

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

FACT SHEET FOR DRAFT PERMIT

(May 2023)

Permit Number: **3-1172**
PIN: **EJ95-0286**
NPDES Number: **VT0101028**
Facility Name: **Hinesburg WWTF**
Facility Address: **10632 Route 116, Lagoon Rd**
Hinesburg, VT 05461
Facility Coordinates: **Lat: 44.3322 Long: -73.1258**
Facility Classification at issuance: **II Domestic Major**
Facility Classification following upgrade: **III Domestic Major**
Discharge Point ID: **S/N 001**
Receiving Water: **LAPLATTE RIVER**

I. Facility and Proposed Action

Applicant's wastewater treatment facility ("facility" or "WWTF") is engaged in the treatment of municipal wastewater in Hinesburg, Vermont. A map of the facility's location, outfalls, and receiving water is provided in Attachment A. This facility is classified as a Grade 2 Domestic Major NPDES WWTF.

On 4/28/2022 the Secretary of the Vermont Agency of Natural Resources (the "Secretary") received Applicant's renewal application for the permit to discharge into the designated receiving water. The facility's previous permit was issued on 1/26/2018 and expired on 12/31/2022.

The previous permit (the "current permit") has been administratively continued, pursuant to 3 V.S.A. § 814, as the applicant filed a complete application for permit reissuance within the prescribed time period per the Vermont Water Pollution Control Permit Regulations (VWPCPR) § 13.5(b).

At this time, the Secretary has made a tentative decision to reissue and amend the discharge permit.

II. Statutory and Regulatory Authority

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 § 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 C.F.R. 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. Water quality standards have three parts: (1) the designated uses for each waterbody or waterbody segment in the state; (2) numeric or narrative water quality criteria sufficient to protect designated uses of that waterbody; and (3) an antidegradation policy to protect and maintain water quality and existing and designated uses. CWA § 303(c)(2)(A); 40 C.F.R. § 131.12.

This permit complies with both the Discharge Criteria and the Antidegradation Policy in the 2022 Vermont Water Quality Standards. The Antidegradation Implementation Procedure is applied during the review of applications for any applicable permit for a new discharge to high quality waters in which compliance with the Vermont Water Quality Standards is evaluated.

“High quality waters” are those whose existing ambient water quality exceeds (i.e., is better than) the applicable minimum water quality criteria and indices for the class to which the waterbody is assigned. A waterbody is assessed as high quality on a parameter-by-parameter basis. The Secretary will presume that all waters are high quality for at least one criterion or index for some portion of the year. This presumption may be rebutted by credible and relevant information obtained by or provided to the Secretary.

This permit authorizes a direct discharge to the LaPlatte River in compliance with the Antidegradation Policy. The proposed permit does not authorize a “new discharge” as defined in the Vermont Water Quality Standards and the 2010 Interim Antidegradation Implementation Procedure. “New discharge” means any discharge not authorized under the provisions of 10 V.S.A. § 1263 as of January 7, 1985, or any increased pollutant loading or demand on the assimilative capacity of the receiving waters from an existing discharge that requires the issuance of a new or amended permit.

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 C.F.R. § 122.44(d)(1). An excursion occurs if the projected or actual instream 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 water requirements are established according to numerical and narrative standards adopted under state law for each water class. 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 instream 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 § 304(a) recommended water quality criteria, supplemented as necessary by other relevant information; or, in certain circumstances, based on an "indicator parameter." 40 C.F.R. § 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).

III. Permit Limit and Condition Formulation

A. Reasonable Potential Determination

In determining whether this permit has the reasonable potential to cause or contribute to an impairment, the Secretary 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 (Environmental Protection Rule, Chapter 29A), 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. Total Ammonia Nitrogen was assessed using the daily mean streamflow, the flow of the receiving water equal to the minimum mean flow for thirty consecutive days, which has a 10% probability of occurring in any given year (30Q10). 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; and
- 6) All effluent limitations, monitoring requirements, and other conditions of the 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.

IV. Facility Information

A. Facility History

The Town of Hinesburg owns and operates the Hinesburg wastewater treatment facility (WWTF). The facility receives and treats wastewater from the Town of Hinesburg. The facility was originally built in 1967.

The Hinesburg WWTF is an aerated lagoon treatment facility. Wastewater flows by gravity from the sewer collection system to the Main Pump Station, located in the Village on US Route 116. From the Main Pump Station, flow is pumped west in an 8" force main to Lagoon #1. Wastewater continues through the aerated lagoon system for biological treatment. The biological process consists of four (4) aerated lagoons with a total volume of 17.8 million gallons operating at a liquid depth of 10 ft. Air is provided to Lagoon #1, 2, and 3A by a floating lateral aeration system. A berm separates Lagoon #3A from #3B. Chemical phosphorus removal is provided prior to Lagoon #3B. Lagoon effluent continues to the chlorine contact tanks for disinfection and dechlorination before discharging to the LaPlatte River.

The facility was upgraded in 2009, the project included future plans for increase of the permitted flow from 0.250 to 0.308 mgd to meet the pretreatment demand within the system. Resulting from the Saputo Cheese facility closure, the Town no longer needed this additional capacity, so the Discharge Permit was not amended to the 0.308 mgd permitting capacity. Design of the following equipment for the upgrade was based on the flow of 0.308 mgd:

- Main pump sewage pumps and controls

- Aerated lagoon air distribution piping and partial mix aeration system
- Alum feed and storage system
- Lagoon aeration blowers
- Chlorine contact tank and disinfection feed and storage system

The facility is proposed to change to a sequencing batch reactor (SBR) system. The aerated lagoons will be abandoned and the new treatment facility, with a permitted capacity of 325,000 gpd, constructed in Lagoon No. 1. The new facility consists of a: headworks with screening, two (2) sequential batch reactors (SBR) with pre and post equalization, filtration with chemical addition, ultraviolet disinfection, aerated sludge, sludge storage tank, and control building. This work is planned to be completed in phases:

- Phase I initiated in July of 2021 and consisted of sludge removal for the installation of wick drains. This advance work accelerated the soil consolidation to achieve the total settlement necessary for Phase II construction. Lagoon #1 was taken out of service, drained, and the sludge removed (pumped) to the other lagoons and the existing sludge storage lagoon. The influent flow has been directed to Lagoon #2 throughout the construction process.
- Phase II is proposed to begin June of 2023, and consist of a new:
 - Main Pump Station
 - Headworks with rotary screening
 - Abandon and regrade existing Lagoons #2 and #3 while restoring to floodplain.
 - Two (2) cast-in-place concrete SBR reactor tanks with pre- and post-equalization tanks
 - Flocculation tank and tertiary cloth media filtration
 - Ultraviolet disinfection
 - Sludge storage tanks
 - Control Building for operator office, laboratory, electrical/controls, workshop and appurtenant equipment

According to the permit renewal and amendment application received by the Agency on April 28, 2019, the estimated population in the service area is 1,400. Of this population, 100% are serviced by the treatment system. The application states an approximate volume of 161,000 gallons per day of wastes, other than stormwater, are collected by the separate sanitary sewer system (83,700 gallons per day of residential waste, 32,300 gallons per day of commercial waste, 11,000 gallons per day of industrial waste, and 34,000 gallons per day from other waste sources).

The application stated Vermont Smoke and Cure is the largest contributor based on a sewer allocation at 6,050 gpd but is less than 5% of the total influent discharge. This discharger is not currently subject to a Pretreatment Permit administered by the VT DEC Wastewater Management Program.

Condition I.A.1.a. limits proposed in the draft permit shall apply once the permit is in effect and until the facility upgrades are complete.

Condition I.A.2.a. limits proposed in the draft permit shall apply once the Secretary acknowledges the completion of the facility upgrade or by 12/31/2025, whichever occurs first. This condition accounts for changes proposed for Flow, Total Phosphorus, Total Ammonia Nitrogen, Total Nitrate, Total Suspended Solids, Total Residual Chlorine, and Ultimate Oxygen Demand monitoring requirements.

All violations observed since the duration the current permit has been in effect, or otherwise active, have been mitigated through corrective actions to continue to meet the current permit limits and conditions.

B. Pretreaters

There are no pretreaters permitted under the NPDES program discharging to the collection system.

C. Receiving Water Classification

Discharge point 001 discharges to the LAPLATTE RIVER.

All uses Class B with a waste management zone. Class B waters are suitable for swimming and other primary contact recreation; irrigation and agricultural uses; aquatic biota and aquatic habitat; good aesthetic value; boating, fishing, and other recreational uses; and suitable for public water source with filtration and disinfection or other required treatment. A waste management zone is a specific reach of Class B(1) or B(2) waters designated by a permit to accept the discharge of properly treated wastes that prior to treatment contained organisms pathogenic to human beings.

D. Waste Management and Mixing Zones

A Waste Management Zone (WMZ) is a specific reach of Class B waters designated by a permit to accept the discharge of properly treated wastes that contained organisms pathogenic to human beings prior to treatment. Throughout the receiving waters, water quality criteria must be achieved but increased health risks exist in a WMZ due to the authorized discharge.

The Secretary may establish a WMZ as part of the issuance of a discharge permit as described in 10 V.S.A. § 1252. The model used to determine the WMZ is based upon three precepts of domestic wastewater treatment facility discharges: 1) the use of coliform bacteria as an indicator of pathogenic organisms; 2) despite proper operation and maintenance disinfection failures may occur; and 3) a reasonably sized waste management segment provides a "buffer zone" downstream of the wastewater discharge in which contact recreation is not recommended. If a disinfection failure should occur at the WWTF, the time of travel through this zone will provide time during which some pathogen die-off will occur and may also allow time for public notification. A WMZ is not a Mixing Zone.

The current permit designates a WMZ of 1.4-mile downstream from the Hinesburg WWTF outfall S/N 001 within the LaPlatte River. The Permittee applied for the permit amendment and renewal which proposed a flow increase from the current permitted 0.250 MGD to 0.325 MGD. The facility will be refurbished from the existing lagoon facility to a sequencing batch reactor treatment system. The WMZ was evaluated for the draft permit to consider the amended flow using the 1995 “Waste Management Zone Designation Procedure”. This evaluation is presented in the “*Hinesburg Wastewater Treatment Facility Reasonable Potential Determination (RPD) and Water Quality Based Effluent Limit (WQBEL) Calculation for NPDES Direct Discharge Permit 3-1172*”, Attachment A of this Fact Sheet. The WMZ is proposed to change from 1.4 miles to 2.3 miles downstream from the outfall of the Hinesburg WWTF, within the LaPlatte River. The new waste management zone shall be effective once the proposed facility upgrade is complete.

Mixing Zone. A Mixing Zone is a length or area within Class B waters required for the dispersion and dilution of waste discharges adequately treated to meet federal and state treatment requirements and within which it is recognized that specific water uses, or water quality criteria associated with the assigned classification for such waters may not be realized. A mixing zone shall not extend more than 200 feet from the point of discharge and must meet the terms of 10 V.S.A. § 29A-204. For a mixing zone to be applicable to a discharge it must be authorized within the discharge permit. The Secretary has made the determination that conditions due to discharges of waste within any mixing zone shall:

- a. not result in a significant increase in public health risk when evaluated using reasonable assumptions about exposure pathways.
- b. not constitute a barrier to the passage or movement of fish or prevent the full support of aquatic biota, wildlife, and aquatic habitat uses in the receiving waters outside the mixing zone.
- c. not kill organisms passing through.
- d. protect and maintain the existing uses of the waters.
- e. be free from materials in concentrations that settle to form objectionable deposits.
- f. be free from floating debris, oil, scum, and other material in concentrations that form nuisances.
- g. be free from substances in concentrations that produce objectionable color, odor, taste, or turbidity; and
- h. be free from substances in concentrations that produce undesirable aquatic life or result in a dominance of nuisance species. (Vermont Water Quality Standards § 29A-204(a)).

This facility currently does not have a mixing zone.

V. Monitoring

A. Discharge Sampling Points

Influent and Effluent sampling points are not proposed to change. Post construction of the proposed facility upgrade project, which will convert the existing lagoon treatment system with chlorine disinfection to a sequencing batch reactor system equipped to disinfect with ultraviolet (UV) light, the effluent sampling shall be collected after UV disinfection, within the effluent channel and after the v-notch weir before discharging to the LaPlatte River. This is a new condition for the draft permit and will be a new method of sampling for the Hinesburg WWTF as the current facility disinfects via chlorination and dechlorination.

B. Composite Sampling

24-hour composite sampling shall be performed on all parameters listed in the discharge permit that require composite sample collection. Implementation of 24-hour composite sampling ensures representative influent and effluent sample collection and captures variables such as fluctuations in flow rates or pollutant concentrations that can occur over 24 hours.

A composite sample is a composite of at least twenty-four (24) grab samples taken during one consecutive 24-hour period, either collected at equal intervals and combined proportional to flow or continuously collected proportional to flow. Composite samples shall be collected and stored in accordance with 40 CFR 136 and other applicable EPA guidance.

This condition is newly proposed in the draft permit as the current permit simply stated the condition shall be sampled as a composite, without this specificity of the sample duration period.

C. Flow Monitoring at Discharge Point 001

1. Flow - Monitoring Notes: Annual Average, Calculated

The draft permit allows an increase in discharge flow from 0.25 million gallons per day (MGD), annual average, to 0.325 MGD, annual average.

- From the permit effective date until the facility upgrade is complete and fully operational, the 0.250 MGD annual average flow shall apply.
- From completion of the facility upgrade, once the facility is fully operational, or by 10/31/2026, whichever occurs first, the newly proposed 0.325 MGD annual average flow shall apply.

This facility maintains a constant discharge and continuous flow monitoring is required to continue daily. Reports shall include monthly average and daily maximum results.

The new or increased portion of the proposed discharge constitutes a proposed “New Discharge” under the Vermont Water Quality Standards, as previously mentioned and described in Section III.C of this Fact Sheet.

Compliance Schedule

Under Section 13.4(d) of the VWPCPR, the Secretary may set schedules in permits to achieve compliance, within the shortest reasonable period of time, with applicable effluent standards and limitations, water quality standards, and other legally applicable requirements. When compliance will require more than nine months, the schedule of compliance shall include interim requirements, spaced no more than nine months apart, such as submission of reports of progress towards completion of the tasks necessary to achieve compliance.

The Secretary is including a compliance schedule in the draft permit because the Secretary has determined that the Permittee is unable to immediately comply with the proposed annual average flow limit upon the effective date of the permit. The proposed and pending modification of the WWTF and its operations will result in the facility no longer being able to meet the 0.250 MGD annual average flow limit and will need to change once construction is complete and operating properly.

The WWTF shall achieve compliance with the new annual average flow limit as soon as possible but no later than October 31, 2026.

2. Flow - Monitoring Notes: Effluent Gross Value, Continuous

This facility maintains a constant discharge and continuous flow monitoring is required. Monthly average, daily maximum and annual average flow rates are required for use in assessing compliance with the permit limitation and the design capacity of the WWTF.

D. Conventional Pollutants Monitoring at Discharge Point 001

1. Biochemical Oxygen Demand, 5-Day (BOD5) - Monitoring Notes: Effluent Gross Value, Comp

The effluent limitations for Biochemical Oxygen Demand, 5-Day (BOD5) shall remain unchanged from the current permit. The monthly and weekly averages reflect the minimum level of effluent quality specified for secondary treatment in 40 C.F.R. Part 133.102. Those values are a weekly average of 45 mg/l and a monthly average of 30 mg/l. In addition, the draft permit contains a maximum day, BOD5 limitation pursuant to Vermont Water Pollution Control Permit Regulations § 13.4.c. That limitation of 50 mg/l is based upon the previous permit and best professional judgement. The Secretary implements the limitation to supplement the federal technology-based limitations. This is designed to prevent a gross one-day permit effluent violation from being offset by multiple weekly and monthly sampling events, which would enable a discharger to comply with the weekly average and monthly average permit limitations. Mass limits are calculated using the concentration limits outlined above.

The monitoring frequency for BOD5 is proposed to change from twice monthly to weekly in the draft permit. The limits are not proposed to change and shall remain: 30 mg/L monthly average, 45 mg/L weekly average, and 50 mg/L daily maximum, 63 lbs/day monthly average, and 94 lbs/day weekly average. The pounds limits are calculated based on the current design permitted flow of 0.25 MGD (30 mg/L monthly average BOD5 x 0.25 MGD x 8.34 = 63 lbs/day monthly average BOD5 & 45 mg/L weekly average BOD5 x 0.25 MGD x 8.34 = 94 lbs/day weekly average BOD5). The mass limits shall remain as these are stricter than if the limit was calculated for the amended flow of 0.325 MGD and are subject to federal anti-backsliding conditions.

These limits will remain in place year-round. However, to meet the proposed Ultimate Oxygen Demand limitation of 60.5 lbs/day from June through September, the BOD5 will need to be lower than the permitted BOD5 limits.

2. BOD, 5-Day - Monitoring Notes: Influent, Comp

Influent monitoring for BOD5 shall remain once monthly as a “monitor only” condition in the permit renewal. Values shall continue to be used to calculate percent removal of BOD5.

3. BOD, Carb-5 Day, 20 Deg C, Percent Remvl - Monitoring Notes: Percent Removal, Calculated

The BOD5 monthly average percent removal shall not be less than 85 percent as specified in 40 C.F.R. § 133.102(a)(iii). This limit is a Technology-Based Effluent Limitation (TBEL) established by the Clean Water Act that requires WWTFs to achieve a minimum level of effluent quality. TBELs are based on available technologies to reduce discharges of pollutants into waters of the United States and are developed independently of the potential impact of a discharge on the receiving water.

4. Chlorine, Total Residual - Monitoring Notes: Effluent Gross Value, Grab

The effluent limitation for TRC remains unchanged from the current permit, however: 1) the compliance limit allowance of 0.05 mg/L is removed as sufficiently sensitive methods are available to achieve compliance with a limit of 0.02 mg/L, and 2) the reported data shall be the daily maximum value rather than the instantaneous maximum value. The change in value reported is semantic to be consistent with other permits and change in internal procedures for how the Program is collecting data. This does not change the intent of the original permit limit as the maximum value collected for the daily monitoring requirement will need to be reported in the WR-43 and ANR Online submitted discharge monitoring reports.

The TRC daily maximum limit is set in accordance with the Policy for the protection of aquatic biota and ensures compliance with the Vermont Water Quality Standards.

The facility is in the final design phase for the refurbishment project to transform the existing lagoon treatment system which uses chlorine disinfection, to the sequencing batch reactor (SBR) treatment system which will use ultraviolet (UV) light for disinfection.

This project is slated to begin construction in June of 2023. There may be unexpected factors that may delay the construction activities. For this reason, the draft permit specifies TRC monitoring is only applicable when chlorine disinfection is used at the Hinesburg Wastewater Treatment Facility.

5. Total Copper - Monitoring Notes: Influent & Effluent, Comp

Influent Total Copper monitoring on a quarterly basis is proposed in the draft permit, for daily maximum mass quantity and concentration. This condition is intended to complement Condition I.M of the draft permit where the Permittee shall conduct an Industrial Waste Survey for Total Copper within the Town collection system, prior to treatment at the WWTF. Collection of this data will allow the Secretary to further assess the impacts of Copper on the WWTF and the receiving water.

A monthly “monitor only” condition for daily maximum, mass quantity (lbs/day) and concentration (mg/L), monitoring for Total Copper in the effluent is newly proposed for the draft permit.

As stated in Condition I.M of the draft permit: copper analyses shall be carried out using a method that assures a Method Detection Limit (MDL) of 0.006 mg/L or lower. This level of detection may be achieved using EPA methods 200.7 and 200.8 listed in 40 C.F.R. Part 136 which have estimated detection limits of 0.0054 mg/L and 0.004 mg/L, respectively.

6. E. Coli - Monitoring Notes: Effluent Gross Value, Grab

Weekly monitoring for E. coli from May 1-September 30 is a new requirement in this permit, however, the monitoring frequency is proposed to remain twice monthly from October through April.

Additional monitoring is included with the goal of reducing the likelihood of illness associated with freshwater recreational activities during the contact recreation season and supports the ability of the Permittee to promptly notify the public of an exceedance of Water Quality Standards (WQS) for pathogens.

The E. coli limitation remains at 77 cfu/100 ml, instantaneous maximum as specified in the current permit and the anti-backsliding provisions of Section 402(o) of the CWA.

E. coli monitoring shall continue to be collected as a grab sample.

7. pH - Monitoring Notes: Effluent Gross Value, Grab

The pH limitation remains at 6.5 - 8.5 Standard Units as specified by Vermont Water Quality Standards § 29A-303(6). Monitoring continues to occur daily.

8. Settleable Solids - Monitoring Notes: Effluent Gross Value, Grab

The settleable solids limitation of 1.0 mL/L instantaneous maximum and daily monitoring remain unchanged from the current permit. This numeric limit was established in support of the narrative standard in Vermont Water Quality Standards § 29A-303(2).

9. Suspended Solids, Total (% Removal) - Monitoring Notes: Percent Removal, Calculated

As required in the current permit, the TSS monthly average percent removal shall not be less than 85 percent as specified by 40 C.F.R. §133.102(b)(3). This limit is a Technology-Based Effluent Limitation (TBEL) established by the Clean Water Act that requires WWTFs to achieve a minimum level of effluent quality. TBELs are based on available technologies to reduce discharges of pollutants into waters of the United States and are developed independently of the potential impact of a discharge on the receiving water.

10. Suspended Solids, Total - Monitoring Notes: Effluent Gross Value, Comp

The effluent limitations for TSS remain unchanged from the current permit, until the facility upgrade is complete.

The monthly average (45 mg/L) and weekly average (45 mg/L) reflect a level of effluent quality attainable by facilities eligible for treatment equivalent to secondary treatment.

In addition, the draft permit contains a 50 mg/L, maximum day, TSS limitation. This is the Agency standard applied to all such discharges pursuant to 13.4(c) of the Vermont Water Pollution Control Permit Regulations. The Secretary implements the limit to supplement the federal technology-based limitations to prevent a gross one-day permit effluent violation to be offset by multiple weekly and monthly sampling events which would enable a discharger to comply with the weekly average and monthly average permit limitations. Mass limits (94 lbs/day, monthly average and 94 lbs/day, weekly average) are calculated using the concentration limits outlined above and the permitted flow of 0.25 MGD (45 mg/L monthly average TSS x 0.25 MGD x 8.34 = 94 lbs/day monthly and weekly average TSS).

The monitoring frequency for TSS is proposed to change from twice monthly to weekly in the draft permit.

Because the facility has not consistently achieved the TSS effluent limitations set forth under 40 C.F.R. § 133.102(b), the facility meets the criteria under 40 C.F.R. § 133.101(g)1 necessary for eligibility for application of the effluent limitations for treatment equivalent to secondary treatment.

In order to be eligible for effluent discharge limitations based on equivalent to secondary standards, a WWTF must meet the following criteria:

- 1) The WWTF must demonstrate that the BOD5 and TSS effluent concentrations that are consistently achievable through proper operation of the facility exceed secondary treatment standards set forth in 40 C.F.R. §§ 133.102(a) and (b).
- 2) the WWTF's principal treatment process must be a trickling filter or waste stabilization pond; and
- 3) the WWTF must provide significant biological treatment of municipal wastewater through an aerobic or anaerobic biological treatment process to consistently achieve a 30-day average of at least 65 percent removal of BOD5 as specified in § 133.101(k).

Facilities may be eligible for the effluent limitations for treatment equivalent to secondary treatment if:

- (1) the TSS effluent concentrations consistently achievable through proper operation and maintenance of the treatment works exceed the minimum level of effluent quality set forth in 40 C.F.R. § 133.102(b).
- (2) a waste stabilization pond is used as the principal process; and
- (3) The treatment works provides significant biological treatment of municipal wastewater.

Following the upgrade, the facility will no longer be eligible for the "equivalent to secondary treatment" TSS limits afforded to waste stabilization ponds (lagoons) of 45 mg/L monthly average. Once the upgraded facility is on-line, the secondary treatment standard of 30 mg/L monthly average will apply.

The monthly mass limit must change to 81 lbs/day monthly average based on the updated design flow of 0.325 MGD and the new concentration limit (30 mg/L monthly average TSS x 0.325 MGD x 8.34 = 81 lbs/day monthly average TSS).

Compliance Schedule

Under Section 13.4(d) of the VWPCPR, the Secretary may set schedules in permits to achieve compliance, within the shortest reasonable period of time, with applicable effluent standards and limitations, water quality standards, and other legally applicable requirements. When compliance will require more than nine months, the schedule of compliance shall include interim requirements, spaced no more than nine months apart, such as submission of reports of progress towards completion of the tasks necessary to achieve compliance.

The Secretary is including a compliance schedule in the draft permit because the Secretary has determined that the Permittee is unable to immediately comply with the proposed monthly average TSS concentration limit upon the effective date of the permit. The proposed and pending modification of the WWTF and its operations will result in the facility no longer being able to meet equivalent to secondary treatment limits and will need to change, once construction is complete and operating properly.

The WWTF shall achieve compliance with the new monthly average TSS concentration limit as soon as possible but no later than October 31, 2026.

11. Suspended Solids, Total - Monitoring Notes: Influent, Comp

Influent monitoring for TSS shall remain monthly as a “monitor only” condition in the permit renewal. Values shall continue to be used to calculate percent removal of TSS.

12. Ultimate Oxygen Demand - Monitoring Notes: Effluent Gross Value, Calculated

On the basis of assimilative capacity modeling completed on the receiving water, an effluent UOD limit is included in the draft permit in order to ensure compliance with the dissolved oxygen water quality criteria during critical summertime instream conditions. UOD is dependent on the quantity of Biochemical Oxygen Demand (BOD5) and Total Kjeldahl Nitrogen (TKN) in a discharge, as specified in the following equation:

$$\text{UOD (lbs/day)} = [(\text{BOD5 (lbs/day)} \times 1.43) + (\text{TKN (lbs/day)} \times 4.57)]$$

Calculation of the UOD concentration in the discharge is required twice per month from the period of June 1 through September 30th. The sampling frequency is unchanged from the current permit. The BOD and TKN analyses used to calculate UOD must be conducted on the same effluent sample. Since receiving waters are the most sensitive to oxygen depleting wastes during periods of high-water temperature and low flow, the UOD limitation is in effect from June 1 through September 30 of each year. The UOD limitation ensures compliance with the dissolved oxygen criteria during this time period as specified in the Vermont Water Quality Standards. During the other months of the year, the Biological Oxygen Demand limitation is adequate to ensure compliance with the dissolved oxygen criteria.

The UOD mass limitation in the current permit is 400 lbs/day, maximum day, and is effective from June 1st through September 30th of each year. This limitation was based on a conservative screening model of the assimilative capacity of the LaPlatte River as determined in the 1980's with a much lower facility flow (70,000 gpd) and a higher receiving water base flow (1.5 CFS). A review of the monitoring data reported during the five-year timespan specified in Table 3 indicates that the facility has reliably met this limitation.

In 2022, The Watershed Management Division determined the 7Q10 of the LaPlatte River to be 0.36 CFS at the point of discharge of the Hinesburg WWTF. The increased design flow, along with the high instream waste concentration at critical flows, prompted an updated UOD analysis for the permit amendment and renewal.

The Streeter-Phelps screening model initially calibrated for the LaPlatte River (DOSIM), was recreated in Excel. Using the Excel-based model, the flow and velocity were updated to simulate the DO dynamics downstream of the facility following the proposed flow increase. To achieve a DO concentration that meets the VWQS of 5 mg/L, the conservative screening model indicates a UOD limit of 60.5 lbs/day from June through September would result in a minimum downstream dissolved oxygen concentration of 5.04 mg/L.

Upon the effective date of the permit, the twice monthly UOD monitoring shall comply with the existing 400 lbs/day limit, from June through September.

A limit of 60.5 lbs/day is newly proposed for the draft permit to be effective upon completion of the facility upgrade. Monitoring shall continue to be conducted twice monthly from June through September.

Compliance Schedule

Under Section 13.4(d) of the Vermont Water Pollution Control Permit Regulations (VWPCPR), the Secretary may set schedules in permits to achieve compliance, within the shortest reasonable period of time, with applicable effluent standards and limitations, water quality standards, and other legally applicable requirements. When compliance will require more than nine months, the schedule of compliance shall include interim requirements, spaced no more than nine months apart, such as submission of reports of progress towards completion of the tasks necessary to achieve compliance.

The Secretary is including a compliance schedule in the draft permit because the Secretary has determined that the Permittee is unable to immediately comply with the proposed seasonal UOD mass quantity limit upon the effective date of the permit. The proposed and pending modification of the WWTF and its operations will result in the facility no longer being able to meet equivalent to secondary treatment limits and will need to change, once construction is complete and operating properly.

The WWTF shall achieve compliance with the new UOD limit as soon as possible but no later than October 31, 2026.

E. Nutrients Monitoring at Discharge Point 001

1. Total Nitrate & Total Nitrite (as N) - Monitoring Notes: Effluent Gross Value, Comp

Nitrite Plus Nitrate as Nitrogen (NO_x) – Nitrite (NO₂⁻) and Nitrate (NO₃⁻) are oxidized forms of Nitrogen. NO_x is needed to calculate Total Nitrogen (TN).

Reasonable Potential was detected for Total Nitrate based on the data available and the amended flow, detailed in Attachment A.

Nitrite (NO₂⁻) plus Nitrate (NO₃⁻) monitoring is proposed in the draft permit. The proposed monitoring is twice monthly, year-round. This differs from the current permit requirement to sample quarterly for the “monitor only” NO_x condition. Sampling for Nitrate and Nitrite should be sampled as separate species such that the laboratory produces results for Nitrate and results for Nitrite to assess compliance with the VWQS. For this reason, the previous condition of Nitrate/Nitrite monitoring, is now separated into two new constituents: Total Nitrite and Total Nitrate.

To gather data on the amount of Total Nitrogen, Total Nitrate, and Total Nitrite in this discharge:

- Increased monitoring of both Total Nitrate and Total Nitrite is proposed in the draft permit to collect additional data for the next permit renewal. Upon the effective date of the permit, the Permittee shall sample twice monthly as a “monitor only” condition. A change from the current permitted condition to sample quarterly.
- New limits are proposed for the draft permit to be effective once the upgrade is complete for Total Nitrate only: Maximum Day limit of 40 mg/L and Average Monthly limit of 20 mg/L. Monitoring shall occur twice monthly.
- No changes to Total Nitrite monitoring are proposed post upgrade and shall continue to be “monitor only” and occur twice monthly.

Test results for NO₂⁻ and NO₃⁻ are reported in terms of Nitrogen (N) because water quality standards are generally expressed in terms of Nitrogen for simplicity and consistency.

2. Nitrogen, Ammonia Total - Monitoring Notes: Effluent Gross Value, Grab

The current permit requires:

- Total Ammonia Nitrogen (TAN) to be monitored weekly and reported as daily maximum concentration values.
- A compliance schedule applicable after December 31, 2022, or upon completion of the facility upgrade, the seasonal monthly average and daily maximum concentration and mass load limitations applied to the Hinesburg WWTF discharge pursuant to the existing permit.
 - From June through September, a monthly average mass limit of 7.3 lbs., daily maximum mass limit 34.6 lbs., monthly average concentration limit of 3.5 mg/L, and instantaneous maximum concentration limit of 16.6 mg/L.
 - From October through May, a monthly average mass limit of 42.1 lbs., daily maximum mass limit 175.0 lbs., monthly average concentration limit of 20.2 mg/L, and instantaneous maximum concentration limit of 84.0 mg/L.

Due to the increased flow proposed, changed hydrology, and an update to the Vermont Water Quality Standards, the limits were recalculated and assessed for reasonable potential for this permit issuance.

The facility's discharge has a reasonable potential to cause or contribute to an impairment in the LaPlatte River, based on the previous self-reporting data and the 2022 Vermont Water Quality Standards, the draft permit contains new water quality-based effluent limitations for TAN. See Attachment A for more information on the reasonable potential determination for TAN.

Proposed limits for TAN, post upgrade:

- From June through September, a monthly average mass limit of 4.8 lbs., daily maximum mass limit 9.7 lbs., monthly average concentration limit of 1.8 mg/L, and daily maximum concentration limit of 3.6 mg/L.
- From October through May, a monthly average mass limit of 33.4 lbs., daily maximum mass limit 67.0 lbs., monthly average concentration limit of 12.3 mg/L, and daily maximum concentration limit of 24.7 mg/L.

Monitoring schedules should coincide with proposed twice monthly Total Nitrogen monitoring.

A compliance schedule is proposed in the draft permit to set milestones for project completion and reporting during the facility upgrade. These limits shall come into effect once the upgrade is complete.

Compliance Schedule

Under Section 13.4(d) of the VWPCPR, the Secretary may set schedules in permits to achieve compliance, within the shortest reasonable period of time, with applicable effluent standards and limitations, water quality standards, and other legally applicable requirements. When compliance will require more than nine months, the schedule of compliance shall include interim requirements, spaced no more than nine months apart, such as submission of reports of progress towards completion of the tasks necessary to achieve compliance.

The current permit considered the need for system refurbishment and included a compliance schedule in Condition I.K which required compliance at the earliest time possible, or by the expiration date of the permit 12/31/2022, whichever occurred sooner to comply with the 2017 VWQS. This refurbishment project remains incomplete at the time of the permit expiration and this development of this draft permit.

The Secretary is including a compliance schedule in the draft permit because the Secretary has determined that the Permittee is unable to immediately comply with the TAN limit upon the effective date of the permit. There is a need for modification of the WWTF and its operations in order to meet the new TAN limits.

The Permittee cannot comply with the current permit limits effective by 12/31/2022, due to the construction delays experienced by the social-economic consequences cascading from the ongoing 2019 global pandemic, the Novel Coronavirus also termed “COVID-19”. The delays that were experienced are listed below and were obviously unexpected and not considered when writing the current permit, issued in 2018.

- From March 13, 2020, to June 14, 2021, Governor Phil Scott declared a state of emergency for the COVID-19 public health emergency.
- Staffing shortages around the globe created delays in manufacturing production lines, as well as delays in hauling services of manufactured goods. These continue to occur.
- Financial planning around an inflated economy slowed the planning process and affected the affordability of the project materials and associated budget items considered for the bond vote that passed. The market continues to fluctuate.
- Proper planning and design for the geotechnical issues experienced at the facility location. The clay liner needed to be dried prior to construction, for stabilization purposes. A wick and dewatering method have been installed to dry out the lagoons and subsurface soils to prepare for construction of the SBR. Phase II construction is proposed to begin June of 2023.

The following Findings of Facts were gathered and exhibited in Attachment C to support the determination.

- In July 2019, Aldrich and Elliott, C Water Resource Engineers submitted the “Wastewater Treatment Facility Upgrade/Expansion Study Preliminary Engineering Report” RF1-229, 90% Preliminary Engineering Study. The Study introduces the Geotechnical Subgrade Improvement Alternatives explored for the proposed refurbishment project to convert the existing lagoon treatments system with a Sequencing Batch Reactor (SBR) treatment system. Wick drains, or prefabricated vertical drains (PVD), were selected to accelerate the consolidation of compressible soils. The Study proposed a timeframe for December 2023 as the “Complete Construction/Substantial Completion” date, which exceeds the current permit December 31, 2022, compliance schedule for meeting the Total Ammonia and Phosphorus monitoring requirements.

- The manufacturer documents in this study specify the design alternative selected treats approximately 2.7 mg/L of Total Ammonia Nitrogen. Due to the flexibility of treatment made available by the SBR system, the manufacturer confirmed the proposed design could meet concentrations lower than 2.7 mg/L.
- On May 25, 2021, The Town submitted a Total Ammonia and Phosphorus Progress Report to comply with the May 31, 2021, deadline. This report detailed project progress, including delays resulting from COVID-19. Attached to the report was a proposed schedule for completion of construction, which proposed July 2024 as the date “Complete Construction/Substantial Completion”.
- On 8/23/2022, The Town of Hinesburg submitted an explanation for the delays experienced from COVID-19 and cascading impacts to the global supply chain, where materials will be available for the start of Phase II construction to occur in the Spring of 2023.

The following information was reported:

“We are working with Aldrich & Elliott on the new wastewater facility. Elliott reported they are close to the original schedule even with working through Covid and the geotechnical issues. The project schedule from Elliott is outlined here - Permit applications are being submitted and the plan is to advertise for bids later this year for a spring 2023 start of construction. Project delays with Covid and because of the supply chain issues, materials will not be available before spring 2023. Starting the sitework and concrete work in the winter would be very slow and costly, so a spring start is more realistic. Therefore, the town will continue with the same protocols as stated above to meet the discharge permit.”

Draft permit Condition I.K requires the permittee to develop a plan that ensures the WWTF is brought into compliance with its TAN limits after the facility is constructed which shall be submitted by October 31, 2026.

The WWTF shall achieve compliance with these TAN limits as soon as possible but no later than October 31, 2026. During the time the facility is coming into compliance, the facility shall have an interim “monitor only” limitation and shall not be subject to meet the current permitted limits effective after 12/31/2022. As part of the anticipated facility modifications, progress reports on the upgrades shall be submitted every six months from the permit effective date.

3. Nitrogen, Kjeldahl Total - Monitoring Notes: Effluent Gross Value, Comp

TKN is the sum of nitrogen in the forms of ammonia (un-ionized (NH₃) and ionized (NH₄⁺)), soluble organic nitrogen, and particulate organic nitrogen. To gather data on the amount of TKN in this discharge and its potential impact on the receiving water, a “monitor only” sampling requirement is included in the draft permit.

The current permit requires the daily maximum concentration values for TKN monitoring to be reported twice a month from June through September and quarterly from October through May. Results from June through September monitoring calculate results for Ultimate Oxygen Demand (UOD).

The draft permit proposes this to change and for TKN to be reported as daily maximum concentrations and mass loads and monitored twice monthly, year-round. No limits are proposed for TKN. Monitoring shall continue to be “monitor only”.

Results shall be used to calculate Total Nitrogen and UOD results. These monitoring schedules shall coincide with the proposed Total Ammonia Nitrogen monitoring when it occurs.

4. Nitrogen, Total - Monitoring Notes: Effluent Gross Value, Calculated

TN is the sum of nitrate, nitrite, ammonia, soluble organic nitrogen, and particulate organic nitrogen. To gather data on the amount of Total Nitrogen (TN) in this discharge and its potential impact on the receiving water, a “monitor only” requirement for TN has been included in this permit. TN is a calculated value based on the sum of NO_x and TKN, and, shall be reported as pounds, calculated as:

$$\text{Average TN (mg/L)} \times \text{Total Daily Flow (MGD)} \times 8.34$$

$$\text{where TN (mg/L)} = \text{TKN (mg/L)} + \text{NO}_x \text{ (mg/L)}$$

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 plants 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). Facilities with design flow greater than 1 MGD will complete monthly monitoring unless more frequent sampling is required by the current permit.

Facilities with design flows less than 1 MGD will complete quarterly monitoring unless more frequent sampling is required by the current permit. The current permit required Total Nitrogen to be calculated and reported on a quarterly basis as a “monitor only” condition. Total Nitrogen monitoring is proposed to change to a twice monthly frequency for this facility, to align monitoring schedules with the Total Kjeldahl Nitrogen (TKN) and NO_x requirements proposed in the draft permit.

To calculate the effluent results for Total Nitrogen (TN), monitoring is proposed for Total Kjeldahl Nitrogen (TKN), Nitrate (NO₃⁻), and Nitrite (NO₂⁻). Each nitrogenous constituent should be reported using an appropriate combination of CWA approved methods and arithmetic (i.e., TN = TKN + NO₃⁻ + NO₂⁻).

5. Phosphorus, Total - Monitoring Notes: Annual Average, Calculated & Comp

Background:

Excess phosphorus entering Lake Champlain from a variety of sources has impaired the lake's water quality. The Lake Champlain Total Maximum Daily Load (LC TMDL), issued June 17, 2016, places a cap on the maximum amount of phosphorus from point and non-point sources that is allowed to flow into the lake while still meeting Vermont's water quality standards. The EPA developed phosphorus TMDLs for the twelve Vermont segments of Lake Champlain in collaboration with the Vermont Agency of Natural Resources, Department of Environmental Conservation and the Vermont Agency of Agriculture, Food, and Markets, and released the document titled "Phosphorus TMDLs for Vermont Segments of Lake Champlain" (June 2016). The 2016 LC TMDL specifies allowable phosphorus loads, or waste load allocations (WLA), expressed as metric tons per year (mt/yr), for each of the 59 WWTFs that discharge to the Lake Champlain watershed. The Secretary will issue discharge (NPDES) permits in accordance with the permit issuance schedule in the Lake Champlain TMDL Phase 1 Implementation Plan (Chapter 3, page 46). The Secretary will follow this schedule unless special circumstances are raised by the facility that warrant the issuance of the permit sooner (e.g., planned facility upgrades), and the Wastewater Management Program has sufficient staff capacity to handle the request.

Reductions in WLAs are targeted only to WWTFs in those lake segment watersheds where the currently permitted wastewater load represents a 10% or greater portion of the total phosphorus load to that segment from all sources (Main Lake, Shelburne Bay, Burlington Bay, St. Albans Bay) or where wastewater upgrades would meaningfully reduce the phosphorus reduction burden placed on non-wastewater (non-point) sources (Missisquoi Bay). Therefore, WWTFs discharging to Port Henry, Otter Creek, Mallets Bay, Northeast Arm, Isle LaMotte, and the South Lake A/B lake segments were not assigned a new waste load allocation. The EPA also determined that wastewater facilities with a design flow of < 0.1 million gallons per day (MGD) would be given the same allocations as in the 2002 TMDLs due their minor contribution of phosphorus loading.

The LC TMDL establishes new annual WLAs for WWTFs with a design flow capacity of above 0.1 MGD that discharge to the Main Lake, Shelburne Bay, Burlington Bay, St. Albans Bay, and Missisquoi Bay lake segments. Specifically, WWTFs with a design flow capacity of 0.1 to 0.2 MGD were assigned WLAs based on a 0.8 mg/L effluent phosphorus concentration at permitted flow while WWTFs with design capacity of > 0.2 MGD were assigned WLAs based on a 0.2 mg/L effluent phosphorus concentration at permitted flow.

In the LC TMDL, EPA acknowledged and supported the Secretary's commitment to employ flexible approaches to implementing the WWTF WLAs including "providing a period of time for optimization to be pursued and the corresponding load reduction results to be realized, and then commencement of the process to upgrade phosphorus treatment facilities will be required when actual phosphorus loads reach 80% of the LC TMDL limits." The Wastewater Management Program maintains a tracking system for phosphorus loading from Vermont WWTFs so facilities approaching or over the 80% threshold can be identified. The 80% phosphorus load threshold is calculated by comparing the individual WWTF phosphorus WLA established in the LC TMDL to the actual phosphorus discharge load from the WWTF over last 12 months:

$$\text{WWTF Annual TP Load} / \text{LC TMDL WLA} \times 100$$

There are currently WWTFs in the Lake Champlain watershed with existing discharged loads of phosphorus already at, or above, 80% of allowable loads. To ensure facilities are operating as efficiently as possible, all reissued wastewater discharge (NPDES) permits under the LC TMDL will specify a period of 12 months for optimization to be pursued and the corresponding load reduction results to be realized, prior to evaluating where a facility ranks relative to the 80% trigger. Discharge permits will specify that after the optimization period, when an existing facility reaches 80% of its WLA for phosphorus (evaluated as a rolling, 12-month load), the Permittee will have to develop and submit a projection of whether the facility will exceed its WLA during the permit term and if it is projected to do so, then the facility will be required to develop a Phosphorus Elimination/Reduction Plan (PERP) that will ensure the facility continues to comply with its WLA.

Effluent TP limits in permits are expressed as:

- (1) total annual mass loads, and
- (2) for facilities that currently have an existing monthly effluent concentration limit for TP in their NPDES permit, as monthly effluent concentration limits.

Phosphorus Limit in Draft Permit:

The current discharge permit for this facility includes a mass-based, effluent limit of 608 pounds of TP per year. This annual mass limitation was based on an allocation of 0.276 metric tons established in the 2002 Lake Champlain Phosphorus TMDL. The current permit also contains an effluent TP concentration limit of 0.8 mg/L, monthly average, consistent with the annual load limit.

This proposed draft permit contains a phosphorous effluent concentration limit of 0.8 mg/l, monthly average, and a mass effluent limit of 152 total pounds, annual limitation. The concentration effluent limitation is based on the requirements of 10 V.S.A. § 1266a. The mass annual effluent limitation is based on the LC TMDL. The LC TMDL allocated 0.069 metric tons per year or 152 pounds per year to the Hinesburg WWTF.

This new, annual WLA represents a 75% reduction (-456 pounds) from the current permit and is equivalent to setting the effluent TP limit at 0.2 mg/L at the design capacity of the WWTF (0.25 MGD). To convert units of the WLA from metric tons to pounds for the annual, mass-based TP permit limit, the following equation was used and the resulting WLA rounded down to the nearest pound:

$$(0.069 \text{ mt/yr}) (2204.62 \text{ lbs/mt}) = 152 \text{ lbs/yr}$$

The LC TMDL includes WLAs for WWTFs expressed as total annual mass loads. Compliance with the annual limit will be calculated each month using the Running Total Annual Pounds Calculation (Condition I.G.2.c. of the permit), rather than once at the end of the calendar year. The LC TMDL does not include monthly average concentration effluent limits for WWTFs. State law (10 V.S.A. 1266a) requires that, “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.” Therefore, in addition to the annual mass load effluent limitation required by the TMDL, the permit must also include a monthly average concentration limit for phosphorus. While the WLA in the TMDL was calculated based on a TP effluent concentration of 0.20 mg/L, the permit does not include 0.20 mg/L as the concentration effluent limitation because a Permittee may not need to achieve 0.20 mg/L to ensure compliance with the WLA established in the TMDL. Rather the permit includes a monthly average concentration limit for phosphorus of 0.80 mg/L to ensure compliance with state law and to recognize seasonal variations in the facility’s discharge. It is important to note that because the annual mass load and average monthly concentration limits are not mathematically consistent in the permit, meeting a 0.80 mg/L concentration limit at design flows will not result in meeting the annual mass limit.

The Permittee must comply with both limitations and as required by the permit, must operate the facility to meet the more restrictive limitation, which may vary depending upon discharge flows at the facility. If the facility is operating at design flows, the annual mass load limitation will be the more restrictive limitation. However, if the facility is operating at low flows, the monthly average concentration limit may be the more restrictive limitation.

Sampling for total phosphorus is required, weekly. This is proposed to change from the existing permitted monitoring frequency of twice monthly.

Condition I.G.3.c. of this draft permit requires the submission of monitoring reports to the Secretary specific to tracking TP in the discharge. A report that documents the annual TP discharged from the facility, summarizes phosphorus removal optimization and efficiencies, and tracks trends relative to the previous year shall be attached to the applicable WR-43 form. The annual and monthly TP loads discharged from the facility shall also be reported electronically with other required parameters.

Analysis in Support of Phosphorus Limit:

The Secretary is using the WLA from the LC TMDL (available at <https://www.epa.gov/tmdl/lake-champlain-phosphorus-tmdl-commitment-clean-water>) as the water quality-based effluent limitation (WQBEL) for phosphorus for this permit because this is the first permit issued to this facility under the new LC TMDL and the TMDL and Vermont is meeting the required milestones of the LC TMDL Accountability Framework. *In re Multiple WWTF Permit Appeals*, Docket Nos. 138-10-17 Vtec, 139-10-17 Vtec, 140-10-17 Vtec, 141-10-17 Vtec, 145-10-17 Vtec, 146-10-17 Vtec, 4-1-18 Vtec, 5-1-18 Vtec, and 17-2-18 Vtec, slip op. at 32 (Vt. Super. Ct. Envtl Div. Feb. 1, 2019) (Durkin, J.) (“ANR could have looked to [the report card on implementation milestones]— all of which were completed—to confirm that TMDL implementation was proceeding as planned, and that the assumptions underlying the TMDL therefore held true”).

In 2016, the EPA gave Vermont an “excellent” report card for meeting milestones by December 30, 2016. By 2017, the State had completed a majority of the milestones in the LC TMDL Accountability Framework (pages 54-59 of the LC TMDL) due by December 30, 2017 and was actively working to complete those that were outstanding, as outlined in the 2018 Vermont Lake Champlain Phosphorus Total Maximum Daily Loads Accountability Framework Report (Submitted by the State to EPA on March 7, 2018; available at: <https://www.epa.gov/sites/default/files/2019-05/documents/vt-march-2018-tmdl-progress-report-to-epa.pdf>).

With the issuance of the “Developed Lands General Permit” (Stormwater General Permit 3-9050) in late 2020, EPA acknowledged that Vermont has successfully completed all Phase 1 Accountability Framework milestones in its September 3, 2020 Lake Champlain TMDL Implementation Final Report Card for Phase 1 Milestones (Available at: <https://www.epa.gov/sites/production/files/2020-09/documents/lake-champlain-report-card-ltr-09-3-20.pdf>).

With the State having completed all Phase 1 Accountability Framework milestones, and with EPA’s affirmative reports thus far, there is no reason to believe that the assumptions upon which the WLA was developed – including that discharges in other sectors will be reduced in the future – are no longer valid. Therefore, it is appropriate to establish the phosphorus WQBEL for this facility based upon its WLA in the LC TMDL.

Phosphorus Limit Compliance Schedule:

Under Section 13.4(d) of the VWPCPR, the Secretary may set schedules in permits to achieve compliance, within the shortest reasonable period of time, with applicable effluent standards and limitations, water quality standards, and other legally applicable requirements. When compliance will require more than nine months, the schedule of compliance shall include interim requirements, spaced no more than nine months apart, such as submission of reports of progress towards completion of the tasks necessary to achieve compliance.

The Secretary is including a compliance schedule in this permit because the Secretary has determined that the Permittee is unable to immediately comply with the TP limit upon the effective date of the permit given its current facility and treatment processes. There is a need for modification of the WWTF and its operations in order to meet the new TP limit. Given this needed facility refurbishment a compliance schedule in the current Permit Condition I.B.1 required compliance at the earliest time possible. The compliance schedule did not extend past the expiration date of the permit, 12/31/2022.

Under the current permit schedule, the facility shall comply with interim TP limits (Condition I.B.1.b) from the previous discharge permit (608 lbs., annually; 0.8 mg/L, monthly average) until completion of the upgrade or by December 31, 2022, whichever occurs first, at which point, new TP annual mass limits (152 lbs., annually; 0.80 mg/L, monthly average) will be enforced.

The needed facility modifications mentioned have not been implemented yet, as previously described in Section V.2 of this Fact Sheet. Therefore, the Secretary/Agency is aware the Permittee remains unable to comply with the TP permit limits proposed because the existing facility remains unequipped with the technology to treat the effluent to a quality that meets the VWQS.

A compliance schedule adjustment is proposed for the WWTF to comply with the new limits effective upon completion of the facility upgrade; pursuant to draft permit Condition I.A.2.a. (152 lbs., annually; 0.80 mg/L, monthly average effective from November through May, and 0.25 mg/L monthly average and 0.51 mg/L daily maximum from June through October).

In the interim, from the permit effective date, the Permittee shall continue to comply with the 608 lbs/yr annual average, annually and the 0.80 mg/L monthly average, requirements. Sampling, as stated previously, is proposed to change from twice monthly to weekly.

Phosphorus Optimization and Elimination/Reduction Plans:

To ensure the facility is operating as efficiently as possible for purposes of phosphorus removal, Condition I.G.3 of the permit requires that within 6 months of facility upgrades, or October 31, 2026, whichever occurs first, the permittee shall develop or update (as appropriate), and submit to the Secretary, a Phosphorus Optimization Plan (POP) to increase the WWTF's phosphorus removal efficiency by implementing optimization techniques that achieve phosphorus reductions using primarily existing facilities and equipment. The techniques to be evaluated may include operational process changes to enhance biological and/or chemical phosphorous removal, incorporation of anaerobic/anoxic zones, septage receiving policies and procedures, and side stream management.

The facility shall have until 12-months from facility upgrades, or October 31, 2026, whichever occurs first, to optimize removal of phosphorus. If, after the 12-month optimization period, the WWTF's actual TP loads reach or exceed 80% of the LC TMDL WLA for the WWTF, based on the WWTF's 12-month running annual load calculated using the Running Total Annual Pounds Calculation (Condition I.G.4 of the permit) the permittee shall, within 90 days of reaching or exceeding 80% of the LC TMDLWLA for the WWTF, develop and submit to the Secretary a projection based on the WWTF's current operations and expected future loadings of whether it will exceed its WLA during the permit term.

If, after the 12-month optimization period, the facility is not projected to exceed its WLA within the permit term, the WWTF shall reassess when it is projected to reach its WLA prior to permit renewal and submit that information with its next permit application. If, after the 12-month optimization period, the facility is projected to exceed its WLA during the permit term, the permittee shall submit a Phosphorus Elimination/Reduction Plan (PERP) within 6 months to the Secretary to ensure the WWTF continues to comply with its WLA. The PERP shall be treated as an application to amend the permit, and therefore, shall be subject to all public notice, hearing, and comment provisions, in place at the time the plan is submitted, that are applicable to permit amendments. The WWTF shall revise the PERP, if required by the Secretary.

IV. Permit Schedule Items

A. Annual Constituent Monitoring

For all facilities with a design flow greater than 0.1 MGD, 40 CFR § 122.21(j) requires the submittal of effluent monitoring data for those parameters identified in the draft permit. Samples must be collected once annually such that by the end of the term of the permit, all quarters have been sampled at least once, and the results will be submitted by December 31 of each year.

B. Emergency Power Failure Plan

To ensure the facility can continue operations during the event of a power failure, permittees are required to have Emergency Power Failure Plans on file. By December 31, 2026, the Permittee must ensure this plan is up to date by submitting to the Secretary updated documentation addressing how the discharge will be handled in the event of an electric power outage after the facility upgrade is complete.

C. Engineering Evaluation and Report/Asset Management Plan

An engineering evaluation condition is included in this permit. This condition requires the Permittee to conduct an in-depth inspection and report of the treatment facility and collection system to identify and repair equipment, processes, and other possible deficiencies which may adversely affect effluent quality or proper operation. This type of evaluation is required once every 20 years.

While it is known the Hinesburg WWTF is undergoing a treatment facility upgrade, the collection system was required in the current permit to be evaluated by an engineer, as well as any other equipment that would not be subject to the upgrade. This requirement remains applicable for the draft permit.

The Permittee shall submit the engineering evaluation by the deadline specified in the draft permit and it shall include an evaluation of the collection system and any remaining components of the system that are not planned to be replaced or refurbished during the proposed upgrade.

D. Operation Management Emergency Response Plan (OMERP)

As required by the revisions to 10 V.S.A. Section 1278 the Permittee shall implement the Operation, Management, and Emergency Response Plan on file. To ensure this plan remains up to date, the permittee shall prepare and submit to the Agency for review and approval an Operation, Management, and Emergency Response Plan for the WWTF, sewage pump/ejector stations, stream crossings, and sewage collection system following the facility upgrade. The plan shall be updated to reflect any major changes at the facility or within the collection system.

E. Phosphorus Optimization Plan

A Phosphorus Optimization Plan (POP) is included in the permit to assist in compliance with the Lake Champlain Total Phosphorus TMDL. Compliance schedules are proposed, to track compliance with this condition before and after the facility upgrade.

F. Pollutant Scan (Majors or IWC >2.5%)

Municipal facilities greater than 1 MGD or with a 7Q10 instream waste concentration greater than 2.5% pose a higher risk of discharging an effluent that may lead to toxicity in the receiving water. Therefore, these facilities are required to conduct an effluent analysis of S/N 001 for the pollutants included in 40 CFR § 122 Appendix J Table 2 and Aluminum, included as Attachment A of the permit, and submit the results to the Secretary.

In addition, this draft permit adds Aluminum to the Pollutant Scan as Vermont Water Quality Standards will be incorporating the EPA's 2018 National Recommended Water Quality Criteria for Aluminum. Aluminum is not part of a standard Pollutant Scan; therefore, it is advised that the Permittee specifically request the laboratory include Aluminum in the Pollutant Scan analysis. EPA's 2018 National Recommended Water Quality Criteria for Aluminum are calculated based on water chemistry parameters that include Dissolved Organic Carbon (DOC) and Total Hardness, which have been included as concurrent sampling and analysis in this the permit with the Pollutant Scan and the results shall be submitted electronically through the ANR Online eDMR for the month the samples were collected. Total Hardness is typically included in the WET test report and is acceptable data to report on the ANR Online eDMR if taken from a concurrent sample with the Metals Scan.

In order to meet federal minimum data requirements at permit renewal, collect data to evaluate effluent toxicity, and support the calculation of reasonable potential and permit limits, concurrent testing of parameters included in the Pollutant Scan are included with the increased WET testing frequency. These results provide the benefit of additional context for the WET test results, as well as more data to assess compliance with the VWQS at permit renewal.

To provide data for future assessment of metals toxicity reasonable potential in the receiving water, the metals data from the Pollutant Scan shall be taken from the laboratory report and submitted electronically through ANR Online eDMR submission for the month the samples were collected. For the months not sampled, the permittee shall enter No Data Indicator (NODI) "Conditional Monitoring-Not Required This Period" and Sampling Frequency "NA" in the ANR Online eDMR. The full Pollutant Scan laboratory report shall be submitted to the Secretary according to the schedule provided in the draft permit.

Based upon the results of these tests, the Secretary reserves the right to reopen and amend this permit to change the monitoring frequency.

The first required Pollutant Scan shall be during January-February 2024.

G. Quality Assurance Report / Proficiency Testing

To ensure there are adequate laboratory controls and appropriate quality assurance procedures, the Permittee shall conduct an annual laboratory proficiency test for the analysis of all pollutant parameters performed within their facility laboratory and reported as required by their NPDES permit. Proficiency Test samples must be obtained from an accredited laboratory or as part of an EPA DMR-QA study. Results shall be submitted to the Secretary by December 31, annually.

H. Whole Effluent Toxicity (WET) Testing (Majors and IWC>2.5%)

40 C.F.R. Part 122.44(d)(1) requires the Secretary to assess whether the discharge causes or has the reasonable potential to cause or contribute to an excursion above any narrative or numeric water quality criteria. Under the Vermont Water Quality Standards § 29A-303(7)(A)(iii) waters shall be managed to prevent the discharge of toxic substances in concentrations, quantities, or combinations that exceed acute or chronic toxicity to aquatic biota or wildlife. Per these Federal and State requirements, the Permittee shall conduct Whole Effluent Toxicity (WET) testing and toxic pollutant analyses (i.e., Pollutant Scan and Total Ammonia Nitrogen) according to the frequency outlined in the draft permit. The WET test replicates the effect various concentrations of effluent have in the receiving water on a representative species of vertebrate and invertebrate.

Major municipal facilities and those with 7Q10 instream waste concentrations (IWC) greater than 2.5% pose a higher risk of discharging an effluent that may lead to toxicity in the receiving water and shall be required to conduct modified acute/chronic WET tests (48-hour static renewal acute endpoints within a 7-day sub-lethal chronic test) on 24-hour composite effluent samples and pollutant scans twice a year in the winter (January-February) and late summer/early fall (August-October).

This draft permit includes a requirement that a dilution reflecting the IWC at 7Q10 flow be added to the WET test dilution series in order to optimize the precision of calculated effect concentrations and assist in establishing concentration-response relationships. This facility's 7Q10 IWC is 59% for summer flows and 31% for winter flows.

Results for the NOEC, NOAEL, IC25 and LC50 shall be reported in the eDMR for the month the samples were collected. Laboratories may report C-NOEC or Chronic NOEC, which are equivalent to NOEC, and A-NOEC or Acute NOEC, which are equivalent to NOAEL. For the months not sampled, the permittee shall enter the No data Indicator (NODI) “Conditional Monitoring-Not Required This Period” and Sampling Frequency “NA” in the eDMR.

Based upon the results of these tests or any other toxicity tests conducted, the Secretary reserves the right to reopen and amend this permit to change the WET testing frequency, or require a Toxicity Identification Evaluation, and/or a Toxicity Reduction Evaluation.

The first required WET test shall be during January-February of 2024.

I. FLOW, TOTAL AMMONIA NITROGEN (TAN), TOTAL NITRATE, TOTAL SUSPENDED SOLIDS, & ULTIMATE OXYGEN DEMAND COMPLIANCE SCHEDULES

Compliance schedules are proposed in the draft permit for Flow, Total Ammonia Nitrogen, Total Nitrate, Total Suspended Solids, and Ultimate Oxygen Demand. The proposed monitoring requirements specified in Condition I.A.2.a shall be complied with by no later than October 31, 2026.

The Permittee shall develop and submit a plan to the Secretary for review to ensure the WWTF is brought into compliance with these proposed conditions. The plan shall be developed by qualified professionals with experience in the operation and design of WWTFs in consultation with the Chief Operator of the WWTF.

Progress reports shall be submitted to the Secretary for review every six months between the permit effective date and the compliance schedule deadline, October 31, 2026. By this time, the facility upgrade is expected to be complete and fully operational.

J. Instream Monitoring

The Permittee shall perform instream water quality monitoring for Turbidity, Total Phosphorus, Total Ammonia Nitrogen, Temperature, Total Nitrate, Dissolved Organic Carbon, Total Hardness, Priority Pollutant Metals including Aluminum, and pH in the LaPlatte River above the Hinesburg WWTF outfall S/N 001. Respectively, upstream at river mile (RM) 12.5.

This condition is changed from the current permit as:

- Total Ammonia Nitrogen, Total Nitrate, Dissolved Organic Carbon, Total Hardness, and Priority Pollutant Metals including Aluminum are newly proposed for upstream monitoring.
- Downstream monitoring of Turbidity, Total Phosphorus, and pH is no longer proposed.

These changes were dependent on a general change in the Program approach to collect more instream data. This approach is consistent with recently issued permits by the Secretary.

The Permittee shall submit a sampling plan and updated Quality Assurance Project Plan (QAPP), outlining the specific locations of the collection, sampling methodology, and analysis of the data, to the Secretary for approval by the date specified in the draft permit Condition I.L.8. This condition is newly proposed for the draft permit. The current permit referred to this as a “study plan” not a QAPP.

K. Copper Assessment

To continue to investigate concerns for the effects of the discharge of copper within the section of the LaPlatte River downstream from the facility, the Condition I.M of the draft permit requires effluent copper analyses to be carried out using a method with a Method Detection Limit (MDL) of 0.006 mg/L or below. This level of detection is deemed to be reasonably achievable as EPA methods 200.7 and 200.8 listed in 40 C.F.R. Part 136 have estimated detection limits of 0.0054 mg/L and 0.004 mg/L, respectively.

Influent copper monitoring is also required to quantify the amount of copper loading to the facility and estimate copper removal within the WWTF.

In addition, the facility is required to conduct and submit the results of an Industrial User Survey. This effort is intended for facilities to establish a list of connections where copper may enter the system from Significant Industrial Users (SIUs) and categorize those dischargers. Significant industrial users are best defined in Condition III of the permit. The list shall also include waste hauling companies that the facility accepts septage from and other root treatment specialists that may contribute to copper loading at the WWTF. The list supports future efforts to characterize influent copper sources further, should they be necessary. It is not expected for the Permittee to track down the varying waste hauler customers for this Survey.

The Survey shall track the Significant Industrial Users (SIUs), waste hauler or other root treatment specialist and include each entity’s business name, address, contact information, NPDES Direct Discharge or Pretreatment permit number, number of any other environmental permits as they apply, and wastewater allocations as they apply. It is expected for the Plan to describe the SIU’s industrial activity and manufacturing process that may be a source for copper loading to the WWTF.

Each SIU and activity identified to contribute to the treated copper loading at the WWTF shall specify a qualitative estimate option that ranks the potential load for copper to be present in the waste stream as high, moderate, or low impact. It is not expected for the Permittee to conduct tests or additional monitoring to identify where exactly the SIU’s discharge ranks within the high range for >10 lbs/yr, the moderate range for <10 lbs/yr but greater than 1lb/yr, or the lower range for <1 lb/yr. Only a rough estimate, or guess, is needed.

The Industrial User Survey shall have a rough estimate average daily and maximum daily process water volume treated by the WWTF for each facility. The Survey shall note whether the industrial facility utilizes wastewater management practices and describe, as necessary.

This Survey is due by March 31, 2028, as specified in Condition I.M.5 of the draft permit.

VI. General Conditions

A. Electronic Reporting

The National Pollution Discharge Elimination System (NPDES) Electronic Reporting Rule (eRule) modernized Clean Water Act reporting for municipalities, industries, and other facilities by converting to an electronic data reporting system. The eRule requires the inclusion of electronic reporting requirements in NPDES permits that become effective after December 21, 2015. The rule requires that NPDES regulated entities that are required to submit discharge monitoring reports (DMRs), including majors and nonmajors, individually permitted or covered by a general permit, must do so electronically after December 21, 2016. The Secretary has created an electronic reporting system for DMRs and has trained facilities in its use. As of December 21, 2020, these NPDES facilities must also submit additional information electronically as specified in Appendix A in 40 C.F.R. Part 127.

B. Noncompliance Notification

As required by 10 V.S.A. § 1295, a Noncompliance Notification has been included in the draft permit. Section 1295 requires the Permittee to provide public notification of untreated discharges from wastewater facilities. The Permittee is required to post a public alert within one hour of discovery and submit to the Secretary specified information regarding the discharge within 12 hours of discovery.

C. Reopener

The draft permit includes a reopener clause whereby the Secretary reserves the right to reopen and amend the permit to implement an integrated plan to address multiple Clean Water Act obligations.

VII. Procedures for Formulation of Final Determinations

The public comment period for this draft permit is from **May 9, 2023**, through **June 19, 2023**, during which time interested persons may submit their written views on the draft permit. The Secretary will consider and respond to written comments received by 4:30 PM on **June 19, 2023**, in the formulation of the final determination on the draft permit. The period of comment may be extended at the discretion of the Secretary.

Public comments concerning draft permits may be submitted electronically via the Environmental Notice Bulletin (ENB) or by paper copy to the Agency's mailing address: Agency of Natural Resources, Department of Environmental Conservation, Watershed Management Division, One National Life Drive, Davis Building, 3rd Floor, Montpelier, VT 05620-3522. In addition to providing a portal for submitting public comments, the ENB website presents the permit processing history and draft permit documents and can be used to request public meetings. The ENB public site is <http://enb.vermont.gov> and the ENB information page is <http://dec.vermont.gov/permits/enb>.

The complete application, draft permit, and other information are on file and may be inspected by appointment on the 3rd floor of the Davis Building at One National Life Drive, Montpelier, Vermont. Copies may be obtained by calling 802-828-1115 from 7:45 AM to 4:30 PM Monday through Friday and will be made at a cost based upon the current Secretary of State Official Fee Schedule for Copying Public Records. The draft permit and fact sheet may also be viewed on the Watershed Management Division's website at <https://anrweb.vt.gov/DEC/IWIS/ReportViewer2.aspx?Report=WWPublicNotices&ViewParms=False>

For additional information, contact Jamie.Bates@vermont.gov.

Public Meeting

The Secretary will hold a public meeting on **June 12, 2023, at 6 PM at the Town Hall lower-level Conference Room located at 10632 Rte 116, Hinesburg, VT 05461. For information on attending the meeting,** to review the complete application, proposed permit, and other information on file, and submit comments online, visit: <http://enb.vermont.gov>.

Any person may submit oral or written statements and data concerning the draft permit at the public meeting. The Secretary may establish reasonable limits on the time allowed for oral statements and may require the submission of statements in writing. All statements, comments, and data presented at the public meeting will be retained by the Secretary and considered in the formulation of the final determination on the draft permit.

Final Action/Right to Appeal to the Environmental Division of the Superior Court

Pursuant to 10 V.S.A. § 8504 (amended effective January 1, 2018), an aggrieved person shall not appeal the final determination on the draft permit unless the person submitted to ANR a written comment during the applicable public comment period or an oral comment at the public hearing conducted by ANR. Absent a determination of the Environmental judge to the contrary, an aggrieved person may only appeal issues related to the person's comments to ANR as prescribed by 10 V.S.A. § 8504(d)(2).

Pursuant to 10 V.S.A. Chapter 220 and the Vermont Rules for Environmental Court Proceedings, any appeal of this permit or an authorization made pursuant to this permit, except for an appeal of a permit for a renewable energy plant, must be filed with the clerk of the Environmental Division of the Superior Court within 30 days of the date of the decision. The address for the Vermont Environmental Court is Vermont Superior Court, Environmental Division, 32 Cherry Street, 2nd Floor, Suite 303, Burlington VT 05401 (Tel. (802) 951-1740). For further information, see the Vermont Rules for Environmental Court Proceedings, available online at www.vermontjudiciary.org.

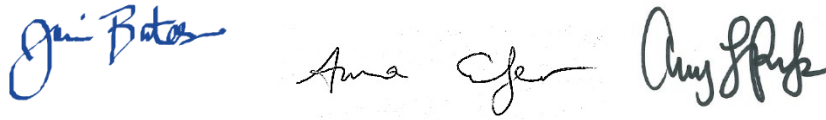
The notice of appeal must specify the parties taking the appeal and the statutory provision under which each party claims party status; must designate the act or decision appealed from; must name the Environmental Division; and must be signed by the appellant or the appellant's attorney. In addition, the appeal must give the address or location and description of the property, project, or facility with which the appeal is concerned and the name of the applicant or any permit involved in the appeal. The appellant must also serve a copy of the notice of appeal in accordance with Rule 5(b)(4)(B) of the Vermont Rules for Environmental Court Proceedings. For further information, see the Vermont Rules for Environmental Court Proceedings.

If the determination relates to a renewable energy plant for which a certificate of public good is required under 30 V.S.A. § 248, any appeal of such determination must be filed with the Vermont Public Utility Commission pursuant to 10 V.S.A. § 8506. Section 8506 does not apply to a facility that is subject to 10 V.S.A. § 1004 (dams before the Federal Energy Regulatory Commission), 10 V.S.A. § 1006 (certification of hydroelectric projects), or 10 V.S.A. Chapter 43 (dams). Any appeal under Section 8506 must be filed with the clerk of the Public Utility Commission within 30 days of the date of this decision; the appellant must file with the clerk an original and six copies of its appeal. The appellant shall provide notice of the filing of an appeal in accordance with 10 V.S.A. § 8504(c)(2) and shall also serve a copy of the notice of appeal on the Vermont Public Service Department. For further information, see the Rules and General Orders of the Public Utility Commission.

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

**ATTACHMENT A – REASONABLE POTENTIAL DETERMINATION & LIMIT CALCULATION
MEMORANDUM**

Prepared by: Amy Polaczyk, Manager, WWP
Anna Gallagher, Monitoring and Assessment Program (MAP)
Jamie Bates, Wastewater Program (WWP)



Cc: Pete LaFlamme, Director, Watershed Management Division (WSMD)
Bethany Sargent, Manager, Monitoring and Assessment Program (MAP)

Date: April 20, 2023

Subject: Hinesburg Wastewater Treatment Facility Reasonable Potential Determination (RPD) and Water Quality Based Effluent Limit (WQBEL) Calculation for NPDES Direct Discharge Permit 3-1172.

I. Overview

The Vermont Agency of Natural Resources received a permit amendment and renewal application to authorize the Hinesburg Town Wastewater Treatment Facility (WWTF) discharge into the LaPlatte River on April 28, 2022. The applicant filed a complete application for reissuance pursuant to the Vermont Water Pollution Control Permit Regulations (VWPCPR) § 13.5(b), therefore the current permit is administratively continued, pursuant to 3 V.S.A. § 814, past the expiration date of December 31, 2022.

The applicant requested to increase the permitted design flow from 0.25 MGD to 0.325 MGD. The proposed increase is a component of the planned facility upgrade, changing the treatment system from a lagoon to a sequencing batch reactor (SBR) treatment system, which Phase II construction is planned to begin in spring 2023.

The 2022 Vermont Water Quality Standards were used to determine reasonable potential in the following analysis. In addition, this determination reassessed permit limits at the two flows applicable in the permit amendment and renewal: current facility flow (0.250 MGD) and upgraded facility flow (0.325 MGD).

II. Facility Information

Hinesburg Wastewater Treatment Facility (WWTF) located in Hinesburg, VT

Permit No. 3-1172

NPDES No. VT0101028

Receiving Water: LaPlatte River

Facility Location: 44.33223, -73.12588 (NAD 83)

Approximate Outfall Location: 44.33321, -73.12605 (NAD 83)

III. Hydrology for Hinesburg WWTF used in the Water Quality Based Limit Calculations

Effluent Flow

Table 1a. Current and newly proposed amended effluent flow for the Hinesburg WWTF in units million gallons per day & cubic feet per second.

Permitted		Proposed following upgrade	
MGD	CFS	MGD	CFS
0.25	0.387	0.325	0.503

Receiving Water Hydrology

Table 1b. Seasonal and annual hydrology observed in the receiving water.

	Annual (CFS)	June – Sept (CFS)	October – May (CFS)
7Q10	0.36	0.35	1.1
Low Median Monthly (LMM)	1.99	1.99	4.39
30Q10	0.65	0.62	1.95
Annual Median Flow	8.38	-	-

Instream Waste Concentrations at Design Flow of 0.25 MGD

Table 1c. Seasonal and annual instream waste concentrations estimated in the receiving water for 7Q10, Low Median Monthly (LMM), and 30Q10 flows based on the current permitted design flow, 0.25 MGD.

	Annual	June – Sept	October – May
7Q10	52%	52%	26%
LMM	16%	16%	8%
30Q10	37%	38%	17%
Annual Median Flow	4.4%	-	-

Instream Waste Concentrations at Design Flow of 0.325 MGD

Table 1d. Seasonal and annual instream waste concentrations estimated in the receiving water for 7Q10, Low Median Monthly (LMM), and 30Q10 flows based on the proposed amended design flow, 0.325 MGD.

	Annual	June – Sept	October – May
7Q10	58%	59%	31%
LMM	20%	20%	10%
30Q10	44%	45%	21%
Annual Median Flow	5.7%	-	-

7Q10: Using daily mean streamflow, 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.

LMM or “Low Median Monthly Flow”: Using daily mean streamflow, the median monthly flow of the receiving water for that month having the lowest median monthly flow.

30Q10: Using daily mean streamflow, the flow of the receiving water equal to the minimum mean flow for thirty consecutive days, that has a 10% probability of occurring in any given year.

Annual Median Flow: Using the mean daily flow that is equaled or exceeded 50 percent of the time for the analysis period. Where statistically significant trends in annual median stream flows exist for long-term records, the analysis period is limited to the most recent 30-years.

IV. Receiving Water Quality

Table 2a. Concentrations of surface water chemistry upstream and downstream of the Hinesburg Wastewater Treatment Facility Outfall S/N 001 (river miles 12.5 above and 12.0 below, respectively).

Parameter	Unit	Upstream			Downstream		
		# of Samples	Median	Max	# of Samples	Median	Max
Ammonia Nitrogen, Total	mg/L as N	5	<0.05	<0.05	15	0.399	1.52
Antimony, Total	µg/L	0	--	--	1	--	<10
Arsenic, Total	µg/L	1	--	<1	2	0.79	1.073
Cadmium, Total	µg/L	1	--	<1	2	<1	<1
Chromium, Total	µg/L	1	--	<5	2	<5	<5
Copper, Total	µg/L	1	--	<10	2	<10	<10
Iron, Total	µg/L	1	--	527.6	2	526.4	552.4
Lead, Total	µg/L	1	--	<1	2	<1	<1
Manganese, Total	µg/L	1	--	135.7	2	186.8	235.3
Nickel, Total	µg/L	1	--	<5	2	<5	<5
Selenium, Total	µg/L	1	--	<5	2	<5	<5
Silver, Total	µg/L	0	--	--	1	--	<1
Thallium, Total	µg/L	0	--	--	1	--	<1
Zinc, Total	µg/L	1	--	<50	2	<50	<50
Nitrate/Nitrite	mg/L as N	10	0.119	0.212	1	--	0.63
Phosphorus, Total	µg/L	35	47	101	21	58.3	102
Turbidity	NTU	10	5.72	10.1	15	6.21	16.6
Dissolved Oxygen	mg/L	1	--	8.52	1	--	8.22
Dissolved Oxygen Saturation	%	1	--	80.8	1	--	80.5
pH	S.U.	1	--	7.6	2	7.54	7.68
Color	PCU	1	--	50	1	--	40
Alkalinity	mg/L	1	--	121	1	--	143
Temperature	°C	1	--	13.2	2	19.4	24.1

Table 2b. Macroinvertebrate site summary from analyses conducted upstream and downstream of the Hinesburg Wastewater Treatment Facility Outfall S/N 001 (river miles 12.5 above and 12.0 below, respectively).

Macroinvertebrate Site Summary - LaPlatte River														
Date	Location	RM	Density	EOT Richness	BCG Intolerant Richness	PMA-O	B.I.	Amphipod + Isopod - Hyallela	EOT/EOT+ C	PPCS-F	Sensitive COTE%	EOT Density	IBI Score	Community Assessment
9/30/2016	Above	12.5	392	8.0	4.0	56.8	5.34	3.7	0.720	0.378	70.031	237.6	35	Meets VWQS
	Below	12.0	195	10.0	5.0	68.0	6.40	1.5	0.381	0.411	31.282	40.0	28	Does not meet VWQS
		IBI 5	≥ 500	≥ 15	≥ 10	≥ 65	≤ 5.5	0	≥ 0.5	≥ 0.5	≥ 20	≥ 500		
		IBI 4	≥ 400	≥ 11	≥ 7	≥ 57	≤ 6	≤ 1	≥ 0.36	≥ 0.42	≥ 14	≥ 350		
		IBI 3	≥ 300	≥ 8	≥ 5	≥ 50	≤ 6.5	≤ 5	≥ 0.23	≥ 0.34	≥ 9	≥ 200		
		IBI 2	≥ 200	≥ 5	≥ 2	≥ 40	≤ 7	≤ 25	≥ 0.11	≥ 0.29	≥ 3	≥ 100		
		IBI 1	≥ 0	≥ 0	≥ 0	≥ 0	>7	>25	≥ 0	≥ 0	≥ 0	≥ 0		

Scoring Guidelines for Stream Type SLG and WQ Class B(2)

V. Effluent Data for the Hinesburg WWTF

Table 3. Effluent data for the Hinesburg WWTF, from 10/31/2017 to 7/31/2022. Data are collected from routine effluent monitoring permitted under Condition I.A.1 of the current permit or permit-required Annual Constituent Monitoring. MO = Monitor Only

Parameter Name & Measurement Type	Limit	Min	Average	Max	Count
BOD, 5-DAY (20 DEG. C)					
Concentration Measurement - Monthly Average, mg/L	30	1.60	7.04	24.00	47
Concentration Measurement - Weekly Average, mg/L	45	1.80	8.28	27.00	47
Concentration Measurement - Daily Maximum, mg/L	50	1.80	8.28	27.00	47
Quantity Measurement - Monthly Average, lbs/d	63	1.83	9.79	33.61	47
Quantity Measurement - Weekly Average, lbs/d	94	2.28	11.79	36.70	47
BOD, 5-DAY PERCENT REMOVAL					
Concentration Minimum Measurement -Monthly Min., %	85	94.80	98.57	99.70	47
CHLORINE, TOTAL RESIDUAL					
Concentration Measurement - Instantaneous Maximum, mg/L	0.02	0.01	0.02	0.04	47
E. COLI, THERMOTOL, MF, M-TEC					
Concentration Measurement - Instantaneous Maximum, CFU/100 mL	77	1.00	1.63	10.00	47
FLOW, IN CONDUIT OR THRU TREATMENT PLANT					
Quantity Measurement - Annual Average, MGD	0.25	0.06	0.17	0.25	47
PHOSPHORUS, TOTAL (AS P)					
Concentration Measurement -Monthly Average, mg/L	0.8	0.07	0.49	3.05	57
Quantity Measurement - Annual Total, lbs/y	608	150.72	173.34	195.95	2
pH					
Concentration Measurement -Daily Minimum & Daily Maximum, s.u.	6.5 - 8.5	6.91	7.41	7.89	47
TOTAL SUSPENDED SOLIDS (TSS)					
Concentration Measurement -Monthly Average, mg/L	45	2.00	16.33	58.50	47
Concentration Measurement - Weekly Average, mg/L	45	2.00	20.16	68.00	47
Concentration Measurement - Daily Maximum, mg/L	50	2.00	20.16	68.00	47
Quantity Measurement - Monthly Average, lbs	94	2.05	23.90	92.76	47
Quantity Measurement - Weekly Average, lbs	94	2.19	28.99	103.78	47
SOLIDS, SUSPENDED PERCENT REMOVAL					
Concentration Minimum Measurement -Monthly Min., %	85	81.90	95.22	99.20	47
SETTLABLE SOLIDS					
Concentration Maximum Measurement - Instant. Max., mL/L	1	0.01	0.08	1.00	41
ULTIMATE OXYGEN DEMAND					
Quantity Measurement - Daily Maximum, lbs	400	27.58	119.22	246.29	16
TOTAL AMMONIA NITROGEN					
Concentration Measurement - Daily Maximum from June through September, mg/L	MO	7.80	17.57	29.00	16
Concentration Measurement - Daily Maximum from October through May, mg/L	MO	1.30	16.78	32.93	31
TOTAL KJELDAHL NITROGEN					
Concentration Measurement - Daily Maximum, mg/L	MO	1.50	17.12	27.00	34
TOTAL NITROGEN					
Concentration Measurement - Daily Maximum, mg/L	MO	9.20	17.90	23.00	16
Quantity Measurement - Daily Maximum, lbs	MO	7.90	26.89	42.40	16
NITRATE/NITRITE					
Concentration Measurement - Daily Maximum, mg/L	MO	0.20	3.37	16.00	16
OIL AND GREASE mg/L					
	MO	0.1	1.12	2.5	5
DISSOLVED OXYGEN mg/L					
	MO	6.87	9.522	14.7	5
TEMPERATURE deg C					
	MO	8.2	16.68	25.6	5
TOTAL DISSOLVED SOLIDS mg/L					
	MO	670	783.6	925	5

VI. Reasonable Potential and Permit Limit Determinations

A. Ultimate Oxygen Demand (UOD)

UOD is dependent on the quantity of five-day Biochemical Oxygen Demand (BOD5) and Total Kjeldahl Nitrogen (TKN) in a discharge, as specified in the following equation:

$$UOD \text{ (lbs/day)} = [(BOD5 \text{ (lbs/day)} \times 1.43) + (TKN \text{ (lbs/day)} \times 4.57)]$$

The UOD mass limitation in the current permit is 400 lbs/day, maximum day, and is effective from June 1st through September 30th of each year. This limitation was based on a conservative screening model of the assimilative capacity of the LaPlatte River as determined in the 1980's with a much lower facility flow (70,000 gpd) and a higher receiving water base flow (1.5 CFS). A review of the monitoring data reported during the five-year timespan specified in Table 3 indicates that the facility has reliably met this limitation.

In 2022, The Watershed Management Division determined the 7Q10 of the LaPlatte River to be 0.36 CFS at the point of discharge of the Hinesburg WWTF. The increased design flow, along with the high instream waste concentration at critical flows, prompted an updated UOD analysis for the permit amendment and renewal.

The Streeter-Phelps screening model initially calibrated for the LaPlatte River (DOSIM), was recreated in Excel. Using the Excel-based model, the flow and velocity were updated to simulate the DO dynamics downstream of the facility following the proposed flow increase. To achieve a DO concentration that meets the VWQS of 5 mg/L, the conservative screening model indicates a UOD limit of 60.5 lbs/day from June through September would result in a minimum downstream dissolved oxygen concentration of 5.04 mg/L.

A complete list of inputs to and outputs from this analysis are included as Appendix A.

UOD monitoring should continue to be calculated twice monthly from BOD5 and TKN results as a daily maximum load.

B. Non-Metals Technology Based Effluent Limitations: Biochemical Oxygen Demand, Total Suspended Solids, Settleable Solids, and pH

The following constituents are subject to meeting federal required Technology Based Effluent Limitations (TBELs) and were not further assessed for reasonable potential: five-day Biochemical Oxygen Demand, Total Suspended Solids, Settleable Solids, and pH.

1. Five-Day Biochemical Oxygen Demand (BOD5)

Current BOD5 are: 30 mg/L monthly average, 45 mg/L weekly average, and 50 mg/L daily maximum, 63 lbs/day monthly average, and 94 lbs/day weekly average. The pounds limits are calculated based on the current design permitted flow of 0.25 MGD (30 mg/L monthly average BOD5 x 0.25 MGD x 8.34 = 63 lbs/day monthly average BOD5 & 45 mg/L weekly average BOD5 x 0.25 MGD x 8.34 = 94 lbs/day weekly average BOD5).

These limits will remain in place year-round. However, to meet the proposed Ultimate Oxygen Demand limitation of 60.5 lbs/day from June through September, the BOD5 will need to be lower than the permitted BOD5 limits.

Ultimate Oxygen Demand is calculated as follows:

$$UOD \text{ (lbs/day)} = [(BOD5 \text{ (lbs/day)} \times 1.43) + (TKN \text{ (lbs/day)} \times 4.57)]$$

TKN is the main determinant of UOD, assuming the facility has a monthly average TKN discharge of 4.8 lb/day (e.g., all the proposed TKN load is discharged as ammonia), the BOD discharge needs to be no greater than 27 lbs/day (monthly average) to achieve compliance. The monitoring frequency for BOD₅ in the effluent is proposed to change from twice monthly to once weekly in the draft permit.

Influent monitoring for BOD₅ should remain monthly as a “monitor only” condition in the permit renewal. Values should continue to be used to calculate percent removal of BOD₅.

2. Total Suspended Solids (TSS)

TSS limits, upon the effective date of the permit and prior to the facility being fully operational following the proposed upgrade, are not proposed to change and should remain: 45 mg/L monthly average, 45 mg/L weekly average, and 50 mg/L daily maximum, 94 lbs/day monthly average, and 94 lbs/day weekly average. The pounds limits are calculated based on the previous design permitted flow of 0.25 MGD (45 mg/L monthly average TSS x 0.25 MGD x 8.34 = 94 lbs/day monthly and weekly average TSS). The monitoring frequency for TSS in the effluent is proposed to change from twice monthly to once weekly in the draft permit.

Influent monitoring for TSS should remain monthly as a “monitor only” condition in the permit renewal. Values should continue to be used to calculate percent removal of TSS.

Following facility upgrade the facility will no longer be eligible for the “equivalent to secondary treatment” TSS limits afforded to waste stabilization ponds (lagoons) of 45 mg/L monthly average. Once the upgraded facility is on-line, the secondary treatment standard of 30 mg/L monthly average will apply.

The monthly mass limit must change to 81 lbs/day monthly average based on the updated design flow of 0.325 MGD and the new concentration limit (30 mg/L monthly average TSS x 0.325 MGD x 8.34 = 81 lbs/day monthly average TSS).

The monitoring frequency for TSS in the effluent is proposed to change from twice monthly to once weekly in the draft permit. Influent monitoring for TSS should remain monthly as a “monitor only” condition in the permit renewal.

3. pH

Monitoring for pH, the VWQS Condition 29A-303 “General Criteria Applicable to all Waters” specifies the range of 6.5 to 8.5 s.u., which are consistent with the Hinesburg WWTF current permitted minimum and maximum limits. Monitoring should remain daily and be reported as a daily maximum limit for 8.5 s.u. and daily minimum limit of 6.5 s.u.

4. Settleable Solids

Monitoring for Settleable Solids is not proposed to change. Monitoring should continue to occur daily and be subject to the existing limit of 1.0 ml/L.

C. Water Quality Based Effluent Limitation (WQBEL) Calculations:

The Water-Quality Based Effluent Limitations (WQBELs) for pollutants of concern were assessed via the mass balance steady state model method outlined in EPA’s Technical Support Document for Water Quality-Based Toxics Control (TSD) and described in detail in Appendix B.

D. Non-Metals Water Quality Based Effluent Limitations: Total Residual Chlorine, E. Coli,

1. Total Residual Chlorine (TRC):

TRC consists of the sum of free chlorine and combined chlorine. Chlorine is a toxic substance with acute and chronic criteria. The existing permit includes an instantaneous maximum, daily, monitoring limit of 0.02 mg/L. Once upgraded the facility will use UV disinfection and a chlorine limit will no longer be applicable.

Using the TSD calculation, the current facility flow, an annual 7Q10 of 0.36 cfs, and the existing CV of 0.2, the updated daily max limit for TRC was determined to be 0.0228 mg/L. Based on this calculation, the existing limit of 0.02 mg/L daily max TRC will not change.

A limit of 0.02 mg/L will ensure that the instream water quality criteria for chlorine of 0.019 mg/L, (acute) and 0.011 mg/L (chronic) of the Vermont Water Quality Standards is met. This permit limit is equal to the detection limit of the currently approved version of Standard Methods for the Examination of Water and Wastewater (Method 4500 CL-E and G).

2. E. coli

The E. coli limit of 77 cfu/100 ml is not proposed to change for this permit renewal; however, the monitoring frequency is proposed to change to weekly only from May through September; and remain twice monthly from October through June. E. coli monitoring should be collected as a grab sample when monitoring occurs.

E. Metals

We assessed reasonable potential for metals using EPA's TSD method and assuming the following conditions:

- Current maximum permitted effluent flow = 0.25 MGD
- Minimum observed upstream hardness = 123 mg/L
- Assumed pH (due to lack of ambient pH data) = 7.5
- CV based on current permit effluent data = 0.6

Table 4. Effluent Pollutant Scan Metals data.

Pollutant	Most Stringent Criterion (µg/L)	Flow Scenario	Max Observed Effluent Conc. (µg/L)	Median Upstream Ambient Conc. (µg/L)	Projected Max Receiving Water Conc. (µg/L)	Reasonable Potential Determination
Antimony	5.6	7Q10	< 2.0	No data	No data	Indeterminate
Arsenic	0.02	Median Annual	< 1.0	<1	<1	Indeterminate
Cadmium	0.93	7Q10	< 0.5	<1	<2	Indeterminate
Chromium (III)	102	7Q10	< 5.0	<5	<20	No
Chromium (VI)	11	7Q10	< 5.0	<5	<20	Indeterminate
Copper	11.1	7Q10	4.1	<10	18	Indeterminate*
Cyanide	4.0	7Q10	< 10	No data	No data	Indeterminate
Iron	300	7Q10	No data	527.6	No data	Indeterminate
Lead	4.1	7Q10	< 1.0	<1	3.7	No
Mercury	0.012	7Q10	< 0.2	No data	No data	Indeterminate
Nickel	62	7Q10	< 5.0	<5	18	No
Selenium	3.1	30Q10	< 2.0	<5	<9	Indeterminate
Silver	5.4	7Q10	< 10	No data	No data	Indeterminate
Thallium	0.24	7Q10	<1.0	No data	No data	Indeterminate
Zinc	143	7Q10	23	<50	98	No

Available data indicate that iron concentrations in the LaPlatte River may exceed the most stringent iron water quality criterion, 300 µg/L. WSMD notes, however, that this criterion is not human health-based, but rather is equal to the secondary maximum contaminant level for iron, which is a level at which there may be aesthetic concerns (i.e., taste, color) for a person drinking the water.

*The results indicate reasonable potential for copper to exceed VWQS in the receiving water. However, our analysis is based on a single effluent sample, which does not meet the minimum data requirements set by WSMD for developing WQBELs. More frequent copper monitoring in the next permit term (further described in subsection 2 below) will enable WSMD to develop appropriate copper effluent limits in the future, if necessary.

1. Priority Pollutant Monitoring, including Metals

To provide additional data for future effluent assessments of reasonable potential for metals, the pollutants included in Appendix J, Table 2 of 40 CFR Part 122, along with aluminum, dissolved organic carbon, and hardness, should be analyzed concurrently with semi-annual WET tests in the draft permit. The condition proposed:

- Twice per year, in winter (January or February) and late summer/early fall (August, September or October), the Permittee should conduct an effluent analysis of pollutant scans at outfall serial number S/N 001 for the pollutants included in 40 CFR § 122 Appendix J Table 2 and Aluminum and submit the results to the Secretary. Sampling and analysis for Hardness and Dissolved Organic Carbon should be conducted concurrently with the Pollutant Scan. Sampling should coincide with Whole Effluent Toxicity (WET) testing schedules proposed for the draft permit.
- Monthly instream monitoring from June through October for priority pollutant metals is proposed for the draft permit and further described below in Section VII.

2. Total Copper

Further monitoring is necessary to assess pollutant concerns for Total Copper within the LaPlatte River for the next permit renewal or amendment. For this reason:

- Influent daily maximum mass quantity (lbs/day) and concentration (mg/L) Total Copper monitoring is proposed for the draft permit to be “monitor only” and occur monthly.
- Monthly “monitor only” daily maximum, mass quantity (lbs/day) and concentration (mg/L), Total Copper monitoring in the effluent is proposed for the draft permit.
- The draft permit should also propose a Copper Assessment Industrial Waste Survey be completed within the Town’s collection system prior to treatment at the WWTF.

F. Nutrients: Total Nitrogen (TN), Total Kjeldahl Nitrogen (TKN), Total Ammonia Nitrogen (TAN), Nitrate, Nitrite, and Total Phosphorus (TP)

1. Total Nitrogen:

TN is the sum of nitrate, nitrite, ammonia, soluble organic nitrogen, and particulate organic nitrogen.

This facility is currently required to monitor quarterly for Total Nitrogen. The proposed permit includes twice monthly monitoring, as a “monitor only” condition.

To calculate the effluent results for Total Nitrogen (TN), monitoring is proposed for Total Kjeldahl Nitrogen (TKN), Nitrate (NO_3^-), and Nitrite (NO_2^-). Each nitrogenous constituent should be reported using an appropriate combination of CWA approved methods and arithmetic (i.e., $\text{TN} = \text{TKN} + \text{NO}_3^- + \text{NO}_2^-$).

Total Kjeldahl Nitrogen

The current permit requires daily maximum concentration values for TKN monitoring to be reported twice a month from June through September and quarterly from October through May. Results from June through September monitoring calculate results for Ultimate Oxygen Demand (UOD).

Proposed monitoring conditions for the amended permit require TKN to be reported as daily maximum concentrations and mass loads and monitored twice monthly, year-round. No limits are proposed for TKN, however, as a component of Ultimate Oxygen Demand TKN will need to be controlled to meet the new UOD limit. Monitoring should continue to be “monitor only.”

Results should be used to calculate Total Nitrogen results and monitoring schedules should coincide with the proposed Total Ammonia Nitrogen monitoring, when it occurs.

Nitrate and Nitrite (NOx)

We assessed reasonable potential for Nitrate using EPA’s TSD method and assuming the following conditions:

- Annual low median monthly flow = 1.99 cfs
- Current maximum permitted effluent flow = 0.25 MGD
- Maximum observed effluent nitrate concentration = 16 mg/L
- Median observed upstream nitrate concentration = 0.119 mg/L
- CV based on current permit effluent data = 1.43

Based on this input data, the maximum projected nitrate concentration in the receiving water is 5.5 mg/L, which exceeds the VWQS of 5 mg/L for Class B(2) waters, and WQBELs are required.

Limits were calculated, again using EPA's TSD method, assuming the flow and ambient conditions listed above for the current facility. Separate limits were calculated for the upgraded facility, assuming a maximum permitted effluent flow of 0.325 MGD and a CV of 0.6, as there is no effluent data available for the upgraded plant. The draft permit should contain the following limits:

- Current facility: Maximum Day limit of 55 mg/L and Average Monthly limit of 19 mg/L
- Upgraded facility: Maximum Day limit of 40 mg/L and Average Monthly limit of 20 mg/L

Twice monthly Nitrate and Nitrite monitoring is proposed. Sampling for Nitrate and Nitrite should be sampled as separate species such that the laboratory produces results for Nitrate and results for Nitrite to assess compliance with the VWQS.

Total Ammonia Nitrogen (TAN)

The current permit includes limits for TAN based on a positive finding of RP:

- From June through September, a monthly average mass limit of 7.3 lbs., daily maximum mass limit 34.6 lbs., monthly average concentration limit of 3.5 mg/L, and instantaneous maximum concentration limit of 16.6 mg/L.
- From October through May, a monthly average mass limit of 42.1 lbs., daily maximum mass limit 175.0 lbs., monthly average concentration limit of 20.2 mg/L, and instantaneous maximum concentration limit of 84.0 mg/L.

Because the facility at the time of permit issuance was unable to meet these limits, a compliance schedule was included in the current permit and requires TAN to be "monitored only" on a weekly basis, and reported as daily maximum concentration values until December 31, 2022 or the completion of the facility upgrade. However, the facility is not prepared to meet these limits due to being completely rebuilt to accommodate a technology to meet the TAN and TP limitations.

The municipality has continued to make a good-faith effort to meet this deadline, however geotechnical site constraints and supply chain challenges have delayed facility construction. Phase II construction is planned to begin in the Spring of 2023.

Due to the increased flow proposed, changed hydrology, and an update to the Vermont Water Quality Standards, the limits were recalculated for this permit issuance.

Input data:

- pH assumed to be equal to 7.5 s.u.
- Temperature was assumed to be 5 degrees Celsius for the winter season and 25 degrees Celsius for the summer season. The highest temperature observed in the summer season was 24.4 degrees Celsius. This is consistent with past assumptions made for permits when assessing the TAN criteria in the VWQS.
- 30Q10 seasonal flows listed in Section III based on the 2022 VWQS.

Proposed limits for TAN:

- From June through September, a monthly average mass limit of 4.8 lbs., daily maximum mass limit 9.7 lbs., monthly average concentration limit of 1.8 mg/L, and daily maximum concentration limit of 3.6 mg/L.

- From October through May, a monthly average mass limit of 33.4 lbs., daily maximum mass limit 67.0 lbs., monthly average concentration limit of 12.3 mg/L, and daily maximum concentration limit of 24.7 mg/L.

Monitoring schedules should coincide with proposed twice monthly Total Nitrogen monitoring. A compliance schedule should be included in the draft permit set milestones and reporting during the facility upgrade and for these limits to come into effect once the upgrade is complete.

2. Total Phosphorus:

This facility is subject to the 2016 Lake Champlain Phosphorus TMDL (LC TMDL). That document requires the facility to meet an annual total Waste Load Allocation (WLA) which was included in the current permit.

As was the case for TAN, currently the facility cannot meet the limits for TP and is being rebuilt to achieve them. The municipality has continued to make a good-faith effort to meet the current December 31, 2022 deadline, however due to geotechnical site constraints and supply chain challenges, facility Phase II construction is planned to begin in the Spring of 2023.

The permit should keep the annual TP WLA of 152 lbs/yr. and sample weekly instead of twice monthly in the current permit.

A monthly average concentration limit of 0.80 mg/L should also remain in the permit renewal, pursuant to 10 VSA 1266(a).

In addition to the Lake Champlain TMDL and statutory limits on TP discharges, VWQS also contain the following narrative phosphorus criterion:

In all waters, total phosphorus loadings should 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.

The LaPlatte River in the vicinity of the discharge is classified as a Slow Low Gradient wadeable stream. There is no associated numeric phosphorus criterion for Slow Low Gradient streams, and the most recent macroinvertebrate data are insufficient to determine whether the stream is impaired due to nutrients. In the absence of numeric criteria for phosphorus, we reviewed national recommended criteria for assessing reasonable potential to exceed the narrative VWQS. EPA's [1986 Quality Criteria for Water](#) (the "Gold Book") recommends an in-stream phosphorus concentration less than or equal to 100 µg/L in streams not discharging directly to lakes or impoundments to prevent plant nuisances due to accelerated eutrophication. Waterbody-specific conditions can result in increased or decreased nutrient response, and WSMD may develop a site-specific criterion for the LaPlatte River in the future.

We followed EPA's TSD method and assuming the following conditions in our analysis:

- Summer low median monthly flow = 1.99 cfs
- Current maximum permitted effluent flow = 0.25 MGD
- Maximum observed effluent TP concentration (June-October) = 560 µg/L
- Median observed upstream TP concentration (June-October) = 47 µg/L
- CV based on current permit effluent data = 0.51 for RP assessment and rounded to 0.60 for the WQBEL calculation.

Based on this input data, the maximum projected phosphorus concentration in the receiving water is 137 µg/L, which exceeds the Gold Book criterion and indicates that a WQBEL during the June through October growing season is necessary.

Limits were calculated, again using EPA’s TSD method, assuming the flow and ambient conditions listed above for the current facility. Separate limits were calculated for the upgraded facility, assuming a maximum permitted effluent flow of 0.325 MGD and a CV of 0.6, as there is no effluent data available for the upgraded plant. The draft permit should contain the following limits:

- Current facility: Maximum Day limit of 590 µg/L and Average Monthly limit of 310 µg/L
- Upgraded facility: Maximum Day limit of 510 µg/L and Average Monthly limit of 250 µg/L

A compliance schedule should be included in the draft permit set milestones and reporting during the facility upgrade and for these limits to come into effect once the upgrade is complete.

G. Whole Effluent Toxicity

Whole Effluent Toxicity (WET) testing data for this facility is presented below in Table 3. No WET limits are included in the current permit.

Table 5. Whole Effluent Toxicity Test Results for the Burlington Riverside WWTF.

Test Start Date	<i>Pimephales promelas</i>				<i>Ceriodaphnia dubia</i>				Total Ammonia Nitrogen
	Acute		Chronic		Acute		Chronic		
	NOEC %	LC50 %	NOEC %	LOEC %	NOEC %	LC50 %	NOEC %	LOEC %	mg/L
8/21/2018	100	>100	50	100	100	>100	12.5	25	
1/8/2019	50	70.7	25	50	50	77.3	25	50	19
9/1/2020	50	72.2	50	100	100	>100	<6.25	6.25	
1/12/2021	50	>100	50	100	100	>100	50	100	16

Analysis of the acute WET test data indicates that this facility’s effluent may have caused acute toxicity in the receiving water at the time the tests were conducted. The toxicity observed in these WET tests are believed to be from effluent ammonia concentrations being greater than WQS ammonia criteria to protect aquatic biota such as *Ceriodaphnia dubia* and *Pimephales promelas*. The current permit includes limits and compliance schedule as RP for Total Ammonia Nitrogen was determined for this facility.

The winter WET tests were the only tests sampled with Total Ammonia Nitrogen and were evaluated for this RPD for the Hinesburg WWTF. Only the 2019 results were evaluated since these results had the lowest survival and highest TAN concentration reported.

The winter acute criteria at a pH 7.68 and temperature of 5 degrees Celsius is 9.98 mg/L-TAN. The effluent ammonia concentration in 2019 was 19 mg/L-TAN, and the LC-50 was 70% dilution as such the ammonia concentration within the 70% dilution was 13.3 mg/L (0.7 X 19 mg/L) (Table 5). This exceeds the winter acute toxicity LC50 endpoint. Similarly, the chronic NOEC for both *Pimephales promelas* and *Ceriodaphnia dubia* was 25% dilution; which would result in ammonia concentration of 4.75 mg/L-TAN (0.25 X 19 mg/L); which meets the chronic criteria of 6.75 mg/L-TAN.

Acute and Chronic WET limitations are not proposed for inclusion in the draft permit for the following reasons:

- The observed WET toxicity under the current conditions is suspected to be resulting from the reasonable potential detected for Total Ammonia Nitrogen in the receiving water. The TAN limits proposed for the permit renewal and that will be applicable to the WWTF post construction, are protective of the VWQS acute and chronic TAN criteria.
- The effluent data available is representative of the current aerated lagoon facility and not the sequencing batch reactor (SBR) treatment system proposed to begin construction in 2023.

- The decision for the facility to construct the SBR was solely based on the need to meet the VWQS TAN acute and chronic criteria protective of aquatic biota limits in the current permit.

Because the facility upgrade is proposed to begin within the first year of the new permit term, WET limits will not be implemented until there is data to assess for the WWTF post final construction and by the next permit renewal. This will allow further review of toxicity alongside TAN and priority pollutant metals.

Additional monitoring is proposed for the permit renewal to provide data for future assessments of WET reasonable potential, it is recommended that:

- Twice per year, in winter (January or February) and late summer/early fall (August, September or October), the Permittee should conduct two-species (*Pimephales promelas* and *Ceriodaphnia dubia*) modified acute/chronic WET tests (48-hour static renewal acute endpoints within a 7-day sub-lethal chronic test) on 24-hour composite effluent samples collected from outfall serial number S/N 001. This sampling should be done concurrently with the required Priority Pollutant Scan plus Aluminum, Hardness, and Dissolved Organic Carbon (DOC) sampling. Total Ammonia should be measured in the highest concentration of test solution at the beginning of the test.
- If chlorine is used in the WWTF's system, Total Residual Chlorine should be measured in the highest concentration of test solution at the beginning of the test.
- A dilution reflecting the Instream Waste Concentration at 7Q10 flow should be bracketed in the WET test dilution series. This facility's summer 7Q10 IWC is 0.590 (59%).
 - It is recommended for the qualified contract laboratory hired to conduct the test to run a 50% and 60% dilution to bracket the IWC available in the LaPlatte River for WET Testing.
- The WET tests should be conducted according to the procedures and guidelines specified in "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms" and "Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" (both documents are productions of the U.S. EPA from October 2002). If a newer edition of either U.S. EPA Methods document is available, the most recent edition should be followed.
- Contract laboratory water may be used for controls and dilution if:
 - acquiring receiving water is hazardous due to weather or topography
 - previous WET tests have shown that receiving water has had poor performance in the lab controls or dilution, and
 - received approval from the Agency.

VII. Instream Monitoring

Instream monitoring to occur monthly, from June through October, is proposed for the draft permit. Instream water quality monitoring should be conducted in the LaPlatte River above the Hinesburg WWTF outfall S/N 001, upstream at river mile (RM) 12.5. This condition will be within the monitoring table and will populate the ANR Online discharge monitoring report.

The following conditions are newly proposed for this condition:

- Instream sampling should be conducted following approval of the sampling plan and updated Quality Assurance Project Plan (QAPP). This is a replacement of the previously permitted Study Plan.
- Monitoring should include concurrent measurement of Turbidity, Total Phosphorus, Total Ammonia Nitrogen, Nitrate, Temperature, DOC, Hardness, priority pollutant metals, and pH.
- Streamflow characteristics should be documented for each sample collection, and sampling should be targeted to low flow conditions, as determined using the relevant U.S. Geological Survey streamflow gage.

VIII. Summary of Changes to Proposed Limits & Monitoring

Table 6. Proposed effluent limits for the permit renewal and amendment issuance and limits applicable post upgrade. Only includes constituent monitoring subject to limit changes for the draft permit. Excludes changes to monitoring frequencies.

Parameter Name & Measurement Type, Units	Permitted Limit	Proposed Limit at the permit effective date	Proposed Limit following upgrade
FLOW, IN CONDUIT OR THRU TREATMENT PLANT			
Quantity Measurement - Annual Average, MGD	0.25	0.25	0.325
ULTIMATE OXYGEN DEMAND			
Quantity Measurement - Daily Maximum from June through September, lbs/day	400	400	60.5
PHOSPHORUS, TOTAL (AS P)			
Concentration Measurement -Monthly Average from November to May, mg/L	0.80	0.80	0.80
Concentration Measurement -Monthly Average from June to October, mg/L	0.80	0.80	0.25
Concentration Measurement –Daily Maximum from June to October, mg/L	NA	MO	0.51
Quantity Measurement - Annual Total, lbs/y	608	608	152
TOTAL SUSPENDED SOLIDS (TSS)			
Concentration Measurement -Monthly Average, mg/L	45	45	30
Concentration Measurement - Weekly Average, mg/L	45	45	45
Concentration Measurement - Daily Maximum, mg/L	50	50	50
Quantity Measurement - Monthly Average, lbs	94	94	81
Quantity Measurement - Weekly Average, lbs	94	94	94
NITRATE			
Concentration Measurement – Daily Maximum, mg/L	MO	55	40
Concentration Measurement – Monthly Average, mg/L	MO	19	20
TOTAL AMMONIA NITROGEN			
Concentration Measurement - Daily Maximum from June through September, mg/L	MO	MO	3.6
Concentration Measurement - Daily Maximum from October through May, mg/L	MO	MO	24.7
Concentration Measurement – Monthly Average from June through September, mg/L	3.5*	MO	1.8
Concentration Measurement – Monthly Average from October through May, mg/L	20.2*	MO	12.3
Quantity Measurement – Daily Maximum from June through September, lb/d	34.6*	MO	9.7
Quantity Measurement – Daily Maximum from October through May, lb/d	175.0*	MO	67.0
Quantity Measurement – Monthly Average from June through September, lb/d	7.3*	MO	4.8
Quantity Measurement – Monthly Average from October through May, lb/d	42.1*	MO	33.4
CHLORINE, TOTAL RESIDUAL			
Concentration Measurement – Instantaneous Maximum, mg/L	0.02	0.02 (daily max)	N/A

* Applicable following the proposed facility upgrade and compliance schedules in the current permit

IX. Summary of Changes to Recommended Effluent and Instream Monitoring:

The following monitoring is suggested for inclusion in the permit renewal to provide additional data to support future Reasonable Potential Determinations:

- Twice per year, in winter (January or February) and late summer/early fall (August, September or October), the Permittee should conduct two-species (*Pimephales promelas* and *Ceriodaphnia dubia*) modified acute/chronic WET tests (48-hour static renewal acute endpoints within a 7-day sub-lethal chronic test) on 24-hour composite effluent samples collected from outfall serial number S/N 001. This sampling should be done concurrently with the required Priority Pollutant Scan plus Aluminum, Hardness, and Dissolved Organic Carbon (DOC) sampling. Total Ammonia should be measured in the highest concentration of test solution at the beginning of the test. If chlorine is used in the WWTF's system, Total Residual Chlorine should be measured in the highest concentration of test solution at the beginning of the test. A dilution reflecting the Instream Waste Concentration at 7Q10 flow should be included in the WET test dilution series. This facility's summer 7Q10 IWC is 0.590 (59%). It is recommended for the qualified contract laboratory hired to conduct the test to run a 50% and 60% dilution to bracket the IWC available in the LaPlatte River for WET Testing.
- Twice per year, in winter (January or February) and late summer/early fall (August, September or October), the Permittee should conduct an effluent analysis of pollutant scans at outfall serial number S/N 001 for the pollutants included in 40 CFR § 122 Appendix J Table 2 and Aluminum and submit the results to the Secretary. Sampling and analysis for Hardness and Dissolved Organic Carbon should be conducted concurrently with the Pollutant Scan. Sampling should coincide with Whole Effluent Toxicity (WET) testing schedules proposed for the draft permit.
- Monitoring for BOD5 is proposed to change from twice monthly to once weekly in the draft permit.
- Monitoring for TSS is proposed to change from twice monthly to once weekly in the draft permit.
- Daily sampling should continue, and the limit of 0.02 mg/L should remain in the permit renewal for TRC and apply if chlorine disinfection treatment is used. The current limit is an instantaneous maximum and is proposed to change to a daily maximum reported value.
- The *E. coli* monitoring frequency is proposed to change to weekly only from May through September; and remain twice monthly from October through May.
- Influent daily maximum mass quantity (lbs/day) and concentration (mg/L) Total Copper monitoring is proposed for the draft permit to be "monitor only" and occur monthly.
- Monthly "monitor only" daily maximum, mass quantity (lbs/day) and concentration (mg/L), Total Copper monitoring in the effluent is proposed for the draft permit.
- Twice monthly Total Nitrogen monitoring is proposed, in lieu of the quarterly monitoring, as a "monitor only" condition for the draft permit.
- Twice Monthly monitoring for daily maximum and monthly average TKN is proposed as a "monitor only" condition for the draft permit. This is a change from the current permitted quarterly monitoring. Monitoring schedules should coincide with proposed Total Nitrogen and associated nitrogenous species monitoring.
- Twice Monthly monitoring for daily maximum and monthly average mass quantity Nitrate and Nitrite is proposed as a "monitor only" condition for the draft permit before the facility upgrade, in addition to the new concentration limits proposed in Table 6, above. This is a change from the current permitted quarterly monitoring for concentration data. Monitoring schedules should coincide with proposed Total Nitrogen and associated nitrogenous species monitoring. Sampling should be sampled as separate species such that the laboratory produces results for Nitrate and results for Nitrite to assess compliance with the VWQS.
- Weekly TAN monitoring is proposed for the draft permit. The seasonal daily maximum and monthly average limitations are proposed to change in the draft permit as summarized in Table 4 above.

- Monthly instream monitoring from June through October is proposed for the draft permit. Instream water quality monitoring for Turbidity, Total Phosphorus, Total Ammonia Nitrogen, Nitrate, Temperature, DOC, Hardness, priority pollutant metals, and pH should be conducted in the LaPlatte River above Hinesburg WWTF outfall S/N 001 at river mile (RM) 12.5. Instream sampling should be conducted following approval of the sampling plan and updated Quality Assurance Project Plan (QAPP). Streamflow characteristics should be documented for each sample collection, and sampling should be targeted to low flow conditions, as determined using the relevant U.S. Geological Survey streamflow gage.

X. Waste Management Zone (WMZ)

Surface waters of the State of Vermont are classified pursuant to 10 V.S.A. §1252, which establishes the designated uses and also describes the Agency's process for establishing a Waste Management Zone (WMZ) during the issuance of the discharge permit. The Vermont Water Quality Standards § 29A-204 establishes Waste Management Zone criteria. Waste Management Zones are calculated based on the [Waste Management Zone Designation Procedure \(December 1, 1995\)](#)

The Hinesburg WWTF WMZ begins at the WWTF outfall and extends 1.4 miles downstream in the LaPlatte River. This was calculated using 7Q10 of 1.6 cfs and 0.25 WWTF design flow. Due to the proposed facility design flow increase from 0.25 to 0.325 MGD, the WMZ in the LaPlatte River is proposed to change. Using the current 7Q10 for this reach is 0.36 cfs, and the proposed WWTF design flow of 0.325 MGD, **the proposed WMZ for the WWTF is 2.3 miles.**

The 0.9-mile extension from the existing permitted WMZ was evaluated using the 2008 Vermont Antidegradation Implementation Existing Use Determination for Use During River Basin Planning procedure. An Existing Use Determination was conducted downstream of the permitted WMZ to identify existing uses are occurring within the proposed WMZ. There was no evidence of swimming use along the extended reach of the proposed waste management zone in the LaPlatte. Incidental contact recreation sometimes occurs within a WMZ. Incidental use is defined as infrequent or occasional use of waters for swimming at isolated areas along a river with no defined access or established swimming area noted. The findings from this determination are in Attachment B of the draft permit fact sheet.

These findings will be presented to the public during a public meeting to continue the evaluation of the newly proposed WMZ for the Hinesburg WWTF. The public meeting should consider the draft permit public comment period and the WMZ extension. The spreadsheet(s) used for these calculations is part of the permit record and can be made available upon request.

XI. Antidegradation

Antidegradation does not apply because the proposed permit would not authorize a new discharge as defined in the 2010 Interim Anti-degradation Implementation Procedure. The increase in design flow would not impact the physical, chemical, or biological condition of the receiving water based on the proposed permit limits relative to the currently permitted limits.

XII. Conclusion

The proposed limits and monitoring within this Reasonable Potential Determination and Water Quality Based Effluent Limit (WQBEL) Calculation for the Amendment and Renewal of NPDES Direct Discharge Permit 3-1172, should be considered for inclusion into the draft permit for the Hinesburg WWTF.

APPENDIX A – Ultimate Oxygen Demand (UOD) Model Inputs/Outputs

Table 1a. Ultimate Oxygen Demand Input variables and values used to calculate UOD using the Excel recreation of the DOSIM model.

Parameter	Value	Unit	Source/Description	Notes
Flow	0.36	cfs	7Q10	
Upstream CBOD	1	mg/L	1986 DOSIM model	
Upstream NBOD	0.5	mg/L	1986 DOSIM model	
Upstream DO	8.47	mg/L	1986 DOSIM model	
Increment	0.2	mi	1986 DOSIM model	
WWTF Flow	0.325	MGD	Design Flow	0.502849 CFS
CBOD initial	10	mg/L	Adjusted to achieve 5 mg/L min DO	
NBOD initial	1.6	mg/L	Adjusted to achieve 5 mg/L min DO	
UOD initial	60.5	lbs/d	Calculated from CBOD & NBOD initial	
DO of effluent	7	mg/L	Minimum observed from Facility Annual Constituent Monitoring	
Temperature	25	C	Maximum observed from Facility Annual Constituent Monitoring	Same as 1986 DOSIM
DO Saturation	8.37	mg/L	Calculated	
Velocity	0.0873 78	fps	Initial velocity determined in WMZ analysis (Equation 4 in Appendix C)	1.42986143 miles/day
Reach time of travel	1.53	days	From DOSIM, original Time of Travel study	3.26797386 miles/day
Reaeration rate	3	1/day	From DOSIM	Not used in model
Temp adjusted K2	3.3	1/day	From DOSIM	
CBOD decay rate	1	1/day	From DOSIM	Not used in model
Temp adj Kc CBOD	1.27	1/day	From DOSIM	
NBOD decay rate	1	1/day	From DOSIM	
Temp adj Kn NBOD	1.4	1/day	From DOSIM	Not used in model

Model Outputs*Table 1b. Ultimate Oxygen Demand Outputs using the Excel recreation of the DOSIM model.*

Distance	Distance	CBOD	NBOD	UOD	DO deficit	DO
mi	mi from WWTF	mg/L	mg/L	mg/L	mg/L	mg/L
10	0	9.37	5.21	14.6	0.76	7.61
9.8	0.2	7.84	4.79	12.6	2.43	5.94
9.6	0.4	6.57	4.39	11.0	3.15	5.22
9.4	0.6	5.50	4.03	9.5	3.33	5.04
9.2	0.8	4.60	3.70	8.3	3.22	5.15
9	1	3.85	3.40	7.3	2.96	5.41
8.8	1.2	3.23	3.12	6.3	2.64	5.73
8.6	1.4	2.70	2.86	5.6	2.31	6.06
8.4	1.6	2.26	2.63	4.9	1.99	6.38
8.2	1.8	1.89	2.41	4.3	1.70	6.67
8	2	1.59	2.21	3.8	1.45	6.92
7.8	2.2	1.33	2.03	3.4	1.22	7.15
7.6	2.4	1.11	1.87	3.0	1.03	7.34
7.4	2.6	0.93	1.71	2.6	0.86	7.51
7.2	2.8	0.78	1.57	2.4	0.72	7.65
7	3	0.65	1.44	2.1	0.60	7.77
6.8	3.2	0.55	1.32	1.9	0.50	7.87
6.6	3.4	0.46	1.22	1.7	0.42	7.95
6.4	3.6	0.38	1.12	1.5	0.35	8.02
6.2	3.8	0.32	1.02	1.3	0.29	8.08
6	4	0.27	0.94	1.2	0.24	8.13
5.8	4.2	0.22	0.86	1.1	0.20	8.17
5.6	4.4	0.19	0.79	1.0	0.17	8.20
5.4	4.6	0.16	0.73	0.9	0.14	8.23
5.2	4.8	0.13	0.67	0.8	0.12	8.25
5	5	0.11	0.61	0.7	0.10	8.27

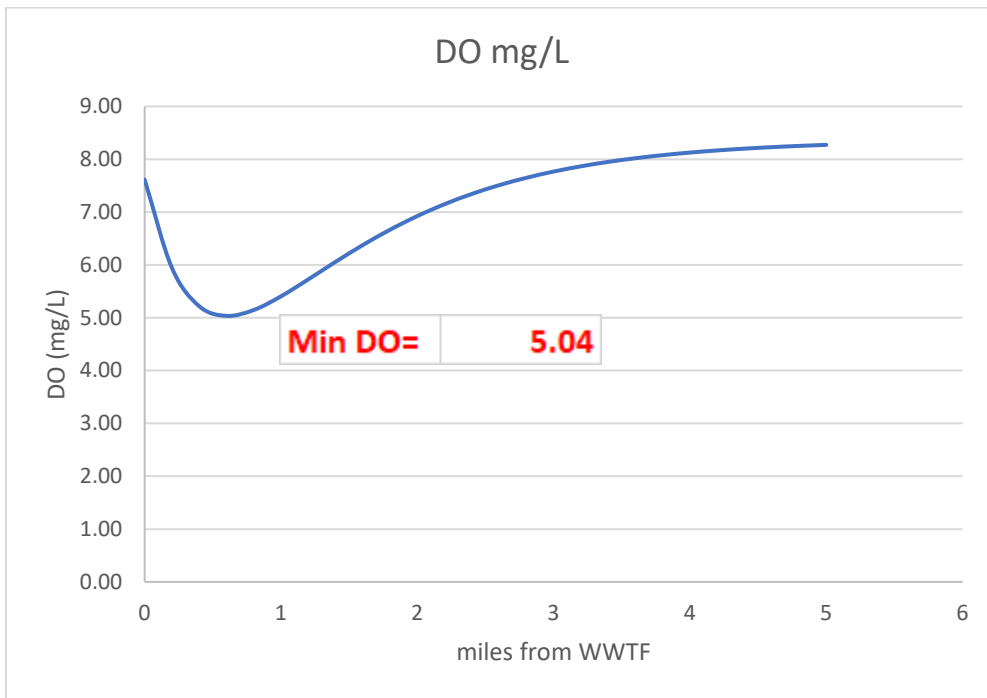


Figure 1. Dissolved Oxygen in mg/L estimated in the receiving water.

DOSIM Model Inputs/Outputs

VERMONT DEPT OF WATER RESOURCES

DOSIM

THIS PROGRAM COMPUTES UOD DECAY AND DISSOLVED
OXYGEN DEFICIT AS A FUNCTION OF INSTREAM
DISTANCE. IT IS FOR STEADY-STATE SIMULATION
OF MULTI-REACH STREAMS.

REACH NAME AND DESCRIPTION OF CONDITIONS:

LAPLATTE RIVER DOWNSTREAM OF HINESBURG WWTF - SCREENING

BOUNDARY CONDITION FLOW (cfs).....	1.5
BOUNDARY CONDITION CBOD (mg/l).....	1
BOUNDARY CONDITION NBOD (mg/l).....	.5
BOUNDARY CONDITION D.O. (mg/l).....	7.4

TOTAL NUMBER OF REACHES IN SYSTEM = 1

INPUT DATA FOR REACH # 1

REACH STARTING MILEPOINT.....	10
REACH ENDING MILEPOINT.....	5
INCREMENT FOR LPRINTING REACH RESULTS (mi).....	.2
FLOW ADDED AT REACH07
CFS OR MGD.....	MGD
CBOD OF ADDED FLOW (mg/l).....	30
NBOD OF ADDED FLOW (mg/l).....	10
UOD ADDED (lbs/d).....	= 52.6
D.O. OF ADDED FLOW (mg/l).....	6
REACH TEMPERATURE (C).....	25
REACH VELOCITY (fps).....	.2
REACH TIME OF TRAVEL (days).....	= 1.53
REACH REAERATION RATE (1/d).....	3
TEMPERATURE ADJUSTED K2 (1/d).....	= 3.3
REACH CBOD DECAY RATE (1/d).....	1
TEMPERATURE ADJUSTED Kc (1/d).....	= 1.3
REACH NBOD DECAY RATE (1/d).....	1
TEMPERATURE ADJUSTED Kn (1/d).....	= 1.4
REACH DISTRIBUTED CBOD INPUTS (mg/l/day)...	0
REACH DISTRIBUTED NBOD INPUTS (mg/l/day)...	0
REACH PHOTOSYNTHESIS RATE (mg/l/day).....	0
REACH RESPIRATION RATE (mg/l/day).....	0
REACH BENTHIC DEMAND (mg/l/day).....	0

LAPLATTE RIVER DOWNSTREAM OF HINESBURG WWTF - SCREENING

CONCENTRATIONS FOR REACH # 1

Distance (mi)	CBOD (mg/l)	NBOD (mg/l)	DO DEFICIT (mg/l)	DO (mg/l)
10.00	4.43	5.21	1.06	7.31
9.80	4.10	4.79	1.56	6.81
9.60	3.79	4.39	1.90	6.46
9.40	3.51	4.03	2.14	6.23
9.20	3.25	3.70	2.28	6.08
9.00	3.00	3.40	2.36	6.01
8.80	2.78	3.12	2.38	5.98
8.60	2.57	2.86	2.37	6.00
8.40	2.38	2.63	2.32	6.05
8.20	2.20	2.41	2.25	6.12
8.00	2.03	2.21	2.17	6.20
7.80	1.88	2.03	2.07	6.30
7.60	1.74	1.86	1.97	6.40
7.40	1.61	1.71	1.87	6.50
7.20	1.49	1.57	1.76	6.61
7.00	1.38	1.44	1.66	6.71
6.80	1.27	1.32	1.55	6.82
6.60	1.18	1.21	1.45	6.92
6.40	1.09	1.11	1.36	7.01
6.20	1.01	1.02	1.26	7.10
6.00	0.93	0.94	1.18	7.19
5.80	0.86	0.86	1.09	7.27
5.60	0.80	0.79	1.02	7.35
5.40	0.74	0.73	0.94	7.42
5.20	0.68	0.67	0.87	7.49
5.00	0.63	0.61	0.81	7.56
5.00	0.63	0.61	0.81	7.56

APPENDIX B – RPD & WQBEL CALCULATION METHODOLOGY

Reasonable Potential Determination Methodology

A steady-state mass balance approach was used to assess reasonable potential for the potential pollutants of concern based on the methods described in the Technical Support Document for Water Quality-based Toxics Control (TSD; EPA/505/2-90-001). The expected receiving water concentrations (RWC; C_r) of pollutants were calculated according to Equation 1 at critical conditions. If the expected receiving water concentration determined exceeds the applicable Vermont Water Quality Standard, limits must be included in the permit.

$$\text{Equation 1. } C_r = \frac{(Q_e)(C_e) + (Q_s)(C_s)}{Q_r}$$

Where:

C_r = resultant expected receiving water pollutant concentration (mg/L or ug/L)

Q_e = maximum permitted effluent flow (cfs).

C_e = critical effluent pollutant concentration (mg/L or ug/L)

Q_s = stream flow upstream of the point of discharge (cfs). Low Median Monthly flow for nutrients, 7Q10 for applying toxics criteria. When applicable, 30Q10 is used for chronic Total Ammonia Nitrogen assessments.

C_s = critical background in-stream pollutant concentration (units dependent on parameter, typically mg/L or ug/L).

$Q_r = (Q_s + Q_e)$ = resultant in-stream flow, after discharge (cfs)

NPDES regulations at §122.44(d)(1)(ii) require that permit writers consider the variability of the pollutant in the effluent when determining the need for Water Quality-Based Effluent Limits (WQBELs). EPA guidance for permit writers on how to characterize effluent concentrations of certain types of pollutants using a limited data set and accounting for variability is detailed in the TSD. The current analysis uses the TSD procedure to project a critical effluent concentration (C_{etsd}) of the 95th percentile of a lognormal distribution of observed effluent concentrations over 5 years. The 95th percentile is calculated from the effluent data set using the number of available effluent data points (n) for the measured concentration of the pollutant and the coefficient of variation (CV) of the data set to predict the critical pollutant concentration in the effluent. When less than 10 data points are available, the CV is set to 0.6. For less than 10 items of data, the uncertainty in the CV is too large to calculate a standard deviation or mean with sufficient confidence (TSD). The CV and n are used to determine the factor (TSD pg 54) that is multiplied by the maximum observed effluent concentration (C_e) to determine C_{etsd} .

$$\text{Equation 2. } C_{etsd} = \text{TSD}_{\text{factor}} \times C_e$$

Where:

C_{etsd} = Effluent concentration adjusted to 95th percentile value (mg/L or ug/L)

$\text{TSD}_{\text{factor}}$ = Factor based upon EPA TSD Table 3-2, pg 54

C_e = critical (maximum observed) effluent pollutant concentration (mg/L or ug/L)

The Instream Waste Concentration (IWC) is a measure of the effluent dilution and is also used as an estimate of the facility's potential to cause or contribute to an excursion of the VWQS. The IWC equation is the simplification of the flow portion of the mass balance equation (Equation 1) and is shown below in Equation 3:

$$\text{Equation 3. } IWC = \frac{(Q_e)}{(Q_r)}$$

The critical effluent pollutant concentration (C_e) can be multiplied by the IWC to approximate the resultant receiving water concentrations (C_r).

Water-Quality Based Effluent Limitation (WQBEL) Calculation Methodology

The Water-Quality Based Effluent Limitations (WQBELs) for pollutants of concern were assessed via the mass balance steady state model method outlined in Chapter 5 of the EPA's Technical Support Document for Water Quality-Based Toxics Control (TSD).

Results were then compared to the current permit limit. The recommended draft permit limit was selected by comparing applicable Technology-Based Effluent Limits (TBELs), current WQBELs, and WQBELs calculated based on 2022 VWQS acute and chronic criteria.

The steady-state mass balance method produces a Waste Load Allocation (WLA), the critical effluent pollutant concentration based on the VWQS acute and chronic critical thresholds for the constituent(s) of concern. The method assumes complete mixing of the pollutant within the receiving water.

Per the TSD method, WLA results were used to calculate the Long-Term Average (LTA) for each criteria type using methods provided in Table 5-1 (TSD page 102). WLA multipliers are picked from the 99th percentile column. The most conservative LTA is then used to determine the Maximum Daily Limit (MDL) or Average Monthly Limit (AML) using the calculation shown in Table 5-2 (TSD page 103). The 99th percentile column is used for the MDL calculation and the 95th percentile columns are used for the AML calculation.

In this process, the facility and receiving water data is used. When necessary, values for VWQS were calculated based upon the methods described in their appendices and footnotes. Monitoring frequencies were taken from the existing permit or assigned for new pollutants based upon similar facilities. In the absence of ambient receiving water data, a value of 5% of the VWQS has been generally assumed for the upstream or instream or otherwise receiving water concentration. Please see the individual calculation spreadsheet tabs for specific analyses.

The resulting MDL and AML are compared with the existing permit limits, any applicable TBELs including TMDLs, and any statutory limits to determine the final effluent limits that are protective of water quality standards.

APPENDIX C – Wastewater Management Zone Calculation Methods

WMZ Procedure:

The process, as outlined in the [Waste Management Zone Designation Procedure \(1995\)](#), has two distinct parts:

- 1) technical evaluation of the WMZ requisite length, and
- 2) public participation process for evaluation of its acceptability relative to the public interest.

While a WWTF discharge is properly disinfected and is permitted to comply with the Vermont Water Quality Standards (VWQS) for E. Coli, moderate numbers of viruses, cyst forming organisms and pathogenic bacteria can survive a disinfection process that meets coliform bacteria VWQS. Meaning the absence of high coliform counts in the immediate vicinity of a sanitary discharge does not necessarily indicate the absence of pathogenic organisms. When high counts (i.e., > 77 colonies of Escherichia coli/100 ml) are found in conjunction with a sanitary discharge, there is a high probability that pathogens are also present. Pathogens that do survive the disinfection process eventually succumb to the relatively harsh aquatic environment and die. The 1995 WMZ Procedure considers partial failure of the disinfection system, the volume of the discharge, 7Q10 flow and time of travel in the receiving water, and the decay rate of E. Coli. The WMZ is calculated using Equations 1-5. Assumptions for variables are listed in specificity to the Hinesburg WWTF discharge to the LaPlatte River.

Equation 1.

$$C_f = C_i e^{-\left(\frac{KX}{u}\right)}$$

Where:

C_f = Final coliform concentration, cfu/100 mL.

C_i = Initial coliform concentration, cfu/100 mL. Calculated using Equation 3.

K = Coliform decay rate, 1/day.

- Assumed to be 1.5/day based on the 1995 WMZ Procedure.

X = Waste management zone distance, miles. Calculated using Equation 2.

u = Stream velocity, miles/day. Calculated using Equation 4.

Equation 2.

$$X = \frac{-u \ln\left(\frac{C_f}{C_i}\right)}{K}$$

Where:

C_f = Final coliform concentration, cfu/100 mL.

C_i = Initial coliform concentration, cfu/100 mL. Calculated using Equation 3.

K = Coliform decay rate, 1/day.

- Assumed to be 1.5/day based on the 1995 WMZ Procedure.

X = Waste management zone distance, miles.

u = Stream velocity, miles/day. Calculated using Equation 4 and converted from feet/second to miles/day.

Equation 3.

$$C_i = \frac{Q_s C_s + Q_w C_w}{Q_s + Q_w}$$

Where:

C_i = Initial coliform concentration, cfu/100 mL.

Q_s = Stream flow, cfs.

C_s = Upstream coliform concentration, cfu/100 mL.

Q_w = Wastewater Treatment Facility design flow, or permitted flow, cfs.

C_w = Effluent coliform concentration, cfu/100 mL.

Equation 4.

$$u = V_2 \left(\frac{Q_s}{Q_2} \right)^m$$

Where:

u = Stream velocity, fps.

V_2 = Measured velocity at second measured stream flow, Q_2 , fps.

Q_s = Incremental stream flow, cfs.

Q_2 = Second measured stream flow, cfs.

m = Calculated Slope from Equation 5.

Equation 5.

$$m = \frac{\ln \left(\frac{V_1}{V_2} \right)}{\ln \left(\frac{Q_1}{Q_2} \right)}$$

Where:

m = Calculated Slope.

V_1 = Measured velocity at initial or first measured stream flow, Q_1 , fps.

- Assumed to be 0.1 fps, the measured value from the 1987 time of travel monitoring completed for the first reach of the LaPlatte River and documented in the 1990 Time of Travel Studies on Selected Rivers in Vermont, Second Edition. The same value was included in the 1983 Vermont Class C-Zone Study.

V_2 = Measured velocity at second measured stream flow, Q_2 , fps.

- Assumed to be equal to the measured values from the 1983 C-Zone Study, 0.12 fps, for the LaPlatte River.

Q_1 = Initial or first measured stream flow, cfs.

- Assumed to be equal to 4.85 cfs, the measured value from the 1987 time of travel monitoring completed for the first reach of the LaPlatte River and documented in the 1990 Time of Travel Studies on Selected Rivers in Vermont, Second Edition. The same value was included in the 1983 Vermont Class C-Zone Study.

Q_2 = Second measured stream flow, cfs.

- Assumed to be equal to the measured value from the 1983 C-Zone Study, 50 cfs, for the LaPlatte River.

Equations 4 & 5 initial velocities and flows were measured on September 26, 1987, as documented in the 1990 Time of Travel Studies on Selected Rivers in Vermont Second Edition. The first reach of the LaPlatte River, from the Hinesburg WWTF to the first wooden bridge, was measured to have a flow of 4.85 cfs at a velocity 0.10 fps.

These flow and velocity values were also used in the 1983 Vermont Class C-Zone Study for computing the C-Zone for the Hinesburg WWTF. The C-Zone is now known as the Waste Management Zone (WMZ). It should be noted the assumptions considered between the 1983 Vermont Class C-Zone Study and the current 1995 WMZ Procedure differ. This is mainly due to the past changes in the contact recreation standard in the VWQS since 1983. For instance, the 1983 study generally assumed the following for most facilities:

V_1 = Stream Velocity of 0.2 fps

K = Decay rate of 1.5 / day

C_w = Effluent concentration of 100,000 # / 100 mL

C_i = Background concentration of 0

Q_s = 7Q₁₀ flow assumed for the receiving water

C_f = Standard of 500 # / 100 mL standard (20x reduction)

Hinesburg was not included in the list of facilities these assumptions applied to. This was due to the river being smaller and slower moving than other rivers in VT and was considered an outlier during the 1983 C-Zone study. Field measurements were collected for initial and second flows and velocities for the LaPlatte River downstream of the Hinesburg WWTF outfall for the current permitted flow of 0.25 MGD, which resulted in the existing 1.4-mile WMZ:

V_1 = First velocity field measurement of 0.1 fps at a flow of 4.85 cfs.

V_2 = Second velocity field measurement of 0.12 fps at a flow of 50 cfs, during a high flow event.

C_w = Effluent concentration of 100,000 cfu / 100 mL

C_i = Background concentration of 0 cfu / 100 mL

K = Decay rate of 1.5 / day

The value for final coliform concentration was not provided for this calculation.

The same model was used for calculating the WMZ length for the Hinesburg WWTF based on a higher flow of 0.4 MGD, resulted in a WMZ of 1.7 miles, and assumed the following:

V_1 = First velocity measurement of 0.1 fps at a flow of 4.85 cfs.

V_2 = Second velocity measurement of 0.12 fps at a flow of 50 cfs

C_w = Effluent concentration of 1540 # / 100 mL

C_i = Background concentration of 0

K = Decay rate of 1.5 / day

C_f = E. coli permit limit of 77 # / 100 mL

ATTACHMENT B – WASTE MANAGEMENT ZONE DESIGNATION ANALYSIS FOR THE AMENDED DESIGN FLOW FROM MAP

Hinesburg Wastewater Treatment Facility

The waste management zone (WMZ) in the proposed permit extends from the current permitted outfall structure, which discharges directly to the LaPlatte River, downstream 2.3 miles, pursuant to the Agency's "Waste Management Zone Designation Procedure" (December 1, 1995) and considers the impacts from the amended design flow of the wastewater treatment facility. The prior WMZ extended downstream 1.4 miles from the outfall, within the LaPlatte River.

The Town of Hinesburg did not provide an existing use determination, pursuant to the "Waste Management Zone Designation Procedure" (December 1, 1995).

The Secretary has conducted the following analysis pursuant to the Agency's Procedure.

I. Waste Management Zone Designation and Criteria, Section 29A-204(b) of the Vermont Water Quality Standards

Section 29A-204(b) establishes the following criteria for waste management zones:

- a. It should be the minimum length necessary to accommodate the authorized discharge;
- b. It should be consistent with the anti-degradation policy (Section 29A-105) of these rules;
- c. It should not result in significantly increased health risks when evaluated using reasonable assumptions about exposure pathways;
- d. It will be located and managed so as to not result in more than a negligible increased risk to public health adjacent to or downstream of the waste management zone; and
- e. It will not constitute a barrier to the passage or movement of fish or prevent the full support of aquatic biota, wildlife, and aquatic habitat uses.

As described above and throughout the fact sheet of the draft discharge permit, the WMZ should begin at the facility discharge point S/N 001, which discharges directly to the LaPlatte River and extends 1.7 river miles downstream. The discharge should satisfy all effluent limitations specified in the draft discharge permit which does authorize an increase in flow or pollutants within the discharge. Therefore, pursuant to Appendix A of the Agency's "Waste Management Zone Designation Procedure" (December 1, 1995), the waste management zone is sufficient.

Sections I and II of this analysis conclude that the waste management zone designation satisfies the Antidegradation Policy within the Vermont Water Quality Standards and Interim Antidegradation Procedure. In addition, as stated in the Antidegradation analysis, because the discharge will comply with the Vermont Water Quality Standards, the WMZ will not constitute a barrier to the passage or movement of fish, and will continue to support aquatic biota, wildlife, and aquatic habitat uses.

Due to the absence of contact recreation occurring downstream of the discharge, it is determined that the WMZ designation will not cause significantly increased health risks or pose more than a negligible increased risk to public health adjacent or downstream of the WMZ.

II. The Public Interest – 10 V.S.A. § 1253(e)

Pursuant to 10 V.S.A. § 1252(d)(6), the Secretary must also "[d]etermine that the creation or expansion of such a waste management zone is in the public interest after giving due consideration to the factors specified in subdivisions 1253(e)(1) through (10)."

Because the 1.4 reach is currently a WMZ, relocating the outfall will address a water quality issue, and the effluent limitations in the permit are protective of water quality and existing uses, the Secretary finds that the proposed 2.3 WMZ is in the public interest.

In closing, after giving due consideration to the applicable conditions of the Vermont Water Quality Standards, the Interim Antidegradation Procedure, and requirements under state statute, the Secretary believes the new discharge location complies with all applicable standards. The Secretary will hold a public hearing pertaining to this proposed discharge, WMZ designation, and draft permit, convenient to the waters affected, to accept verbal and written public comments on the items described above. Those comments will be used to supplement this analysis.



Town of Hinesburg

3-1172 Delinquent Progress Report (due February 28, 2022)

- i. To achieve compliance with the TP effluent limitations in Condition I.A.1 – remove waste phosphorous out of lagoon 4 to sludge pit & then remove sludge offsite. The remaining water was recycled back to lagoon 2.
- ii. The TP during the winter 2022 was .064 mg/l and testing occurred twice monthly. During the colder months, the Alum is increased. The Hinesburg Wastewater Department has Jake Holland perform jar testing to help maintain TP levels.
- iii. We are working with Aldrich & Elliott on the new wastewater facility. Elliott reported they are close to the original schedule even with working through Covid and the geotechnical issues. The project schedule from Elliott is outline here - Permit applications are being submitted and the plan is to advertise for bids later this year for a spring 2023 start of construction. Project delays with Covid and because of the supply chain issues, materials will not be available before spring 2023. Starting the sitework and concrete work in the winter would be very slow and costly, so a spring start is more realistic. Therefore, the town will continue with the same protocols as stated above to meet the discharge permit.