

AGENCY OF NATURAL RESOURCES
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATERSHED MANAGEMENT DIVISION
ONE NATIONAL LIFE DRIVE, DAVIS 3
MONTPELIER, VT 05620-3522

FACT SHEET
(August 2022)
~~(Revised September 2022)~~
(Revised October 2022)

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT TO DISCHARGE TO WATERS OF THE UNITED STATES

PERMIT NO: 3-1575
PIN: N/A
NPDES NO: VT0120100

NAME AND ADDRESS OF APPLICANT:

MHG Solar
PO Box 1204
Manchester Center, VT 05255

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Button Falls Solar Project
1308 Button Falls Rd
Pawlet, VT

FACILITY CLASSIFICATION: Unclassified Industrial Non-Major

OPERATOR LICENSE REQUIREMENT: None

FACILITY LAT/LONG: 43.40097, -73.2416

OUTFALL LAT/LONG: 43.40190, -73.24270

RECEIVING WATER: Mettawee River

CLASSIFICATION: Class B(2). Class B(2) waters are suitable for swimming and other forms of water-based recreation and irrigation of crops and other agricultural uses without treatment; good aesthetic value; aquatic biota and wildlife sustained by high quality aquatic habitat; suitable for boating, fishing, and other recreational uses; acceptable for public water supply with filtration and disinfection.

I. Proposed Action, Type of Facility, and Discharge Location

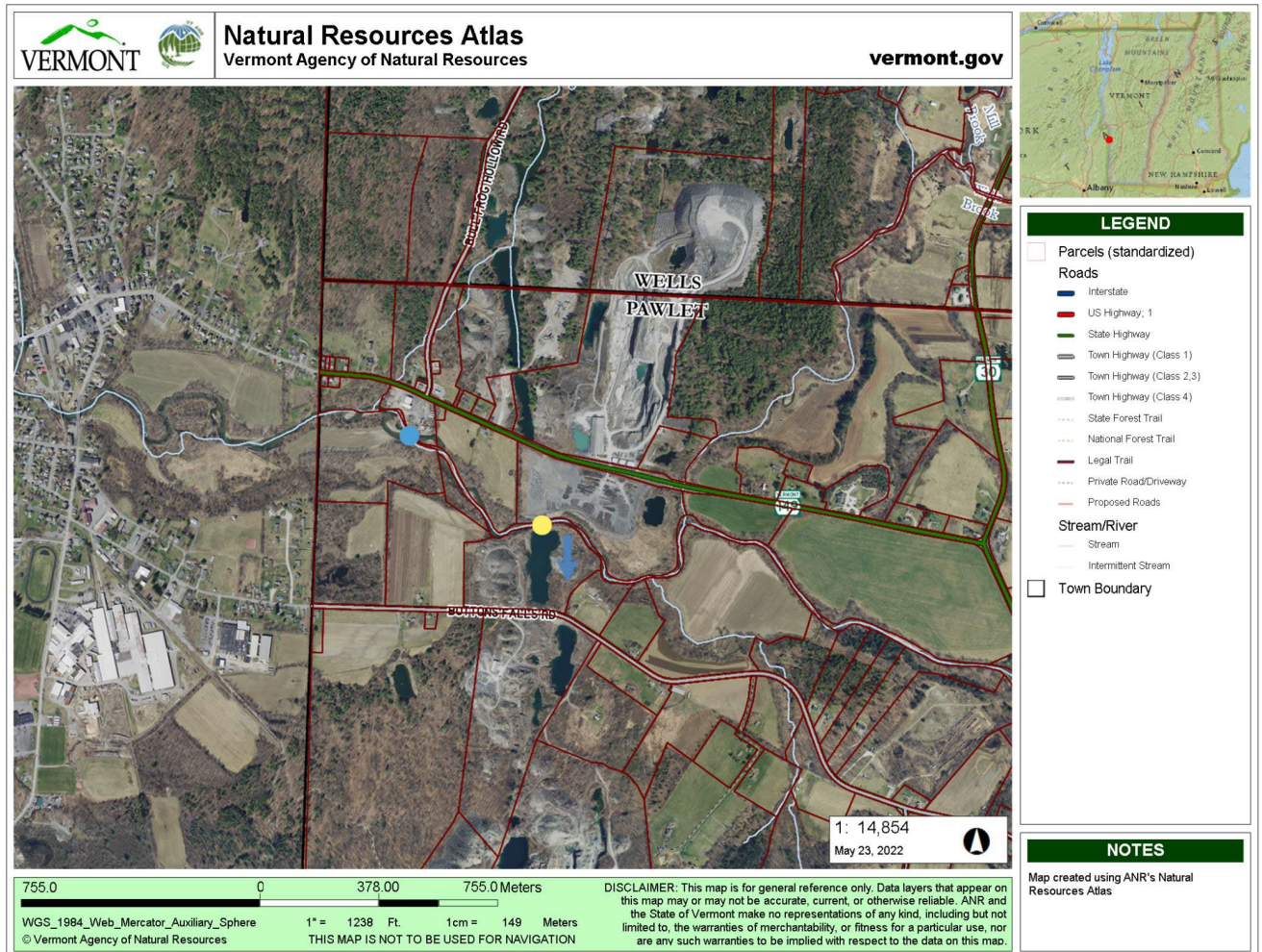
9/26/2022: Revisions made in response to public comments are shown in *Italics*.

10/6/2022: Revisions made in response to the public comment letter found in email are shown in ***Italics***.

The Vermont Agency of Natural Resources (Agency) received an application for the permit to discharge into the designated receiving water from the above-named applicant on February 14, 2022 and the application was technically complete on March 8, 2022. At this time, the Secretary has made a tentative decision to issue the discharge permit.

MHG Solar, LLC owns the Button Falls Solar Project. They intend to dewater an existing slate quarry so that the tailing piles on the project property can be placed into the quarry to create a level lot for the installation of a solar array. The quarry contains process water comingled with stormwater and groundwater (comingled process water). No treatment is proposed, but if the pH of the quarry water is found to exceed the Vermont Water Quality Standard of 8.5 then pH adjustment will be required. Discharge is planned for approximately 10 days. After the completion of grading the quarry will refill with water and be very similar to the existing conditions, just shallower and smaller in area. This quarry does not have a surface water source or outlet. The stormwater that drains to the quarry is from the immediately adjacent surfaces and is not transported from other parcels.

A location map is shown below. The approximate direct discharge location is represented by a yellow circle and the facility location is denoted by the blue arrow. The blue circle represents a water quality monitoring station.



A copy of the Reasonable Potential Determination is attached as Attachment A.

II. Description of Discharge

This permit authorizes the discharge of comingled process water from a defunct slate quarry.

III. Limitations and Conditions

The effluent limitations of the draft permit, the monitoring requirements, and any implementation schedule (if required), may be found on the following pages of the draft permit:

Effluent Limitations: Pages 2-4 of 23
Monitoring Requirements: Pages 2-4 of 23

IV. Statutory and Regulatory Authority

A. Clean Water Act and NPDES Background

Congress enacted the Clean Water Act (CWA or Act), “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.” CWA § 101(a). To achieve this objective, the CWA makes it unlawful for any person to discharge any pollutant into the waters of the United States from any point source, except as authorized by specified permitting sections of the Act, one of which is Section 402. CWA §§ 301(a), 402(a). Section 402 establishes one of the CWA’s principal permitting programs, the National Pollutant Discharge Elimination System (NPDES). Under this section of the Act, the U.S. Environmental Protection Agency (EPA) may “issue a permit for the discharge of any pollutant, or combination of pollutants” in accordance with certain conditions. CWA § 402(a). The State of Vermont has been approved by the EPA to administer the NPDES Program in Vermont. NPDES permits generally contain discharge limitations and establish related monitoring and reporting requirements. CWA § 402(a)(1) - (2).

Section 301 of the CWA provides for two types of effluent limitations to be included in NPDES permits: “technology-based” limitations and “water quality-based” limitations. CWA §§ 301, 303, 304(b); 40 CFR Parts 122, 125, 131. Technology-based limitations, generally developed on an industry-by-industry basis, reflect a specified level of pollutant-reducing technology available and economically achievable for the type of facility being permitted. CWA § 301(b). As a class, WWTFs must meet performance-based requirements based on available wastewater treatment technology. CWA § 301(b)(1)(B). The performance level for WWTFs is referred to as “secondary treatment.” Secondary treatment is comprised of technology-based requirements expressed in terms of BOD5, TSS and pH; 40 C.F.R. Part 133.

Water quality-based effluent limits, on the other hand, are designed to ensure that state water quality standards are achieved, irrespective of the technological or economic considerations that inform technology-based limits. Under the CWA, states must develop water quality standards for all water bodies within the state. CWA § 303. These standards have three parts: (1) one or more “designated uses” for each water body or water body segment in the state; (2) water quality “criteria,” consisting of numerical concentration levels and/or narrative statements specifying the amounts of various pollutants that may be present in each water body without impairing the designated uses of that water body; and (3) an antidegradation provision, focused on protecting high quality waters and protecting and maintaining water quality necessary to protect existing uses. CWA § 303(c)(2)(A); 40 C.F.R. § 131.12. The applicable water quality standards for this permit are the 2017 Vermont Water Quality Standards (Environmental Protection Rule, Chapter 29a).

A permit must include limits for any pollutant or pollutant parameter (conventional, non-conventional, toxic, and whole effluent toxicity) that is or may be discharged at a level that causes or has "reasonable potential" to cause or contribute to an excursion above any water quality standard, including narrative water quality criteria. See 40 CFR §122.44(d)(1). An excursion occurs if the projected or actual in-stream concentration exceeds the applicable criterion. A NPDES permit must contain effluent limitations and conditions in order to ensure that the discharge does not cause or contribute to water quality standard violations.

Receiving stream requirements are established according to numerical and narrative standards adopted under state law for each stream classification. When using chemical-specific numeric criteria from the State's water quality standards to develop permit limits, both the acute and chronic aquatic life criteria are used and expressed in terms of maximum allowable in stream pollutant concentrations. Acute aquatic life criteria are generally implemented through maximum daily limits and chronic aquatic life criteria are generally implemented through average monthly limits.

Where a state has not established a numeric water quality criterion for a specific chemical pollutant that is present in the effluent in a concentration that causes or has a reasonable potential to cause a violation of narrative water quality standards, the permitting authority must establish effluent limits in one of three ways: based on a "calculated numeric criterion for the pollutant which the permitting authority demonstrates will attain and maintain applicable narrative water quality criteria and fully protect the designated use"; on a "case-by-case basis" using CWA Section 304(a) recommended water quality criteria, supplemented as necessary by other relevant information; or, in certain circumstances, based on an "indicator parameter." 40 CFR § 122.44(d)(1)(vi)(A-C).

The state rules governing Vermont's NPDES permit program are found in the Vermont Water Pollution Control Permit Regulations (Environmental Protection Rule, Chapter 13).

1. Reasonable Potential Determination

In determining whether this permit has the reasonable potential to cause or contribute to an impairment, Vermont has considered:

- 1) Existing controls on point and non-point sources of pollution as evidenced by the Vermont surface water assessment database;
- 2) Pollutant concentration and variability in the effluent as determined from the permit application materials, monthly discharge monitoring reports (DMRs), or other facility reports;
- 3) Receiving water quality based on targeted water quality and biological assessments of receiving waters, as applicable, or other State or Federal water quality reports;
- 4) Toxicity testing results based on the Vermont Toxic Discharge Control Strategy, and compelled as a condition of prior permits;
- 5) Available dilution of the effluent in the receiving water, expressed as the instream waste concentration. In accordance with the applicable Vermont Water Quality Standards, available dilution for rivers and streams is based on a known or estimated value of the lowest average flow which occurs for seven (7) consecutive days with a recurrence interval of once in ten (10) years (7Q10) for aquatic life and human health criteria for non-carcinogens, or at all flows for human health (carcinogens only) in the receiving water. For nutrients, available dilution for stream and river discharges is assessed using the low median monthly flow computed as the median flow of the month containing the lowest annual flow. Available dilution for lakes is based on mixing zones of no more than 200

feet in diameter, in any direction, from the effluent discharge point, including as applicable the length of a diffuser apparatus.

- 6) All effluent limitations, monitoring requirements, and other conditions of the proposed draft permit.

The Reasonable Potential Determination for this facility is attached to this Fact Sheet as Attachment A.

B. Anti-Backsliding

Section 402(o) of the CWA provides that certain effluent limitations of a renewed, reissued, or modified permit must be at least as stringent as the comparable effluent limitations in the current permit. EPA has also promulgated anti-backsliding regulations which are found at 40 C.F.R. § 122.44(l). Unless applicable anti-backsliding exemptions are met, the limits and conditions in the reissued permit must be at least as stringent as those in the current permit.

This is a new permit application, and this facility has never had an NPDES Direct Discharge Permit. Therefore, the anti-backsliding provisions of the CWA are not applicable at this time.

V. Receiving Water

The Mettawee River downstream of the Button Falls Solar Project discharge is a Class B (2) water and is designated as Cold Water Fish Habitat. At the point of discharge, the river has a contributing drainage area of 111.0 square miles. No Waste Management Zone or Mixing Zone are proposed. The 7Q10 flow of the river is estimated to be 8.8 cubic feet per second (CFS) and the Low Median Monthly flow is estimated to be 24.4 CFS. Discharge will only be allowed when the flow at the discharge point is at least 53.4 CFS based upon the discharge at the Middle Granville, NY, USGS Station 04280450 being at least 80.3 CFS.

VI. Antidegradation Policy

Section 29A-105 of the Vermont Water Quality Standards (VWQS) describes the Antidegradation Policy. The Secretary implements this policy in accordance with the Agency's "Interim Anti-Degradation Implementation Procedure," dated October 12, 2010 (Procedure).

Among other circumstances, the Secretary applies the Antidegradation Policy and Procedure during the review of applications for a new discharge under an individual NPDES direct discharge permit issued pursuant to 10 V.S.A. §1263 and the Vermont Water Pollution Control Permit Regulations, as in this case.

Under the Antidegradation Policy and Procedure, the Secretary must first determine the applicable water quality review Tier:

- Tier 3 - Protection of water quality in outstanding resource waters
- Tier 2 - Protection and maintenance of water quality in high quality waters
- Tier 1 - Determination and protection of existing uses

The Mettawee River is not classified as an Outstanding Resource Water in the 2017 VWQS (Tier 3). The Procedure requires the Secretary to presume that all waters are high-quality waters for at least one criterion for some portion of the year (Tier 2). Procedure at VII.E.1.c. Because the Secretary has not received credible and relevant information to the contrary, the Tier 2 approach of protecting designated and existing uses is the focus of this antidegradation review.

Tier 2 review requires the Secretary to determine:

- (1) whether the proposed discharge will result in a limited reduction in water quality; and
- (2) after an analysis of alternatives, any limited reduction in water quality satisfies the socioeconomic justification test set forth in the Procedure.

An analysis of the impacts of the proposed discharge on the receiving water was conducted in the attached Reasonable Potential Determination using information provided with the application as well as monitoring data from the Mettawee River collected by VT DEC. This analysis found that there will be no lowering of the water quality in the receiving water.

Predicted changes did not create conditions that exceed VWQS at appropriate critical conditions. Due to the short-term nature of this discharge (expected to last 10 days), the low concentration of solids, BOD5, COD and nutrients, and lack of toxins in toxic amounts, this discharge will not have an impact on total pollutant loadings or assimilative capacity. The proposed discharge will be limited to less than 3% of the receiving water flow and erosion control will be required at the outfall. This is more restrictive than the 5% flow contribution limitation included in the VWQS for Class A1 and B1 waters. This is a Class B2 water, but this limitation has been included in lieu of requiring a site specific flow study. All available data indicates that this reach of the Mettawee River fully supports all designated uses and that a one-time partial dewatering of the quarry will not result in a limited lowering of water quality.

The cumulative impacts of this discharge have also been considered. Procedure VII.E.2.e. Effluent limits have been set for Turbidity and pH at the VWQS for the fishery type in order to avoid any impacts to aquatic biota. The proposed effluent does not contain any toxic metals measured at levels that will exceed VWQS when mixed with the receiving water. The receiving water is not listed on the 303(d) list and the available macroinvertebrate data indicates that the macroinvertebrate population is supportive of VWQS. This short-term discharge will not have cumulative impacts that result in a limited lowering of water quality.

Based upon the above analysis, the Secretary finds that the proposed effluent from this facility will not reduce water quality in the receiving water, and that therefore it is not necessary to further analyze cumulative negative impacts to water quality or the socio-economic benefit to the region and state.

VII. Discharge Policy

The proposed permit for this facility has been drafted to comply with the Discharge Policy contained in the Vermont Water Quality Standards (Environmental Protection Rule, Chapter 29-106). The proposed discharge is in conformance with all applicable provisions of these rules as

described below.

§ 29A-106 Discharge Policy (a) Discharge Criteria. In addition to the other provisions of these rules, new discharges of wastes may be allowed only when all the following criteria are met:

(1) The proposed discharge is in conformance with all applicable provisions of these rules including the classification of the receiving waters adopted by the Secretary as set forth in Appendix F of these rules.

The proposed discharge is in conformance with all applicable provisions of these rules including the classification of the receiving waters adopted by the Secretary as set forth in Appendix F of the Vermont Water Quality Standards.

(2) There is neither an alternative method of waste disposal, nor an alternative location for waste disposal, that would have a lesser impact on water quality including the quality of groundwater, or if there is such an alternative method or location, it would be clearly unreasonable to require its use.

There is no feasible alternative method or location of disposing of the water in the quarry. Due to the large volume of dewatering proposed, trucking or pumping the water to another location would be cost prohibitive and emissions intensive. Due to the relatively small size of the lot and depth of the quarry, subsurface disposal would result in the water returning to the quarry and is therefore not feasible.

(3) The design and operation of any waste treatment or disposal facility is adequate and sufficiently reliable to ensure the full support of uses and to ensure compliance with these rules and with all applicable state and federal treatment requirements and effluent limitations.

The effluent for this project has been sampled, and the data reported on the updated Schedule B form has been analyzed in the RPD memo and found to not require treatment. Daily turbidity and pH monitoring will be required, and the discharge must be stopped if an exceedance is measured.

If an exceedance of turbidity is measured, it will be necessary to either wait until the quarry water has cleared or to move the influent pipe. A passing sample will need to be obtained prior to the continuation of discharge.

If an exceedance of pH is measured, it will also be necessary to immediately halt discharge. A treatment plan must be submitted to the Secretary for review and approval prior to the continuation of discharge. The treatment system will be required to be adequate and sufficiently reliable to ensure the full support of uses and to ensure compliance with these rules and with all applicable state and federal treatment requirements and effluent limitations.

Erosion control devices with required inspections, and daily confirmation of the receiving water flows will be required and will help to prevent exceedances of VWQS or highly altered flow patterns.

(4) Except as provided for in 10 V.S.A. § 1259(d) and (f), the discharge of wastes other than nonpolluting wastes and stormwater runoff is prohibited in Class A(1) and A(2) waters regardless of the degree of treatment provided.

This is a Class B water.

(5) Except as provided for in 10 V.S.A. § 1259, the discharge of wastes that, prior to treatment, contained organisms pathogenic to human beings into waters is prohibited.

This facility will discharge a mixture of stormwater, groundwater and process water (comingled process water) in order to partially dewater an existing slate quarry. No pathogenic organisms are known or expected to be in the effluent source.

(6) The receiving waters will have sufficient assimilative capacity to accommodate the proposed discharge.

The effluent from this site will meet the VWQS for the receiving water and will be conditioned to be less than 5% of the flow. The addition of a small quantity of water meeting the VWQS will not have any impact requiring a measurable amount of assimilation by the receiving water.

(7) Assimilative capacity has been allocated to the proposed discharge consistent with the classification set forth in Appendix F of these rules.

Assimilative capacity will not be impacted. Effluent limits for this discharge have been set that are consistent with the classification set forth in Appendix F of the VWQS and that are supportive of all designated uses.

(8) The discharge of wastes to the thermocline or hypolimnion of any lake in manner that may prevent the full support of uses is prohibited.

This facility will not discharge wastes into either the thermocline or hypolimnion of any lake.

(9) The discharge of sewage into Class B(1) or B(2) waters shall not pose more than a negligible risk to public health. Compliance with this criterion shall include an assessment of both the level and reliability of treatment achieved and the impact of the discharge on the water quality of the receiving waters.

This facility will not discharge sewage or pose a risk to the public health from human pathogens.

(b) Assimilative Capacity. The capacity of waters to assimilate both the discharge of wastes and the impact of other activities that may adversely affect water quality, and at the same time to be maintained at a level of water quality that is compatible with their classification, is finite. The Secretary may hold a portion of the assimilative capacity in reserve to provide for future needs, including the abatement of future sources of pollution and future social and economic development. Accordingly, the assimilative capacity of waters shall be carefully allocated in accordance with the “Wasteload Allocation Process” as adopted by the Secretary.

This facility will not affect assimilative capacity in the receiving water. The water in the quarry does not contain detectable toxic metals and the measured BOD5 and COD values are low. Total phosphorus was found at concentrations lower than the numeric thresholds in the VWQS and TN was lower than the receiving water concentrations. It is not necessary to develop a wasteload allocation for this facility.

(c) Compliance Schedules. A permit issued pursuant to Vermont's federally-delegated National Pollutant Discharge Elimination System (NPDES) program may, when appropriate, specify a schedule leading to compliance with the Vermont and Federal Clean Water Acts and regulations. The purpose of a schedule of compliance generally is to afford a permittee adequate time to comply with one or more permit requirements or limitations that are based on new, newly interpreted or revised water quality standards that became effective after both issuance of the initial permit for a discharge and July 1, 1977. For a permit requirement or limitation that is based on such a new, newly interpreted, or revised water quality standard, the Secretary may include a schedule of compliance in a permit at the time of permit reissuance or modification where the permittee either cannot comply with the permit requirement or limitation, or there is insufficient information available to determine whether the permittee can comply with the permit requirement or limitation. A schedule of compliance shall require compliance at the earliest possible time, as determined by the Secretary. A schedule of compliance shall include dates for specified tasks or activities leading to compliance and may include interim effluent limitations, as the Secretary deems appropriate. This provision does not limit the Secretary's authority to include compliance schedules in permits as provided by state law.

This facility will not require a compliance schedule. All limits and conditions will be applicable beginning the permit effective date.

VIII. Facility History and Background

The Button Falls Solar Project is located at the site of the former Clay Quarry (MRDS ID W023070), a slate quarry that was previously operated by the Somich Brothers Slate Co. Quarrying operations resulted in the creation of a deep quarry and large piles of tailings. The quarry is currently full of a combination of stormwater, groundwater and co-mingled process water. Dewatering would have been required in order to operate the quarry.

The Button Falls Solar Project will construct a level area for the installation of solar panels. A portion of the tailings from the previous slate mining operations will be placed back into the quarry. The quarry is currently filled with comingled process water which is non-turbid and which will meet VWQS when discharged into the Mettawee River. When the tailings are placed into the quarry the turbidity will be increased by an unknown amount expected to exceed VWQS. In order to avoid an uncontrolled discharge of this water during the grading operations the quarry will be partially dewatered prior to placing materials back into the quarry.

The Agency has determined that the commingled discharge of process generated wastewater from this operation is subject to 40 CFR Part 436. The term "process generated wastewater" shall mean any wastewater used in the slurry transport of mined material, air emissions control, or processing exclusive of mining. The term shall also include any other water which becomes commingled with

such wastewater in a pit, pond, lagoon, mine, or other facility used for the treatment of such wastewater. This quarry contains comingled process water based on the assumption that the residual processing water and wastes were present in the quarry when last operated.

After the completion of this project the quarry will refill with a combination of storm and ground water. The quarry will appear largely the same as the existing conditions but will be slightly smaller and shallower.

IX. Permit Basis and Explanation of Effluent Limitation Derivation (S/N001)

A. Flow – The permit contains a monitoring and reporting requirement for flows discharged from this facility. Continuous monitoring is required with daily average and monthly total reporting requirements. Additionally, discharge from this facility is conditioned to only occur when the receiving water contains a minimum of 53.4 cfs in order to minimize the impacts of the additional flows from the facility. A condition is included to verify this flow by observation of a downstream USGS Station.

B. Conventional Pollutants

pH – The pH limitation is 6.5 - 8.5 Standard Units as specified in Section 3-01 B.9. in the Vermont Water Quality Standards. Since the applicant indicated that effluent will meet the VWQS of 6.5 to 8.5 no mixing zone is needed. Monitoring is required daily.

Total Suspended Solids (TSS) – The draft permit does not contain a limit or monitoring requirements for TSS. The proposed effluent contains 4 mg/l of TSS. The permit does contain a requirement to monitor for Turbidity on a daily basis. This requirement is based on best professional judgement and upon Section 3-03.A and Appendix A (Fish Habitat Designation) of the 2017 Vermont Water Quality Standards. The receiving waters are designated as Cold Water Fish Habitat. Compliance with the Turbidity limit is expected to result in a minimal discharge of TSS.

C. Non-Conventional and Toxics

Turbidity – The draft permit requires an instantaneous maximum limit of 10 NTU. Monitoring is required daily. This requirement is based upon Section 3-04.A and Appendix A (Fish Habitat Designation) of the 2017 Vermont Water Quality Standards.

Total Nitrogen– The draft permit does not contain monitoring requirements or a limit for Total Nitrogen. The proposed effluent contains very low levels of Total Nitrogen and the proposed discharge will be of short duration. The receiving water is in compliance with the VWQS for TP.

Total Phosphorus (TP) – The draft permit does not contain monitoring requirements or a limit for Total Phosphorus. The proposed effluent contains very low levels of TP and the proposed discharge will be of short duration. The receiving water is in compliance with the VWQS for TP.

X. Discharge Special Conditions

A. Erosion Control Measures and Inspections Requirement – The draft permit requires that the erosion control measures depicted on the project plans be constructed and utilized. The splash pool and geotextile must be inspected a minimum of three times per day when discharging, and records of these inspections must be included in the monthly report. If turbidity in excess of 10 NTU or erosion of the riverbank is observed, then flow must be discontinued and a plan to mitigate the erosion must be submitted to the Secretary for review and approval prior to further discharge.

B. Requirement to cease discharge if pH or Turbidity exceedance occurs – The draft permit requires that the discharge of effluent be halted immediately upon a pH or Turbidity measurement that exceeds the permit limits.

For Turbidity discharge may not resume until a passing sample is obtained that is representative of the proposed discharge. The influent point may be moved to a less turbid location.

If a pH exceedance occurs a plan must be submitted to the Secretary for review and approval. Any treatment system required must be in place and operational prior to the resumption of discharge.

C. Flow at Middle Granville, NY USGS Station 04280450 – The draft permit requires that the flow rate at this USGS Station be checked each day and recorded prior to beginning pumping operations. The flow rate in Middle Granville must be at least 80.3 cfs. That flowrate will ensure that the flow available in the Mettawee River at the point of the Button Falls Solar Project's discharge will be 53.4 cfs and that the discharge will be less than 3% of the total flow. This condition has been included in order to ensure that the any hydraulic impacts from the discharge are minimized.

D. Prohibition of discharge after initiation of grading activities – The draft permit prohibits discharging additional dewatering water after tailings have started to be placed in the quarry. This condition is meant to prevent the discharge of sediment and turbidity that may be created by the grading activities.

E. Notification Requirement for starting dewatering operations – *The draft permit includes a requirement to notify DEC on the day that dewatering operations begin.*

XI. Procedures for Formulation of Final Determinations

The public comment period for receiving comments on this draft permit is from **August 12, 2022 through September 20, 2022** during which time interested persons may submit their written views on the draft permit. All written comments received by 4:30 PM on **September 20, 2022** will be retained by the Secretary and considered in the formulation of the final determination to issue,

deny or modify the draft permit. The period of comment may be extended at the discretion of the Secretary.

The Secretary held a public meeting on **Tuesday, September 13, 2022**, from **5:00 – 6:00 PM** at the Agency of Natural Resources Annex Building located at 190 Junction Road, Berlin, Vermont 05602. This meeting could be attended via Microsoft Teams meeting at: <https://tinyurl.com/ycyjvndm> or call in (audio only) +1 802-828-7667, United States, Montpelier Phone Conference ID: 731 916 658#

Per Vermont Act 150, public comments concerning draft permits must be submitted via the Environmental Notice Bulletin (ENB) for all applications deemed administratively complete after January 1, 2018. In addition to providing a portal for submitting public comments, the ENB website presents details on the processing history, draft permit documents for review, and can be used to request public meetings. The ENB public site is <http://enb.vermont.gov> and the DEC ENB information page is <http://dec.vermont.gov/permits/enb>.

NPDES permits are considered Type 1 permits under Act 150 and are subject to a 30-day public comment period. All comments received within the period described above will be considered by the Department of Environmental Conservation in its final ruling to grant or deny authorization to discharge. Any person who has commented on the draft permit may, within 30 days of the final ruling by the Department of Environmental Conservation to grant or deny authorization to discharge, appeal the ruling to the Environmental Court pursuant to 10 V.S.A. Chapter 220.

Comments were received during the public meeting and are included in the Responsiveness Summary attached to this document. ~~No written comments were received.~~ ***On October 4th an email from Thomas Weiss summarizing his comments was found. That email did not raise any new issues beyond the testimony provided at the meeting, but has been included in this revised factsheet as part of the public record.***

Vermont Agency of Natural Resources
Department of Environmental Conservation
Watershed Management Division
1 National Life Drive, Davis 3
802-828-1115

MEMORANDUM



Prepared by: John Merrifield, Wastewater Program (WWP)

Cc: Pete LaFlamme, Director, WSMD
Amy Polaczyk, Manager, WWP
Michelle Kolb, Manager, WWP Direct Discharge Section
Bethany Sargent, Manager, MAP

Date: August 1, 2022

Subject: Reasonable Potential Determination for the Button Falls Solar Project

I. Facility Information:

Button Falls Solar Project
1308 Button Falls Rd
Pawlet, VT
Permit No. 3-1575
NPDES No. VT0120100
Facility Location: 43.40097, -73.2416 (NAD 83)
Approximate Outfall Location: 43.40190, -73.24270 (NAD 83)

II. Hydrology:

Receiving water: Mettawee River
Facility Design Flow: 1.440 MGD = 2.228 CFS
Estimated 7Q10¹ = 8.8 CFS
Estimated LMM² = 24.4 CFS
Minimum River Flow during Discharge³ = 53.4 cfs (80.3 cfs at USGS Station 04280450)

¹ Using daily mean streamflows, the flow of the receiving water equal to the minimum mean flow for seven consecutive days, that has a 10% probability of occurring in any given year.

² "Low Median Monthly Flow". Using daily mean streamflows, the median monthly flow of the receiving water for that month having the lowest median monthly flow.

³ The project has proposed only discharging when the effluent will represent less than 5% of the downstream flow. This will be accomplished through observation of the Middle Granville, NY, USGS Station 04280450.

Instream Waste Concentration at 7Q10 Flow (IWC-7Q10) = 0.202 (>10%)

Instream Waste Concentration at Low Median Monthly Flow (IWC-LMM) = 0.084 (>1%)

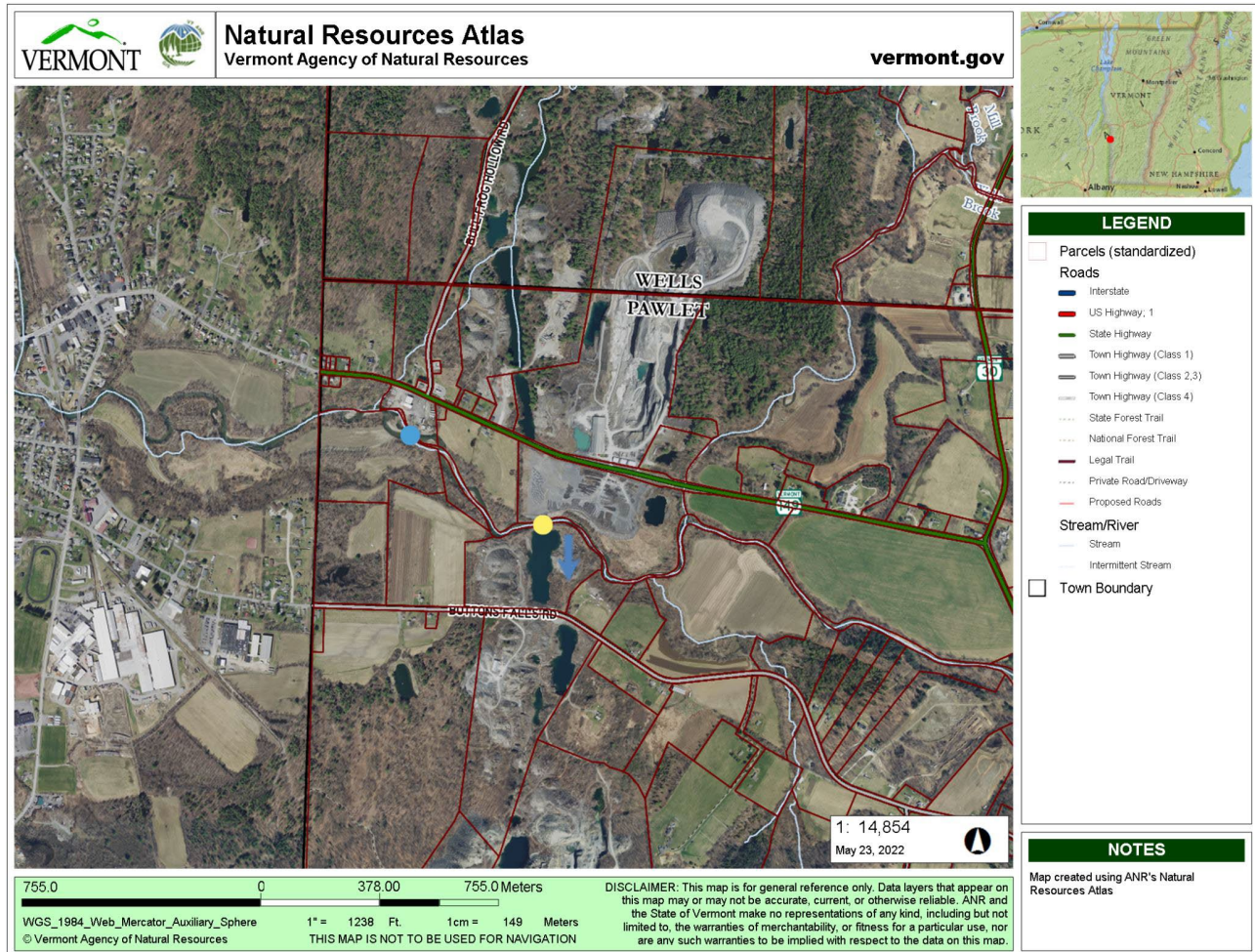
Instream Waste Concentration at Minimum River Flow during Discharge = 0.0259 (>1%)

III. Facility Description:

MHG Solar, LLC owns the Button Falls Solar Project. They intend to partially dewater an existing slate quarry so that a portion of the tailing piles on the project property can be placed into the quarry to create a level lot for the installation of a solar array. No treatment is proposed, but if the pH of the quarry water is found to exceed the Vermont Water Quality Standard of 8.5 then pH adjustment will be required. Discharge is planned for 10 days. After the tailings have been placed in the partially dewatered quarry, a mixture of storm and ground water will refill the quarry and it will appear very similar to the existing conditions but will be smaller and slightly shallower.

The Mettawee River downstream of the Button Falls Solar Project discharge is a Class B (2) water and is designated as Cold Water Fish Habitat. At the point of discharge, the river has a contributing drainage area of 111.0 square miles. No Waste Management Zone or Mixing Zone are proposed.

Figure 1. Mettawee River near the Button Falls Solar Project. The facility location is represented by a blue arrow. The proposed outfall (S/N 001) is represented by a yellow dot. The nearby monitoring station at RM 20.0 is shown west of the facility as a blue dot. Figure produced with the Vermont Integrated Watershed Assessment System on the VT Agency of Natural Resources Atlas (<https://anrweb.vt.gov/DEC/IWIS/>).



This memo is organized into the following sections:

- Summary of Effluent Data for the Button Falls Solar Project
- Summary of Instream Ambient Chemistry Data and Macroinvertebrate Data for the Mettawee River
- Assessment of Reasonable Potential of the Button Falls Solar Project discharge to exceed Vermont Water Quality Standards (VWQSs)

IV. Effluent Data for the Button Falls Solar Project

The Button Falls Solar Project intends to partially dewater an existing slate quarry. The water was sampled on 12/20/2021 and the results are presented below in Table 1.

Table 1. Effluent Data for the Button Falls Solar Project included with the application.

Test results submitted with Application		
Parameter	Value	Units
BOD5	3.9	mg/l
COD	<10	mg/l
Dissolved Oxygen	10.5	mg/l
Dissolved Oxygen Saturation**	84.5	%
TSS	4	mg/l
Turbidity	1.84	mg/l
Settleable Solids	<0.5	mg/l
Oil and Grease	2.8	mg/l
Total Phosphorus	0.013	mg/l
Total Kjeldahl Nitrogen	0.2	mg/l
Nitrite	<0.02	mg/l
Nitrate	0.044	mg/l
Total Ammonia Nitrogen	<0.08	mg/l
Total Nitrogen**	<0.264	mg/l
Total Hardness	225	mg/l
Color	5	CoPT
Materials Affecting Taste and Odor	N/A	mg/l
Temperature Range	41-41	Deg. F
pH range*	8.09-8.24	SU
Arsenic	<0.001	mg/l
Cadmium	<0.002	mg/l
Chromium (+6)	<0.02	mg/l
Chromium (+3)	<0.005	mg/l
Copper	<0.02	mg/l
Cyanide	<0.009	mg/l
Iron	0.062	mg/l
Lead	<0.001	mg/l
Manganese	0.17	mg/l
Mercury	<0.0002	mg/l
Nickel	<0.005	mg/l
Selenium	<0.002	mg/l
Silver	<0.01	mg/l
Zinc	<0.02	mg/l
Magnesium	17	mg/l
Antimony	<0.002	mg/l
Beryllium	<0.001	mg/l
Calcium	62	mg/l
Notes:		
* pH was initially submitted as 11.03. This measurement has been determined to be erroneous. See attach memo titled Re: pH Monitoring for Button Falls Quarry, Pawlet VT		
** Calculated value based on provided information.		

V. Receiving water monitoring data

A. Biological Assessments and Ambient Chemistry Data for the Mettawee River upstream and downstream of the Button Falls Solar Project

MAP maintains the VTDEC assessment database, an EPA-required database which describes the conditions of Vermont's surface waters with respect to their attainment of VWQS. For the Mettawee River segment to which this facility discharges, the database indicates the receiving water does support all designated uses.

Biological Assessments:

Biological assessments were conducted downstream of the facility at RM 20.0 on 9/30/2019. The biological assessment meets VWQS for aquatic biota uses for the Class B(2) Medium High Gradient stream type. Macroinvertebrate monitoring data is summarized below in Table 2. It should be noted that this data does not reflect the influence of the unconstructed solar project but does provide information about the existing water quality than can be used to help predict the impact of the short-term quarry dewatering.

Table 2. Results of the Biological Monitoring for Macroinvertebrates on the Mettawee River, (RM 20.0), near the Button Falls Solar Project outfall.

Macroinvertebrate Site Summary - Mettawee River RM 20.0									
Date	Density	Richness	EPT Richness	PMA-O	B.I.	Oligo.	EPT/EPT + Chiro	PPCS-F	Community Assessment
9/30/2019	4888	66.0	36.0	87.2	3.86	0.08	0.92	0.58	Meets VWQS
Scoring Guideline for a MHG Stream of Water Quality Class B(2)									
	≥ 300	≥ 30	≥ 18	≥ 45	≤ 5	≤ 12	≥ 0.45	≥ 0.4	Full Support
	≥ 250	≥ 28	≥ 16	≥ 40	≤ 5.15	≤ 14.5	≥ 0.43	≥ 0.35	Indeterminate
	< 250	< 28	< 16	< 40	> 5.15	> 14.5	< 0.43	< 0.35	Non-Support

B. Ambient Chemistry Data:

The most recent ambient chemistry data available from VT DEC sampling is from 9/30/2019, when surface waters were sampled downstream of the outfall at River Mile (RM) 20.0. The downstream sampling location is 0.35 miles downstream from the outfall (Figure 1).

Data representativeness are assessed by evaluating the observed flow conditions from field sheets, whether measured or qualitatively described, at which samples were collected. Other contemporaneous streamflow data, such as the U.S. Geological Survey stream gage network, are also taken into consideration where proximal and representative of the hydrologic conditions at the time (e.g., unimpacted by artificial flow regulation). The downstream sampling location at this site is the most sensitive location, and the sampling results are determined to be representative of low flow based on a review of available streamflow observations. Thus, the data presented below are relevant for inclusion in this analysis.

Water chemistry measures of relevant parameters for this assessment are summarized in Table 3.

Data used to evaluate in-stream chemistry is collected under low flow conditions (typically August or September) when turbidity is low, and no precipitation has been observed for 3 days.

Table 3. Surface-water quality data downstream of the Button Falls Solar Project.

Visit Date	Location ID	Mettawee River	
9/30/2019	522739	RM	20.0
Parameter		Unit	Value
Alkalinity		mg/l	109
Conductivity		umho/cm	298.8
Dissolved Oxygen		mg/l	10
DO Saturation		%	100.5
pH		None	7.98
Temperature		deg C	13.8
Total Aluminum		ug/l	20
Total Calcium		mg/l	37.64
Total Chloride		mg/l	13.8
Total Color measured using the visual method		PCU	10
Total Hardness		mg/l	122.15
Total Iron		ug/l	50
Total Magnesium		mg/l	6.84
Total Manganese		ug/l	15.07
Total Nitrate/Nitrite Nitrogen		mg/l	0.411
Total Nitrogen		mg/l	0.52
Total Phosphorus		ug/l	10
Total Potassium		mg/l	1.64
Total Sodium		mg/l	8.96
Total Sulfate		mg/l	12.16
Turbidity		NTU	0.27

VI. Assessment of Reasonable Potential of the Button Falls Solar Project discharge to exceed Vermont Water Quality Standards

A. Total Residual Chlorine:

This facility does not treat human waste or have any requirements for disinfection. No chlorine use has been indicated on the application and no limits or monitoring requirements should be included in the permit.

B. Whole Effluent Toxicity:

This facility will be dewatering an existing slate quarry that is in close proximity to the Mettawee River. The chemical analysis of the quarry water provided in the application did not indicate concentrations of metals which will be toxic when mixed into the receiving water at 7Q10. Metals are considered the most likely toxin present at this facility due to the presence of metals in rock deposits. The quarry dewatering is proposed to last for 10 days

during a time of relatively high flow, so actual dilution will be greater than that provided at 7Q10. Turbidity and pH limits will be set at the VWQS values for the receiving water type, and no appreciable BOD5 or COD loading is anticipated. Due to the nature of the quarry pond water and the short duration of discharge proposed, no WET limits or testing are proposed for this facility.

C. Flow:

This facility proposed to discharge 4,645,402 gallons from the existing slate quarry to the Mettawee River over a period of 10 days using a 1000 gpm pump. For evaluation purposes, the pump's average flow rate should be used (1000 gpm = 1.44 MGD). Using the average pump rate rather than the expected volume allows for a more conservative evaluation and also provides flexibility in the event that groundwater inflow into the quarry is greater than anticipated.

The permit should contain a daily average flow limit of 1.44 MGD (1000 gpm) and a monthly total monitor only condition.

Additionally, several special conditions should be included in the permit related to flow.

The first special condition is a restriction of discharge to times when the project's effluent flows represent approximately 5 percent of the total flow. The applicant prepared a memo titled "Re: Mettawee River 7Q10 Analysis - Button Falls Quarry, Pawlet VT" (attached) which explains the rationale behind this in anticipation of the Anti-Degradation analysis found in the Fact Sheet. The permit should contain a condition that requires that the permittee check the flows at the Middle Granville, NY, USGS Station 04280450 and verify that the flow is at least 80.3 cfs prior to discharging. The watershed at Middle Granville is 167 square miles, the watershed at the effluent point is 111 square miles, and assuming a proportional flow relationship, a flow of 80.3 cfs in Middle Granville is correlated with a flow of 53.4 cfs at the effluent point. Records of these flow checks should be included as an attachment to the monthly data report. The analyses for this RPD have been performed using the required 7Q10 and LMM flows, and information is included about this additional flow restriction for information purposes only.

The second special condition is a restriction on additional dewatering once material has started to be placed in the quarry. This condition is necessary to reduce the possibility of high turbidity discharges. This condition should require that the permittee provide notification via email at the time that discharge ceases and prior to placing material in the partially dewatered quarry pit.

The third special condition is related to the possibility that the discharge can cause erosion and water quality problems at the discharge point. The project plans (Sheet C-100 dated 3/8/22) include details and notes for erosion prevention. The permit should include a requirement that the splash pool be inspected daily to ensure that it is operating correctly and that there is no erosion of the Mettawee River bank. These inspections should also make note of any turbidity created in the river by the discharge and cease discharge if there is a violation of VWQS in the receiving water.

D. pH:

The draft permit should contain a daily sampling requirement for pH. Effluent should be limited to between 6.5 and 8.5 in order to match VWQS. The revised application indicated that the effluent will be in this range.

However, the initial application indicated that the pH was 11.03. A review of the laboratory report indicated that this value was measured outside of the holding time for pH and was also outside of the calibrated instrument range. This value was discussed with the applicant's consultant and new pH measurements were collected on site using a freshly calibrated pH meter. A memo describing this is attached.

The discharge should be stopped immediately upon a pH measurement less than 6.5 or greater than 8.5. If the pH exceeds the VWQS then the applicant must submit a treatment plan for approval by the Secretary that must be implemented prior to continuing the discharge.

E. Total Suspended Solids:

The quarry water sampling indicates that it contains 4 mg/l of total suspended solids (TSS). Based upon best professional judgement and upon Section 3-03.A and Appendix A (Fish Habitat Designation) of the 2017 Vermont Water Quality Standards this discharge does not have a reasonable potential to negatively impact the receiving water due to total suspended solids, and therefore no monitoring or limit is proposed. The permit will contain a limit and monitoring for turbidity which is generally considered an acceptable surrogate for TSS.

F. Turbidity:

The draft permit should contain a Turbidity limit equal to the VWQS for Cold Water fisheries (Instantaneous Maximum limit of 10 NTU). Monitoring should be conducted daily. This requirement is based upon Section 3-04.A and Appendix A (Fish Habitat Designation) of the 2017 Vermont Water Quality Standards. If an exceedance is measured, then the discharge should be stopped immediately and not resumed until a passing turbidity sample is obtained. The pump inlet may be moved, but the sample must be representative of the effluent (i.e. a sample cannot be taken from the far side of the quarry if the area near the pump inlet has become turbid).

G. Metals

The quarry water was tested for priority pollutant metals and the results are shown in Table 1 and below in Table 4. No priority pollutant metals were above the detection limit. The measured concentrations are compared to the Vermont Water Quality Standards as calculated using the hardness of the receiving water.

Only Arsenic and Mercury were calculated to potentially exceed the VWQS when the design flow was mixed into the 7Q10 flow.

Arsenic was calculated to have the potential to exceed the Human Health Criteria for Consumption of Water and Organisms. It was not calculated to have an exceedance of the criteria for Consumption of Organisms Only. The Mettawee River is a Class B(2) river, and according to the VWQS, the management objectives for the public water source use of this water is: Waters shall be managed to achieve and maintain a level of quality that is suitable for use as a public water source with filtration and disinfection or other required treatment. The Federal arsenic standard for drinking water is 10 ug/l, or at least 10 times greater than the measured concentration.

Due to the short-term duration of this discharge, and the ability of a public drinking water system to remove Arsenic prior to distribution, it is not necessary to monitor Arsenic in the effluent.

Mercury was also calculated to have the potential to exceed the Chronic Criteria for Aquatic Biota when mixed into the 7Q10 flows. At the proposed river flow of 53.4 cfs this potential disappears. Due to the short-term nature of this discharge, and the prohibition on discharging when the river provides less than 53.4 cfs of dilution water it is not necessary to monitor for Mercury in the effluent.

It should be noted that the criteria for Arsenic and Mercury that exceeded the VWQS either in the pond or at 7Q10 flows are very low and are not measurable using normal analytic methods. For the purposes of this memo the full numeric value of the non-detect was used in the calculations despite that being an excessively conservative practice.

Table 4 Comparison of Select Parameters with VWQS as calculated for the receiving water conditions.

Constituent	Consumption of Water and Organisms	Consumption of Organisms Only	Maximum Allowable Concentration - Acute Criteria	Allowable Average Concentration - Chronic Criteria	Quarry Water Sample	Mixed Contribution at 7Q10	Proposed Mixed Contribution when Qs=53.4 cfs	Notes
Note: Total Ammonia Nitrogen as N criteria were calculated at a pH of 7.98 and temperatures of 5 and 20 Degrees C (Winter/Summer).								
Total Ammonia Nitrogen as N (winter) (mg/L)			5.83	4.62	<0.08	<0.016	<0.002	Below VWQS in quarry before mixing with river.
Total Ammonia Nitrogen as N (summer) (mg/L)			4.05	2.00				
Free Cyanide (ug/L)	4	400	22	5.2	<9	<1.818	<0.236	Below VWQS when mixed at 7Q10.
Total Arsenic (ug/L)	0.02	1.5	340	150	<1	<0.202	<0.026	Below all criteria except HH Consumption of Water and Organisms in quarry prior to mixing.
Total Antimony (ug/L)	5.6	640			<2	<0.404	<0.052	Below VWQS in quarry before mixing with river.
Total Beryllium (ug/l)					<1	<0.202	<0.026	No VWQS for this metal.
Total Iron (ug/L)	300			1000	62	12.53	1.63	Below VWQS in quarry before mixing with river.
Note: Hardness Dependent Metals Criteria were calculated at a Total Hardness of 122.15 mg/l as CaCO3.								
Total Cadmium (ug/L)			2.47	1.03	<2	<0.404	<0.052	Below VWQS when mixed at 7Q10.
Total Chromium III (ug/L)			6722	118	<20	<4.040	<0.525	Below VWQS in quarry before mixing with river.
Total ChromiumVI (ug/L)			16	11	<5	<1.010	<0.131	Below VWQS in quarry before mixing with river.
Total Copper (ug/L)			17.61	11.53	<20	<4.040	<0.525	Below VWQS when mixed at 7Q10.
Total Lead (ug/L)			138	5.4	<1	<0.202	<0.026	Below VWQS in quarry before mixing with river.
Total Nickel (ug/L)			557	62.0	<5	<1.010	<0.131	Below VWQS in quarry before mixing with river.
Total Mercury (ug/L)			1	0.012	<0.2	<0.040	<0.005	Below all criteria under proposed discharge conditions.
Total Silver (ug/L)			6.28		<10	<2.020	<0.262	Below VWQS when mixed at 7Q10.
Total Zinc (ug/L)			145	144	<20	<4.040	<0.525	Below VWQS in quarry before mixing with river.
Dissolved Selenium (ug/L)	170	4200		5	<2	<0.404	<0.052	Below VWQS in quarry before mixing with river.
Total Thallium (ug/L)	0.24	0.47			<1	<0.202	<0.026	Below VWQS when mixed at 7Q10.

H. Nutrients

Table 1 shows the values for Nitrogen and Phosphorus that were submitted with the application. Table 5 below shows the mass balance for the proposed discharge.

This facility is located in the Lake Champlain basin and will discharge to the South Lake B Segment which is impaired for Total Phosphorus. The results for Nitrogen and Phosphorus do not suggest the need for Water-Quality Based Effluent Limits, and due to the short-term duration of the discharge and low TP/TN concentrations additional monitoring for TP and TN is not necessary for this permit.

a. Total Nitrogen:

TN is the sum of nitrate, nitrite, ammonia, soluble organic nitrogen, and particulate organic nitrogen. The quarry water has a TN concentration of <0.264 mg/l and the Mettawee River just downstream of the proposed discharge had a TN concentration of 0.52 mg/l on 9/30/2019. The discharge of the quarry water will not contribute to an exceedance of VWQS for TN or its constituent parts. As shown in Table 5 below, the current data indicates that this discharge is likely to slightly reduce downstream TN concentrations.

TN is a calculated value based on the sum of NO_x and TKN, and, shall be reported as pounds, calculated as:

Average TN (mg/L) x Total Daily Flow (MGD) x 8.34 = Pounds TN/day
where, TN (mg/L) = TKN (mg/L) + NO_x (mg/L)

Per EPA excess nitrogen (N) and phosphorus (P) are the leading cause of water quality degradation in the United States. Historically nutrient management focused on limiting a single nutrient—phosphorus or nitrogen—based on assumptions that production is usually phosphorus limited in freshwater and nitrogen limited in marine waters. Scientific research demonstrates this is an overly simplistic model. The evidence clearly indicates management of both phosphorus and nitrogen is necessary to protect water quality. The literature shows that aquatic flora and fauna have differing nutrient needs, some are P dependent, others N dependent and others are co-dependent on these two nutrients.

Like P, N promotes noxious aquatic plant and algal growth. High concentrations of P and N together cause greater growth of algae than P alone. The relative abundance of these nutrients also influences the type of species within the community. Furthermore, a high N-to-P ratio may exacerbate the growth of cyanobacteria, while elevated levels of nitrogen increase toxicity in some cyanobacteria species. Given the dynamic nature of all aquatic ecosystems, for the State to fully understand the degradation to water quality it is necessary to limit P and monitor bioavailable N (including nitrate, ammonium, and certain dissolved organic nitrogen compounds). For this facility the information provided with the application is considered sufficient for these purposes.

Total Ammonia:

This facility does not process organic wastes which have the potential to contain TAN, and there is no reasonable potential for effluent TAN concentrations to cause or contribute to an excursion above any narrative or numeric water quality criteria. A comparison of the reported TAN value and the seasonal VWQS along with diluted concentrations is presented above in Table 4. No TAN monitoring is required.

b. Total Phosphorus:

As shown in Table 1 this facility's proposed effluent contains 13 ug/l of phosphorus. The available data for the Mettawee River in Table 3 indicates that TP concentrations at the time of observations was 10 ug/l. Both values are less than the numeric criteria for a Medium High Gradient Class B2 Stream of 15 ug/l. Because the quarry pond water and the receiving water contain less Total Phosphorus than the numeric criteria for this stream type, and because this portion of the Mettawee River fully supports the phosphorus response variables including macroinvertebrates, a permit limit and additional monitoring are not required for the proposed permit.

The potential impacts of phosphorus discharges from this facility to the receiving water have been assessed in relation to the narrative criteria in §29A-302(2)(A) of the 2017 VWQS, which states:

In all waters, total phosphorous loadings shall be limited so that they will not contribute to the acceleration of eutrophication or the stimulation of the growth of aquatic biota in a manner that prevents the full support of uses.

To interpret this standard, the Secretary relies on a framework which examines TP concentrations in relation to existing numeric phosphorus criteria and response criteria in §29A-306(a)(3)(c) of the VWQS, for streams that can be assessed using macroinvertebrate biocriteria. Under this framework, a positive finding of compliance with the narrative standard can be made when nutrient criteria are attained, or when specific nutrient response variables; pH, Turbidity, Dissolved Oxygen, and aquatic life use, all display compliance with their respective criteria in the Water Quality Standards. To assist in determining whether this facility's TP discharge is in compliance with VWQS the analysis is broken into an analysis of the TP numeric standard and an analysis of the Nutrient Response Conditions needed to determine compliance with the narrative standard.

Total Phosphorus Numeric Analysis:

The TP concentrations in the Mettawee River are less than the 2017 nutrient criteria threshold of 15 ug/L Total Phosphorus in a Class B Medium, High-Gradient stream. After mixing with the proposed quarry water discharge the concentration will remain under that threshold. The calculated change in the in-stream TP concentration attributable to the Button Falls Solar Project is 0.25 ug/l. Table 5 below shows the mass balance for the proposed discharge.

Table 5. Mass Balance of Nutrients of Concern around the Button Falls Solar Project.

	Total Phosphorus (ug/l)	Total Nitrogen (mg/l)	Notes
Qs (cfs)	24.42		<i>Estimated LMM flow</i>
Qe (cfs)	2.228		<i>permitted effluent discharge</i>
Qr = Qs + Qe (cfs)	26.65		<i>Qs+Qe</i>
LMM IWC	0.0836		<i>Qe/(Qs+Qe)</i>
Cs	10.00	0.52	<i>upstream pollutant concentration (average)</i>
Ce	13	0.3	<i>maximum effluent pollutant concentration observed</i>
Cr = (CsQs+CeQe)/Qr	10.3	0.50	<i>calculated resultant downstream pollutant concentration without TSD factor of safety</i>
Cr (mg/L) (IWC)	2.2	4.2	<i>calculated resultant downstream pollutant concentration using instream waste concentration method</i>
Stream Type	B2 Medium, High-Gradient		
Calculated Instream Contribution from Effluent without TSD method	0.3	-0.02	<i>difference between observed upstream concentration and calculated resultant downstream concentration. Without TSD method</i>
VWQS Criteria (2017)		None for Streams	
Threshold Criteria	15		
Threshold Exceeded without TSD method?	No		

Total Phosphorus Nutrient Response Conditions Analysis:

The Combined Nutrient Response Conditions for Aquatic Biota and Wildlife in Rivers and Streams at RM 20.0 on 9/30/2019 meets VWQS for pH, meets VWQS for Turbidity, meets VWQS for Dissolved Oxygen and meets VWQS for Aquatic Biota as shown below in Table 6. Therefore, the narrative standard presented in §3-01.B.2 of the VWQS is supported and the receiving waters are in compliance with VWQS for Total Phosphorus but may still be subject to limits prescribed by VSA 1266a or a Phosphorus TMDL.

Table 6. Assessment of Phosphorus Response Variables around the Button Falls Solar Project

Response variable (VWQS reference)	Target Value for Cold Water Fish Habitat	River-mile: 20.0 9/30/2019
pH (§3-01.B.9)	6.5-8.5 s.u.	7.98
Turbidity (§3-04.B.1)	< 10 NTU at low mean annual flow	0.27
Dissolved Oxygen (min) (§3-04.B.2)	>6 mg/L and 70% saturation	10 (100.5%)
Aquatic biota, based on macroinvertebrates.	Attaining an assessment of good, or better.	Meets VWQS

Total Phosphorus Reasonable Potential Determination:

The quarry water and Mettawee River water sample TP concentrations were both below the numeric threshold for this water body and would remain below that threshold when mixed under LMM flows. The nutrient response criteria for TP are also satisfied, and therefore this facility does not have reasonable potential to violate VWQS for TP.

This facility is subject to 10 V.S.A. 1266a, which reads “No person directly discharging into the drainage basins of Lake Champlain or Lake Memphremagog shall discharge any waste that contains a phosphorus concentration in excess of 0.80 milligrams per liter on a monthly average basis. Discharges of less than 200,000 gallons per day, permitted on or before July 1, 1991, shall not be subject to the requirements of this subsection.” This facility will not discharge quarry dewatering water in excess of this concentration and due to the measured TP concentration and short duration of discharge, no monitoring or limit is suggested.

This facility was not assigned a WLA in the 2016 Lake Champlain Phosphorus TMDL. It is not clear that TP discharged from this location would remain suspended long enough to be deposited into the lake. This facility is anticipated to discharge approximately ½ pound of TP. The South Lake B segment to which this facility discharges has a total Wastewater WLA of 3,575 lbs TP of which only 18.3% was discharged during the period between March 2021 and March 2022. These numbers can be seen below in Table 7. Due to the small amount of TP proposed for discharge, the large amount of unutilized Wastewater WLA and the uncertainty in whether TP from this facility reaches the lake, it is not necessary to monitor for TP or have a limit in the permit.

Table 7. Assessment of Total WWTF Phosphorus loading for South Lake B segment

Facility	WLA from 2016 Lake Champlain TP TMDL		Lbs TP Discharged 3/21-3/22
	Metric Tons TP	Lbs TP	
Benson	0.122	268	129.22
Castleton	0.397	875	118.22
Fair Haven	0.414	912	56.61
Poultney	0.414	912	71.24
West Pawlet (Pawlet)	0.276	608	277.65
Total	1.623	3575	652.94
Percent of Wastewater WLA Discharged:			18.3%
Anticipated lbs TP from Button Falls Solar = $8.34 \times 0.013 \text{ mg/l} \times 4.645 \text{ MG} =$			0.50

VII. Summary of Reasonable Potential Determinations

The data available for this facility does not indicate that it has a reasonable potential to violate VWQS. Limits for the effluent should be set to comply with VWQS at the outlet pipe for turbidity and pH.

A. Recommended Biological and Water Quality Monitoring:

No biomonitoring is proposed for inclusion in the permit.

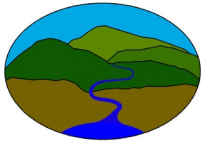
B. Recommended Effluent Monitoring:

The following monitoring is suggested for inclusion in the permit:

- Daily pH monitoring should be included in the permit with minimum and maximum limits of 6.5 and 8.5.
- Daily Turbidity monitoring should be included in the permit with an instantaneous max limit of 10 NTU.
- Continuous flow monitoring with a daily average limit of 1.44 MGD (1000 gpm) and a monthly total monitor only condition should be included in the permit.
- A special condition requiring that discharge stop immediately upon measurement of an exceedance of either pH or Turbidity. If Turbidity is exceeded discharge may resume once a passing turbidity sample representative of the proposed effluent is obtained. If pH is exceeded, then an operational plan to treat the effluent so that it is less than 8.5 and greater than 6.5 must be submitted to the Secretary for review and approval prior to continued discharge.
- A special condition prohibiting the discharge of effluent from this facility once material has started to be placed in the partially dewatered quarry. This condition should require email notification that discharge has stopped, and material placement has begun.
- A special condition that requires daily monitoring of the USGS Station 04280450 and prohibits discharge if the flow is less than 80.3 cfs. This flow rate has been prorated based on watershed area to correlate with a flow of 53.4 cfs at the effluent point. See "Re: Mettawee River 7Q10 Analysis - Button Falls Quarry, Pawlet VT" (attached) That flow check should be documented and included as an attachment to the monthly report.
- A special condition requiring erosion control devices at the point of discharge and daily inspections with documentation.

C. Conclusion:

After review of all available information, it has been determined that there is not a reasonable potential for the discharge to cause or contribute to a water quality violation.



March 7, 2022

John Merrifield
Vermont Department of Environmental Conservation
Direct Discharge Analyst
1 National Life Drive, Davis 3
Montpelier, VT 05620-3522

Re: pH Monitoring for Button Falls Quarry, Pawlet VT

Dear John:

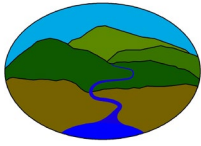
Fitzgerald Environmental Associates (FEA) was hired as a sub-consultant to Krebs & Lansing Consulting Engineers to assist with water quality sampling at the quarry pond site on Button Falls Road in Pawlet, VT. FEA completed an initial round of water quality grab sampling on 12/20/2021 and delivered the samples to Endyne Laboratory in Williston, VT on the same day. The analyzed samples were within the expected ranges, except for pH. The lab sample was reported at 11.03, which is highly basic and well outside of the expected range. We had numerous discussions with yourself and with the Endyne Laboratory manager and concluded that this sample was likely an error. The sample was collected from shore in an area that was approximately 2-feet deep, it is possible that a locally high pH value was present due to shoreline contamination. The laboratory QC report notes that the value "exceeded the analytical calibration range", also the sample was not processed until the following day, approximately 24 hours after it was collected. There is no official hold time listed for Method SM 4500-HB, however it is recommended that samples be processed "immediately". We suspect that the combination of a 24 hour hold time and the value outside the calibration range produced an invalid result for the pH sample.

I completed a follow up site visit on 2/22/2022 and directly measured pH at 4 locations along the shoreline using a YSI Pro 1030 handheld unit (see attached map). The YSI unit was rented from Geotech Environmental and was calibrated approximately 3 hours prior to sampling. Field measurements of pH were collected by chiseling a hole through the ice and lowering the sensor approximately halfway down the water column. Readings were collected at depths ranging from 1 to 6 feet deep. Field measured pH values ranged from 8.09 to 8.24. The field measured values are within the acceptable range described in the Vermont Water Quality Standards.

We anticipate that project mobilization will occur in late fall of 2022 or winter or 2023. The Project Team will verify pH in the quarry pond a minimum of two times prior to dewatering. We propose to follow the sampling protocol described above approximately 2 months prior to pumping and again 1 week prior to pumping. The contractor shall be responsible for measuring pH daily during pumping.

Sincerely,

Joe Bartlett, CFM
Watershed Scientist



March 7, 2022

John Merrifield
Vermont Department of Environmental Conservation
Direct Discharge Analyst
1 National Life Drive, Davis 3
Montpelier, VT 05620-3522

Re: Mettawee River 7Q10 Analysis - Button Falls Quarry, Pawlet VT

Dear John:

We completed a 7Q10 analysis for the Mettawee River to determine appropriate pumping rates for partially dewatering the quarry pond on Button Falls Road in Pawlet, VT. The USGS operates a stream gage on the Mettawee in Middle Granville, NY (Station 04280450). The station has been in continuous operation since 1990. The drainage area at the USGS gage is 167sqmi, the drainage area at the quarry pond is 111sqmi. Annual low flow values range from 13.3cfs to 54cfs. We assume a drainage area adjusted 7Q10 flow for the project of 8.8cfs ($13.3\text{cfs} \times (111\text{sqmi}/167\text{sqmi})$). The lowest annual flows consistently occur between late August and early October.

The project requires daily dewatering of approximately 464,540 gallons from the pond into the Mettawee River for 10 days. A 1,000gpm (2.67cfs) pump is proposed for dewatering. The Vermont Water Quality Standards specify that the natural flow regime for B1 waters shall not be diminished by more than 5% of the 7Q10 for water withdrawal. We are targeting an increase of no more than 5% to the flow rate of the Mettawee River. We propose to monitor the daily flow rates at the USGS gage and operate the pump when the flow rate at the gage is no less than 80.3cfs, which equates to 53.4cfs at the project site. This will ensure that the maximum pump rate represents less than 5% of the receiving waterbody.

Sincerely,

Joe Bartlett, CFM
Watershed Scientist

MHG Solar – Pawlet
 3/8/2022
 FEA Antidegradation Writeup

FEA staff collected water quality grab samples from the quarry pond on 12/20/2021. Dissolved Oxygen was measured directly with a YSI Pro-ODO handheld meter, all other samples were collected into bottles provided by Endyne Laboratories. All samples except pH were delivered within specified holding times to Endyne Laboratories on 12/20/2021. pH samples have a maximum hold time of 15 minutes, which was not feasible for this project (2 hours from the closest analytical lab). Sampling results were compared to the Vermont Water Quality Standards (VTDEC, 2017). All sampling results were well below the values for general criteria, human health, and aquatic biota (chronic exposure), except for pH (Table 1). The field sampled pH value of 11.03 is strongly basic and exceeds the General Criteria Applicable to all Waters range of 6.5 to 8.5. It is worth noting that VTDEC biomonitoring in the Mettowee River immediately downstream of the quarry recorded a slightly basic pH of 7.98 in 2019. We completed a followup visit on 2/22/2022 to directly measure pH with a YSI Pro 1030 and found values ranging from 8.09 to 8.24, falling within the VWQ standards.

Table 1: Vermont Water Quality Criteria and field sampling results

Analyte	VWQS Water Quality Criteria (Class B, Cold-Water)				2021 Sampling
	General	Human Health	Aquatic Biota Acute	Aquatic Biota Chronic	
BOD5					3.9 mg/L
COD					<10 mg/L
Turbidity	10				1.84 NTU
Settleable Solids	*				<0.5 mg/L
Oil and Grease	*				2.8 mg/L
Total Dissolved Solids					284 mg/L
Total Suspended Solids	*				4 mg/L
Total Phosphorus	.054				0.013 mg/L
Total Kjeldahl N					0.2 mg/L
Nitrite					<0.02 mg/L
Nitrate	5.0				0.044 mg/L
Ammonia					<0.08 mg/L
Color	**				5 CoPT
pH	6.5-8.5				8.2***
Dissolved Oxygen	6				10.5 mg/L
Total Hardness					225 mg/L
antimony		5.6			<0.002 mg/L
arsenic		.02	340	150	<0.001 mg/L
beryllium					<0.001 mg/L
cadmium			0.94	0.43	<0.002 mg/L
calcium					62 mg/L
chromium 6			16	11	<0.02 mg/L

Table 1: Vermont Water Quality Criteria and field sampling results

Analyte	VWQS Water Quality Criteria (Class B, Cold-Water)				2021 Sampling
	General	Human Health	Aquatic Biota Acute	Aquatic Biota Chronic	
chromium Total			322	42	<0.005 mg/L
copper			7.0	4.95	<0.02 mg/L
cyanide			22	5.2	<0.009 mg/L
Iron				1,000	0.062 mg/L
lead			30.1	1.17	<0.001 mg/L
magnesium					17 mg/L
manganese					0.17 mg/L
mercury			1.4	.012	<0.0002 mg/L
nickel			260	29	<0.005 mg/L
selenium				5	<0.002 mg/L
silver			1.02		<0.01 mg/L
thallium		.24			<0.001 mg/L
zinc			65	65	<0.02 mg/L

*None in such concentrations or combinations that would prevent the full support of uses

**No change from the natural condition that would prevent the full support of uses

***pH was sampled directly with a handheld meter (YSI Pro 1030) on 2/22/2022

RESPONSIVENESS SUMMARY

NPDES Discharge Permit No. 3-1575

Button Falls Solar Array

Quarry Dewatering

The Vermont Agency of Natural Resources (Agency) placed the above referenced permit on public notice initially from August 13, 2022 to September 20, 2022.. A public meeting was scheduled on September 13, 2022.

Comments on the draft permit were received during the public meeting. The transcript for this meeting is attached. Questions have been pulled from the text of the transcript and paraphrased for clarify. The following is a summary of the comments and the Agency's responses to those comments. A copy of any or all comments received can be obtained by contacting the Agency's Watershed Management Division at (802) 828-1115.

COMMENT #1

Is the discharge necessary?

- **Why wasn't the project configured differently to avoid the need to dewater the quarry?**
- **Is it possible to avoid a discharge by grading tailings into the pond at a slower rate?**
- **Can the site grading plan be amended to avoid the need to put any of material into the quarry?**

The Agency analyzed the project's proposed discharge according to the "Vermont Agency of Natural Resources Department of Environmental Conservation Interim Anti-Degradation Implementation Procedure" (2010, available at <https://dec.vermont.gov/sites/dec/files/wsm/Laws-Regulations-Rules/AntiDegredationImplementationProcedure-Interim.20101012.pdf>) and the Antidegradation Policy and Discharge Policy of the Vermont Water Quality Standards (VWQS). The Agency conducted the anti-degradation analysis with the presumption that the Mettawee River in the vicinity of the proposed discharge is a Tier 2 High Quality Water and concluded that there would be no reduction in water quality. Under the Discharge Policy, alternate disposal methods (trucking, on-site infiltration) for the dewatering water were considered and found to be cost prohibitive and emissions intensive (trucking) or infeasible (infiltration). This analysis is detailed in the Fact Sheet (beginning at page 5) and the Reasonable Potential Determination document.

Proposed NPDES direct discharge permits require an analysis of the potential impact to surface waters and the potential to violate the VWQS. The volume, frequency, and the microbial and chemical nature of the discharge were analyzed.

COMMENT #2

One thing that would have been nice to know was when was that area of the photography or Lidar actually taken?

Metadata for layers shown in the ANR Natural Resources Atlas can be found by clicking on the data of interest. The aerial photograph shown in the ANR Natural Resources Atlas is dated March 15, 2020. Information regarding the LIDAR model is available through the VCGIS website:

[Elevation | Vermont Open Geodata Portal Your source for geospatial data](#)

COMMENT #3

Is there a potential for the seepage into the quarry and resulting erosion?

This quarry was dewatered when it was operational in the past. Some seepage is likely to occur, and this may carry fine soil particles into the quarry pond. The permit's conditions limiting turbidity in the discharge will be sufficient to prevent this erosion from causing water quality issues in the receiving water.

The quarry quarry's sides are cut stone and are unlikely to collapse under a minor increase in water pressure. The banks above the slate formation are heavily littered with slate pieces and according to the NRCS Web Soil Survey, the soils in the vicinity of the riverbank have Whole Soil K erodibility factors of less than 0.17, indicating that they are not susceptible to sheet or rill erosion.

It will be necessary to pump out any seepage in addition to the water in the pond currently. The pumping rate selected by the project's engineers takes this possibility into account. Groundwater seepage into the quarry is anticipated.

This project was reviewed for impacts on floodways, streambanks, wetlands, shoreland and other water resource related factors and found to not have any undue impacts. (Final Order Granting Net-Metering Certificate of Public Good Case No. 21-3466-NMP dated 12/10/2021).

COMMENT #4

Will flood waters enter the quarry and would that impact dewatering?

A flood of sufficient size has the possibility of rising above the bank elevation and flooding the quarry. That would impact dewatering, and it is presumed that the project would not attempt to dewater during active flooding. This would most likely be prohibited by the turbidity limit included in the draft permit since flood waters are likely to exceed a turbidity of 10 NTU.

COMMENT #5

Installing erosion control measures may require tree and vegetation removal. What impact will that have on the bank during a flood?

Erosion control measures have been included in the permit requirements in order to prevent this discharge from eroding the river bank and increasing turbidity in the river. The site plan does not include individual tree locations, so it is not clear if any trees will need to be removed. An 8-foot minimum width is shown in the erosion control detail.

If vegetation trimming is required, it is unlikely that the root systems would be grubbed out due to the conditions set in the Final Order Granting Net-Metering Certificate of Public Good that protect the Riparian Buffer. The remaining root systems would continue to provide structural stability to the soil,

aided by the many pieces of slate on the ground. The erosion control measures will be removed at the end of the discharge and the vegetation will regrow during the next growing season.

COMMENT #6

If you do choose to issue the permit I would be curious to know if, and I think if I were in your position, when they plan to start pumping.

The permit will be modified to add a requirement for the Permittee to provide notice to DEC when they start the pumping operation.

COMMENT #7

I'm wondering if any discharge permits had previously been issued for this quarry for dewatering.

There is no record of this quarry having been issued an NPDES Direct Discharge Permit.

BUTTON FALLS SOLAR PROJECT PUBLIC MEETING 9/13/2022 SIGN IN SHEET

Name

Email/Contact Info

John Merrifield
Thomas Weiss

john.merrifield@vermont.gov
tweiss@together.net

INTRODUCTION

JOHN MERRIFIELD

This is a meeting about the Button Falls Solar project and their proposed direct discharge permit. This is a old slate quarry that will be partially dewatered in order to put part of the old tiling tailings piles back into it. And this is being done to create a level spot for a solar project. The water in the quarry has been analyzed and it meets Vermont water quality standards. It's a short term duration project. They expect to discharge approximately 10 days, but that will be dependent on weather and groundwater conditions. It requires daily checks of pH and turbidity, and compliance with some erosion control measures, which they're going to have to check three times a day. They also need to check the flow rate at the Middle Granville USGS station, and that's being done to ensure that the flows from this facility represent a small portion of the flows in the river, approximately 3%. It's a short term project dewatering groundwater and stormwater into the river and it's a one time shot, once they're done dewatering and start placing materials into the pond, they won't be able to dewater anymore.

THOMAS WEISS

I'm Thomas Weiss. I'm a registered civil engineer with experience in hydrology and flood studies and environmental reviews. I guess I've got one clarifying question, what is the volume of tailings that proposing to put in?

JOHN MERRIFIELD

They're proposing to put in an amount equal to the amount they're going to pump out. I would have to check, but I believe about 400 cubic yards.

THOMAS WEISS

I saw an e-mail that indicated maybe 2,200, but the amount they're pointing out is 23,000.

JOHN MERRIFIELD

Then that would be the number because I haven't looked at this in a couple of months.

THOMAS WEISS

That's fine. Anyways, thanks for holding the public hearing and I appreciate that and to make comments, but I don't understand the actual need for this permit. Why the project couldn't have been configured differently so they didn't need to dewater the quarry.

The fact sheet, as you're aware, mentions that the water quality standards will prohibit issuing a discharge permit if there is an alternative to avoid the discharge, I believe. So, I take the rate of the 10 days of pumping at the amount being requested, that 460,000 gallons a day for 10 days, that amounts to 23,000 cubic yards. You presume they can actually dewater all of that, as you're aware, without groundwater or river water coming in through underground into the quarry refilling. So, one, you could

amend the site grading plan to avoid the need to put any of that into the quarry. The other is to, depending on about three times actually grade the other direction, then put the tailings in slowly enough, then maybe there's no need for discharge permit. They could get some of the tailings off the tailings pile back into the pond.

The site plan shows a saddle point between the pond and the river. If I look at the contours carefully, it's somewhere between 402 feet, 404 feet above sea level, and the water level in the pond and the river is somewhere in that two foot contour interval as well, so there's not a lot of vertical clearance there. I also looked at some information from that had been submitted to the Public Utilities Commission for the Certificate of the Public. They had a site plan with some sections on it and they show that the level of the water in the pond and the river are both at about 403 feet, within the precision of the chart graph, they were saying. One thing that would have been nice to know was when was that area of the photography or Lidar actually taken? You can check the flows in the river then, see how that compares with the flow at the Middle Granville gauge so you can see whether that's above or below the elevation that it would be when discharge is allowed and when does that go away.

The amount would be 23,000 cubic yards. Hydrologists tend to work in acre-feet and that's 14 acre feet. The surface area of the pond, so anyway, is it possible to avoid pushing any tailings into the pond? The area on their site plan is about three and a quarter acres so if they were to instead of grading it into the pond were to distribute it uniformly over the site to raise, it would raise the site where the array is going to be by about 4-4.5 feet. But the site also slopes about 25 feet north to south because that's how they're placed, so maybe they wouldn't raise the upper part and they raise the lower part more. So it seems possible that it could be done that way without grading anything into the pond.

Is it possible to avoid a discharge by grading tailings into the pond at a slower rate? That would depend on the hydraulic connectivity between the groundwater, the river and the quarry pond itself. Given that the information shows that the pond and the river are at the same level, I'm thinking it is highly likely that the pond is the exposed water table – so the water table goes up it all goes up and as the water table goes down it all goes down, but that there's probably a reasonable hydraulic connectivity meeting between the two. So if that's truly pushed them for grading tailings into the pond, them being the applicant, and the pond's about 3 1/2 acres, so that's about four feet of water levels. And if they don't have discharge permit, gives them 10 extra days to grade into the pond so they could do it at slower rate without affecting the total duration of the project. From start until final. And the problem, of course being that if the water goes out of the pond slowly enough, that would take much too long. As I said, I don't know what that answer is. So that that's another alternative, although it is a little iffy depending on the rate at which pushing the tailings into the pond the water comes up and how long it will take the pond water to go back down so you can push some more in, and what effect would that have the project schedule.

So those are two potential alternatives that I didn't see in the fact sheet discussing the alternatives. It discussed two alternatives where water would be taken out of the pond, that it would be disposed of in other ways most feasible, and you can see that it is not feasible given that amount of water. But I've got a number of other concerns and I'm getting close to being done. I actually looked into flood insurance. There is a detailed study from the state line to a point about 400 feet below, downstream, with the saddle point. It shows that the elevation of the lowest point shows 10% annual by, you know probability and that's several feet higher than the elevation saddle point. And it projects the lines and the four

floods that they do down to the mean annual for 43% annual chance, then it's likely that even at that flood, the river is high enough that it flows into the pond, and so that there's an actual connection there. So I don't know how that would affect the applicants ability to actually dewater the pond if the rivers high enough, and I'm not sure, do you know if, at the minimum proposed flow for discharge to occur, how high up that comes?

JOHN MERRIFIELD

We don't have stage information at this location.

THOMAS WEISS

So anyway, that that's another unknown. And the proposed permit would require clearing strip of land for the splash pool and the filter fabric. And if, possibly even on an annual basis or in high water it comes into the pond, what affect would that have once the trees and understory are taken out. There was a picture and the esthetics assessment, I don't know if you received that or not that was submitted to the Public Utilities Commission, they chose that whole area that's wooded back there, that little strip. So I'm concerned about erosion there. If you need to clear it now, that might be prevented. And if the draw down is for a fee, which is what would be needed to take out the 23,000 cubic yards, then water surface level would probably be at or slightly below the bottom of the river channel so that there's a definite pressure from the river through that and the surficial geology indicates the river is probably in alluvial, might be black stream gravels, and so, depending on its permeability, if the water level goes down too far, if there's a potential for seepage coming through and eroding from down below. It would be down below from the rivers point of view but up above from the lower pond's view.

If you do choose to issue the permit I would be curious to know if, and I think if I were in your position, when they plan to start pumping. So that if you wanted to do a quick virtual inspection of the facility's splash pool and what they've done that we see and say, kind of like final inspection of a wastewater treatment plant. But you know, I don't expect you to send one of your inspectors down, just a little, we're going to start pumping now and we'll let you know what's going to happen. Rather than, I think the permits only listed for after they're done to let you know. So those are my comments. Thank you for listening to me.

ANNETTE SMITH

I'm wondering if any discharge permits had previously been issued for this quarry for dewatering. That's the one knowledge. I've seen that the infrastructure is in place for it. There is piping from the foot of the quarry all the way up over the bank and into the river. And this is something that I've observed with several other quarries where we did an investigation in 2015 and over a period of a few visits by a couple of different experts, I think we saw three or four quarries being dewatered. And I have filed public records requests with ANR asking for all of the permits ANR issued for these queries and I don't ever see that a discharge permit has ever been issued for any slate quarry for dewatering. And so while those comments were very interesting about this particular application and pushing slate waste into it, what peaked my interest when I saw this was more how curious it was that a discharge permit was being required for this when it appears that most quarry dewatering, I mean, I will tell you the results of

our investigation were that hardly any. I mean, they're exempt from Act 250. They're not exempt from DEC permits, but hardly any permits have ever been issued for any of the slate quarries for any of the things that they would qualify for. There are a couple of stormwater permits, but in particular, the dewatering seems to be going on without any regulation. And so it was a nice day, I took a little site visit and saw that there's a pipe going right down into this quarry. It goes right up and over the bank and so it's obviously been done probably without a permit, so I'm just, you know, I guess appreciating that this applicant apparently has done the right thing and asked for a permit, but it is not the norm. So that's my comment and I found the other comments to be very interesting about could it be done without doing the dewatering? By the way, there were a few fish in there and a lot of Turkey Vultures. So thank you for allowing me to comment and giving me the opportunity to at least put this issue on your radar because I think it's something that really needs further work, not just with dewatering, but anything that goes on. Thank you.

THOMAS HAND

So Annette, just for clarification, you trespassed onto private property to go look at/for some pipes or something. Is that what you were saying?

Annette Smith (Guest)

I took a walk on lands that were not legally posted, and so it was not trespassing. Had someone come to talk to me while I was there they could have asked me to leave. They could have served me a notice of trespass, but it was definitely not posted in any way. That was legal.

Thomas Hand (Guest)

You were aware that it was private property, of course, because you had gone and looked up this project.

Annette Smith (Guest)

And I didn't go looking for piping, I was just curious, it's not very far from where I live. So, I'm sorry Thomas, but what I did was legal and I'm trying to actually support you being a good applicant here. So I don't understand.

Thomas Hand(Guest)

Please, please don't go walk on my property in the future. I hope that's enough. If you want to go look at something you can ask, but please don't just go trespass on other people's property.

Annette Smith (Guest)

I didn't think it was your property. I wouldn't know who to...

Thomas Hand (Guest)

It is my property.

Annette Smith (Guest)

It's showing it's owned by somebody else, so well I..

Thomas Hand (Guest)

Not if you go look in the land records it's not.

Annette Smith (Guest)

I don't really want to fight with you.

Thomas Hand (Guest)

You shouldn't go walking other people's land, regardless of who it says it's owned by and some online search or something. I mean come on, that's just common sense, and to my knowledge there is not any piping that's connected there, as the landowner. So I dispute your allegations.

CONCLUSION

Do we have any other comments on the permit? OK. Well, if there are no other comments, we can wrap up the public meeting. This will conclude the public meeting on the Button Falls Solar discharge permit and we will be formulating the final permit in the coming month. The public notice period extends beyond this for at least seven days. That date that extends to is in the notice we need to receive your comments before then. Well, I appreciate sending them over. If you have any. They can be submitted on the Environmental Notice Bulletin. I believe they can be OK or they can be sent to me. My e-mail is in the on the ENB notice. We're happy to receive any written comments people have. Thank you very much for attending and we're going to go ahead and close the online meeting now and close it out. Thank you. Have a nice evening.

Thomas Weiss, P. E.
P. O. Box 512
Montpelier, Vermont 05601
September 14, 2022

John Merrifield
Watershed Management Division
Davis 3, 1 National Life Drive
Montpelier, Vermont 05620-3522

Re: Button Falls Road Solar Array, proposed NPDES permit

Dear Mr. Merrifield:

Thank you for the hearing yesterday evening and this opportunity to submit comments on this proposed permit.

I do not understand the need for this permit. Please consider additional alternatives that avoid the need for a discharge permit for this project.

The fact sheet issued for this permit points out that the Vermont Water Quality Standards prohibit issuing a discharge permit for a new discharge if there are alternatives available. The fact sheet then mentions two alternatives that require disposing the quarry water in different locations and declares them to be infeasible. I acknowledge that those two alternatives (trucking water off site, and subsurface disposal on site) are not feasible.

The fact sheet does not mention any alternatives for which no discharge would be needed. I can think of two such alternatives.

- Amend the site grading plan to avoid the need to grade any tailings into the quarry pond.
- Grade the tailings into the quarry pond at such a rate that the rise in the water level in the pond is offset by the diffusion of pond water into the groundwater.

These comments are based on a review of the nine documents available on the Environmental Notice Bulletin on September 12, 2022. In order to supplement that information, I also reviewed:

- The documents available on the Public Utilities Commission's ePUC internet site for this project (case no. 21-3466-NMP). The certificate of public good was issued 12/10/2021.
- The documents available at anrweb.vt.gov/DEC/IWIS/Report=SWActiveCGP&ViewOerms=False for the stormwater discharge permit. The permit, number 9367-9020, was issued March 15, 2022.
- The documents on this project provided at my request by ANR on August 30, 2022.
- Layers available on ANR's Natural Resources Atlas.

The proposal

The proposal is to partially dewater the quarry pond to allow slate tailings to be graded into the pond without raising the water level. The application is for 10 days of dewatering at 464,540 gallons each day, using a 1,000 gpm pump. [NOTE: That amounts to eight hours of pumping each day.]

The site

The applicant's site plan (drawing C-100, revision A, dated 3/8/22) shows a saddle between the quarry pond and the Mettawee River. The saddle is about 25 feet wide. The lowest contour line on the saddle is at 404 feet. The contour interval is two feet. That means the saddle point is between 402 feet and 404 feet. The splash pool is to be placed in the saddle.

The site plan also shows the water levels in the quarry and in the river to be between 402 feet and 404 feet.

The drawing does not indicate the date on which the lidar scan was made. It would be useful to know the discharge at Middle Granville on that date. One would then know whether the river would be higher or lower at the proposed discharge permit's minimum river flow rate. It would also have been useful (although too late now) to create a stage-discharge curve. The stage would be the elevation of the river at the saddle; the discharge that of the gage at Middle Granville.

The applicant provided an aesthetic assessment to the Public Utilities Commission. A photograph in this assessment shows that the area of the proposed splash pool is wooded.



Photograph is from "Aesthetic Assessment of the Button Falls Road Solar Project, Exhibit MHG-NS-1, p. 12 submitted to PUC for the CPG. Its caption is "From the western portion of the property looking north to nearby quarrying operations. A large tailings pile is visible in the distance, and a portion of the tailings pile to be graded is in the near right portion of the photo." The dewatering pump and splash pool would be somewhere in the red oval, added by T. Weiss, Sept. 2, 2022.

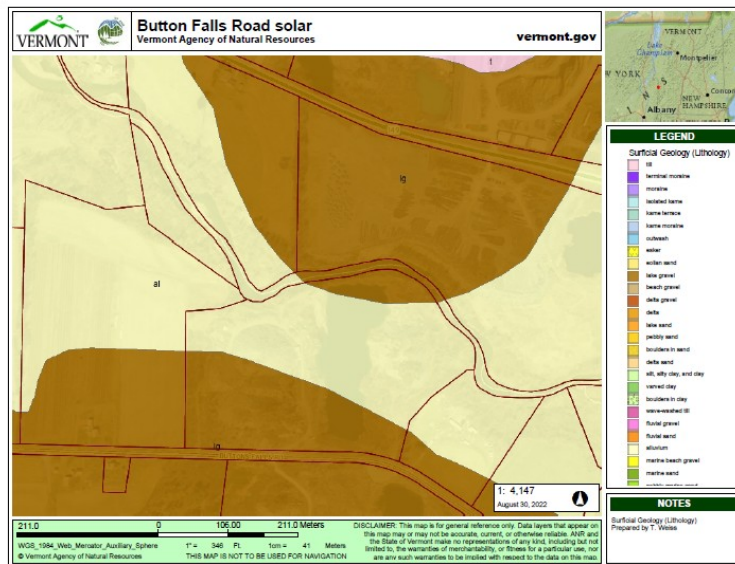
Hydraulic connectivity below ground and above ground

Below ground

It is likely that the river and the pond are closely connected hydraulically and that the surface of the pond is the exposed surface of the water table.

The applicant submitted exhibit MGH-TH-2 to the Public Utilities Commission as part its application for a Certificate of Public Good. Section A - A on drawing C-101 of that exhibit shows that the water surface elevation in the Mettawee River is the same as in the quarry pond: approximately 403 feet.

The ANR Natural Resources Atlas shows surficial geology to be alluvium along the Mettawee River and lacustrine gravels to the north and south of the river. The map shows that the portion of the quarry pond nearest the Mettawee River is lacustrine gravel (brown). The 1970 surficial geological map (from which this layer likely is taken) is at a much smaller scale (1:250,000) than this atlas sheet. The 1970 map shows the river to be entirely in alluvium (cream) in this area. In either case, the material between the river and the pond is likely to be highly permeable, indicating a strong hydraulic connection between the pond and the river.



The fact sheet (p. 7): "Due to the relatively small size of the lot and depth of the quarry, subsurface disposal would result in the water returning to the quarry and is therefore not feasible." This implies that there is a high hydraulic connectivity between the pond and the groundwater.

The Reasonable Potential Determination (p.7): "This facility proposed to discharge 4,645,402 gallons from the existing slate quarry to the Mettawee River over a period of 10 days using a 1000 gpm pump. For evaluation purposes, the pump's average flow rate should be used (1000 gpm = 1.44 MGD). Using the average pump rate rather than the expected volume allows for a more conservative evaluation and also provides flexibility in the event that groundwater inflow into the quarry is greater than anticipated." I interpret this granting of unapplied-for flexibility as a perception of a high hydraulic connectivity between the pond and the groundwater.

Staff of the Watershed Management Division raised concerns about a high hydraulic connectivity during discussions about the project and permit.

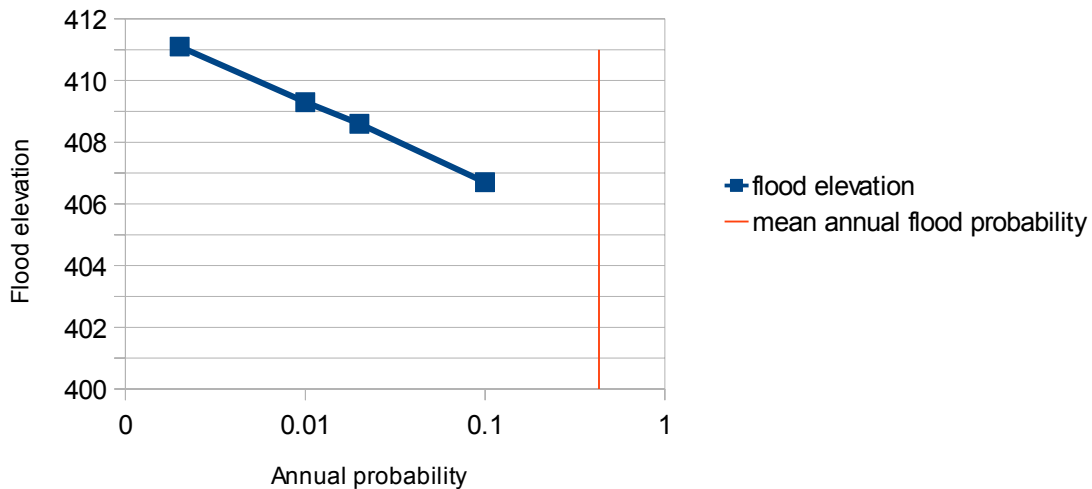
Above ground

The quarry pond appears to be connected to the Mettawee River at times of high water, perhaps at least once each year.

The Flood Insurance Program covers the Mettawee River in three reaches in Pawlet. The project area is shown on Flood Insurance Rate Map Number 50021C0513D, effective August 28, 2008. The project area is at a Zone A (no base flood elevations determined). The upstream end of a zone AE (flood elevations determined) ends at Section C, about 400' downstream of the saddle on the bank of the Mettawee River.

Flood Profiles are shown in volume 2 of the Flood Insurance Study of Rutland County, effective August 28, 2008. The detailed study ending just downstream of the project is shown on Panel 48P. That panel shows that water surface elevations at Section C are higher than at the saddle point between the river and the pond. The stream bed is shown at elevation 397.8'. The water surface elevation of the flood of 10% annual probability is 406.7'. The flood of 2% annual probability is at 408.6'. The flood of 1% annual probability is at 409.3'. The flood of 0.2% annual probability is at 411.1'. Flood elevations will be higher at the saddle by an unknown amount. Given the slopes of the stream bed and of the water surfaces at the various flood frequencies, it is possible that the water surface elevations for a given flood are perhaps half a foot higher at the saddle point.

Water surface elevations at section C



The mean annual flood has a probability of 0.43. An extrapolation of the flood elevation curve to 0.43 shows a flood elevation around 405 feet at FIRM section C. I acknowledge that extrapolations of this type of curve do not necessarily follow a straight-line extension. This means that an elevation of 405 feet is an estimate of the mean annual flood, without doing a statistical analysis.

Avoiding clearing in a riparian buffer zone

Vegetation will need to be removed at the saddle point to accommodate the splash pad and the filter fabric erosion protection. This will increase the potential for erosion of the saddle during annual high water and larger floods, until the trees and understory become fully re-established. That does not appear to have been addressed.

The clearing of vegetation also appears to violate the conditions of the certificate of public good.

The Public Utilities Commission issued findings concerning this project, Case no 21-3466-NMP. Kevin Anderson of ANR requested that the applicant agree to maintain the natural condition of all streams and riparian buffers near the project. The suggested language was"

"The CPG Holder shall maintain undisturbed, naturally vegetated riparian buffers along the Mettawee River and tributary of the Mettawee River as shown in Exhibit MHG-TH-2. The term "undisturbed" means no activities that may cause or contribute to ground or vegetation disturbance, or soil compaction, including but not limited to construction; earth-moving activities; storage of materials; tree trimming or canopy removal; tree, shrub, or groundcover removal; plowing or disposal of snow; grazing; and mowing." (ANR comment letter to PUC, September 28, 2021, p. 2).

This became condition 12 of the certificate of public good.

Avoiding the need for a direct discharge

The proposed permit is under the NPDES program. The key letter in "NPDES" is the "E". The full name is the National Pollutant Discharge Elimination System. It seems that if a discharge can be avoided, that should be preferred, no matter how benign the discharge is to the quality of the receiving water.

According to the fact sheet (p.7), the Vermont Water Quality Standards allow a new discharge only if several conditions are met, including:

§29A-106 (a)(2) "There is neither an alternative method of waste disposal, nor an alternative location for waste disposal, that would have a lesser impact on water quality including the quality of groundwater, or if there is such an alternative method or location, it would be clearly unreasonable to require its use."

The two alternatives discussed in the fact sheet are trucking the water off site or injecting the water on site. Trucking was found to be cost prohibitive and emissions intensive. Injection was found to be not feasible because of the quick return of the injected water into the quarry.

According to a document submitted for the certificate of public good:

"To ensure that the existing water level does not rise during the regrading operation, prior to commencing any grading activity MHG will be dewatering the quarry pond into the Mettawee River. The volume of clean water removed from the pond will be equal to the volume of tailings that are graded into the pond." (Supplemental Prefiled Testimony of Seth Goddard, p. 3

This testimony was incorporated into the PUC's order granting the CPG, in par. 63. The testimony submitted to the PUC appears to contain neither a pumping rate nor a volume of dewatering.

The cover letter for the application for the NPDES permit states:

"The purpose of the dewatering is to create room for the slate tailings pile to be graded into the pond. A total of ±4,645,402 gallons of quarry surface water will be dewatered over the course of 10 days with an average daily rate of ±464,540 GPD. The dewatering will be accomplished using a 6"x6" pump with an average pump rate of 1,000 GPM." The volume of 4,645,400 gallons is 23,000 cu. yds. (14 acre-feet).

I can think of two alternatives that avoid the need for a discharge to the Mettawee River.

One alternative is to avoid grading tailings into the pond. The site plan indicates that the solar array will be located on 3.23 acres. The proposed surface drops about 25 feet from south to north on the site. What happens if the material is retained on the site instead of being graded into the quarry pond? If the 23,000 cu. yds. were placed uniformly over that area, the final ground elevations would be about 4 1/2 feet higher than proposed. Or the applicant might choose to reduce the slope of the site. In this alternative, there is likely to be some unavoidable, incidental sliding of tailings into the quarry as part of the site grading.

The other alternative is to grade the tailings into the pond without dewatering. The reasonableness of this alternative is less clear and depends on the hydraulic connections among the river, quarry pond, and groundwater. It is likely that there is a strong hydraulic connection among the three. It is likely that the quarry pond is the exposed water table. As pointed out earlier, the river and pond have equal water surface elevations, indicating a hydraulic connection. The surficial geology shows that the river is in alluvium or lacustrine gravel.

The pond has a surface area of about 3 1/2 acres. I determined this by using the measuring tool on ANR's Natural Resources Atlas.

The water level of the pond will rise about 4 feet, if the 23,000 cu. yds. of tailings are graded quickly into the pond. That will overtop the saddle and discharge into the river. To avoid that overland discharge, the rate of grading into the pond will need to be at such a rate that the water level rise does not exceed the diffusion of the elevated quarry water into the surrounding groundwater. If there is no drawdown by pumping, then that means the time allowed in the schedule could be converted from dewatering to additional time for grading tailings into the pond.

Concerns with the draft permit

If the drawdown is 4 feet, that will place the water surface in the pond at or below the bottom of the river channel. This will have the potential of slumping the saddle on the pond side.

Grading tailings into the pond will create waves that could cause erosion at the saddle. The rate of grading and the height that the tailings slide down the side of the quarry will determine the height and power of the waves.

The pond will be connected with the river at times of high water. It is not known how high the discharge at the Middle Granville stream gage needs to be to make that connection.

The proposed permit requires clearing a strip of wooded land across the saddle, possibly in violation of the certificate of public good. The cleared area will be subject to erosion until the trees and understory grow back.

The rate of recharge of groundwater into a drawn down quarry pond is unknown.

If a permit is issued, I suggest that the first sentence of special condition 3.f. (page 3) be amended to require the permittee to notify you that the splash pool and pumping facilities are complete and pumping is expected to begin. This will enable you to make what would be the equivalent of a final inspection (it could be virtual) of the splash pool and pumping facilities.

Conclusion

There are a number of concerns with drawing down the water in the quarry that seem unresolved. Given these concerns, it seems that an alternative that avoids drawdown of the pond is a preferred alternative within the confines of the NPDES permit.

I make the following suggestions:

- Get the total volume of tailings expected to be graded into the quarry pond. I have not found an explicit statement of that amount.
- Get the date of the lidar scan and obtain the discharge at Middle Granville on that date.
- Evaluate the two proposed non-discharging alternatives. If either alternative is feasible, then deny the permit on the grounds of there being an alternative with a lesser impact on water quality.

Thank you for taking the time to read and review these comments.

Sincerely,
Thomas Weiss, P. E.