

KARST PERMITTING SUPPLEMENT

Date: _____

Carbonate rock (limestone or dolomite) often has associated karst features that complicate the hydrogeological regime. This form is intended to supply additional information on karst features existing in the general permit area and an assessment specific to potential karst impacts from the proposed mining activities in order to allow the Department to evaluate the hydrologic impacts. This supplement is applicable only for those operations where the permit area or general area has karst geology and must be submitted by a licensed professional geologist (P.G.).

Operations that do not include groundwater pumping in karst geology areas may not need to complete these items if the District Mining Operation waives this informational requirement. The operator is encouraged to consult with their respective DMO prior to submitting this supplemental information.

“General area” is defined in § 77.1 as the topographic and groundwater basin, with respect to hydrology, surrounding a permit area which is of sufficient size, including areal extent and depth, to include one or more watersheds containing perennial streams and groundwater zones.

1. Location of Karst Features [§§ 77.403-406, 77.410, 77.521]

Provide a map labeled “Karst Features” showing karst features (sinkholes, closed depressions, major solution features, cave entrances, extent of cave systems, karst-related springs) for the proposed permit area, and within 1000’ of the proposed (or existing + proposed) permit area or within the expected quarry zone of influence, whichever is greater. Integrate with a groundwater contour map or model projection.

2. Description of features [§§ 77.403-406, 77.410, 77.521]

Describe the depth, characteristics, and extent of karst features. (Examples: Depth of epikarst and soil/rock interface, location of karst features in existing boreholes, outcrops and quarry walls, known cave systems, distribution of sinkholes and closed depressions, location volume of karst springs.) Features should be correlated with groundwater levels and gradients, pre-mining conditions, and groundwater pumping records as applicable.

3. Existing karst impacts [§§ 77.403-406, 77.410, 77.457, 77.521]

Discuss the current state of karst issues (sinkholes, ground subsidence, water pollution) in the general area of the proposed permit, their possible cause, and any historical sinkholes. If a pre-existing quarry has karst-related inflows, characterize this flow during both wet and dry conditions, including temperature, turbidity, conductivity, and water chemistry. If dye/tracer tests, geophysical surveys, fracture trace analysis, or other studies were done related to the karst features, discuss these results in context.

4. Analysis of potential karst impacts [§§ 77.457(b), 77.521, 77.532(b-c) and 52 P.S. § 3311(b)]

a. Describe the effects mining will have on movement of subsurface unconsolidated material (karst void filling) and sinkhole development. Include a description of the extent to which the proposed mining may result in the drawdown of groundwater and the effects to surface water recharge rates. Consider the current land uses, stream uses, and planned development of the adjacent areas in the potential for karst hazards that may affect health and safety of the public and land/stream uses. Relate this information to that provided in items #2 and #3 as applicable.

b. Is groundwater injection or infiltration proposed within the permit area?

Injection Infiltration Neither

If injection or infiltration is proposed, discuss the potential hydrologic impacts on both quantity and quality of the groundwater within and hydrologically connected to the proposed mining area and relate this activity to the information provided in items #2 and #3. Include supporting information associated with any EPA Underground Injection permit.

5. Sinkhole Monitoring and Mitigation Plan [§§ 77.457(b), 77.521, 77.532(b-c) and 52 P.S. § 3311(b)]

Provide a plan for sinkhole monitoring, response, and repair which includes detailed steps to address sinkholes that occur on land, in streams, or along roadways.

- Note that additional permits may be needed to conduct operations within a stream and coordination of repairs is necessary for roads or other rights of way.
- Include as part of this plan a section on monitoring for signals that a hydrologic disturbance has been observed in the quarry (increase in groundwater infiltration/pumping rates, dirty water inflow, subsidence, stream flow loss, etc.)
- Karst features must be documented on the map in Item 1. This map should be updated with data collected under the monitoring plan.