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
(Revised JUNE 2021)

Permit Number: **3-1285**
PIN: **RU95-0265**
NPDES Number: **VT0100871**

Facility Name:	**Rutland WWTF**	
Facility Address:	**10 Greens Hill Lane** **Rutland VT 05701**	
Coordinates:	Lat: **43.6038**	Long: **-72.9938**
Classification:	**Grade V Domestic Major**	
Receiving Water	**Otter Creek**	

I. Facility and Proposed Action

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

On 12/18/2007, 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 11/7/2002.

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 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. These standards have three parts: (1) one or more "designated uses" for each water body or water body segment in the state; (2) water quality "criteria," consisting of numerical concentration levels and/or narrative statements specifying the amounts of various pollutants that may be present in each water body without impairing the designated uses of that water body; and (3) an antidegradation provision, focused on protecting high quality waters and protecting and maintaining water quality necessary to protect existing uses. CWA § 303(c)(2)(A); 40 C.F.R. § 131.12.

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

The City of Rutland owns and operates the Rutland wastewater treatment facility. The facility receives and treats wastewater from the City of Rutland, areas within the Town of Rutland, Mendon, Killington and Clarendon. Treatment is activated sludge extended aeration. Treated wastewater is disinfected with chlorine and then dechlorinated prior to discharging.

The City has four Combined Sewer Overflow (CSO) discharge points within the collection system. Work has been completed over the past several years to reduce the area of combined sewer system thereby reducing the volume of untreated CSO water discharged.

The City was issued a 1272 Order on May 5, 2018 requiring the City to prepare a Long Term Control Plan (LTCP) to reduce the number and volume of CSO discharges and to bring any discharges into compliance with the Vermont Water Quality Standards.

B. Pretreaters

The following pretreaters are permitted under the NPDES program to discharge to the facility.

Pretreater	Discharge Activity
Deermont Corp - VT Plating	Metal Plating/Finishing
General Electric - Columbian Ave	Combined Waste
General Electric - Windcrest Road	Combined Waste
Irving Oil Marketing - Rutland	Treated Groundwater
STO Corporation	Rinsewater from Process

C. Receiving Water Classification - Otter Creek

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. Receiving Water Description

The Otter Creek downstream of the Rutland WWTF discharge is a Class B (2) water and is designated as Cold Water Fish Habitat. At the point of discharge, the river has a contributing drainage area of 307 square miles. The existing permitted waste management zone (WMZ) begins at the outfall of the WWTF and extends downstream 2.10 mile pursuant to 10 V.S.A., Section 1252.

E. 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.

This facility currently has a 2.10 mile WMZ.

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 has a 0.00 foot mixing zone.

V. Monitoring

A. Flow Monitoring at Discharge Point 001

1. Flow

The draft permit maintains the annual average flow limitation. This facility maintains a constant discharge and continuous flow monitoring is required. The limit and monitoring requirements are unchanged from the previous permit.

B. Conventional Pollutants Monitoring at Discharge Point 001

1. BOD, 5-Day

The effluent limitations for BOD5 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 BOD5 seasonal monitoring requirement have been changed from the current permit to be in line with other seasonal limits in the State. The previous permit defined "Winter" as October 1 – June 14 and "Summer" as June 15 – September 30. The new permit defines "Winter" as October 31 to May 30 and "Summer" as June 1 to October 31.

The Permittee shall monitor, a minimum of an 8 hour composite, for BOD5 within the influent once a month. Composite samples for BOD5 shall include the hours of 6:00 a.m. to 6:00 p.m.

2. BOD, 5-Day (% REMOVAL)

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.

3. Chlorine, Total Residual

The Total Residual Chlorine (TRC) limitation is 0.04 mg/L, monthly average and 0.1 mg/l daily maximum. This limitation is changed from the current permit. Based on the Agency's Chlorine Policy, limits of 0.04 mg/L (monthly average) and 0.1 mg/L (daily maximum) 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. Monitoring via grab sample is required daily, which is unchanged from the current permit.

4. E. Coli

The instantaneous maximum E. coli limitation remains unchanged, and is based upon the limitation in the current permit and the anti-backsliding provisions of Section 402(o) of the CWA. The monitoring frequency remains unchanged at weekly.

5. pH

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

6. Settleable Solids

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).

7. Suspended Solids, Total (% Removal)

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.

8. Suspended Solids, Total

The effluent limitations for TSS 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 TSS 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 maximum day limitation supplements the federal technology-based limitations to prevent a gross one-day permit effluent violation from being offset by multiple weekly and monthly sampling events to achieve the weekly and monthly averages. The mass limits are calculated using the concentration limits outlined above. The TSS monitoring requirements have been adjusted to match other seasonal limits in the State. The previous permit defined “Winter” as October 1 – June 14 and “Summer” as June 15 – September 30. The new permit defines “Winter” as October 31 to May 30 and “Summer” as June 1 to October 31.

The Permittee shall monitor, a minimum of an 8 hour composite, for TSS within the influent once a month. Composite samples for TSS shall be include the hours of 6:00 a.m. to 6:00 p.m.

9. Ultimate Oxygen Demand

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 weekly from the period of June 1 through October 31st. The sampling frequency is unchanged from the current permit, but the monitoring period has been adjusted to collect information for October and early June. 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 October 31 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.

C. Nutrients Monitoring at Discharge Point 001

1. Nitrite Plus Nitrate Total 1 Det.

Nitrite Plus Nitrate as Nitrogen (NOx) – Nitrite (NO_2^-) and Nitrate (NO_3^-) are oxidized forms of Nitrogen. NOx is needed to calculate Total Nitrogen (TN). To gather data on the amount of Total Nitrogen in this discharge, Nitrite (NO_2^-) plus Nitrate (NO_3^-) monitoring is proposed in the renewed permit. The proposed monitoring is once per week for the summer and once per month during the winter. The new permit defines "Winter" as October 31 to May 30 and "Summer" as June 1 to October 31.

The sum of Nitrite (NO_2^-) and Nitrate (NO_3^-) is represented as NOx to simplify the notation in wastewater chemistry. The x represents the number of Oxygen atoms (2 or 3) and the negative charge notation (-) is dropped. This notation is also used in atmospheric chemistry where other oxidation states are possible.

$$NO_2^- + NO_3^- = NOx$$

Test results are reported in terms of Nitrogen (N) because water quality standards are generally expressed in terms of Nitrogen for simplicity and consistency. This constituent (NOx) is sometimes also shown as (NO_2/NO_3), Nox, NOX, Nitrate/Nitrite Nitrogen, and Nitrite Plus Nitrate Total 1 Det. (As N). To gather data on the amount of NOx in this discharge and its potential impact on the receiving water, "monitor only" sampling requirement are included in the draft permit.

2. Nitrogen, Ammonia Total

Total Ammonia Nitrogen (TAN) (NH_3-N) is the sum of the free ammonia-nitrogen plus the amount of nitrogen from ammonia that has combined with chlorine. To gather data on the amount of TAN in this

discharge and its potential impact on the receiving water, a quarterly “monitor only” sampling requirement is included in the draft permit.

3. Nitrogen, Kjeldahl Total

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. Sampling is required weekly during the summer and monthly during the winter. The new permit defines “Winter” as October 31 to May 30 and “Summer” as June 1 to October 31.

4. Nitrogen, Total

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 NOx and TKN, and, shall be reported as pounds, calculated as:

Average TN (mg/L) x Total Daily Flow x 8.34where, TN (mg/L) = TKN (mg/L) + NOx (mg/L)

Per EPA excess nitrogen (N) and phosphorus (P) are the leading cause of water quality degradation in the United States. Historically, nutrient management focused on limiting a single nutrient—phosphorus or nitrogen—based on assumptions that production is usually phosphorus limited in freshwater and nitrogen limited in marine waters. Scientific research demonstrates this is an overly simplistic model. The evidence clearly indicates management of both phosphorus and nitrogen is necessary to protect water quality. The literature shows that aquatic flora and fauna have differing nutrient needs: some are P dependent, others N dependent and others are co-dependent on these two nutrients. Like P, N promotes noxious aquatic plant and algal growth. High concentrations of P and N together cause greater growth of algae than P alone. The relative abundance of these nutrients also influences the type of species within the community.

Furthermore, a high N-to-P ratio may exacerbate the growth of cyanobacteria, while elevated levels of nitrogen increase toxicity in some cyanobacteria species. Given the dynamic nature of all aquatic ecosystems, for the State to fully understand the degradation to water quality it is necessary to limit P and monitor bioavailable N (including nitrate, ammonium, and certain dissolved organic nitrogen compounds). Facilities with design flow greater than 1 MGD will complete monthly monitoring unless more frequent sampling is already required by the current permit. Facilities with design flows less than 1 MGD will complete quarterly monitoring unless more frequent sampling is already required by the current permit.

Total Nitrogen monitoring is proposed at a weekly frequency during the summer since the TKN is currently required to be sampled at that frequency. Monthly winter sampling has been added for this facility. The new permit defines “Winter” as October 31 to May 30 and “Summer” as June 1 to October 31.

5. Phosphorus, Total

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 will be issued by the Secretary 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 the 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:

WWTF Annual TP Load / LC TMDL WLA x 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 12420 pounds of TP per year. This annual mass limitation was based on an allocation of 5.634 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 12420 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 5.634 metric tons per year or 12420 pounds per year to the Rutland WWTF.

This new, annual WLA represents a 0% reduction (-0 pounds) from the current permit and is equivalent to setting the effluent TP limit at 0.5 mg/L at the design capacity of the WWTF (8.1 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:

(5.634 mt/yr) (2204.62 lbs/mt) = 12420 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.H.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 0.5 mg/L, the permit does not include

0.5 mg/L as the concentration effluent limitation because a Permittee may not need to achieve 0.5 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.

Weekly sampling for total phosphorus is required between June 1 and October 31. Sampling for total phosphorus is required twice a month between November 1 and May 31.

Condition I.H.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 (https://ofmpub.epa.gov/waters10/attains_impaired_waters.show_tmdl_document?p_tmdl_doc_blobs_id=79000) 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 is less than five years old, an analysis of the assumptions underlying the TMDL is not required. In re Montpelier WWTF Discharge Permit, 2009 WL 4396740, 6, 9-10 (Vt. Envtl. Ct. June 30, 2009) (stating that it "probably would have been meaningless to engage in further analysis" of the 2002 Lake Champlain TMDL a mere year and a half after its adoption, while also holding that when issuing a permit more than five years after the adoption of a TMDL, ANR must assess whether the past assumptions upon which the WLA was based upon "continue to have a basis of reliability"). Notwithstanding the fact that an analysis is not required, the Agency provides the following.

Using the WLA from the LC TMDL as the phosphorus WQBEL in the permit is appropriate because the State is making significant progress toward meeting the assumptions upon which the WLA is based. For 2016, 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: http://dec.vermont.gov/sites/dec/files/wsm/erp/docs/2018VermontLakeChamplainPhosphorusTMDLAccountability FrameworkReport.pdf.) With the issuance of the "Developed Lands General Permit" (Stormwater

General Permit 3-9050) in late 2020, Vermont has successfully completed all Phase 1 Accountability Framework milestones, as acknowledged in the EPA 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 Elimination and Reduction Plan:

To ensure the facility is operating as efficiently as possible for purposes of phosphorus removal, Condition I.H.3. of the permit requires that within 120 days of the permit effective date, 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 12 months from the permit effective date to optimize removal of total 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 Phosphorus Load Calculation (Condition I.H.2.d. of the permit) the Permittee shall, within 90 days of reaching or exceeding 80% of the LC TMDL WLA 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 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 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.

F. Non-Conventional Pollutants Monitoring at Discharge Point 001

1. Septage Received

The quantities of septage received at this facility are monitored to gather information about loading as well as the availability of septage receiving facilities for the State's unsewered residents. The monthly total reporting requirement is new and the daily maximum requirement remains unchanged.

3. Discharge Special Conditions

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. CSO Annual Report

The Town of Rutland owns and operates a combined sewer system which collects both stormwater and sewage and conveys it to the WWTF for treatment. There are currently 4 combined sewer overflows remaining that do not discharge during dry weather conditions. Most recently, the Secretary issued a 1272 Order the Town of Rutland on May 18,2018 requiring the development of a Long Term Control Plan, compliance with the Nine Minimum Controls and annual reporting requirements.

The Combined Sewer Overflow Rule (CSO Rule) (Environmental Protection Rule, Chapter 34), which became effective in September 2016, supersedes the CSO Policy. The CSO Rule codifies, updates, and clarifies the technology-based and water quality-based requirements applicable to CSOs. The technology-based controls for CSOs are referred to as the “Minimum Controls” and are included in the draft permit. To ensure the remaining CSOs are brought into compliance with the Vermont Water Quality Standards, the Secretary, concurrent with issuance of this final permit, shall issue a 1272 Order to the Permittee, requiring the creation of a Long-Term Control Plan that complies with the requirements of the CSO Rule.

The following CSO monitoring requirements are included in the draft permit:

• Implementation of a precipitation monitoring system;
• Continued monitoring and reporting of overflow events utilizing tell-tales, at a minimum;
• Notification of wet-weather overflows though public alert within one hour of discovery, and submit to the Secretary specified information regarding the discharge within 12 hours of discovery; and
• A report on CSO control project(s) of the previous calendar year, due by January 31of each year.

C. Emergency Power Failure Plan

To ensure the facility can continue operations during the event of a power failure, within 90 days of the effective date of the permit, the Permittee must submit to the Secretary updated documentation addressing how the discharge will be handled in the event of an electric power outage.

D. Operations 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.

E. Phosphorus Optimization Plan

The Permittee shall prepare and implement a plan to optimize phosphorus removal at the facility.

F. 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 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.

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 Acute/Chronic

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. Per these federal requirements, the Permittee shall conduct WET testing and toxic pollutant analyses according to the schedule outlined in the draft permit. If the results of these tests indicate a reasonable potential to cause an instream toxic impact, the Secretary may require additional WET testing, establish a WET limit, or require a Toxicity Reduction Evaluation.

VIII. 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.

V. Final Determinations

The public comment period for receiving comments on this draft permit **was originally scheduled from May 25, 2021 to June 25, 2021. A request to extend the public comment period was received on June 18, 2021. The Secretary has agreed to extend the public comment period, which has been revised to May 25, 2021 to July 21, 2021 during which time interested persons may submit their written views on the draft permit. All written comments received by 4:30 PM on July 21, 2021 will be retained by the Secretary and considered in the formulation of the final determination to issue, deny or modify the draft permit. 25, 2021.**

Written comments should be sent to:

Agency of Natural Resources
Department of Environmental Conservation
Watershed Management Division
One National Life Drive, Davis Building, 3rd Floor
Montpelier, VT 05620-3522

Comments may be submitted by e-mail to ANR.WSMDWastewaterComments@vermont.gov

For additional information, contact Amy Polacyzk at 802-490-6185.

Vermont Agency of Natural Resources
Department of Environmental Conservation
Watershed Management Division
1 National Life Drive, Davis 3
802-828-1535

MEMORANDUM

Prepared by: John Merrifield, Wastewater Program (WWP)
Cc: Pete LaFlamme, Director, WSMD
Rick Levey, Monitoring and Assessment Program (MAP)
Amy Polaczyk, Manager, WWP
Bethany Sargent, Manager, MAP

Date: **April 27, 2021**

Subject: Reasonable Potential Determination for the Rutland Wastewater Treatment Facility

I. Facility Information:

Rutland Wastewater Treatment Facility (WWTF)
Rutland, VT
Permit No. 3-1285
NPDES No. VT0100871
Facility Location: 43.60388, -72.9938 (NAD 83)
Approximate Outfall Location: 43.6031, -72.9948 (NAD 83)

II. Hydrology:

Receiving water: Otter Creek
Facility Design Flow: 8.100 MGD = 12.533 CFS
Estimated 7Q10[1] = 68.6 CFS
Estimated LMM[2] = 167.0 CFS
Instream Waste Concentration at 7Q10 Flow (IWC-7Q10) = 0.155 (>10%)
Instream Waste Concentration at Low Median Monthly Flow (IWC-LMM) = 0.070 (>1%)

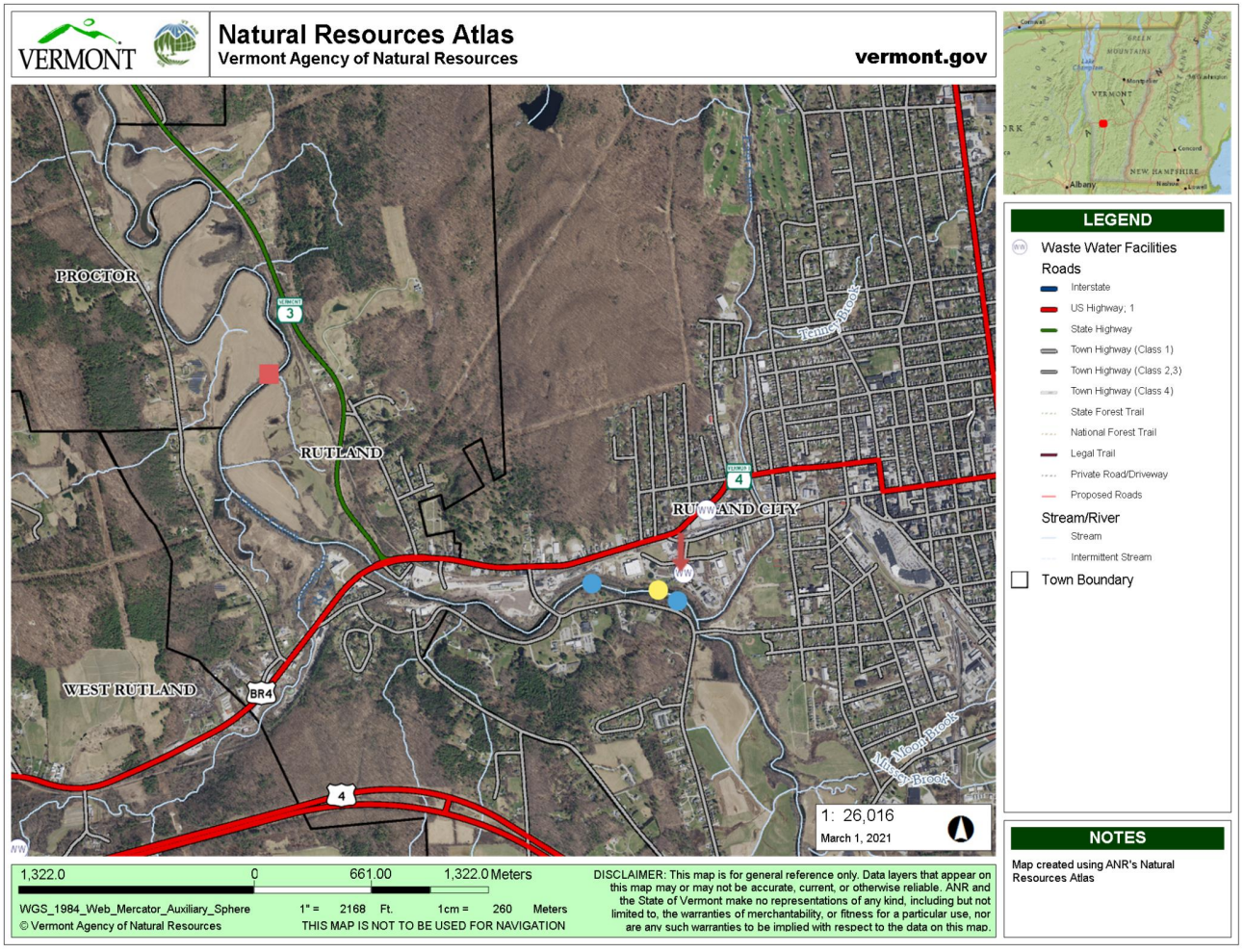
The Town of Rutland owns and operates the Rutland Wastewater Treatment Facility (WWTF) which is an is activated sludge extended aeration system. Treated wastewater is disinfected with chlorine and then dechlorinated prior to discharge..

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

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

The Otter Creek downstream of the Rutland WWTF discharge is a Class B (2) water and is designated as Cold Water Fish Habitat. At the point of discharge, the river has a contributing drainage area of 307 square miles. The existing permitted waste management zone (WMZ) begins at the outfall of the WWTF and extends downstream 2.10 mile (Figure 1) pursuant to 10 V.S.A., Section 1252.

Figure 1. Otter Creek near the Rutland WWTF. The facility location is represented by a white dot containing "WW "and a blue arrow, the outfall location is indicated by a yellow dot, upstream sampling location at RM 71.8 and downstream monitoring locations at RM 71.5 shown by blue dots, and the end of the 2.1 long WMZ is represented by the red square. . Figure produced with the Vermont Integrated Watershed Assessment System on the VT Agency of Natural Resources Atlas (https://anrweb.vt.gov/DEC/IWIS/).



This memo is organized into the following sections:

- Summary of Effluent Data for the Rutland WWTF
- Summary of Instream Ambient Chemistry Data for the Otter Creek
- Biological Assessments upstream and downstream of the Rutland WWTF
- Assessment of Reasonable Potential of the Rutland WWTF discharge to exceed Vermont Water Quality Standards (VWQSs)

III. Effluent Data for the Rutland WWTF

Table 1a. Effluent Data for the Rutland WWTF from 3/31/2016 to 1/31/2021.

Parameter Name	Limit	Units	Min	Average	Max	Count
BOD, 5-DAY (20 DEG. C) - Weekly Average	45	mg/l	2	5.7	15	58
BOD, 5-DAY (20 DEG. C) - Daily Maximum	50	mg/l	2	5.8	15	58
BOD, 5-DAY (20 DEG. C) - Monthly Average	30	mg/l	2	4.9	11	58
BOD, 5-DAY (20 DEG. C) - Monthly Average	1701	lbs/day	61.3	217.9	766	58
BOD, 5-DAY (20 DEG. C) - Weekly Average	2552	lbs/day	61.3	286.6	1281	58
BOD, 5-DAY (20 DEG. C) - Influent Monthly Average	MO	mg/l	65	170.1	303	58
BOD, 5-DAY Percent Removal Monthly Minimum	85	%	90	96.8	99	58
SOLIDS, SUSPENDED Percent Removal Monthly Minimum	85	%	91	97.1	99.5	58
TOTAL SUSPENDED SOLIDS (TSS) - Weekly Average	45	mg/l	3	7.2	24	58
TOTAL SUSPENDED SOLIDS (TSS) - Daily Maximum	50	mg/l	3	7.6	24	58
TOTAL SUSPENDED SOLIDS (TSS) - Monthly Average	30	mg/l	2	5.8	16	58
TOTAL SUSPENDED SOLIDS (TSS) - Monthly Average	1701	lbs/day	55.3	264.6	1283.7	58
TOTAL SUSPENDED SOLIDS (TSS) - Weekly Average	2552	lbs/day	60.7	365.2	1471.2	58
TOTAL SUSPENDED SOLIDS (TSS) - Influent Monthly Average	MO	mg/l	100	233.8	469	58

Table 1b. Effluent Data for the Rutland WWTF from 3/31/2016 to 1/31/2021.

Parameter Name	Limit	Units	Min	Average	Max	Count
pH - Maximum	8.5	SU	7.2	7.7	8.1	58
pH - Minimum	6.5	SU	6	6.9	7.4	58
SETTLEABLE SOLIDS - Instant Maximum	1	ml/l	0	0.0	0.5	58
NITROGEN, KJELDAHL TOTAL (AS N) - Daily Maximum	MO	lbs/day	1.4	64.6	231.7	20
ULTIMATE OXYGEN DEMAND (UOD) - Daily Maximum	2250	lbs/day	195.6	558.3	1598	20
PHOSPHORUS, TOTAL (AS P) - Monthly Average	0.8	mg/l	0.11	0.2	0.68	58
PHOSPHORUS, TOTAL (AS P) - Monthly Average	45.4	lbs/day	4	9.8	31.1	58
E. COLI, THERMOTOL, MF, M-TEC - Monthly Maximum	77	cfu/100ml	2	11.5	68	58
FLOW, IN CONDUIT OR THRU TREATMENT PLANT - Annual Average	8.1	MGD	2.72	4.7	8.86	57
CHLORINE, TOTAL RESIDUAL - Daily Maximum	0.1	mg/l	0.01	0.04	0.08	58
SEPTAGE DISCHARGED TO TREATMENT FAC - Influent Daily Maximum	MO	lbs/day	6000	35726.3	58000	58

Whole Effluent Toxicity Data Summary:

A. Whole Effluent Toxicity (WET) Data Summary:

Whole Effluent Toxicity (WET) data for this facility is presented below in Table 1c. No WET limits were included in the previous permit.

Table 1c. Whole Effluent Toxicity Test Results for the Rutland WWTF.

	Pimephales promelas		*Ceriodaphnia dubia*	
Test Start Date	Acute		Acute	
	NOEC %	LC50 %	NOEC %	LC50 %
12/5/2007	100	>100	100	>100
8/17/2005	100	>100	100	>100

Analysis of the acute WET test data indicates that this facility's effluent did not contain toxic substances that cause acute toxicity in the receiving water at the time the samples were collected. It should be noted that while this data is the most recent available that it is from more than 10 years ago and may not reflect current the current effluent.

This facility has a 7Q10 IWC of 0.155 (>10%). This value exceeds the IWCs described in the RPD Decision Trees for facilities to have potential RP for Total Ammonia Nitrogen (TAN) toxicity and Priority Pollutant Metals toxicity.

40 CFR 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.

To provide additional data for future assessments of WET reasonable potential, it is recommended that four 2-species (*Ceriodaphnia dubia* and *Pimephales promelas)* 48 hour acute/ 96 hour chronic tests be included in the draft permit, two during the summer (August/October 2022 & 2024) and two during the winter (January/February 2023 & 2025). It is also suggested that concurrent sampling for TAN, TRC and priority pollutants be conducted with each of these tests.

B. Biological Assessments and Ambient Chemistry Data for the Otter Creek upstream and downstream of the Rutland WWTF

The Otter Creek in the vicinity of the Rutland City WWTF is on the 2020 303(d) List of Impaired Waters. The problem of multiple CSOs and the pollutants E. coli, organic enrichment and sewage indicators have caused the receiving water not to meet Vermont Water Quality Standards.

Biological Assessments:
Biological assessments were conducted upstream of the facility at RM 71.8 by VTDEC on 10/4/1988 and downstream of the facility at RM 71.5 on 9/21/2020. No additional macroinvertebrate data has been collected at RM 71.8 upstream of the facility since then. Downstream data is sufficient and appropriate to illustrate that benthic assessments have met VWQS. It should be noted that data only represents the point in time when it was collected and data presented prior to 9/21/2020 is presented for historic context only. The most recent biological assessment meets VWQS for aquatic biota and aquatic habitat uses for the Class B Medium, High-Gradient stream type. Macroinvertebrate monitoring data is summarized below in Table *2*.

Table 2. Results of the Biological Monitoring for Macroinvertebrates on the Otter Creek, (RM 71.5 & RM 71.8) near the Rutland WWTF outfall.

Macroinvertebrate Site Summary - Otter Creek											
Date	Location	RM	Density	Richness	EPT Richness	PMA-O	B.I.	Oligo.	EPT/EPT + Chiro	PPCS-F	Community Assessment
10/10/1985	Below	71.5	1125	23.0	7.5	23.6	7.26	20.69	0.30	0.31	Does not meet VWQS
10/4/1988	Below	71.5	3236	39.0	15.0	55.4	5.50	0.11	0.48	0.44	Does not meet VWQS
	Above	71.8	1658	41.0	17.5	62.0	4.36	0.97	0.58	0.43	Meets VWQS
9/5/1991	Below	71.5	2472	45.0	17.0	56.2	5.54	0.00	0.58	0.43	Indeterminate
9/25/1996	Below	71.5	2472	58.0	26.0	73.2	4.96	0.49	0.65	0.61	Meets VWQS
9/28/2006	Below	71.5	5028	66.0	32.0	70.5	4.81	2.31	0.83	0.67	Meets VWQS
9/27/2016	Below	71.5	4024	49.0	25.0	57.7	5.17	0.10	0.85	0.48	Meets VWQS
9/21/2020	Below	71.5	6156	53.0	28.0	59.2	5.16	0.07	0.86	0.52	Meets VWQS
Indeterminate			≥ 250	≥ 28	≥ 15	≥ 40	≤ 5.65	≤ 14.5	≥ 0.43	≥ 0.35	
Non-Support			< 250	< 28	< 15	< 40	> 5.65	> 14.5	< 0.43	< 0.35	

C. Ambient Chemistry Data:

The most recent ambient chemistry data available from VTDEC sampling is from 9/21/2020, when surface waters were sampled upstream of the outfall at River Mile (RM) 71.8 and downstream of the outfall at RM 71.5. The upstream sampling location is 0.1 miles upstream and the downstream sampling location is 0.2 miles downstream from the WWTF outfall (Figure 1).

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

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

Water chemistry measures of relevant parameters for this assessment are summarized in Tables 3a and 3b.

Table 3a. Surface-water quality data upstream and downstream of the Rutland Wastewater Treatment Facility collected by VTDEC.

Visit Date	Location ID	RM	Location Name	Flow Level	Alkalinity (mg/l)	Conductivity (umho/cm)	Dissolved Inorganic Carbon (mg/l)	Dissolved Organic Carbon (mg/l)	Dissolved Oxygen (mg/l)	Dissolved Oxygen Saturation (%)	pH (None)	Temperature (deg C)	Total Ammonia Nitrogen (mg/l)	Total Chloride (mg/l)	Total Color measured using the visual method (PCU)	Total Hardness (mg/l)	Total Nitrate/Nitrite Nitrogen (mg/l)	Total Nitrogen (mg/l)	Total Phosphorus (ug/l)	Total Sulfate (mg/l)	Turbidity (NTU)
8/8/2016	500923	71.8	Otter Creek	Low		259			8.1	94.1	7.7	22.06	0.052	21.3				0.35	16.2		0.5
9/28/2016	500923	71.8	Otter Creek	Low	106	201					8	14.1	<0.05	15.1		110.455	0.05	0.24	15.1	6.48	2.77
7/8/2020	500923	71.8	Otter Creek	Low	97	270.5	23.2	3.9	7.62	95.2	7.86	23.9	0.063	23.9	17.5	109	0.104	0.36	13.7	4.11	
8/8/2016	502230	71.5	Otter Creek	Low		251			8.28	97	7.88	22.5	0.054	19.8		91.197		0.98	31.3		0.7
9/27/2016	502230	71.5	Otter Creek	Low	106	245					8.15	15.1	<0.05	25.83		117.469	1.37	1.61	29.6	7.95	2.45
7/8/2020	502230	71.5	Otter Creek	Moderate	98.8	291.5	23.8	4.2	7.69	96.1	7.79	24	0.06	27.7	17.5	107	0.622	1.72	21.2	5	
9/21/2020	502230	71.5	Otter Creek	Low		342.9			9.83	97.9	8.26	11.73			22		1.56	1.77	26		1.5

Table 3b. Surface-water metals data upstream and downstream of the Rutland Wastewater Treatment Facility collected by VTDEC.

Visit Date	Location ID	RM	Location Name	Flow Level	Total Aluminum (ug/l)	Total Antimony (ug/l)	Total Arsenic (ug/l)	Total Barium (ug/l)	Total Beryllium (ug/l)	Total Cadmium (ug/l)	Total Calcium (mg/l)	Total Chromium (ug/l)	Total Cobalt (ug/l)	Total Copper (ug/l)	Total Iron (ug/l)	Total Lead (ug/l)	Total Magnesium (mg/l)	Total Manganese (ug/l)	Total Molybdenum (ug/l)	Total Nickel (ug/l)	Total Potassium (mg/l)	Total Selenium (ug/l)	Total Silver (ug/l)	Total Sodium (mg/l)	Total Strontium (ug/l)	Total Thallium (ug/l)	Total Uranium (ug/L)	Total Vanadium (ug/l)	Total Zinc (ug/l)
8/8/2016	500923	71.8	Otter Creek	Low																									
9/28/2016	500923	71.8	Otter Creek	Low	61.74		<1			<1	27.1	<5		<10	568.5	<1	10.39	134.7		<5	1.195	<5		9.629					<50
7/8/2020	500923	71.8	Otter Creek	Low	36	<5	<1	18.9	<1	<1	27.3	<1	<1	<5	283	<1	9.99	110	<5	<1	1.21	<1	<1	15	53.7	<1	<1	<1	<10
8/8/2016	502230	71.5	Otter Creek	Low	58.17	<10	<1	16.14	<1	<1	23.55	<5	<1	<10	223	<1	7.866	59.03	<5	<5	1.641	<5	<1	12.49	43.88	<1	<1	<25	<50
9/27/2016	502230	71.5	Otter Creek	Low	40.56		<1			<1	28.87	<5		<10	468.7	<1	11.02	96.14		<5	1.702	<5		19.15					<50
7/8/2020	502230	71.5	Otter Creek	Moderate	43	<5	<1	18.6	<1	<1	26.7	<1	<1	<5	259	<1	9.76	108	<5	<1	1.38	<1	<1	16.6	53.2	<1	<1	<1	<10

IV. Assessment of Reasonable Potential of the Rutland WWTF discharge to exceed Vermont Water Quality Standards

A. ***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. Tables 4, 5 and 6 present this analysis for the Rutland WWTF.

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

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}.

$$\text{Equation 2.} \quad C_{etsd} = TSD_{factor} \times C_e$$

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

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

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

This analysis of reasonable potential used the following data and assumptions:

- Average values of observed upstream and downstream chemical data were used for most calculations; exceptions are described below.
- Upstream pollutant concentrations (C_s) and effluent concentrations (C_e) were set equal to one half the method detection limit when data were censored at the detection limit.
- Effluent pollutant concentrations (C_{etsd}) were set to the maximum observed effluent concentrations * TSD 95th percentile multiplier over the last 5 years of data collected.
- TAN analyses were divided into summer (June 1- October 31) and winter (November 1 – May 31). Summer TAN analyses used defaults of 20ºC for coldwater fish habitat streams and 25 ºC for warmwater fish habitat streams. Winter water temperature was assumed to be 5 ºC. The highest observed downstream pH values were used for both winter and summer.
- Hardness for determining hardness-dependent metal criteria is based upon the lowest observed downstream concentration.

The spreadsheet used for these calculations is part of the permit record and available upon request.

D. Total Residual Chlorine:

The results of mass balance calculations for Total Residual Chlorine(TRC) and Total Ammonia Nitrogen (TAN) were calculated using Equation 1 and are presented in Table 4.

Table 4. Mass Balance for Total Residual Chlorine and Ammonia around the Rutland WWTF

	Chlorine	Total Ammonia Nitrogen - Summer (mg/L)	Notes
Qs (cfs)	68.57		*Estimated 7Q10 flow*
Qe (cfs)	12.533		*permitted effluent discharge*
Qr = Qs + Qe (cfs)	81.10		*Qs+Qe*
7Q10 IWC	0.155		*Qe/(Qs+Qe)*
Cs	0	0.05	*upstream pollutant concentration*
Max Observed Ce	0.080	2.700	*effluent pollutant concentration without adjustment by TSD factor*
Cetsd	0.10	10.26	*effluent pollutant concentration adjusted by TSD factor*
Number of Observations	59	2	
Min. No. of Observations for RP	10	10	
Cr = (CsQs+CeQe)/Qr	0.012	0.46	*resultant pollutant concentration in receiving water without TSD adjustment*
Cr = (CsQs+CetsdQe)/Qr	0.016	1.62	*resultant pollutant concentration in receiving water with TSD method*
VWQS Criteria (2017)			
Protection of Aquatic Biota - Acute	0.019	2.37	
Protection of Aquatic Biota - Chronic	0.011	1.30	
Exceedance Calculated?			
Protection of Aquatic Biota - Acute without TSD adjustment	NO	NO	
Protection of Aquatic Biota - Chronic without TSD adjustment	YES	NO	
Protection of Aquatic Biota - Acute with TSD adjustment	NO	NO	
Protection of Aquatic Biota - Chronic with TSD adjustment	YES	YES	
Sufficient Data to Determine RP?	YES	NO	

This facility has a reasonable potential to violate VWQS for TRC. The existing limits have been checked and should be updated to be protective of VWQS under chronic conditions. Daily sampling should continue.

TAN results are discussed in Section G below.

E. Metals

The results of mass balance calculations for Priority Pollutant metals were calculated using Equation 1 and are presented in Table 5.

Table 5. Mass Balance for Metals of Concern around the Rutland WWTF

		Metal (Total)									
	unit	Antimony	Arsenic	Cadmium	Chromium III	Copper	Lead	Nickel	Silver	Thallium	Zinc
Hardness as $CaCO_3$	mg/L	91.20									
Qe	cfs	12.53									
Cetsd	ug/L	1.5	2.5	5.0	15.0	15.0	50.0	10.0	10.0	0.5	82.0
Data Adjustment?		*	*	*	*	*	*	*	*	*	
Qs	cfs	68.6									
Cs (Average)	ug/L	2.5	0.5	0.5	1.5	3.8	0.5	1.5	0.5	0.5	15.0
Data Adjustment?		*	*	*	*	*	*	*	*	*	*
Qr = Qs+Qe	cfs	81.10									
Cr = (QeCetsd+QsCs)/Qr	ug/L	2.35	0.81	1.20	3.59	5.49	8.15	2.81	1.97	0.50	25.35
Aquatic Biota Acute criteria	ug/L	none	340	1.8	5291	13.4	90.26	434.9	3.8	none	113.3
Aquatic Biota Chronic criteria	ug/L	none	150	0.8	92.9	9.0	3.5	48.4	-	none	112.4
Does data include qualifiers?		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Is there sufficient effluent data?		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Is an acute exceedance calculated?		No	No	No	No	No	No	No	No	No	No
Is a chronic exceedance calculated?		No	No	Yes	No	No	Yes	No	No	No	No
Is there acute RP?		No	No	No	No	No	No	No	No	No	No
Is there chronic RP?		No	No	No	No	No	No	No	No	No	No

Note: * indicates that the data had a < qualifier and that 1/2 of the Method Detection Limit was used for calculation purposes. Calculations based upon data adjusted in this manner are used to recommend additional monitoring but are not used to determine Reasonable Potential. Three sets of effluent monitoring data are also required to determine Reasonable Potential.

This facility does not have RP for metals toxicity based upon currently available data. Exceedances were calculated for Cadmium and Lead, but the method detection limits used in the analyses were not sufficiently precise to confidently determine RP.

This facility has a 7Q10 IWC of 0.155 (>10%). This value exceeds the IWC described in the RPD Decision Trees for facilities to have potential RP for Metals toxicity.

40 CFR 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.

To provide additional data for future assessments of metals toxicity reasonable potential, the effluent should be analyzed for the pollutants included in Appendix J, Table 2 of 40 CFR Part 122, including metals, a minimum of four times during the next permit. This analysis should be conducted concurrently with any WET testing included in the permit.

F. Nutrients

The results of mass balance calculations for Total Nitrogen and Total Phosphorus were calculated using Equation 1 are presented in Table 6.

Table 6. Mass Balance of Nutrients of Concern around the Rutland WWTF.

	Total Phosphorus (ug/l)	Total Nitrogen (mg/l)	Notes
Qs (cfs)	167.00		*Estimated LMM flow*
Qe (cfs)	12.533		*permitted effluent discharge*
Qr = Qs + Qe (cfs)	179.53		*Qs+Qe*
LMM IWC	0.0698		*Qe/(Qs+Qe)*
Cs	15.00	0.32	*upstream pollutant concentration (average)*
Ce	680	13.3	*maximum effluent pollutant concentration observed*
Cetsd	884	50.5	*effluent pollutant concentration adjusted by TSD method.*
Cr = (CsQs+CeQe)/Qr	61.4	0.9	*calculated resultant downstream pollutant concentration without TSD factor of safety*
Cr = (CsQs+CetsdQe)/Qr	75.7	3.8	*calculated resultant downstream pollutant concentration*
Stream Type	B2 Medium, High-Gradient		
Calculated Instream Contribution from Effluent without TSD method	46	0.9	*difference between observed upstream concentration and calculated resultant downstream concentration. Without TSD method*
Calculated Instream Contribution from Effluent with TSD method	61	3.5	*difference between observed upstream concentration and calculated resultant downstream concentration. With TSD Method*
VWQS Criteria (2017)		None for Streams	
Threshold Criteria	15		
Threshold Exceeded without TSD method?	Yes		
Threshold Exceeded with TSD method?	Yes		

G. Total Nitrogen:

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, weekly summer and monthly winter "monitor only" requirements for Nitrate/Nitrite (NOx), Total Nitrogen (TN) and Total Kjeldahl Nitrogen (TKN) are suggested for inclusion in this permit. The summer period should be changed from the current June 15-September 30 to June 1-October 31 to bring this permit into alignment with other permits. Winter time should likewise change from October 1- June 14 to November 1 – May 30.

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

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

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

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

Total Ammonia Nitrogen:

The results of mass balance calculations for TAN were calculated using Equation 1 and are presented above in Table 3.

This facility does not have any effluent data for winter (November 1 – May 31) ammonia and only 3 points from summer (June 1 – October 31) TAN. This is not a sufficient amount of data to determine reasonable potential.

This facility has a 7Q10 IWC of 0.155 (>10%). This value exceeds the IWC described in the RPD Decision Trees for facilities to have potential RP for TAN toxicity.

40 CFR 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.

To provide additional data for future assessments of TAN reasonable potential, it is recommended that monthly monitoring with a monitor only condition be included in the next permit. This analysis should be conducted concurrently with any WET testing included in the permit.

H. Total Phosphorus:

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

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

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

Total Phosphorus Numeric Analysis:

The TP concentrations in the Otter Creek are greater than the 2017 nutrient criteria threshold of 15 ug/L Total Phosphorus in a Class B Medium, High-Gradient stream. The calculated change in the in-stream TP concentration attributable to the Rutland WWTF is 61 ug/L. This calculation is presented above in Table 6.

Total Phosphorus Nutrient Response Conditions Analysis:

The Combined Nutrient Response Conditions for Aquatic Biota and Wildlife in Rivers and Streams at RM 71.5 on 9/21/2020 meets VWQS for pH, meets VWQS for Turbidity , meets VWQS for Dissolved Oxygen and meets VWQS for Aquatic Biota as shown below in Table 7. Therefore, the narrative standard presented in §3-01.B.2 of the VWQS is supported and the receiving waters are in compliance with VQWS for Total Phosphorus but may still be subject to limits proscribed by VSA 1266a or a Phosphorus TMDL.

Table 7. Assessment of Phosphorus Response Variables around the Rutland WWTF

Response variable (VWQS reference)	Target Value for Cold Water Fish Habitat	River-mile: 71.5 9/21/2020
pH (§3-01.B.9)	6.5-8.5 s.u.	*8.26*
Turbidity (§3-04.B.1)	< 10 NTU at low mean annual flow	*1.5*
Dissolved Oxygen (min) (§3-04.B.2)	>6 mg/L and 70% saturation	*9.83 (97.9%)*
Aquatic biota, based on macroinvertebrates.	Attaining an assessment of good, or better.	*Meets VWQS*

Total Phosphorus Reasonable Potential Determination:

The numeric criteria for TP are exceeded when calculated at this facility's full design flow and with the receiving water at LMM conditions. The narrative criteria for TP are satisfied and therefore this facility does not have reasonable potential to violate VWQS.

This facility has a monthly average limit of 45.4 pounds which would equal a maximum annual load of approximately 16,571 pounds per year.

This facility is subject to the 2016 Lake Champlain Phosphorus TMDL. That document reduces the facility's Annual Waste Load Allocation to 5.634 mt/year or 12,420 lbs/year.

This facility is subject to 10 V.S.A. 1266a, which reads "No person directly discharging into the drainage basins of Lake Champlain or Lake Memphremagog shall discharge any waste that contains a phosphorus concentration in excess of 0.80 milligrams pper liter on a monthly average basis. Discharges of less than 200,000 gallons per day, permitted on or before July 1, 1991, shall not be subject to the requirements of this subsection." Therefore, the permit must include a Total Phosphorus limit of 0.8 mg/L.

The new permit should contain an annual TP Waste Load Allocation of 12,420 pounds/year and a monthly average concentration limit of 0.8 mg/l. The monthly average limit of 45.4 lbs/day should be retained. Sampling should remain weekly.

V. Summary of Reasonable Potential Determinations

This facility has a reasonable potential to violate VWQS for TRC. The existing limits have been checked and should be updated to be protective of VWQS under chronic conditions. Daily sampling should continue. A memo with new permit limits is attached.

A. Recommended Biological and Water Quality Monitoring:

As biological monitoring results indicate attainment of aquatic biota thresholds, the stream complies with VWQS for all identified response variables, and the narrative standard presented in §29A-302(2)(A) of the VWQS is supported (as shown in *Table 6*), it is not necessary to include biomonitoring in the draft permit.

B. Recommended Effluent Monitoring:

In addition to the monitoring required in the current permit, the following monitoring is suggested for inclusion in the renewed permit to provide additional data to support future Reasonable Potential Determinations:

- To provide additional data for future assessments of WET reasonable potential, it is recommended that four 2-species (*Ceriodaphnia dubia* and *Pimephales promelas)* 48 hour acute/ 96 hour chronic tests be included in the draft permit, two during the summer (August/October 2022 & 2024) and two during the winter (January/February 2023 & 2025). It is also suggested that concurrent sampling for ammonia, TRC and priority pollutants be conducted with each of these tests.
- This facility has a reasonable potential to violate VWQS for TRC. The existing limits have been checked and should be updated to be protective of VWQS under chronic conditions. Daily sampling should continue. A memo with new permit limits is attached.
- To provide additional data for future assessments of metals toxicity reasonable potential, the pollutants included in Appendix J, Table 2 of 40 CFR Part 122, including metals, should be analyzed a

minimum of four times during the next permit. This analysis should be conducted concurrently with any WET testing included in the permit.

- To gather data on the amount of Total Nitrogen (TN) in this discharge and its potential impact on the receiving water, weekly summer and monthly winter "monitor only" requirements for Nitrate/Nitrite (NOx), Total Nitrogen (TN) and Total Kjeldahl Nitrogen (TKN) are suggested for inclusion in this permit. The summer period should be changed from the current June 15-September 30 to June 1-October 31 to bring this permit into alignment with other permits. Winter time should likewise change from October 1- June 14 to November 1 – May 30.
- To provide additional data for future assessments of TAN reasonable potential, it is recommended that monthly monitoring with a monitor only condition be included in the next permit. This analysis should be conducted concurrently with any WET testing included in the permit.
- The new permit should contain an annual TP Waste Load Allocation of 12,420 pounds/year and a monthly average concentration limit of 0.8 mg/l. The monthly average limit of 45.4 lbs/day should be retained. Sampling should remain weekly.

C. Conclusion:

After review of all available information, it has been determined that there is not a reasonable potential for the discharge to cause or contribute to a water quality violation, with the exception of Total Residual Chlorine (TRC). New WQBELs for TRC that are protective of VWQS have been developed for inclusion in the new permit. With the exception of TRC, this discharge does not appear to cause, have a reasonable potential to cause, or contribute to an instream toxic impact or instream excursion above the water quality criteria.

Agency of Natural Resources
Department of Environmental Conservation
Watershed Management Division
1 National Life Drive Davis 3
802-828-1535

MEMORANDUM

Prepared by: John Merrifield, Wastewater Program (WWP)

Cc: Amy Polaczyk, Manager, WWP
Bethany Sargent, Manager, Monitoring and Assessment Program (MAP)
Rick Levey, MAP

Date: April 27, 2021

Subject: WQBEL Permit Limit Review and Calculations for the Rutland WWTF Facility (3-1285)

I. Introduction

This memo serves as a record of the review and calculation of Water Quality Based Effluent Limits (WQBEL) and is intended to supplement the Reasonable Potential Determination memo prepared for the subject facility. The memo is broken into the following parts:

- An introduction
- A description of new or revised permit limit requirements.
- A description of the methodology used to develop WQBEL permit limits
- Narrative justifications for any new permit limits

The spreadsheet used to perform these calculations is available upon request.

II. New Permit Limits

Effluent Characteristics (Constituents)	WQBEL Discharge Limitations									
	Annual Average	Annual Limit	Monthly Average	Weekly Average	Maximum Day	Monthly Average	Weekly Average	Maximum Day	Instanteous Maximum	Sampling Frequency
		lbs/year	Mass (lbs/day)			Concentration (mg/L)				(per month)
Total Phosphorus		12420	45.4			0.8				Twice a Month (Nov. 1 - May 31) Weekly (June 1 - Oct. 31)
Total Residual Chlorine						0.04		0.1		Daily (30)
Total Nitrogen			MO			MO				Monthly (Nov. 1 - May 31) Weekly (June 1 - Oct. 31)
Total Kjeldahl Nitrogen			MO			MO				
Nitrate/Nitrite Nitrogen			MO			MO				
Total Ammonia Nitrogen			MO			MO				Monthly (1)

The constituents shown above in Table 1 were developed in order to ensure that the proposed discharge is protective of Vermont Water Quality Standards (VWQS) in the receiving water.

The following constituents were not analyzed as WQBELs: Flow, Ultimate Oxygen Demand, BOD, TSS, Settleable Solids, E. coli and pH. These constituents are either subject to TBELs or the data and analytical capacity to model as WQBELs is unavailable.

III. 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 the Chapter 4 of the EPA's Technical Support Document for Water Quality-Based Toxics Control (TSD) (page 86). Results were then compared to the current permit limit. The recommended permit limit was selected by comparing applicable Technology-Based Effluent Limits (TBELs), current WQBELs, and WQBELs calculated based on 2017 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. The resulting WLA is the WQBEL for each acute and chronic VWQS criteria dilution assessed.

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 data for the facility and receiving waters is used. When necessary values for VWQS were calculated based upon the methods described in their appendices and footnotes. Monitoring frequency are 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 concentration. Please see the individual calculation tabs for specific analyses.

The resulting MDL and AML are compared with the existing permit limits, any applicable TBELs including TMDLs, and any legislated limits to determine the final effluent limits that are protective of quality standards. The proposed limits are entered into the spreadsheet and Table 1 (above) and a short narrative is prepared justifying the limits. Those narratives are presented in the next section.

IV. Justification of Proposed WQBELs

1. Total Residual Chlorine

A new Maximum Day limit of 0.1 mg/l and new Monthly Average limit of 0.04 mg/l has been added to the permit. It is suggested that the existing Instantaneous Maximum permit limit of 0.1 mg/l be removed. For the purposes of this permit, TRC analysis must be completed using a test method in 40 C.F.R. § 136 that achieves a minimum level no greater than 0.05 mg/L. The compliance level for TRC for the Monthly Average concentration limit is 0.05 mg/L. Samples with a TRC concentration of 0.05 mg/L and below will be considered in compliance. The previous instantaneous maximum permit limit of

0.1 mg/l was protective of of VWQS for acute toxicity but not for chronic toxicity. Daily monitoring is required and remains unchanged.

2. Total Phosphorus

This facility has been assigned an Annual Limit of 12420 lbs of Total Phosphorus in the 2016 Lake Champlain Phosphorus TMDL. This facility is subject to VSA 1266a and should retain its monthly average TP limit of 0.8 mg/l. The facility's existing monthly average limit of 45.4 lbs/day should be retained. Sampling should remain at weekly during the summer and twice a month during the winter. The summer period should be changed from the current June 15-September 30 to June 1-October 31 to bring this permit into alignment with other permits. Winter time should likewise change from October 1- June 14 to November 1 – May 31.

3. Total Ammonia Nitrogen

This facility has an IWC great enough to have potential Total Ammonia Nitrogen toxic effects in the receiving water. In order to collect data to calculate the reasonable potential for this facility to violate VWQS for Total Ammonia Nitrogen a monthly monitor only requirement has been added to the permit.

4. Total Nitrogen, Kjeldahl Nitrogen and Nitrate/Nitrite Nitrogen

To gather data on the amount of Total Nitrogen (TN) in this discharge and its potential impact on the receiving water, weekly summer and monthly winter “monitor only” requirements for Nitrate/Nitrite (NOx), Total Nitrogen (TN) and Total Kjeldahl Nitrogen (TKN) are suggested for inclusion in this permit. The summer period should be changed from the current June 15-September 30 to June 1-October 31 to bring this permit into alignment with other permits. Winter time should likewise change from October 1- June 14 to November 1 – May 31.

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

REVISED NOTICE:	DRAFT DISCHARGE PERMIT
PUBLIC NOTICE NUMBER:	3-1285
PUBLIC COMMENT PERIOD:	**Revised: May 25, 2021 to July 21, 2021**

PERMITTEE INFORMATION

PERMITTEE NAME:	**Rutland WWTF**
PERMITTEE ADDRESS:	**10 Green Hills Drive** **Rutland, VT 05701**
PERMIT NUMBER:	3-1285
PROJECT ID NUMBER:	RU95-0265

DISCHARGE INFORMATION

NATURE:	Municipal wastewater including domestic, commercial and combined sewer wastewaters.
VOLUME:	8.1 MGD
RECEIVING WATER:	Otter Creek
EXPIRATION DATE:	June 30, 2026
DESCRIPTION:	This is a draft discharge permit proposed for issuance to the Rutland WWTF for the direct discharge of municipal wastewater, including domestic, comercial and combined sewer wastewaters to the Otter Creek.

TENTATIVE DETERMINATIONS

Tentative determinations regarding effluent limitations and other conditions to be imposed on the pending Vermont permit have been made by the State of Vermont Agency of Natural Resources (VANR). The limitations imposed will assure that the Vermont Water Quality Standards and applicable provisions of the Federal Clean Water Act, PL 92-500, as amended, will be met.

FURTHER INFORMATION

The complete application, proposed permit, and other information are on file and may be inspected by appointment on the 3rd floor of the Davis Building at 1 National Life Drive, Montpelier, Vermont. Copies, obtained by calling 802-828-1115 from 7:45 AM to 4:30 PM Monday through Friday, 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 Division's website: https://anrweb.vt.gov/DEC/IWIS/ReportViewer2.aspx?Report=WWPublicNotices&ViewParms=False.

PUBLIC COMMENTS/PUBLIC HEARINGS

Written public comments on the proposed permit are invited and must be received on or before the close of the business day (4:30 pm) on **July 21, 2021** to the Agency of Natural Resources, Department of Environmental Conservation, Watershed Management Division, 1 National Life Drive – Davis 3, Vermont 05620-3522. Comments may also be submitted by e-mail using the e-mail comment provisions included at https://anrweb.vt.gov/DEC/IWIS/ReportViewer2.aspx?Report=WWPublicNotices&ViewParms=False. All comments received by the above date will be considered in formulation of the final determinations.

During the notice period, any person may submit a written request to this office for a public meeting to consider the proposed permit. The request must state the interest of the party filing such request and the reasons why a meeting is warranted. A meeting will be held if there is a significant public interest (including the filing of requests or petitions for such meeting) in holding such a meeting.

FINAL ACTION/RIGHTS TO APPEAL TO THE ENVIRONMENTAL COURT

At the conclusion of the public notice period and after consideration of additional information received during the public notice period, VANR will make a final determination to issue or to deny the permit. Pursuant to 10 V.S.A. Chapter 220, any appeal of this decision must be filed with the clerk of the Environmental Court within 30 days of the date of the decision. The appellant must submit the Notice of Appeal and include the applicable filing fee, payable to the state of Vermont.

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 Court; and must be signed by the appellant or their attorney. In addition, the appeal must give the address or location and the 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.

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.

Peter Walke, Commissioner
Department of Environmental Conservation