why some analytes are missing, or why some Table 1-4 exceedances are not noted. Please review and address as appropriate.
- 5) Please propose site specific Numeric Protection Levels (NPLs) at specified Point of Compliance wells for analytes that exceed Table 1-4 Interim Narrative Standards in baseline data, and describe how these NPL’s are derived based on the available baseline data.
- 6) Please provide graphic trend line summary of all groundwater level data collected for each well.

Independent of TR2, DRMS will also note at this time the following deficiencies with RMCC's groundwater monitoring program as submitted by the permittee during AM1 adequacy.

- 1) RMCC failed to conduct groundwater quality sampling annually as stated above. (no sampling was conducted in 2022 which would have provided additional baseline pre-mining data)
- 2) RMCC failed to provide the water quality data results obtained from the June 2021 sampling event in the 2022 annual report for that site, and instead answered "no" to question 21 which asks specifically "does your permit require you to submit monitoring information annually".

DRMS would like the permittee to commit to preventing these kinds of oversights moving forward, and remind RMCC that, per the adequacy response to AM1, lab data showing exceedances of Table Value Standards should be reported and confirmation sampling conducted.

This concludes the Division's adequacy review of TR2. This letter shall not be construed to mean that there are no other technical issues with the submittal. Other issues may arise as additional information is supplied.

If you have any questions, please contact me at (303) 229-9414, or by e-mail at eric.scott@state.co.us.

Sincerely,

A handwritten signature in blue ink that reads "Eric Scott". The signature is stylized with a large, flowing "E" and a cursive "Scott".

Eric Scott
Environmental Protection Specialist

APPENDIX G-2: BASELINE GROUNDWATER QUALITY DATA

BASELINE GROUNDWATER QUALITY DATA

1. Groundwater Baseline Quality and Quantity Data

Peak Materials has gathered data from 11 monitoring wells located around the property. This data shows the baseline groundwater condition within the alluvial aquifer of the Blue River. The locations of the sampled and measured wells can be found on Figure 1, below. One is located at each corner of the mining area and one is located near the entrance. In particular, GW-2 and GW-5 as well as P1 through P-6 are located adjacent to the wetlands to allow for monitoring of the water level near the wetlands throughout mining operations. The depth from the top of casing to groundwater for each well is shown in Table 1, below. Water quality data can be seen in Table 2, below. LRE Water developed a water quality monitoring plan (provided in Appendix G-3). The depths shown in Table 1 are based on the static water level from each well that were measured during sampling of the wells except for the depths reported on 6/12/2019, which were collected by HRL Compliance. Quality data sampled is based on typical analytes evaluated by the Colorado Division of Reclamation, Mining, and Safety during their review of Designated Mining Operation permits. These permits are typically metal mines with a risk of toxic or acid producing materials; the Peak Ranch Resource operation does not pose this risk. These sampling was conducted to thoroughly establish the groundwater baseline for the site and to allow for long-term water quality and water level monitoring at the site in order to determine if gravel pit operations have impacted the alluvial aquifer.

Five quarters of water sampling data (Q2-4 2019, Q-4 2020) have been collected. Q1 2020 sampling was unable to occur due to the stay-at-home order mandated by the Governor of Colorado. The groundwater wells will continue to be monitored for water depth to improve the operator's knowledge of the water table onsite during operations.

Monitoring Well Construction and Yield Estimate Reports and the ACZ Labs sample results can be found at the end of Appendix G-3. Figure 1 shows the well locations. Table 2 shows a summary of the well sample results.

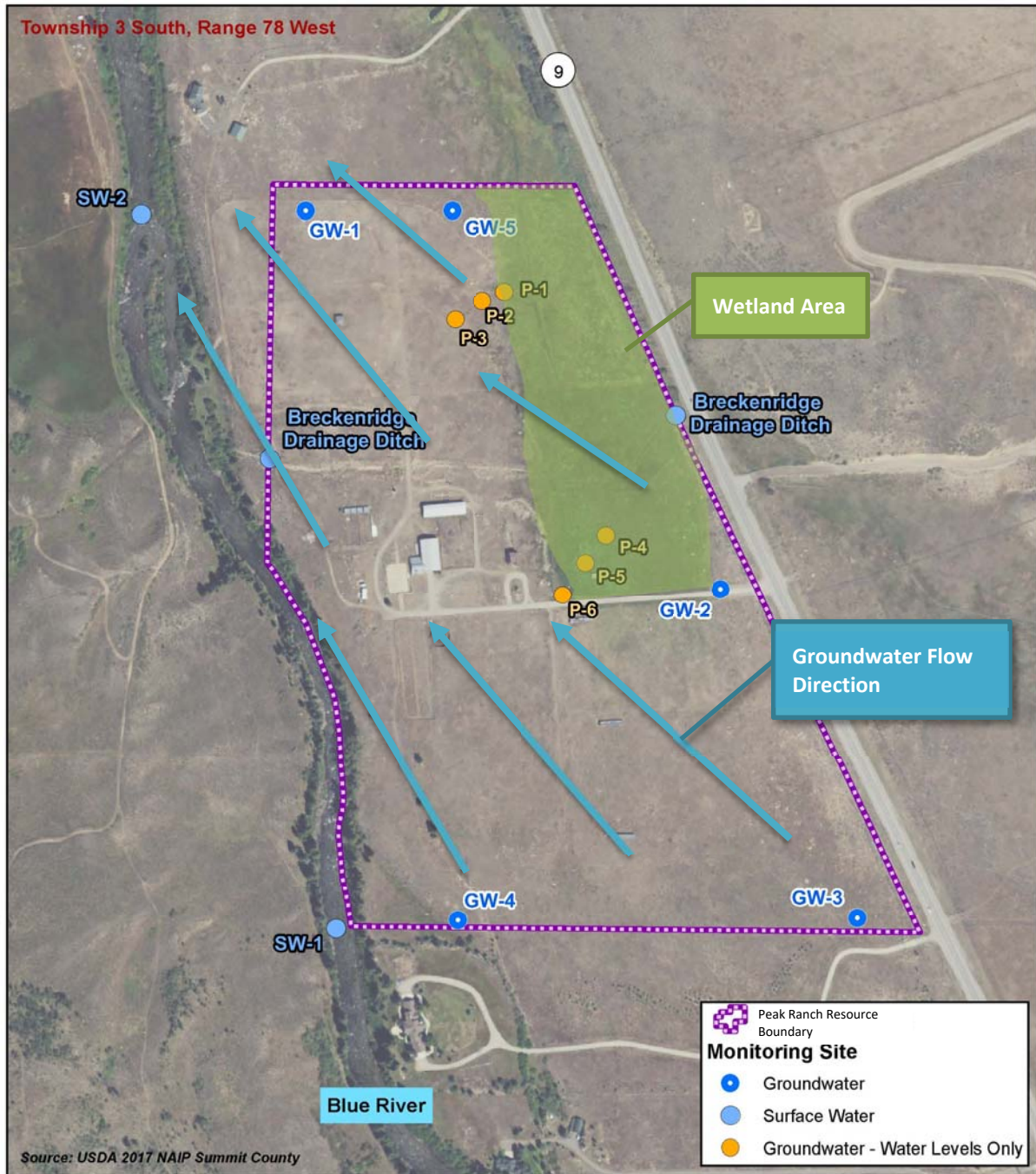
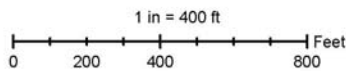


Figure 1
Surface Water and Groundwater Monitoring Well Locations
Peak Materials



Date: 2020-12-14
 File: 1525-2.0
 Drawn: ABS
 Approved: ABS

2. Depth and Flow of Groundwater

The groundwater levels measured in the on-site wells vary in depth over the course of the year. This is typical of alluvial aquifers of this type. The hydrographs (Figure 2 and Figure 3) show how the water table depth and elevation varied over the measurements in 2019 and 2020. Table 1 shows the specific measurements of groundwater depth taken in each well and their UTM locations. All depth measurements from 06/26/19 through present were collected in accordance with the sampling and monitoring plan outlined in Appendix G-3. Depths measured by HRL Compliance on 06/12/19 predate that plan.

2019 was considered typical of the groundwater regime in this area. It was not a drought year, nor was it considered an out of character high water year. As is expected, the groundwater level of the aquifer is highest during the high flow period of the year in the early summer. As the runoff from spring snow melt tapers off and the amount of water in the alluvial system of the Blue River declines, the depth to groundwater increase.

Table 1 - Groundwater Level from Monitoring Wells & Well Location

Depth (ft)	6/12/2019	06/26/19	08/15/19	10/14/19	5/4/2020	6/12/2020	9/15/2020	11/5/2020
GW-1	15.0	13.8	14.5	15.9	19.2	14.74	16.3	17.6
GW-2	10.0	5.5	5.2	9.7	16.4	9.98	9.5	11.1
GW-3	13.0	17.8	17.5	23.8	28.8	19.91	23.1	24.8
GW-4	12.0	11.1	11.3	14.3	17.6	12.06	14.3	15.2
GW-5	5.5	6.56	6.8	9.0	13.7	7.7	9.4	10.8
P-1		-	-	-	13.8	6.5	8.6	9.9
P-2		-	-	-	16.0	9.0	10.9	12.4
P-3		-	-	-	19.6	13.3	15.0	16.4
P-4		-	-	-	13.4	4.2	6.5	8.0
P-5		-	-	-	14.0	5.0	7.4	8.9
P-6		-	-	-	15.4	9.4	8.8	10.3

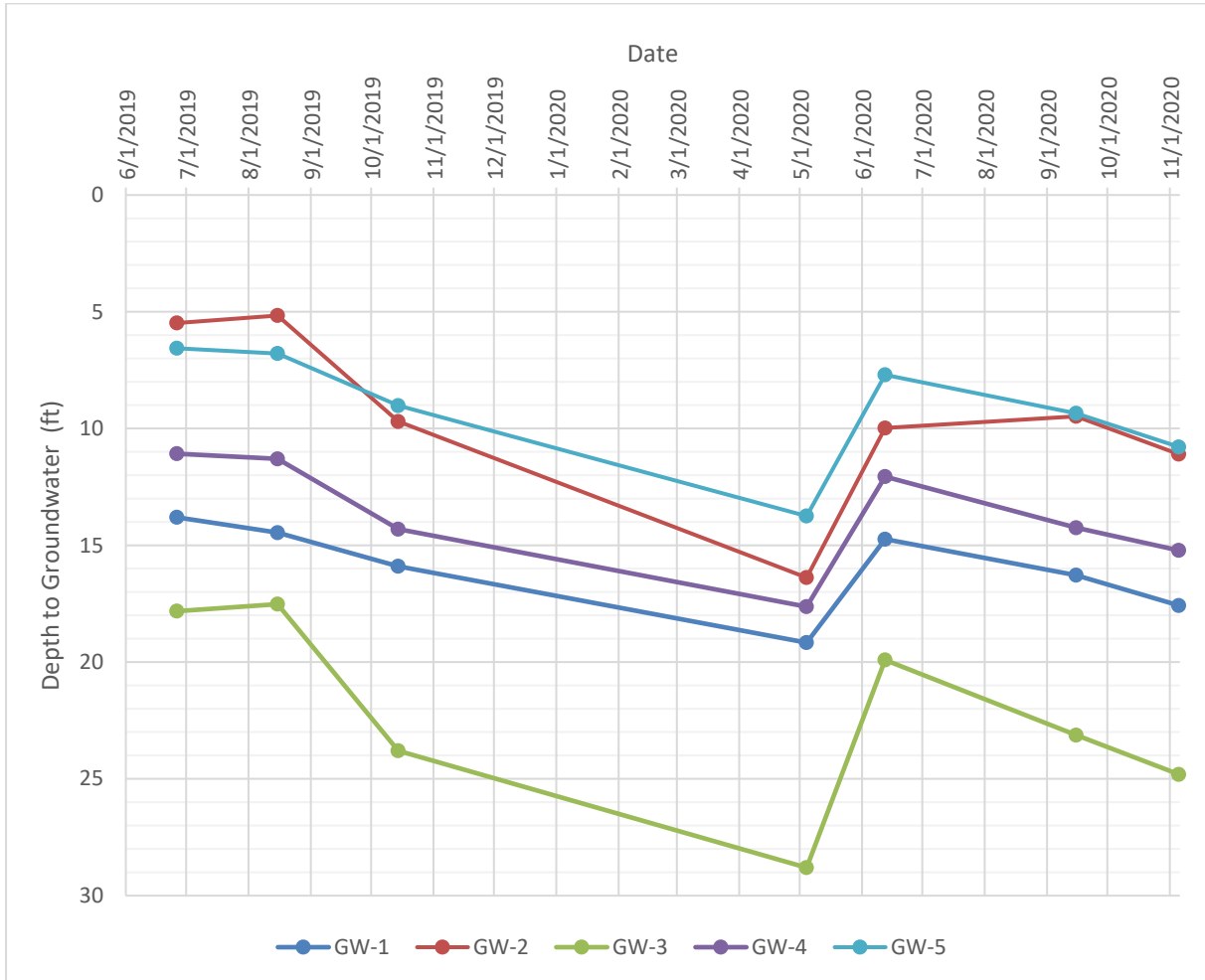
Well Name	UTM X	UTM Y
GW-1	400846.94	4403820.36
GW-2	401280.06	4403468.74
GW-3	401280.64	4403151.85
GW-4	400992.22	4403157.46
GW-5	401036.69	4403838.19
P-1	401058.93	4403742.73
P-2	401038.08	4403734.40
P-3	401011.85	4403716.35
P-4	401155.55	4403510.34
P-5	401136.35	4403483.94
P-6	401114.65	4403452.83

Note: NAD 83, UTM Zone 13N

Groundwater is deepest the farthest from infiltration sources or the river (GW-3) and shallowest near the wetlands in the northeast quadrant of the property (GW-2 & GW-5 and P1 – P-6). The depth to groundwater near the wetland throughout the year is too great for the wetland to be sustained by alluvial groundwater (4.8 ft deep at the shallowest), but given the drainage path passing through the wetland, and that it is a low area for the property (see Map C-1), the wetland area clearly is a source of infiltration to the local alluvium. Surface water enters the wetland area through both seepage through the highway grade and via a culvert under the highway.

Groundwater flow direction is roughly southeast to northwest, towards the Blue River.

Figure 2 – Groundwater Hydrographs (Depth)



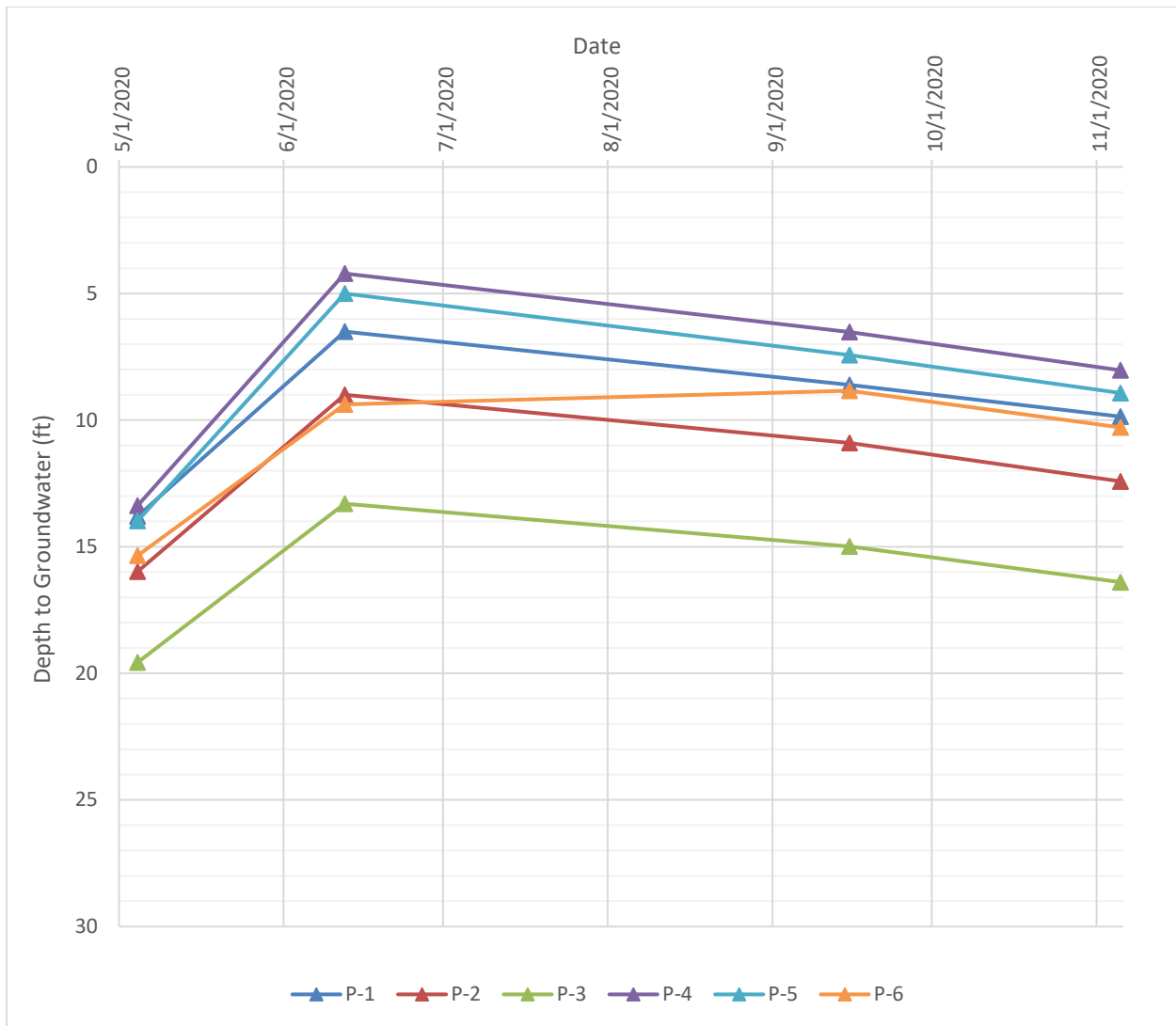
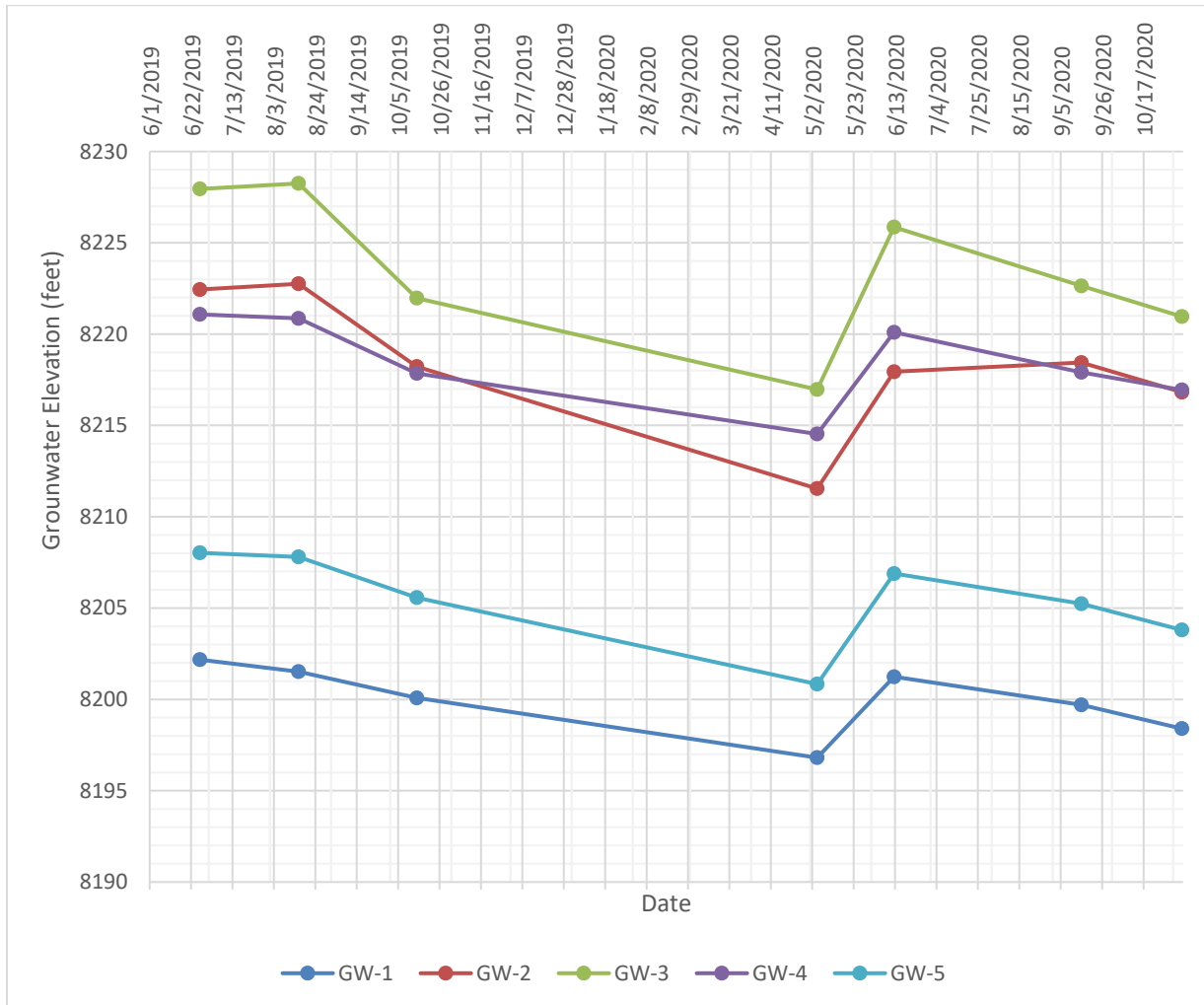


Figure 3 – Groundwater Hydrographs (Elevation)



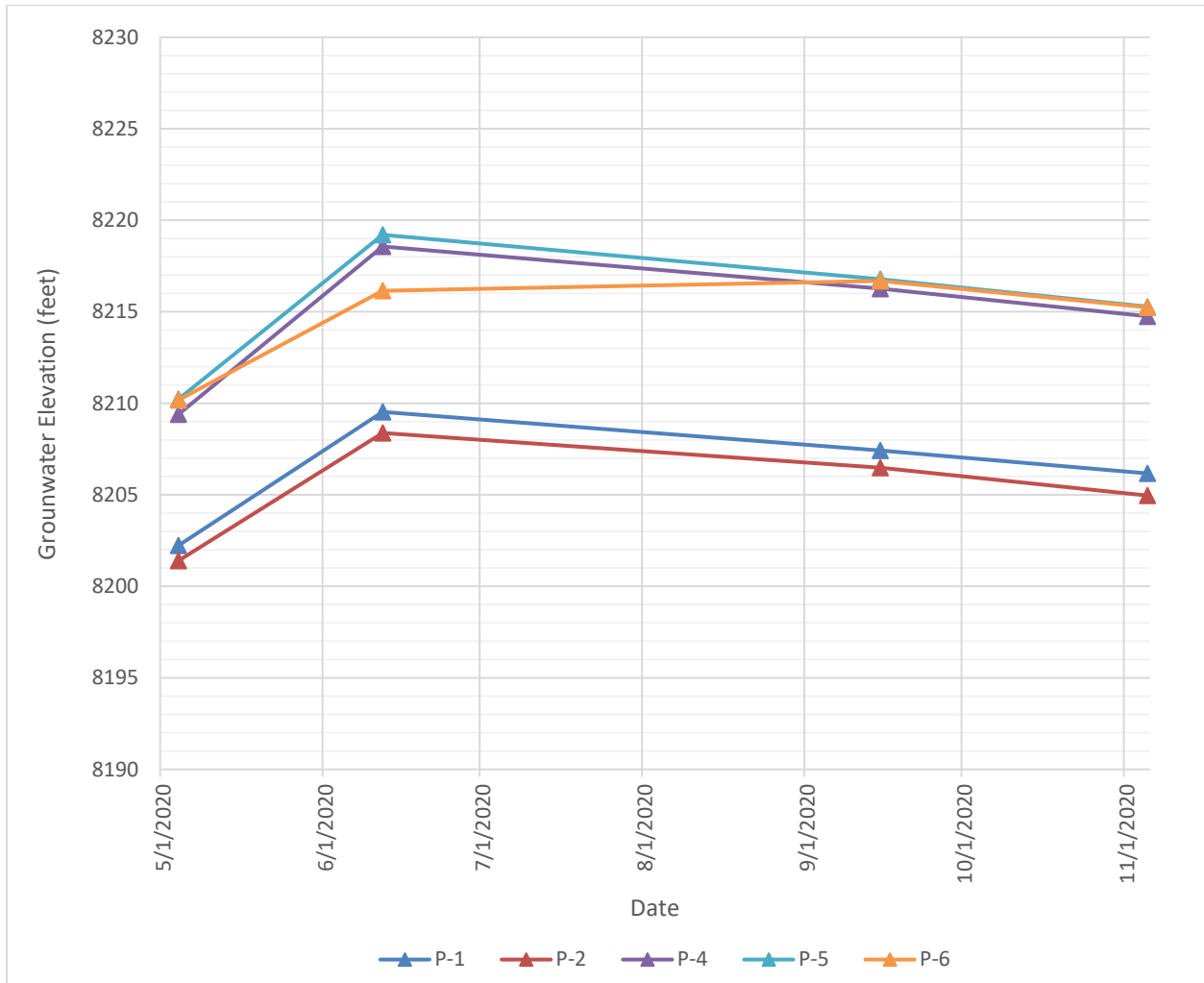


Table 2 - Groundwater Baseline Quality Data

	GW-1						GW-2						GW-3						Compiled Standards ¹
Parameter, Limit	6/26/2019	8/15/2019	10/14/2019	5/4/2020	9/15/2020	11/5/2020	6/26/2019	8/15/2019	10/14/2019	5/4/2020	9/15/2020	11/5/2020	6/26/2019	8/15/2019	10/14/2019	9/15/2020	11/5/2020		
Aluminum, dissolved	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	
Aluminum, total	1.37	0.19	0.19	0.17	19.8	0.339	0.75	0.14	0.08	0.43	0.27	0.3	0.09	0.11	ND	1.19	0.523		
Antimony, dissolved	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.006	
Arsenic, dissolved	ND	0.0002	ND	ND	0.0002	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.01	
Arsenic, total	0.0006	0.0003	0.0003	0.0003	0.0045	0.00038	0.0004	0.0003	0.0002	0.0003	0.0004	0.00025	ND	0.0002	ND	0.0004	0.00028		
Barium, dissolved	0.11	0.104	0.107	0.098	0.097	0.119	0.172	0.15	0.178	0.153	0.168	0.181	0.196	0.176	0.181	0.172	0.28	2	
Beryllium, dissolved	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.004	
Bicarbonate as CaCO3	122	132	137	133	138	130	165	146	181	136	179	164	137	130	135	141	130		
Boron, dissolved	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.75	
Cadmium, dissolved	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.005	
Cadmium, total	ND	ND	ND	ND	0.00036	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Calcium, dissolved	60	59.6	54.9	52.8	50.5	52.6	62.5	55	60.2	54.5	58	62.4	54.8	52.8	51.3	48.8	52.2		
Carbonate as CaCO3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Cation-Anion Balance	2.6	2.6	0	-1.4	-4.3	1.4	-1.2	0	-2.4	-2.7	-7.3	0	0	1.4	0	-5.9	2.8		
Chloride	16.2	11.8	6.8	6.7	8.6	6.24	16	5.1	3.1	12.2	4.3	4.78	14	7.9	4.3	4.9	7.77	250	
Chromium, total	0.002	ND	0.0007	0.0006	0.0188	0.00061	0.0012	ND	ND	0.0009	0.0006	0.00055	ND	ND	ND	0.0014	0.00064	0.1	
Chromium, Trivalent Total	ND	ND	ND	ND	0.019	0	ND	ND	ND	ND	ND	0	ND	ND	ND	ND	0		
Conductivity @25C	380	353	343	338	336	293	392	343	366	341	380	297	358	331	318	321	260		
Copper, dissolved	0.0086	ND	0.0023	ND	0.0011	0.00085	0.0073	ND	0.0013	0.0009	0.0011	ND	0.0078	ND	ND	0.0011	ND	0.2	
Copper, total	0.0022	ND	ND	ND	0.0218	ND	ND	ND	ND	0.0009	ND	0.00082	ND	ND	ND	0.0018	0.00088		
Cyanide, total	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2	
Cyanide, WAD	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Dissolved Chromium, Hexavalent	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
Field Conductivity @25C	376.8	206.3	316	7.35	330.9	351.8	381.3	288.4	347.4	359.6	397.3	389.9	340	305.8	264.6	336.7	345.2		

GW-1			GW-2				GW-3						Compiled Standards ¹					
Parameter, Limit	6/26/2019	8/15/2019	10/14/2019	5/4/2020	9/15/2020	11/5/2020	6/26/2019	8/15/2019	10/14/2019	5/4/2020	9/15/2020	11/5/2020	6/26/2019	8/15/2019	10/14/2019	9/15/2020	11/5/2020	
Field Dissolved Oxygen	7.36	7.73	5.68	7.35	6.98	6.42	7.98	7.81	6.61	7.5	10.79	8.36	6.28	5.52	6.21	9.64	6.82	
Field pH	7.25	7.41	7.54	7.79	8	8.01	6.83	7.48	7.55	7.62	7.91	7.78	7.17	7.59	7.65	7.37	8.07	6.5 - 8.5
Field Temperature	6.9	8.5	10.3	7.6	11.8	10.7	7.4	9.1	10.4	7.9	11.7	10.4	8.2	7.6	7.4	9	8.6	
Field Turbidity	15.30	5.49	6.99	10.10	121.00	2.55	3.99	2.69	2.24	2.51	3.74	1.15	1.60	1.89	1.04	2.60	2.94	
Fluoride	0.3	0.3	0.2	0.3	ND	0.28	0.2	0.4	0.2	0.3	0.2	0.22	0.3	0.4	0.2	0.2	0.23	2
Hardness as CaCO3 (dissolved)	176	175	162	156	148	155	189	166	182	166	175	189	162	157	152	145	156	
Hydroxide as CaCO3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Iron, dissolved	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.3
Iron, total	1.41	0.16	0.23	0.14	17.3	0.29	0.82	0.14	0.1	0.37	0.21	0.246	0.12	0.09	ND	0.84	0.399	
Lead, dissolved	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.05
Lead, total	0.0013	0.0002	0.0001	0.0001	0.016	0.00027	0.0008	0.0001	ND	0.0003	0.0002	0.00024	0.0001	ND	ND	0.0008	0.00036	
Magnesium, dissolved	6.4	6.4	6	5.9	5.4	5.76	7.9	7	7.7	7.2	7.3	8.06	6.2	6	5.9	5.7	6.13	
Manganese, dissolved	0.0013	ND	ND	ND	0.0005	ND	0.0012	ND	0.0011	ND	ND	ND	ND	ND	ND	0.0023	ND	0.05
Manganese, total	0.0235	0.0028	0.0035	0.0023	0.315	0.00466	0.0172	0.003	0.0017	0.0077	0.004	0.0042	0.002	0.0016	ND	0.0132	0.00543	
Mercury, dissolved	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.002
Mercury, total	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Molybdenum, dissolved	0.03	0.02	0.03	ND	0.02	0.025	ND	ND	ND	ND	ND	ND	0.02	ND	0.02	ND	ND	0.21
Molybdenum, total	ND	0.03	0.03	0.03	ND	0.031	ND	ND	ND	ND	ND	ND	ND	0.02	ND	ND	0.021	
Nickel, dissolved	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1
Nitrate/Nitrite as N	4.14	1.25	0.61	2.77	0.72	0.526	1.35	0.8	0.44	0.73	0.53	0.379	0.5	0.62	0.42	0.47	0.398	10
Nitrogen, ammonia	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Phosphorus, ortho dissolved	0.01	0.01	0.01	0.01	0.01	0.015	0.02	ND	0.01	0.01	ND	0.012	ND	ND	ND	ND	ND	
Potassium, dissolved	1.6	1.8	1.7	1.5	1.7	1.79	1.2	1.3	1.3	1	1.4	1.39	1.4	1.4	1.3	1.3	1.4	
Residue, Filterable (TDS) @180C	238	214	196	218	226	204	218	194	212	202	222	240	206	198	190	212	198	400
Residue, Non-Filterable (TSS) @105C	25	ND	7	ND	54	5	19	ND	ND	25	9	5	ND	ND	ND	41	5	

	GW-1						GW-2						GW-3						Compiled Standards ¹
Parameter, Limit	6/26/2019	8/15/2019	10/14/2019	5/4/2020	9/15/2020	11/5/2020	6/26/2019	8/15/2019	10/14/2019	5/4/2020	9/15/2020	11/5/2020	6/26/2019	8/15/2019	10/14/2019	9/15/2020	11/5/2020		
Selenium, dissolved	0.0006	0.0005	0.0004	0.0008	0.0004	0.00052	0.0006	0.0007	0.0004	0.0007	0.0005	0.00044	0.0004	0.0004	0.0005	0.0007	0.00062	0.02	
Silica, dissolved	8.5	9.3	9.4	8.6	8.9	9.2	9.6	9.6	10.4	9.6	10	10.6	8.7	8.6	8.7	8.2	8.5		
Silver, dissolved	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.05	
Sodium, dissolved	6.5	6.9	6.6	6.4	6.4	7.12	8.1	7.3	6.5	4.8	6.2	5.68	9.7	9.5	6.1	5.7	11.5		
Sulfate	35.2	34.5	29.4	31	29.5	28.8	27.7	31.2	22.8	32.8	30.9	32	28.1	29.3	25.7	27.8	30.5	250	
Sulfide as S	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.02	ND		
Sum of Anions	3.7	3.7	3.6	3.5	3.6	3.4	4.3	3.7	4.2	3.8	4.4	4.1	3.7	3.5	3.4	3.6	3.5		
Sum of Cations	3.9	3.9	3.6	3.4	3.3	3.5	4.2	3.7	4	3.6	3.8	4.1	3.7	3.6	3.4	3.2	3.7		
Thallium, dissolved	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.002	
Total Alkalinity	122	132	137	133	138	130	165	146	181	136	179	164	137	130	135	141	130		
Uranium, dissolved	0.0013	0.0014	0.0014	0.0014	0.0015	0.00146	0.002	0.0019	0.0021	0.0017	0.0023	0.00231	0.0014	0.0013	0.0013	0.0014	0.0014	0.03	
Vanadium, dissolved	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	
Zinc, dissolved	ND	ND	ND	ND	ND	ND	ND	ND	0.005	0.02	ND	ND	ND	ND	ND	ND	ND	2	
Zinc, total	0.009	0.006	0.007	ND	0.08	ND	0.005	0.005	0.007	ND	ND	ND	ND	0.006	0.005	0.007	ND		

¹Compiled Standards: Water Quality Control Commission, Regulation 41, Interim Narrative Standards, Tables 1-4, compiled to show the most stringent standard for each analyte.
ND = Not detectable. See the attached ACZ Lab Reports for detection limits.
NM = Not measured



Parameter, Limit	GW-4						GW-5						Compiled Standards ¹
	6/26/2019	8/15/2019	10/14/2019	5/4/2020	9/15/2020	11/5/2020	6/26/2019	8/15/2019	10/14/2019	5/4/2020	9/15/2020	11/5/2020	
Aluminum, dissolved	ND	0.19	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5
Aluminum, total	1.3	0.41	0.25	0.19	0.33	1.59	3.33	0.6	0.41	0.47	3.43	1.41	
Antimony, dissolved	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.006
Arsenic, dissolved	ND	ND	ND	ND	ND	ND	ND	0.0002	ND	ND	ND	ND	0.01
Arsenic, total	0.0005	0.0003	ND	ND	0.0002	0.00075	0.0011	0.0004	0.0003	0.0003	0.0008	0.00045	
Barium, dissolved	0.117	0.116	0.131	0.124	0.11	0.118	0.089	0.093	0.105	0.078	0.096	0.0925	2
Beryllium, dissolved	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.004
Bicarbonate as CaCO3	86.2	93.3	102	96.3	105	99.9	160	195	192	171	200	187	
Boron, dissolved	ND	ND	ND	ND	ND	ND	ND	0.03	ND	ND	ND	ND	0.75
Cadmium, dissolved	ND	0.00011	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.005
Cadmium, total	0.00011	0.00007	ND	ND	0.00007	0.000154	0.0001	0.00006	ND	ND	0.00008	0.000058	
Calcium, dissolved	45.9	46.5	45.8	47.9	40.3	43.1	68.9	71.2	73.1	66.2	70.8	73.4	
Carbonate as CaCO3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Cation-Anion Balance	-1.5	1.5	0	1.5	-4.9	0	2.2	0	2.1	-2.2	-3.1	2.1	
Chloride	22.3	20.3	14.4	18.8	14.7	13	11.4	13.3	4.2	11.5	5.4	3.99	250
Chromium, total	0.0018	0.0006	ND	0.0007	0.0006	0.00191	0.0046	0.0008	0.0006	0.0012	0.0031	0.00168	0.1
Chromium, Trivalent Total	ND	ND	ND	ND	ND	0	ND	ND	ND	ND	ND	0	
Conductivity @25C	328	323	324	331	307	249	423	429	442	425	464	352	
Copper, dissolved	0.0077	0.0012	ND	ND	ND	0.00086	0.0076	0.001	0.0022	0.0009	0.001	0.00111	0.2
Copper, total	0.0026	0.0011	ND	ND	0.0009	0.0026	0.0075	0.0019	0.0013	0.0012	0.0047	0.00231	
Cyanide, total	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2
Cyanide, WAD	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Dissolved Chromium, Hexavalent	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Field Conductivity @25C	305.9	302.8	299.5	344	314.9	321.1	411.4	292.8	419.9	435	471.6	462.3	
Field Dissolved Oxygen	4.12	4.21	3.7	9.9	7.2	5.53	5.59	2.55	3.45	7.41	6.97	6.36	
Field pH	6.71	6.99	7.06	7.3	7.16	7.55	7.22	7.06	7.05	7.61	6.84	7.59	6.5 - 8.5

Parameter, Limit	GW-4						GW-5						Compiled Standards ¹
	6/26/2019	8/15/2019	10/14/2019	5/4/2020	9/15/2020	11/5/2020	6/26/2019	8/15/2019	10/14/2019	5/4/2020	9/15/2020	11/5/2020	
Field Temperature	7.5	7.9	9.4	6.1	11.2	9.4	8.6	12.4	10.3	7.7	11.8	10.5	
Field Turbidity	14.80	6.19	8.60	10.00	2.16	13.17	5.74	9.84	13.40	16.00	13.03	18.47	
Fluoride	0.3	0.3	0.2	0.3	0.2	0.26	0.4	0.4	0.2	0.3	ND	0.38	2
Hardness as CaCO3 (dissolved)	138	142	138	146	121	130	212	219	225	204	217	227	
Hydroxide as CaCO3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Iron, dissolved	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.3
Iron, total	1.34	0.42	0.27	0.18	0.25	1.51	3.63	0.54	0.38	0.43	2.43	1.24	
Lead, dissolved	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.05
Lead, total	0.0012	0.0004	0.0002	0.0002	0.0003	0.00135	0.0035	0.0005	0.0003	0.0004	0.0023	0.00115	
Magnesium, dissolved	5.8	6.3	5.8	6.3	5	5.49	9.7	10	10.4	9.5	9.8	10.5	
Manganese, dissolved	0.0016	0.0394	ND	ND	ND	0.00527	0.0009	0.0017	0.0182	ND	ND	ND	0.05
Manganese, total	0.0893	0.0486	0.0184	0.0237	0.0341	0.129	0.0661	0.0097	0.0056	0.0081	0.0393	0.0208	
Mercury, dissolved	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.002
Mercury, total	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Molybdenum, dissolved	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.21
Molybdenum, total	ND	ND	ND	ND	ND	0.021	ND	ND	ND	ND	ND	ND	
Nickel, dissolved	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1
Nitrate/Nitrite as N	0.35	0.38	0.24	0.34	0.31	0.296	0.33	0.17	0.53	0.49	0.64	0.404	10
Nitrogen, ammonia	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Phosphorus, ortho dissolved	0.02	ND	0.03	0.01	ND	0.012	0.01	0.02	0.02	0.01	0.03	0.012	
Potassium, dissolved	1.5	1.6	1.6	1.4	1.6	1.68	1.5	1.8	1.6	1.6	1.6	1.49	
Residue, Filterable (TDS) @180C	198	194	192	202	186	196	254	262	256	258	298	270	400
Residue, Non-Filterable (TSS) @105C	29	18	ND	ND	ND	41	78	7	5	ND	12	20	
Selenium, dissolved	0.0002	0.0003	0.0002	0.0003	0.0002	0.00026	0.0023	0.0004	0.0011	0.0027	0.0019	0.00154	0.02
Silica, dissolved	9.6	10.4	10.6	9.6	10.3	10.6	10.2	12.6	11.7	10.5	11.1	10.9	

GW-4							GW-5						Compiled Standards ¹
Parameter, Limit	6/26/2019	8/15/2019	10/14/2019	5/4/2020	9/15/2020	11/5/2020	6/26/2019	8/15/2019	10/14/2019	5/4/2020	9/15/2020	11/5/2020	
Silver, dissolved	ND	ND	0.0009	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.05
Sodium, dissolved	9.7	10.2	10.1	9.3	9.5	10.3	6.4	7.7	7.1	6.4	6.7	6.7	
Sulfate	43.3	39.9	39.7	39	30.3	35.8	42.8	23.8	35.8	38.5	41.6	36.9	250
Sulfide as S	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Sum of Anions	3.3	3.3	3.3	3.3	3.2	3.1	4.4	4.8	4.7	4.6	5	4.7	
Sum of Cations	3.2	3.4	3.3	3.4	2.9	3.1	4.6	4.8	4.9	4.4	4.7	4.9	
Thallium, dissolved	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.002
Total Alkalinity	86.2	93.3	102	96.3	105	99.9	160	195	192	171	200	187	
Uranium, dissolved	0.0011	0.0019	0.0015	0.0017	0.0014	0.0015	0.0027	0.0024	0.0024	0.0025	0.0028	0.00299	0.03
Vanadium, dissolved	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1
Zinc, dissolved	ND	0.012	ND	ND	ND	ND	ND	ND	0.004	ND	ND	ND	2
Zinc, total	0.008	0.006	0.006	ND	ND	0.0092	0.019	0.008	0.007	ND	0.015	0.0095	

¹Compiled Standards: Water Quality Control Commission, Regulation 41, Interim Narrative Standards, Tables 1-4, compiled to show the most stringent standard for each analyte.
ND = Not detectable. See the attached ACZ Lab Reports for detection limits.
NM = Not measured



APPENDIX G-3: WATER QUALITY MONITORING PLAN

WATER QUALITY MONITORING PLAN

Peak Materials Hillyard Site

Prepared for:
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ATTACHMENT 1 Well Construction and Yield Estimate Reports

ATTACHMENT 2 ACZ Lab Results

1.0 INTRODUCTION

This water quality monitoring plan (Plan) will to be implemented at the Peak Ranch gravel pit project located in Summit County, approximately 11 miles northwest of Silverthorne, Colorado. The purpose of this plan is to protect the integrity of the region's surface and groundwater quality and to meet the requirements set forth in Division of Reclamation, Mining and Safety (DRMS) rules and regulations and the Colorado Department of Public Health and Environment (CDPHE) Regulation No. 33.

The monitoring plan provides for the collection of pre-operational water quality data (baseline data) that will ultimately be used to compare with results from continuing long-term water quality monitoring. Collection of pre-operational groundwater levels will also occur as part of the plan. Results generated will be used to evaluate whether any adverse impacts on water quality has occurred from Peak Ranch gravel pit project operation. The Plan is discussed in more detail below.

This plan was revised in December 2020 to incorporate recommendations by the DRMS. Monitoring of the water quality in the Phase II unlined pond and the Breckenridge Drainage Ditch will occur under the revised plan as well as collection of water quality samples from adjacent residential well owners within 600 feet.

2.0 WATER QUALITY MONITORING PLAN

The goal of the water quality Monitoring plan is to provide baseline and long-term water quality data for surface and groundwater conditions at the site. Long-term monitoring results will be compared to baseline conditions to determine if gravel pit operations have impacted water quality either from mining activity or from trucks moving mined material offsite.

2.1 Sampling Methodology

This section identifies the surface and groundwater sampling locations, selected parameters, frequency of tests, analytical techniques, the method of interpreting the results of the tests, and general program operation.

2.1.1 Sample Locations

Nine sampling locations have been identified to evaluate pre-operation water quality and potential impacts to surface and groundwater. The location of the monitoring stations are shown in **Figure 1**, and summarized in **Table 1** below. The Well Construction and Yield Estimate Reports for the monitoring wells are provided in Attachment 1. Additionally, Peak Materials will offer to take a water quality sample from the adjacent residential well owners within 600 feet, prior to commencement of mining operations.

Table 1
Surface and Groundwater Monitoring Stations

Station	Type	Location	Purpose
SW-1	Surface Water	Blue River, upstream from the Gravel Pit	To monitor the Blue River upstream of the mining operation. Defines the condition of the river prior to any possible impact from gravel pit.
SW-2	Surface Water	Blue River, downstream from the Gravel Pit	To monitor the Blue River downstream of the gravel pit. Can compare results to the upstream station results to determine what offsite impacts, if any, the river is seeing.
GW-1	Groundwater	On-site to the northwest of the mining envelope	To monitor the groundwater downgradient of the gravel pit. Can compare results to the up-gradient station results to determine if any impacts to groundwater have occurred.
GW-2	Groundwater	On-site to the west by the entrance of the gravel pit	To monitor the groundwater in the vicinity of the entrance of the gravel pit.
GW-3	Groundwater	On-site to the southeast of the mining envelope	To monitor the groundwater up-gradient of the mining operation. Defines the condition of the groundwater prior to any possible impact from gravel pit.
GW-4	Groundwater	On-site to the southwest of the mining envelope	To monitor the groundwater up-gradient of the mining operation. Defines the condition of the groundwater prior to any possible impact from gravel pit.
GW-5	Groundwater	On-site to the northwest of the mining envelope	To monitor the groundwater downgradient of the gravel pit. Can compare results to the up-gradient station results to determine if any impacts to groundwater have occurred.
Breckenridge Drainage Ditch	Surface Water	On-site ditch transecting Peak Ranch	To monitor the surface water passing across the Peak Ranch site via an east-west drainage ditch.
Phase II Unlined Pond	Surface Water / Groundwater	Unlined pond within the mining envelope.	To monitor the surface water and groundwater within the mining excavations below groundwater.

Stations SW-1 and SW-2, located on the Blue River upstream and downstream of the mining envelope, will allow investigators to determine if the mining operation is adversely impacting the quality of the Blue River. Similarly, Stations GW-4/GW-3 and GW-1/GW-5 will facilitate a comparison of groundwater water quality above and below the mining envelope. This paired sampling will allow investigators to determine if the mining operation is adversely impacting the quality of the surface water or groundwater within the vicinity of the mining operation.

Groundwater samples will be collected and analyzed from one additional groundwater monitoring well (Station GW-2) and the Phase II unlined pond. Surface water samples will be collected from the Breckenridge Drainage Ditch where the ditch enters and exits the Peak Ranch property and when there is flow present in the ditch.

2.1.2 Monitoring Frequency

The water quality monitoring plan has two time periods: Baseline Phase consists of sample collection that will occur prior to mining activity occurring on the site. Operational Phase will occur on an ongoing basis once the gravel pit is operational and continue until mining ceases.

1. Baseline Phase, Prior to Mining Activity. Peak Ranch has initiated its pre-operational water quality sampling program. Water samples will be collected and groundwater levels will be measured on June 26, 2019. Samples will continue to be collected quarterly with a goal of having five pre-operational samples to characterize the baseline condition.
2. Operational Phase, Long Term Operation. Samples will be collected four times per year. The monitoring will take place in the following months: March, June, August and early October. The frequency of sampling for long-term monitoring can be reduced in the future if no adverse water quality impacts are detected.

2.1.3 Monitoring Parameters

Peak Materials will conduct field and laboratory analysis on 50 different water quality parameters at each site. A list of the 50 parameters are shown in **Table 2**. All analysis of “non-field” measurements will be performed by ACZ Laboratories, Inc a State of Colorado certified laboratory that follows accepted industry standards and quality assurance/quality control (QA/QC) procedures. An alternate certified laboratory may be used if there are unforeseen circumstances that require a change in the laboratory.

2.1.4 Sampling Protocol

The following protocol will be used to collect water samples:

1. Specific bottles will be ordered from ACZ Laboratories, Inc to collect the water samples.
2. Static water levels in the wells will be measured and recorded using a water level well sounder prior to any pumping of the well. The measurement location at the top edge

of the casing will be marked with permanent ink pen and should be touched up with fresh ink at each sampling event.

3. Monitoring wells will be purged prior to sample collection. A low flow submersible pump will be cleaned prior to being placed in the well. Removal of a least three well volumes will occur prior to sampling. The static volume of water in the well will be calculated using the following equation:

$$V = r^2 h (0.163)$$

Where

V = static volume of water in well (in gallons)

r = inner radius of well casing (in inches)

h = length of water column (in feet) which is equal to the total well depth minus depth to water.

0.163 = a constant conversion factor that compensates for the conversion of the casing radius from inches to feet for 2-inch diameter wells and the conversion of cubic feet to gallons, and pi (A). This factor would change for different diameter wells.

The purged volume of water will be measured using a gallon bucket in order to verify that the static volumes in the wells are evacuated prior to sample collection.

4. Measurements of pH, temperature, dissolved oxygen, turbidity, and conductivity will be collected in the field. The meters will be cleaned and calibrated prior to measurements.
5. Water will be pumped or collected into a clean pitcher or bottle and then the individual bottles will be filled and the date and time the samples were collected will be marked on the bottle along with who collected the sample and the site location. If a pump controller system is used, the sample bottles can be filled directly. Samples will then be placed in a cooler with ice.
6. A chain of custody form will be completed and will indicate what analysis needs to be run, the date and time collected, sample identification and who assembled the sample. The samples will be shipped via overnight delivery to the lab.

2.2 Analytical Procedures

The analytical water quality results will be evaluated by results will be comparing results to State water quality standards.

2.2.1 Comparison to State Water Quality Standards

The analytical results will be compared to the regulatory limits established by the Colorado Water Quality Control Commission (WQCC). These limits are published by the State in The Basic Standards for the Upper Colorado, Planning Region 12, which includes the Blue River. Surface water data will be compared to the Stream Segment Standards for Segment 17: Mainstem of the Blue River from the outlet of Dillon Reservoir to the confluence with the Colorado River. The groundwater water quality data will be compared to standard values in Tables 1-4 of Regulation 41. If exceedances of any of the water quality standards are detected, the DRMS will be notified in accordance with Rule 3.1.7(9) and Peak Materials will initiate a water quality mitigation plan as discussed in more detail in Section 2.2.3 below.

2.2.2 Gravel Pit Exceedance Mitigation Plan

If limits are exceeded under either of the two analytical protocols discussed above, Peak Materials will implement the following mitigation procedures.

- Notify the DRMS of the exceedance within five days of either, receiving the analytical report from the laboratory or completing the described regression analysis.
- Identify the potential causes/sources of the exceedance parameters.
- Implement supplemental water quality sampling. If exceedances are detected, Peak Materials will implement a supplemental monitoring program that will involve weekly sampling of the stations where the exceedance was detected. Only parameter(s) which exceeded the regulatory limits will be analyzed weekly and will continue to be monitored until the parameter(s) drop below the allowable limit.
- Consult with the Summit County Department of Environmental Health regarding appropriate mitigation action(s). Such action might include reducing or eliminating the use of the compound(s) in question.
- A supplementary report will be filed with the County detailing the exceedance, mitigation measures, and results.

2.3 Annual Report

A water quality summary report will be prepared annually by December 31st of each year. The report will present summaries of the data collected during the previous year and will compare such data to State water quality standards and the baseline monitoring results.

Currently, five quarters of water sampling data have been collected. Sample results from ACZ Labs can be found in Attachment 2.

Table 2
Baseline and Operational Water Quality Parameters
Surface and Groundwater Stations

Analyte	Phase	EPA Method	Units
1 Aluminum	Diss. & Total	M200.7 ICP	mg/L
2 Nitrogen, Ammonia		M350.1 Auto Salicylate w/gas diffusion	mg/L
3 Antimony	dissolved	M200.8 ICP-MS	mg/L
4 Arsenic	Diss. & Total	M200.8 ICP-MS	mg/L
5 Barium	dissolved	M200.7 ICP	mg/L
6 Beryllium	dissolved	M200.8 ICP-MS	mg/L
7 Bicarbonate as CaCO ₃		SM2320B - Titration	mg/L
8 Boron		M200.7 ICP	mg/L
9 Cadmium	Diss. & Total	M200.8 ICP-MS	mg/L
10 Calcium	dissolved	M200.7 ICP	mg/L
11 Carbonate as CaCO ₃		SM2320B - Titration	mg/L
12 Cation-Anion Balance		Calculation	mg/L
13 Chloride		SM4500Cl-E	mg/L
14 Chromium III	Diss. & Total	M200.7 ICP, Calculation (Total - Hexavalent)	mg/L
15 Chromium VI	dissolved	SM3500Cr-B	mg/L
16 Conductivity @25C	Field & Lab	SM2510B	umhos/cm
17 Copper	Diss. & Total	M200.8 ICP-MS	mg/L
18 Cyanide	Total & WAD	SM4500-CN I, Ecolorimetric w/ distillation	mg/L
19 Fluoride		SM4500F-C	mg/L
20 Hardness as CaCO ₃	dissolved	SM2340B - Calculation	mg/L
21 Hydroxide as CaCO ₃		SM2320B - Titration	mg/L
22 Iron	Diss. & Total	M200.7 ICP	mg/L
23 Lead	Diss. & Total	M200.8 ICP-MS	mg/L
24 Magnesium	dissolved	M200.7 ICP	mg/L
25 Manganese	dissolved	M200.8 ICP-MS	mg/L
26 Mercury	Diss. & Total	M245.1 CVAA	mg/L
27 Molybdenum	Diss. & Total	M200.7 ICP	mg/L
28 Nickel	dissolved	M200.7 ICP	mg/L
29 Nitrate/Nitrite as N		M353.2 - H ₂ SO ₄ preserved	mg/L
30 pH	Field & Lab	SM4500H+ B	Units
31 Phosphorus		M365.1 - Automated Ascorbic Acid	mg/L
32 Potassium	dissolved	M200.7 ICP	mg/L
33 Residue	Filterable (TDS) @180C	SM2540C	mg/L
34 Residue	Non-Filterable (TSS) @105C	SM2540D	mg/L
35 Selenium	dissolved	M200.8 ICP-MS	mg/L
36 Silica	dissolved	M200.7 ICP	mg/L
37 Silver	dissolved	M200.8 ICP-MS	mg/L
38 Sodium	dissolved	M200.7 ICP	mg/L
39 Sulfate		D516-02/-07 - Turbidimetric	mg/L
40 Sulfide		SM4500S2-D	mg/L
41 Sum of Anions			meq/L
42 Sum of Cations			meq/L
43 Temperature	Field		°C
44 Thallium	dissolved	M200.8 ICP-MS	mg/L
45 Total Alkalinity		SM2320B - Titration	mg/L
46 Turbidity	Field		NTU
47 Uranium	dissolved	M200.8 ICP-MS	mg/L
48 Vanadium	dissolved	M200.8 ICP-MS	mg/L
49 Zinc	Diss. & Total	M200.8 ICP-MS	mg/L
50 Dissolved Oxygen	Field		mg/L



Figure 1
Surface Water and Groundwater Monitoring Well Locations
Peak Materials

Attachment 1

Well Construction and Yield Estimate Reports

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