November 17, 2017

Michael Menghini
District Mining Manager
Pottsville District Mining Office
Department of Environmental Protection
5 West Laurel Boulevard
Pottsville, PA 17901

RE: Permit No. 39140301 and NPDES Permit No. PA0225444, Geryville Materials, Inc.

Dear Mr. Menghini:

I am writing on behalf of the Delaware Riverkeeper Network (DRN), a private non-profit environmental advocacy organization that champions the rights of our communities to a Delaware River and tributary streams that are free-flowing, clean, healthy, and abundant with a diversity of life. DRN has nearly 20,000 members throughout the Delaware River Watershed including residents of Lower Milford Township and Lehigh County.

In October 2015, the Pennsylvania Department of Environmental Protection (PADEP) sent Geryville Materials (GM) a deficiency letter detailing 95 deficiencies identified by PADEP in the above referenced application. In its deficiency letter to GM, PADEP requested a response from GM within 30 days, warning that, should GM fail to respond to "all of the deficiencies listed," its application could be denied. GM, via its consultant, EarthRes, subsequently requested 14 more months to address the deficiencies and complete monitoring.

GM's current non-coal mining application was received by PADEP on December 23, 2014,[1] but it is a revision of an application that was submitted in March 4, 2014.[2] We also note that GM's March 2014 application was itself a revision of an application that was initially submitted on June 25, 2008 and returned on September 13, 2012.[3]

In March 2017, GM responded to PADEP's deficiency letter. DRN has reviewed GM's response and submits the following comments. These comments are submitted supplement DRN comments submitted previously.

[1] 45 Pa.B. 967 (28 February 2015)
[2] 44 Pa.B. 1886 (29 March 2014)
[3] 42 Pa.B. 6145 (29 September 2012)

DELAWARE RIVERKEEPER NETWORK
925 Canal Street, Suite 3701
Bristol, PA 19007
Office: (215) 369-1188
fax: (215)369-1181
drn@delawareriverkeeper.org
www.delawareriverkeeper.org

GM has demonstrated a preference for recycling old data, rather than a willingness to update important environmental studies as advised by agency regulators.

GM response to PADEP's deficiency letter represents a continuation of the applicant's pattern of providing inaccurate and incomplete information. In its defiance letter, PADEP requests that GM has failed to address community concerns.

> *3. Item 1 of the Project Information section indicates that the Applicant has informed the surrounding community and addressed their concerns prior to submitting the Surface Mining Permit (SMP) application to the Department. The concerns of the surrounding communities have not been addressed prior to the SMP application being submitted to the Department. Please correct.*

GM responded:

> Response: Item 1 of the Project Information section has been updated or requested. Please also refer to the response to comment 89.

DRN notes that the response to comment 89 (*Please address the attached public comments received by the Department regarding this application*):

> Response to the public comments will be transmitted under separate cover for the Department's review

However, DRN is unaware of any response to public comments being provided to PADEP. Given the extensive public comment submitted to PADEP opposing the opening of this proposed quarry, and GM's failure to address concerns of the surrounding communities, DRN again asks that PADEP deny this application.

In addition to this omission, DRN notes that GM's deficiency response and revised application reveal gaps in the permit record, contradictory representations, and unsupported conclusions. DRN commissioned Schmid & Company, Inc., Consulting Ecologists, to review the proposed quarry and assess the potential for degradation of streams and wetlands if the proposed major industrial quarry were approved. Schmid & Company's comments are attached (Attachment A).

Schmid & Company identified significant issues that suggest the proposed quarry will result in degradation of wetlands in the future. The harm to onsite wetlands, whether proposed to occur now or decades on, must be considered equally seriously with the other harms because PADEP is tasked with being the trustee of these resources now and for future generations. DRN again requests that this application be denied because the proposed quarry operation cannot dewater and degrade sensitive headwaters.

Wetlands in the Hosensack watershed are designation as "Exceptional Value" or EV, due to the creek's listing, by the Pennsylvania Fish and Boat Commission (PFBC), as a Wild Trout Water (*see pp 47, 48 and 66 in* Appendix D, Pennsylvania Wild Trout Waters (Natural Reproduction) – Jan 2015. [4] As EV waters, Hosensack watershed wetlands are not allowed to be degraded.

[4] Pennsylvania Fish and Boat Commission. (2015). Pennsylvania Wild Trout Waters (Natural Reproduction). Retrieved from http://fishandboat.com/trout_repro.pdf.

> The basic concept of antidegradation is to promote the maintenance and protection of existing water quality for High Quality (HQ) and Exceptional Value (EV) waters, and protection of existing uses for all surface waters because it recognizes that existing water quality and uses have inherent value worthy of protection and preservation. [5]

Given the presence of EV wetlands, the applicant should have included Module 24. Special Protection Waters in this application, but this module was not submitted. The applicant did submit the Anti-Degradation Supplement for Mining Permits, however the applicant lists only Unnamed Tributary to Hosensack Creek – Existing Stream Use: HQ-CWF, the proposed receiving stream. Further the applicant does not consider and evaluate non-discharge alternatives for the proposed storm water and/or encountered groundwater discharge(s) that will impact EV wetlands as required by 25 Pa Code Section 93.4c.(b)(1)(i)(A):

> (A) A person proposing a new, additional or increased discharge to High Quality or Exceptional Value Waters shall evaluate nondischarge alternatives to the proposed discharge and use an alternative that is environmentally sound and cost-effective when compared with the cost of the proposed discharge. If a nondischarge alternative is not environmentally sound and cost-effective, a new, additional or increased discharge shall use the best available combination of cost-effective treatment, land disposal, pollution prevention and wastewater reuse technologies.

This requirement applies to all High Quality (HQ) and EV waters, not simply HQ and EV receiving streams.

Antidegradation regulations require the applicant to undertake an evaluation of nondischarge alternatives to proposed discharges.[6] This analysis should answer specific questions.

> It is critical that the site chosen for the project is appropriate. To this end, the following questions must be answered by the project sponsor to ensure that the HQ or EV water is the only suitable location for the proposed project or activity.
>
> - What are the requirements for locating this project/activity?
>
> Infrastructure
> Utilities
> Transportation
> Raw Materials
> Work Force
> Other
>
> - **Is this watershed or specific stream segment the only location that offers these requirements?**
> - **Were other sites considered?**

The applicant does not answer these questions (emphasis added).

In Module 14: Streams/Wetlands, the applicant is required to describe alternatives to the proposed mining activities that have been considered to avoid or minimize impacts on wetlands. This alternative analysis should include "alternatives to the proposed mining activities, including

[5] Pennsylvania Department of Environmental Protection. (2003). Water Quality Antidegradation Implementation Guidance.
[6] 25 Pa. Code § 93.4c(b)(1)(i)(A). Implementation of antidegradation requirements.

alternative locations, routings or designs to avoid adverse impacts on the wetlands (e.g. relocating spoil/topsoil storage areas, rerouting haul roads)."

This alternatives analysis should be environmentally based and include a "no impact" alternative. The applicant's alternatives analysis fails to address how environmental impacts will be avoided or minimized. Instead, the alternatives analysis notes that "the limit of mining operations has been developed to maximize the extraction area."

GM proposed an infiltration system that will impact EV Wetlands in order to eliminate discharge from routine daily quarry dewatering operations. The applicant asserts that the Antidegradation Best Available Combination of Technologies (ABACT) BMPs selected are sufficient to protect the existing surface water quality, while acknowledging the project will alter temperatures regimes in EV wetlands.

> In referencing PADEP Document 391-2000-017 Implementation Guidance for Temperature Criteria dated April 11, 2009, as the ambient temperature exceeds the target criterion for a Cold Water Fishes, then the ambient temperature becomes the criterion. As noted in the document the permittee is allowed a minimum 1°F instream temperature rise above ambient which will be monitored during the life of the quarry operations.[7]

DRN notes that the focus of PADEP Document 391-2000-017 Implementation Guidance for Temperature was "establishing effluent limits for thermal dischargers from power generating facilities and other industries which use cooling water … "[8] Use of this guidance here represents misapplication of temperature criteria.

The temperature criteria here are guidance values for use when evaluating the impact of discharging heat into streams. It should be noted that this guidance is assumes the assimilative capacity of receiving waters.

The temperature criteria in PADEP Document 391-2000-017 Implementation Guidance for Temperature are not ambient criteria. Nor were they not written to be applied to wetlands where heat dissipation would be difficult.

PADEP Document 391-2000-017 Implementation Guidance for Temperature acknowledges that scenarios where heat dissipation in receiving waters would be difficult and would require thermal limits on other factors.

> Historically, instantaneous complete mix of the discharge with the receiving stream has been assumed in water quality analyses designed to produce thermal effluent limits. Under normal conditions, the Department considers this assumption to be appropriate. However, in some adverse scenarios, the Department may base thermal effluent limits on receiving water flows of less than the full design flow (referred to as the portioned flow). These adverse factors and scenarios include:

[7] EarthRes Engineering and Science. (2017) Application for Noncoal Surface Mining Permit Pre-application No. 39140301, Lower Milford Township, Lehigh County, Pennsylvania, Volume I – Application, February 2014. Revised March 2017. Geryville Materials.

[8] Pennsylvania Department of Environmental Protection. (2009). Document 391-2000-017 Implementation Guidance for Temperature Criteria.

- The discharge is to a lake, pond, impoundment or other low-gradient receiving water, resulting in restricted dispersion of the plume, and horizontal and vertical stratification of the plume. [9]

EV wetlands to be impacted meet the description of "low-gradient receiving water, resulting in restricted dispersion of the plume, and horizontal and vertical stratification of the plume." GM proposes to discharge effluent to EV wetlands that will alter the current temperature regime.

PADEP is also required to make a final determination regarding the "existing uses" of all surface waters which may be impacted by the proposed quarry. This determination necessarily includes wetlands. Existing uses are those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in water quality standards.[10]

Neither PADEP nor the applicant specifically identified any existing uses for the EV wetlands within the surface mine permit (SMP) boundaries. Consequently, PADEP could not have come to any reasonable conclusions regarding whether the proposed activity will degrade those specific existing uses as prohibited by Chapter 93. PADEP has identified a test for determining the degradation of existing uses of streams, but no such parallel test exists for wetlands.

PADEP's "Test for Non-Degradation of Water Quality" expressly excludes a consideration of wetlands.[11] PADEP states that it:

> uses a two-part test that evaluates all facets of the discharge's potential effect on the receiving stream to make [its degradation analysis]. [12]

There is not a single mention of wetlands in the entire Section of the Department's guidance with regard to its "Test for Non-Degradation of Water Quality." Therefore, even if PADEP or GM did identify existing uses for EV wetlands impacted by the proposed quarry, PADEP cannot determine that the existing use would be protected because it has not developed an applicable test to evaluate whether degradation of that EV wetland has, or is likely, to occur. Not only has PADEP failed to identify any existing uses for EV wetlands, it also lacks a specifically defined methodology or test to determine whether or how those existing uses could be degraded by proposed project construction and operational activities. As such, the permit cannot be issued.

Once again, DRN requests that PADEP deny GM's application for the commencement and operation of a proposed quarry operation.

Thank you for your time and your diligence in assuring the water resources of Pennsylvania are protected. Don't hesitate to contact me with questions.

Sincerely,

Maya K. van Rossum
the Delaware Riverkeeper

cc: Michael Kutney, P.G., Pottsville District Mining Operations, PA Dept. of Environmental Protection

[9] Pennsylvania Department of Environmental Protection. (2009). Document 391-2000-017 Implementation Guidance for Temperature Criteria.
[10] 25 Pa. Code § 93.1. Definitions
[11] Pennsylvania Department of Environmental Protection. (2003). Water Quality Antidegradation Implementation Guidance.
[12] Pennsylvania Department of Environmental Protection. (2003). Water Quality Antidegradation Implementation Guidance.

ATTACHMENT A

SCHMID & COMPANY, INC., CONSULTING ECOLOGISTS
1201 Cedar Grove Road Media, Pennsylvania 19063-1044
(610) 356-1416 FAX: (610) 356-3629
www.schmidco.com

6 September 2017

Chari Towne
Schuylkill Programs, Delaware Riverkeeper Network
925 Canal Street Suite 3701
Bristol, Pennsylvania 19007

In re: **Comments on Documents Concerning A Proposed Geryville Materials, Inc., Quarry,** PADEP Surface Mining Permit 39140301 and NPDES Permit 0225444, Lower MilfordTownship, Lehigh County, Pennsylvania

Dear Ms. Towne:

Schmid & Company was asked to address the potential for degradation of streams and wetlands if the proposed major industrial quarry were approved, based on review of documents provided by the Delaware Riverkeeper Network. This is a revised application first submitted more than a decade ago, then partially revised in 2014 and again in 2017. The application appears to contain unacknowledged potential impacts, omissions, and unresolved contradictions that must be addressed prior to permit approval.

The first section of this letter summarizes the facts set forth in the application. The second section presents concerns that require attention from PADEP and the applicant.

Basic Facts of Proposed Geryville Materials, Inc., Quarry

Overall property under agreement for mining: 628.5 acres in an irregular parcel with maximum dimension about 8,000 feet notheast-southwest and 8,000 feet northwest-southeast. Ultimate extent of mining not addressed in this application.

Municipal Zoning: AR Agricultural-Residential; resource extraction allowed only by Special Exception.

Site bedrocks are of the Triassic Brunswick Formation of the Gettysburg-Newark Lowland just south and southeast of an unconformable contact with the PreCambrian Reading Prong.

Surface topography on the property extends from about 360 feet msl elevation in the Hosensack Creek Valley at the western corner and 460 feet in the Macoby Creek Valley at the southeast corner to over 740 feet on Mill Hill, a prominent forested diabase sill ridge that extends northeast-southwest across the property.

Land use: Sections of the property within the stream valleys are in agricultural use. Mill Hill is forested. Surrounding land uses are rural and residential.

Expected production: 250,000 tons/year of Triassic-age fanglomerate, diabase, and hornfels crushed stone products exported for 30 years by truck from the quarry area labeled GM-2.

NPDES Permit Area: 127.64 acres along the northern flanks of Mill Hill, about 5,000 feet by 2,500 feet in maximum dimensions.

Proposed Mining Area including access roads and water management: 111.5 acres.

Ultimate area of surface water drainage capture: 60.28 acres from watersheds of three unnamed tributaries (UNTs) to Hosensack Creek.

Extraction area in GM-2 quarry footprint: 46 acres in a recharge zone of the bedrock aquifer.

Other Industrial Operations: An asphalt plant also is proposed but nowhere described or its impacts assessed in the applications.

Maximum quarry pit depth: 300 feet.

Quarry Highwalls: 50 to 65 feet tall, 25 foot-wide horizontal benches between vertical highwalls.

Finished Perimeter Highwall: to be reduced to 35° horizontal slope from shoreline down to 50 feet depth below proposed water elevation after end of quarrying (35° slope down to elevation 510 feet msl).

Stormwater will be captured, retained onsite in basins and sediment traps, and subjected to infiltration or controlled release (runoff from 2-yr storm of 5.3 mgd will trigger a surface discharge; expected groundwater infiltration into pit, 0.2 mgd; management system sized to control 100-year storm). Intermittent discharge water quality will be monitored and reported.

Precipitation and pit seepage during quarry operations is proposed to be infiltrated to prevent potential dewatering of wetlands and three UNTs (recharge averaging 5 to 6 thousand gallons per day in 4,178 linear feet of 6-foot wide trenches). Wetland monitoring and reports are proposed during quarrying operations.

Two Proposed Intermittent Surface Stormwater Discharges, each 0.55 mgd via level spreaders during and after quarry operations: 001 to Hosensack Creek UNT 1474 (CWF, MF); 002 to Hosensack Creek UNT 1475 (CWF, MF), These two permanent discharges into intermittent upper segments of headwater streams are to continue indefinitely after end of quarrying, with flow expected half the time during average years. No approval is being sought for a possible 36-inch diameter postmining

discharge to uppermost UNT “HUNT-1” to maintain flow despite 7-acre diversion from the Wetland N watershed.

Impoundment proposed at end of quarrying after partial fill: 44(if partial backfill), 46, or 68(?) acres, with normal surface elevation at 560 feet msl (seasonal fluctuations +/- 10 feet). Expected lowering of the bedrock water table is 40 feet on the uphill (east) side and raising of the bedrock water table 20 feet on the downhill (west) side.

Fifteen onsite wetlands are Exceptional Value (30.6 acres total); several of these extend offsite. Most adjoin tributaries of natural brown trout waters; one has a known bog turtle population but is more than 1,000 feet from the proposed quarry. Wetland F-1 is stated to be isolated from surface watercourses. Wetlands A, B, C, D, and Q are adjacent to UNTs of Macoby Creek (a tributary of Perkiomen Creek). These six wetlands appear not to be EV. A 1-acre pond on UNT 1475 is adjacent to Wetland L.

Hydrologic impacts. No direct impact is proposed to 2.19 acres of open waters (9 onsite streams and two ponds) or 33.74 acres of wetlands identified by Army Corps Jurisdictional Determination as Waters of the United States based on 2008 field delineation, partially revised in 2013. Wetland F-1 (0.08 acre) was deemed “isolated” and not a Water of the United States. Fifteen wetlands are mentioned in the current application, 11 of which contained springs and seeps. Nineteen labeled wetlands are shown on Exhibit 6.2 “Environmental Resources Map” (3-15-2017). Six wetlands (F, H, I, L, M, and N) are within 1,000 feet of the proposed quarry; four (F, H, M, and N) are within the modeled 10-foot drawdown area of bedrock water table. Wetland Q (0.004 acre) is shown on the 2017 revision of Exhibit 6.2. The labeled wetland parcels on that drawing total 33.214 acres, including Wetland F-1. Five non-wetland “islands” totaling 1.07 acre are shown within Wetland F. The applicant’s well pump tests in the vicinity of the quarry produced no detected short-term impacts on surface waters or wetlands.

Stream buffers. Stormwater management will encroach into 100-foot forested riparian stream buffers. About 0.5 acre total of forested riparian buffer is to be replanted along UNTs 1474 and 1475 after quarry operations cease.

Nearby Hosensack Creek Receiving Water: High Quality Cold Water Fisheries (HQ-CWF, MF), Class A naturally reproducing brown trout waters with migratory fishes (from confluence of UNT 1483 to confluence of UNT 1479 near the northwest corner of the property, upstream from UNT 1474 confluence but downstream from “HUNT-1” confluence); Cold Water Fisheries with migratory fishes (CWF, MF) downstream from UNT 1479 to the confluence with Perkiomen Creek. Perkiomen Creek water flows into the Schuylkill River and thence via the Delaware River into Delaware Bay.

Comments

A significant amount of onsite investigation has been reported for this application, much of it prompted by PADEP review comments and questions. Planning for facility operations and abandonment appears to be incomplete, creating uncertainties regarding total short-term and long-term cumulative impacts. The following comments focus on remaining gaps in the permit record, contradictory representations, and unsupported conclusions.

• **Asphalt plant**. The proposed asphalt plant has not been seriously addressed. It is not even mentioned in this applicant's fragmentary, generic Spill Prevention, Control, and Contingency Plan (SPCCP). The application does not state whether the asphalt plant is eligible for authorization or instead will need a change in local zoning.

The applicant requests that monitoring be waived for several NPDES wastewater permit parameters, and offers to monitor oil and grease because of the asphalt plant. Organic toxic pollutants are not eligible for waivers from sampling in industrial wastewater discharges. Oil and grease (more precisely, hexane-extractable substances) is an appropriate parameter for monitoring of sewage effluent, but it is not sufficient for asphalt plants. As PADEP TGD 383-3000-001 (2001, p. 29) states, "Ambient monitoring analyses should include all those [pollutants] … that will be generated by a proposed activity. Potential degradation products of known contaminants also should be considered." Such pollutants have not been included in background monitoring and are not proposed for discharge monitoring.

For this quarry adequate background monitoring of onsite surface waters and groundwaters, followed by routine wastewater discharge monitoring and reporting, must be imposed to characterize existing and future concentrations of the following parameters typically associated with asphalt plant water pollution hazardous to humans and to the environment: VOCs (volatile organic compounds), including base-neutral semi-volatiles, polycyclic aromatic hydrocarbons (PAHs), and both 1-methylnapthalene and 2-methlynapthalene. These compounds dissolve in water, and at very low concentrations can be toxic to fish. Moreover, undissolved fractions can accumulate over time in sediments. No background data for these analytes at the quarry site have been provided. There are no plans to monitor for them in the future. That is not acceptable for a proposed asphalt plant.

No permit approvals should be granted until adequate background data have been provided for asphalt-related pollutants in vulnerable surface waters and groundwaters. Appropriate discharge monitoring must be required by PADEP to protect surface waters and groundwaters of the Commonwealth. Appropriate attention must be given to the asphalt plant prior to approval of the SPCCP.

• **Sanitary effluent** from this quarry operation is not addressed. Potable water presumably will be obtained from an onsite well. There is no nearby sewage treatment plant (POTW) or connecting sewer in this rural area. Will effluent be collected in a septic tank and disposed onlot? Or simply collected and trucked offsite for 30 years?

• **Stream quality**. The applicant's consultant report on benthic invertebrates documents much higher biological quality in Hosensack Creek UNT 1474, which flows along the western slopes of Mill Hill, than in UNT 1475 farther west. The applicant's one-time biological sampling of UNT 1474 documented conditions almost meeting designation as High Quality, a Special Protection category. Conditions in UNT 1475 have been degraded by human activity in its watershed. There is no mention of any proposed effort by the applicant to provide any greater protection to UNT 1474 than to UNT 1475, although the former would appear to warrant more stringent protection to prevent its degradation.

• **The ultimate extent of mining** on this 628.5-acre property is not addressed. The applicant apparently would like to mine as much of the property as practicable, if a market for crushed stone persists within the economic truck-hauling distance. The preferred timing for additional operations beyond the present application is not described. To what extent would approval and implementation of the currently or ultimately proposed industrial activity induce further land use conversions in this rural landscape?

• **The ultimate size of impoundment** after completion of quarrying apparently is not settled. Hence the size of the water-filled quarry is variously stated to be 44(?), 46, or 68(?) acres at the proposed 560-foot water surface elevation, a dramatic difference. Whether the northwestern section of the quarry will be filled to restore 7 acres of surface watershed drainage to 0.4-acre Wetland N and to "HUNT-1" is not clear. Alternatively, a 36-inch diameter discharge pipe to this watershed is being considered but is not applied for in this application. The quarry also could be reclaimed to approximate original contour with no permanent impoundment. When will these decisions be made? How can any permit be approved without a definite plan the applicant deems practicable?

• **Conclusions regarding hydrologic impacts.** The applicant's wetland delineation report (last revised December 2008) and 2007 wetland functions and values report remark the abundance of springs and seeps in most of the onsite wetlands. Extensive subsequent onsite investigations of hydrogeology over several seasons support the applicant's claim that flows into headwater streams and wetlands adjacent to the proposed quarry are unlikely to be affected during the 30 years of quarry operations, according to the applicant's hydrogeologist in 2017. Nearby domestic wells are not expected to be dewatered. If well dewatering occurs, however, the applicant proposes to deepen wells as required to reestablish water supplies. Adequate aquifer thickness within the deep bedrock to supply groundwater is expected to remain unaffected by currently proposed quarrying.

Three wetlands (H, M, and N) and one stream ("HUNT-1") are at risk of dewatering post-closure as a result of watershed diversion. Surface water flowing into Hosensack Creek is not expected to change, although some flow will be transferred from HUNT-1 to UNTs 1474 and 1475 during quarry operations. Transfer among UNT watersheds post-closure is not resolved, as discussed below. Wetland dewatering may prove significant during post-closure years with below average precipitation, exacerbated by global warming.

At the quarry site the water table typically is found near the upper limit of low-permeability bedrock. Fractures are not abundant and seldom extend deeper than 100 to 150 feet in diabase; they are somewhat deeper and more common in fanglomerate. The Brunswick Formation has secondary porosity that formed subsequent to deposition of its sediments. The thin uppermost layer of bedrock averages 8 feet thick (range: 0 to 55 feet). Above the bedrock is more readily permeable, unconsolidated overburden averaging 15 feet thick (range: 8.5 to 24.4 feet), within which groundwater can move fairly readily except where there are clay deposits. The uppermost few feet are weathered soil horizons, generally underlain by several feet of clay in delineated wetlands with perched water tables. As a result of pump tests, the applicant determined that 2.28 acres of Wetland H, 0.18 acre of Wetland M, and 0.39 acre of Wetland N lie within the expected contour of 10 feet bedrock water table drawdown. Wetland N also is to have 7 acres of surface watershed diverted. Thus the applicant investigated hydrology further in these wetlands, as well as three more (F, I, and L) within 1,000 feet of the proposed quarry pit.

Depths of deep bedrock test wells at the GM-2 quarry ranged from 97 to 402 feet below the ground surface (bgs), with the median depth of 293 feet. Bedrock groundwater is not plentiful and is associated chiefly with relatively shallow fractures and zones of contact between contrasting rock types. Water levels in the bedrock vary +/- 13 feet seasonally over the course of a year and are not responsive to short-term precipitation events, even though the proposed quarry is in a bedrock recharge area. The applicant's credible data show that bedrock groundwater here is not discharging to onsite wetlands.

Unconsolidated overburden in the studied area ranges from 2 to 37 feet thick, averaging 15 feet. Overburden water tables measured beneath wetlands are more responsive than in the bedrock below---8 of 26 overburden wells responded to precipitation events. Overburden provides diffuse recharge to the bedrock, but the unconfined overburden, according to the applicant's hydrogeologist, is not saturated so as to form a consistent source of groundwater for the overlying wetlands. Clay layers in the overburden as thick as 15 feet beneath the wetlands impede vertical groundwater exchange---either discharge to or recharge from the perched wetlands.

Four (DP-2, DP-3, NP-1, and FP-2, not shown on drawings) of 27 root-zone piezometers (about 15 inches deep) in these wetlands showed year-round saturation;

the remaining piezometers encountered variable hydrology, several piezometers experiencing prolonged dry periods. (Although Corps guidelines were followed for design and installation of wetland piezometers, these shallow wells were not continuously monitored for periods long enough to address the precise duration of wetland hydrology.) These wetlands have soil ranging from 0.7 to 3.6 feet thick and clearly respond to precipitation events and local runoff, exhibiting seasonal wetness. Most of the wetlands are considered by the applicant's hydrogeologist to be independent, discrete systems. Only Wetland I was found to be connected via its perched water table with Wetland H; yet the delineators remarked upon the flow of water among several linked wetlands such as P-E-F-H-I and K-L-M. Seven of the monitored wetlands were considered to be gaining water from nearby streams; eight were losing water on slopes.

The hydrologic monitoring using shallow piezometers confirmed that virtually none of the monitored wetlands receives significant groundwater discharge; they depend on direct precipitation and local runoff from adjacent non-hydric soils of nonwetlands just upslope. These include Wetlands F, H, and I on the east side of UNT 1474, which has springs or seeps only along Mill Hill, not on its west bank close to the proposed quarry. Similarly Wetlands L and M along UNT 1475 and Wetland N along "HUNT-1" receive no groundwater discharge according to the hydrogeologist. Bail tests confirmed the lack of wetland water drawdown by well pumping at Wetlands H, M, and N. Water temperature measurements corroborated the close association of wetland water temperatures with air and surface water temperatures, rather than the distinctly different temperatures of bedrock groundwater found in the onsite test wells. Ten of the wetlands' had groundwater discharge as their primary function/value according to the applicant's wetland consultant in 2007, with discharge listed as a secondary function in Wetlands D, H, and J by the hydrogeologist in 2017. The applicant's record concerning the wetness of onsite wetlands is not consistent.

Wetlands H, M, and N are upgradient from the proposed quarry discharges. They are to be watered by quarry water pumped to infiltration trenches during quarry operations but will not receive supplemental flow post-mining, and thus are at long-term risk from surface runoff loss even if not at risk of subsurface dewatering. Wetland I is also upslope from quarry trenches, but is east of UNT 1474 and thus will not have watershed surface runoff disturbance. Modeling indicated that under worst-case, dry-year conditions Wetlands H and M could have their perched water tables lowered by 3 feet (reduction in surface watershed of 27.7 and 16.3 acres, respectively), and Wetland N could have lowering of 1 foot (7 acres of watershed reduction). In each case, no reduction in water table is predicted for years with average and above-average precipitation. According to the applicant, these reductions are conservatively over-estimated by the modeling used, in the experience of the consulting hydrogeologist.

The biological consequences are claimed to be minimal, inasmuch as 1) these wetlands already experience periods of unsaturated conditions to which their vegetation is adapted, 2) some of the excess water from average and wet years might recharge these wetlands, and 3) a capillary fringe can supply water upwards to plant roots in dry years, so the plants can continue to draw from the perched water table under simulated worst-case conditions. Moreover, the consultant expects that hydrologic changes here will occur only gradually over many years and be readily detectable through the proposed monitoring.

It is true that the vegetation of the onsite wetlands is adapted to seasonally variable wetness. If net hydrologic change does occur, some species would likely benefit and some decline, leading to a change in the species composition of the vegetation. Detection of such change through annual monitoring would pose a considerable scientific challenge, and any detected change would be difficult to attribute to quarry operations as contrasted with results of weather fluctuations and global warming. It is not clear what monitoring is anticipated subsequent to quarry closure. It also is not clear what remedial measures, even if a need were detected, would be implemented post-closure.

The perched wetlands are separated from unconsolidated overburden by virtually impenetrable clay, and most of the overburden is unsaturated except occasionally near its contact with bedrock. That excess water from average and wet years could be stored in these wetlands for use during dry years appears highly unlikely. A capillary fringe may aid plants by raising water above the perched water table, but capillary fringes extend upward by less than 1 foot. Wetlands H, M, and N clearly appear to be at risk of long-term dewatering post closure of the quarry as a result of watershed loss.

The alternative of placing reclamation fill to approximate original contour is mentioned as a way that existing surface runoff and water tables might be restored to these three wetlands. No example of any such restoration in a quarry of this size in comparable bedrock, however, was mentioned in the applications. Such reclamation appears more likely, if actually undertaken, to succeed in reestablishing surface watersheds than groundwater conditions of base flow, considering the low permeability of existing bedrock. The applicant claims that a partial refilling of the quarry could reestablish surface runoff to Wetland N and HUNT-1, but no commitment to do so appears in the application. Given the size of the subject property, it would appear possible to construct 4 acres of new wetlands onsite as mitigation, but the applicant apparently has not considered doing so and includes no mitigation plans to compensate for any observed damage to wetlands.

• **Prime farmland soils and site reclamation.** Prime farmland soils, along with other topsoils and subsoils, are to be used to construct a 15-foot tall berm with 2:1 side slopes to screen the quarry operations. Presumably these materials are to be segregated and separately stored, although that is not stated in the application. No discussion was

offered concerning the condition of prime farm soil if it is respread after 30 years of stockpiling. Were the quarry backfilled to approximate original contour, the stockpiled soil materials would be needed as final cover.

The only clear reuse currently described for the stockpiled subsoil and topsoil from 46 (68?) acres is to cover rough grading of the reduced highwall of the quarry impoundment perimeter extending to a depth of 50 feet. Inasmuch as the impoundment water level is expected to drop seasonally as much as 10 feet below normal pool elevation, it is reasonable to provide subsoil and topsoil on the potentially exposed perimeter as part of bank stabilization. No discussion is included concerning the potential for growing hydrophytes around the impoundment margins. Applying topsoil to the impoundment floor covered by water deeper than 10 feet below the normal pool level does not appear to be warranted. No riparian forest buffer is planned to be reestablished around the impoundment, but such would seem appropriate to maximize long-term habitat values. Provision should be made for beneficial reuse of all stockpiled soil materials.

• **Flocculant**. The applicant expects that its proposed sediment traps and basins will be adequate to clarify stormwater from the quarry. If needed, flocculant is to be used to augment the settlement of turbidity. The materials to be used as flocculants should be specified, the method for identifying the need for application of flocculant should be detailed, and plans for removal and disposal of flocculant sediments should be described.

• **Riparian buffer plantings**. Native tree species proposed for installation include black spruce (*Picea mariana*). The quarry site is south of the natural range of this species, which inhabits cold peat bog margins in northern forests. Disjunct native populations of black spruce are found in the higher elevations of the Poconos. This species may not be the best choice for long-term survival without maintenance at the relatively low elevation of the quarry site during a period of global warming. Red spruce (*Picea rubens*) might be more appropriate, inasmuch as it flourishes farther south than black spruce.

• **Tree protection**. Trees to be planted in riparian buffers are stated to be 2-inch caliper. Protective tubes are to be installed to protect young trees against predation, but are to be removed when the trees have reached 2 inches in diameter. This apparent contradiction should be clarified.

• **Wetland monitoring**. Wetland indicator status of species monitored in the potentially affected wetlands is proposed to be referenced to Reed 1988. This 30-year old reference is obsolete. Indicator statuses have changed. Regionally appropriate indicator statuses should be reported from the most recent version of the National Wetland Plant List available at the time each monitoring report is prepared.

• **Wetland sizes and locations**. The foregoing comments use wetland acreages stated in the application text. Wetlands were delineated during the summers of 2005 and

2006, and boundary flags later were surveyed at the request of the Corps of Engineers. Wetland areas appear to have been revised several times. These acreages are not consistent, and their accuracy is unknown. The 2008 wetland delineation report states the total onsite wetlands as 36.68 acres, generally ignoring parcels of uplands or wetlands smaller than 100 square feet. The current application text total for wetlands onsite is 33.74 acres, which does not agree with any of the labeled wetlands on drawings but is the wetland total stated in the 2013 Corps JD letter.

The actual labeled extent of several wetland polygons differs from drawing to drawing. Figures 1-B “Background Monitoring Map” and Figure 11GM-2 “Drawdown Map”, both dated 3-31-2017, unrevised, report 39.83 acres of labeled wetlands. Figure 3 “Hydrologic Investigation Map”, 1-30-2016, unrevised, and Exhibit 6.2, “Environmental Resources Map”, 3-15-2017 report 33.21 acres. Figure G-4 “Test Model Cross-Sections”, 2-15-2017, unrevised, uses the wetland acreage from Figure 1-B, but mislabels Wetland I as Wetland H. Wetland G apparently was relabeled as part of Wetland F and its acreage included with the rest of F. Presumably impacts on it were analyzed along with the rest of F. Wetland Q is a very small polygon at the edge of the subject property adjacent to two streams in the Macoby Creek drainage.

Such discrepancies of nearly 20% of total reported onsite wetland acreage cannot be resolved, at least in the absence of other parts of the applications not available for review. In the functions and values table (page 2-6 of the 2017 Groundwater Pumping Evaluation) Wetlands A, B, C, G, and J-1 are not included. The remaining unidentified 6.5 acres of wetland not accounted in other parcels comprise a significant omission.

Schmid & Company staff are pleased to provide these comments based on the information made available to us.

Yours truly,

James A. Schmid, Ph. D.
President