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Mr. Jeremy Eddy, PG, Manager
SC Department of Health and Environmental Control
Division of Mining and Solid Waste Management
2600 Bull Street
Columbia, SC 29201

RE: Groundwater Monitoring Plan
Orangeburg Limestone Quarry Site
Plan Date – September 25, 2023

Dear Mr. Eddy:

Kennedy Consulting Services, LLC has prepared this Groundwater Monitoring Plan for the Orangeburg Limestone Quarry on behalf of Vulcan Construction Materials, LLC to describe how the groundwater levels will be monitored during mining operations. As stated in the Plan, the monitoring wells will set limits to the extent of groundwater drawdown at the permit boundary and to track the groundwater drawdown during mining. The Plan will be updated as necessary once the monitoring wells are drilled and surveyed.

Feel free to contact me at your convenience if you should have any questions.

Sincerely,

Craig Kennedy
Principal

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1.0 INTRODUCTION

Kennedy Consulting Services, LLC has prepared a Groundwater Monitoring Plan on behalf of Vulcan Construction Materials, LLC's Orangeburg Limestone Quarry site. The quarry site is located in the mid coastal plain of South Carolina in Orangeburg County along Addidas Road approximately 3.5 miles southeast of Eutawville, SC. The limestone quarry will be a wet mining operation with limited groundwater drawdown in the active pit area to de-saturate the overburden. The wet mining plan of limit groundwater drawdown will allow for efficient mining operations and will protect the neighboring properties from unnatural sinkhole development.

2.0 GROUNDWATER MONITORING

2.1 Purpose of Groundwater Monitoring

With limestone mining, there is potential for sinkhole development if the groundwater levels are lowered below the top of limestone. The mine plan intends to limit dewatering within the pit to maintain groundwater levels at two feet above top of limestone at the mine permit boundaries. With limited mine dewatering and the need to maintain groundwater levels at 2 feet above limestone, it's anticipated the maximum groundwater drawdown in the pit will be approximate 35 feet below ground surface or 57 feet msl.

An additional purpose of monitoring groundwater levels is to ensure neighboring wells are not adversely affected. This is of less concern because of the limited mine dewatering, but nonetheless, the data will be available if a concern arises that a neighboring domestic well malfunctions.

2.2 Proposed Well Installations and Locations

The Plan has 7 groundwater monitoring well sites around the perimeter of the mine permit boundary where mine dewatering will be conducted. Each monitoring well will be an open hole well into the limestone stratum to a minimum depth of 80 feet. Monitoring wells will be drilled by a SC certified well driller. The monitoring wells are identified as VMW 1, VMW 2, VMW 3, VMW 4, VMW 5, VMW 6 and VMW 7. Their planned locations are shown on the attached *Mine Use Map*.

At monitoring well locations VMW 3 and VMW 6, GZA GeoEnvironmental, Inc. drilled shallow wells for their hydrogeologic studies. These wells are still in place and a representative well will be selected to be included in the groundwater monitoring system. At VMW 3, GZA wells MW-4, MW-5, MW-6 & MW-7 are available, and one will be selected for the shallow well monitoring at the VMW 3 site. At VMW 6, GZA wells MW-8, MW-9, & MW-10 are available and one will be selected for the shallow well monitoring at the VMW 6 site.

Once the wells are drilled, all wells in the network will be surveyed to establish latitude and longitude coordinates and elevations at top of casing determined to 0.01 feet msl by a licensed surveyor. The deep wells will be logged by a professional geologist to determine the top of limestone. Elevations for the top of limestone for each deep well will be determined and a compliance water level elevation 2 feet above the top of limestone established.

2.3 Monitoring, Data Collection and Reporting

Each of the deep limestone wells will have automatic data recorders that will measure water levels to 0.01 foot. The water levels in each deep well will be sampled hourly 24 hours each day and compiled monthly and reported to DHEC on a quarterly basis. The data recorders will note the date and time of each water level sampling event. The data will be reported to DHEC within 30 days after the end of each calendar quarter. The report to DHEC will provide a summary of the well data collected for each quarter.

2.4 Table 2 - 1

Monitoring Well Summary

Well ID	Planned Depth	Elevation	Brief Construction Details
VMW-1	80 feet	TBD	Case overburden; open hole in limestone
VMW-2	80 feet	TBD	Case overburden; open hole in limestone
VMW-3	80 feet	TBD	Case overburden; open hole in limestone
VMW-3S (GZA wells MW-4, MW-5, MW-6 or MW-7)	Existing Depth of GZA Wells (BGS)		Determine which existing GZA well to use in monitoring well network. Screen in overburden
GZA MW-4	22 feet	TBD	
GZA MW-5	23 feet	TBD	
GZA MW-6	19 feet	TBD	
GZA MW-7	20 feet	TBD	
VMW-4	80 feet	TBD	Case overburden; open hole in limestone
VMW-5	80 feet	TBD	Case overburden; open hole in limestone
VMW-6	80 feet	TBD	Case overburden; open hole in limestone
VMW-6S (GZA wells MW-8, MW-9 or MW-10)	Existing Depth of GZA Wells (BGS)		Determine which existing GZA well to include in monitoring well network. Screen in overburden
GZA MW-8	27 feet	TBD	
GZA MW-9	28 feet	TBD	
GAZ MW-10	29 feet	TBD	
VMW-7	80 feet	TBD	Case overburden; open hole in limestone