



Date: January 22, 2024

To: Sydney Connor

From: Jocelyn Carter, DRMS Groundwater Task Force

**Re: Limon Sand and Gravel Resource File No. M2024053, Groundwater Monitoring Plan Adequacy Review**

**1 Background Information**

**1.1 Site Description**

1. The description of the physical geology of the site and sampling area is lacking. Provide more details about the topography, land use, surface cover, all relevant physical features, past and present activities, existing structures, etc. Provide more details about the current physical settings of the area, including more information about the topography and about the Big Sandy Creek (i.e. the total elevation change, the distribution of elevation changes, the creek's dimensions, flow direction, seasonal flow patterns, etc.).
2. The permit file shows that there was a previous 111 permit within the proposed permit area. Provide details about this area in the site description of the GWMP.
3. More detail is needed to fully describe the geology of the area. Maps or cross section information may be helpful to better describe how the thickness of the overburden varies in depth across the site and the Big Sandy Creek. Provide information about the presence

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of faults and other major geological structural features in the area.

4. The aquifer description provided in the proposed GWMP is for the Colorado River Basin. The proposed permit area, with the Big Sandy Creek running through it, is located in the Arkansas River Basin. Provide information about the Arkansas River basin for the proposed operation site. Include information about any known aquitards and/or confining layers present within and in the vicinity of the proposed site.
5. Two maps are required within the GWMP. One map to show the vicinity of the proposed permit area and its geographic region. A second map to show the proposed monitoring well locations, the potentiometric contour lines of the existing water table or details about the groundwater directional flow, information on all permitted wells, all springs and seeps, and any geological outcrops that may be present in the area. There is one arrow provided in Figure 2 – Groundwater Sampling Locations, however, one arrow describing the groundwater flow is not sufficient given the large size of the proposed permit area. The two images provided do not meet the requirements of a map as outlined by Rule 6.2.1(2) and the Guidance Document. Please provide two maps that meet the requirements outlined in Rule 6.2.1(2) (with the exception of the scale requirements) and that includes all of the required information given in item 1.1. Site Description of the Guidance Document.

## **1.2 Baseline Groundwater Characterization**

6. The proposed network of three groundwater monitoring wells is not sufficient to allow for the assessment of the potential impacts to the prevailing hydrologic balance by the proposed future mining operation. As stated before, the Big Sandy Creek runs through the proposed site, with the permit boundary extending to the north and south of the Big Sandy Creek. Depending on the geological setting information provided in response to item #5 above, the GWMP should have at minimum 3-4 monitoring wells for mining phases 1 and 6, 3-4 monitoring wells for mining phases 2 and 3, and 3-4 monitoring wells for mining phases 4 and 5. Please design a network of groundwater monitoring wells that will be sufficient to assess the current groundwater characteristics and be able to affectively monitor the groundwater conditions throughout mining operations.
7. The proposed four groundwater monitoring wells, GW-1, GW-2, GW-3, and GW-4, are not all located within the proposed permit area. According to the Guidance Document, all groundwater monitoring wells should be within the permit area. The requested network (see item #6 above) should have all of the groundwater monitoring wells located within the proposed permit area.

### **1.2.1 Monitoring Well Installation**

8. As stated above, the proposed use of existing wells will not be adequate as they don't meet requirements for proper installation. The existing wells that are within the proposed permitted area (GW-1, GW-2, and GW-3) are not as deep as the proposed mining project which calls for excavating to a depth of approximately 45 feet. All monitoring wells should be at a minimum depth of the proposed mining depth. These requirements will be determined by the nature of the aquifer(s) and the response to the overall site description (see items #1, #2, #3, and #4 above). The requested network of monitoring wells (see #6 above) should be at an appropriate depth based on the aquifer(s), geologic features, and the hydrogeology of the area. Be advised, upon the approval of a more robust monitoring network system, the information about well installation will need to meet the requirements outlined in the Guidance Document.

### **1.2.2 Baseline Groundwater Quantity**

9. Information about the how water quality data will be analyzed is not provided. According to the Guidance Document, information about how this data will be analyzed is required. If a modeling program will be used, provide an explanation for why the modeling program was selected, any assumptions that are made, parameter values for boundary conditions and initial conditions, and the model calibration.
10. A reporting schedule for data collection of the groundwater quantity is stated as being included with the annual report after baseline is established. The Operator should expect to follow the quarterly reporting scheduled outlined in the table below. This reporting schedule will remain in place during the baseline establishment process and for a year after mining operations have begun, at minimum (see item #18 below for more details).

Table 1: Reporting Schedule

Quarter	Reporting Due Date
Q1	May 1
Q2	August 1
Q3	November 1
Q4	February 1 of the next year

## **2. Predicted Impacts to Hydrologic Balance**

11. Provide more detail about the anticipated effects to the groundwater quantity caused by the dewatering and the timescale over which it will be observed. Include information about the anticipated time for recovery to a steady state occur after reclamation activities have been completed.
12. Provide more details about the anticipated effects to groundwater quality the operation may cause. It is stated that “the pit acts as a gravel filter preventing pollution from traveling to the aquifer” on page 7 of the proposed GWMP. Address any quality parameters that may increase or decrease because of the proposed mining operation and the decrease in the sand and gravel layer at the surface (approx. 45 feet in depth). Provide information about the spatial and temporal extent of the possible impacts on both the quantity and the quality of the groundwater.

## **3. Groundwater Monitoring Plan**

### **3.1. Groundwater Points of Compliance**

13. Multiple points of compliance (POC) will be required for the proposed site, including at least one located on the north side and the south side of the Big Sandy Creek and down gradient of the mining proposed mining disturbance. Please reconsider the location of the proposed POC and include at minimum one either side of the Big Sandy Creek. Additional POC locations may be required based on the full description of the site (see items #1, #2, #3, and #4 above).
14. A schedule for monitoring frequency is given in the GWMP under section 3.1. Refer to the above table regarding the reporting schedule that should be expected for the monitoring wells and the POC sites.

## **4. Sampling Methods**

### **4.1 Sampling Location**

15. At this time, the Division cannot affectively assess the adequacy of the proposed locations of the sampling locations due to the insufficient information about the geography, geology, and hydrogeologic setting given for the area. The Division’s suggestion for the number of wells for each proposed mining phase given in item #6, are speculative based on the sizes of the phases. The actual number and the location of the monitoring sites will need to be determined based on the characteristics of the aquifer(s), the geography, geology, and hydrogeology in the area (see items #1, #2, #3, and #4 above).

#### **4.2 Sampling Frequency**

16. The proposed sampling frequency given in the GWMP will not be sufficient to assess any impacts that may be occur after mining activities begin. Please refer to the above table regarding the monitoring schedule that should be expected for the monitoring wells and the POC sites. Monitoring all well sites will allow for the Operator to better implement a mitigation plan prior to any exceedances of a contaminate migrating to a POC location. The Operator should be advised that an exceedance detected at a POC may result in the Division issuing a possible violation in accordance with C.R.S. 34-32.5-116(4)(i) for failure to protect areas outside of the affected land. The Operator is advised to implement a mitigation plan when exceedances are detected at monitoring sites to prevent exceedances from occurring at any POC location.

#### **4.7 State Water Quality Standards**

17. As a mitigating procedure, the Operator proposes consulting with Garfield County Department of Environmental Health and notifying the Garfield County staff of exceedances. The proposed site is not located in Garfield County, please revise the proposed mitigation plan to include contacting local agencies and authorities.

#### **4.8 Reporting**

18. To reiterate, after five (5) consecutive quarters of acceptable data have been collected, baseline standards can be established for the site with the submission of a Technical Revision with the Division. After baseline is established, and mining operations proceed, and groundwater can be exposed. The Operator will be required to maintain a quarterly sampling frequency at all monitoring sites and the POC sites for, at a minimum, a year. The Division will consider reducing sampling frequency through a Technical Revision application that provides evidence, deemed satisfactory by the Division, for a potential reduction in frequency.