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October 1, 2014

Mr. Joe Koon, Project Manager  
SC Department of Health and Env Control  
Division of Mining and Solid Waste Management  
2600 Bull Street  
Columbia, SC 29201

RE: Mine Permit Application I-002053  
Winnsboro Crushed Stone, LLC - Winnsboro Quarry  
Response to Request for Supplemental Information

Dear Mr. Koon:

On behalf of Winnsboro Crushed Stone, LLC, (WCS) the below information and enclosed maps are being submitted as requested to assist in completing SC DHEC's review of WCS's application for the mine permit for the Winnsboro Quarry. This response includes the information contained within this letter, map titled, *Map for Pre-Blast Survey with 1/2 Mile Radius* and map titled, *Winnsboro Quarry - Proposed Monitoring Well Locations*.

1. Provide a map showing at a minimum, the permit boundary, quarry pit boundary, and a 0.5 mile radius around the quarry pit boundary. These items should overlay a recent aerial photograph or satellite image so that residential homes and other structures adjacent to the proposed quarry can be viewed.

**Response #1**

The attached map shows the requested information. It appears two structures fall within the 1/2 mile radius south of the permit area.

A separate 1/2 mile radius is shown for Future Reserve area. Because a mine plan has not been developed for this area, the 1/2 mile radius is measured from the property line. The actual pit perimeter where blasting will occur in the Future Reserves is unknown at this time and this 1/2 mile radius is a very conservative approach due to the lack of mine plans. Should the mine expand into this area the resultant pit perimeter will be based on rock quality, overburden thickness and the need to avoid probable wetlands. A final mine plan will be submitted if and when WCS modifies the mine permit to reallocate the future reserves to affected land.

The 1/2 mile radius from the Future Reserve is for illustration purposes and WCS is not proposing to conduct a pre-blast survey on any structures within this radius. Should WCS expand into the Future Reserves, a review will be conducted to determine location of structures within 1/2 mile when WCS submits the application to SCDHEC to modify the mine permit to reallocate future reserves to affected lands.

2. On the Mine and Reclamation Maps submitted with the permit application, areas were designated as future impact areas and colored yellow. For each of these areas, please provide clarification and specific information on what these areas could be used for in the future.

### **Response #2**

The current mine plan for the following Future Reserves and Future Impact areas may be utilized for the following purposes:

- Future Reserve area, located north of Phase III of the pit area, has potential for granite resources that could be mined and processed to produce aggregate. If not mined, portions of this area could be used for overburden storage.
- Future Impacts - West area is not anticipated to be mined. Possible uses for this area could be overburden/screenings storage or shop and equipment maintenance areas.
- Pit Utility Area is not anticipated to be mined. However, due to its proximity to the pit, this area could possibly be mined. Possible uses for this area could be overburden storage or equipment shop and maintenance area.
- Plant Expansion Area will not be mined. Located adjacent to the processing plant it will provide an easily accessible area to expand processing plant functions (e.g., stockpiles, screen storage, equipment storage, equipment maintenance) as quarry operations mature.

The above listed possible uses for the referenced future reserves & impact areas are based on plans as currently envisioned by Winnsboro Crushed Stone. WCS understands that any significant changes in the mine plan (i.e., changing Future Impacts - West to include mining rock) may be a significant modification to the mine permit.

3.A. There are concerns about water supply during initial processing plant and quarry pit construction and development. (Second & fourth sentences move to 3.B. for convenience of grouping questions and responses.)... Please clarify what supply of water will be used for dust suppression during the initial development of roads, processing plant, and quarry.

### **Response 3#A**

Possible sources of water that can be tapped for use for dust suppression during initial quarry development are surface water storage ponds, water supply wells and public water system.

- *Surface water storage ponds* - Possibility exists to enhance the storage capacity to trap and store additional water in sediment ponds O and M.
- *Water supply well(s)* - Potential construction and use of industrial well(s) to supply water.
- *Public Water System* - Town of Winnsboro public water line runs along the south side of Hwy 34. Preliminary discussions with water service official about a possible connection to the system have been held. WCS would, at their expense, extend a water line connection underneath Hwy 34 and railroad right-of-ways for use of public water.

3.B. Also, there are concerns about how dewatering during quarry operation could impact residential water supply wells, ponds and springs adjacent to the quarry. ... Please provide information on how dewatering of the pit during quarry operation will be monitored. This information should include a map of proposed monitoring wells, stream staff gauges, and any other means of monitoring drawdown of the groundwater table during quarry operations.

### **Response #3B**

Groundwater monitoring wells will be the method used to track groundwater drawdown. The enclosed map "Winnsboro Quarry -- Proposed Monitoring Well Locations", indicate proposed well locations. The monitoring wells will be approximately 150 feet total depth with the saprolite cased to top of rock, anticipated to be 60 - 70 feet thick, with remaining well depth open hole. Because of the extended time it takes to develop the pit and slow movement of groundwater, the monitoring wells will be measured monthly. At this time, WCS does not plan installing staff gauge(s) to monitor stream levels. It should not

be necessary. Furthermore, using stream staff gauges to collect stream levels and analyzing and interpreting such data would be expensive and of questionable value as a means track groundwater drawdown for the following reasons:

- 1) Experience shows that granite quarries in the Piedmont typically create groundwater drawdowns limited to hundreds of feet not thousands of feet from the quarry's edge. This limited groundwater *cone of depression* minimizes impacts to surface waters.
- 2) Horse Creek, the largest drainage on the mine property, changes from a 2nd to 3rd order stream as it transits through and near the mine property. This would necessitate monitoring multiple surface water systems to account for all flows near the quarry site. Consequently, this increases the complexity of interpreting data from multiple data points and accounting for the other variables (e.g., precipitation, back ground flows, surface water base flows, changes in land use, climate change etc.) throughout the watershed<sub>s</sub> to discern if surface water is being significantly affected by mining. This would be tedious and difficult at best.
- 3) Locating gauging stations in waters of the US will require permitting from the Corps pursuant to Nationwide Permit #5. Furthermore, the gauging stations will need periodic maintenance and repairs from floods, stream debris and vandalism. All add costs and decreases data reliability. Furthermore, added cost will be necessary to retain a consultant with the ability and experience to analyze the data and attempt to apply the conclusions in a meaningful way.

#### **Potential to Impact Wells, Ponds and Springs on Adjacent Properties**

The nearest domestic wells range from 2,600 to 4,400 feet from the quarry. The domestic wells are assumed to be hard rock-open hole in the crystalline rock water bearing zone. Groundwater hydrology in hard rock aquifers depend on the natural fractures in the rock for groundwater flow. However, the transmissivity of these fractures is typically relatively low (as compared to clastic aquifers) and also are affected by their depth below surface. Typically, below 100 – 150 feet below surface, the overlying rock pressure diminishes the fracture widths and its ability to transmit groundwater. Consequently, with a “tight” aquifer (low transmissivity) groundwater drawdown in hard rock aquifers are usually measured in hundreds of feet from the edge of the pit. The impact will be less in some instances due to location of streams and creeks. Consequently, wells should not be impacted by this limited drawdown.

The nearest pond appears to be located 3,000 feet south of planned pit. Two other possible ponds appear on the USGS topographic map at approximately 4,200 to 4,600 feet southwest of the quarry. (These ponds are marginally visible at best with Fairfield County GIS imagery and questionable if they are still viable ponds.) Stormwater runoff and shallow water table in the saprolite are probable sources of water for these ponds. If pit dewatering should lower the groundwater table in the saprolite within the mine property (property line ranging from 1,800 to 2,400 feet from the pit in the direction of these ponds), the extent of the groundwater lowering will be mitigated by the hydrologic boundaries presented by the numerous streams and drainages. With the distances to the ponds and drainages acting a hydrologic boundaries, the potential for significant impacts to streams and springs on adjacent properties should be minimal to non-existent.

If you should have any questions, please do not hesitate to contact me.

Sincerely,



Craig Kennedy, PG  
KCS Principal

cc Rich Moses