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

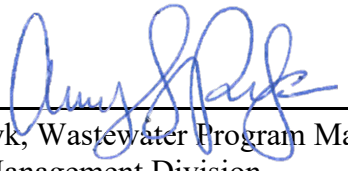
Permit Number: **3-1232**
PIN: **BR95-0001**
NPDES Number: **VT0100455**

Facility Name:	**Stowe WWTF**
Facility Address:	**56 River Rd** **Stowe VT 05672**
Approximate Facility Coordinates:	Lat: **44.4592** Long: **-72.6946**
Expiration Date:	**12/31/2025**
Reapplication Date:	**6/30/2025**

In compliance with the provisions of the Vermont Water Pollution Control Act as amended (10 V.S.A., Chapter 47), the Vermont Water Pollution Control Permit Regulations as amended (Environmental Protection Rules, Chapter 13), and the federal Clean Water Act as amended (33 U.S.C. § 1251 *et seq*.), and implementing federal regulations, the Town of Stowe (hereinafter referred to as the "Permittee") is authorized by the Secretary of the Agency of Natural Resources (hereinafter referred to as the "Secretary") to discharge from the Stowe Wastewater Treatment Facility (hereinafter referred to as the "WWTF") to the Little River in accordance with the following conditions.

This permit shall be effective on **12/1/2020**

Peter Walke, Commissioner
Department of Environmental Conservation

By:  Date 11/16/2020

Amy Polaczyk, Wastewater Program Manager
Watershed Management Division

I. PERMIT SPECIAL CONDITIONS

A. EFFLUENT LIMITS AND MONITORING REQUIREMENTS

1. Discharge Point S/N 001, Lat. 44.46145, Long. -72.69281: During the term of this permit, the Permittee is authorized to discharge from outfall S/N 001 of the Stowe WWTF to the Little River, an effluent for which the characteristics shall not exceed the values listed below:

Discharge Monitoring						
Constituent; Sampling Point and Sample Type	**Season and Sampling Frequency**	**Limit 1**	**Limit 2**	**Limit 3**	**Limit 4**	**Limit 5**
Flow; Effluent; Continuous	Year Round Daily	Monitor mgd Monthly Avg				
BOD, 5-Day; Effluent; 24 Hour Comp	Year Round Weekly	168 lbs/day Monthly Avg	252 lbs/day Weekly Avg	30 mg/l Monthly Avg	45 mg/l Weekly Avg	50 mg/l Daily Max
BOD, 5-Day; Influent; 8 Hour Comp	Year Round Weekly			Monitor mg/l Monthly Avg		
Copper, Total; Effluent; 24 Hour Comp	Year Round Monthly	0.33 lbs/day Monthly Avg	0.47 lbs/day Daily Max	Monitor mg/l Monthly Avg		
E. Coli; Effluent; Grab	Year Round Weekly					20 #/100 ml Instant Max
Nitrite Plus Nitrate Total; Effluent; 24 Hour Comp	Year Round Monthly		Monitor lbs/day Daily Max			Monitor mg/l Daily Max
Nitrogen, Ammonia Total; Effluent; Grab	11/01 - 05/31 2 per Month	201 lbs/day Monthly Avg	217 lbs/day Daily Max	Monitor mg/l Monthly Avg		Monitor mg/l Daily Max
Nitrogen, Ammonia Total; Effluent; Grab	06/01 - 10/31 Weekly	59.6 lbs/day Monthly Avg	59.6 lbs/day Daily Max	Monitor mg/l Monthly Avg		Monitor mg/l Daily Max
Nitrogen, Kjeldahl Total; Effluent; 24 Hour Comp	06/01 - 10/31 Weekly		Monitor lbs/day Daily Max			Monitor mg/l Daily Max
Nitrogen, Kjeldahl Total; Effluent; 24 Hour Comp	11/01 - 05/31 Monthly		Monitor lbs/day Daily Max			Monitor mg/l Daily Max
Nitrogen, Total; Effluent; 24 Hour Comp	Year Round Monthly		Monitor lbs/day Daily Max			Monitor mg/l Daily Max
pH; Effluent; Grab	Year Round Daily			6.5 s.u. Min		8.5 s.u. Max
Phosphorus, Total; Effluent; 24 Hour Comp	Year Round Weekly			0.8 mg/l Monthly Avg		
Phosphorus, Total; Effluent; Calculated	Year Round Monthly	Monitor Annual Total	Monitor Monthly Total	Monthly Total		
Septage Received; Influent; Recorder Total	Year Round Daily		Monitor gallons Daily Max			
Settleable Solids; Effluent; Grab	Year Round Daily					1 ml/l Instant Max
Suspended Solids, Total; Effluent; 24 Hour Comp	Year Round Weekly	168 lbs/day Monthly Avg	252 lbs/day Weekly Avg	30 mg/l Monthly Avg	45 mg/l Weekly Avg	50 mg/l Daily Max
Suspended Solids, Total;	Year Round			Monitor mg/l Monthly Avg		

Influent; 8 Hour Comp	**Monthly**					
Ultimate Oxygen Demand; Effluent; Calculated	**06/01 - 10/31 Weekly**		**300 lbs/day Daily Max**			
Additional Monitoring						
Constituent; Sampling Point and Sample Type	**Season and Sampling Frequency**	**Limit 1**	**Limit 2**	**Limit 3**	**Limit 4**	**Limit 5**
Flow; Annual Average; Calculated	**12/01 - 12/31 Annual**	**1.000 mgd Annual Avg**				
BOD, 5-Day (%R); Percent Removal; Calculated	**Year Round Monthly**			**85 % Monthly Min**		
Phosphorus, Total; See General Conditions; Calculated	**12/01 - 12/31 01/yr**	**608 lbs/day Annual Total**				
Suspended Solids, Total (%R); Percent Removal; Calculated	**Year Round Monthly**			**85 % Monthly Min**		

2. Discharge Sampling Points

a) Effluent sampling: The Permittee shall collect E.coli and ammonia samples after the V-notch weir; samples for all other parameters are collected in the well prior to the weir.

b) Influent sampling: The Permittee shall collect samples in the influent line between the EQ tank and the SBR's.

3. Discharge Special Conditions

a) The effluent shall not cause visible discoloration of the receiving waters.

b) The discharge shall not result in toxic substances or chemical constituents in concentrations or combinations in the receiving water that injure or are inimical to plants, animals, humans or aquatic life; or persist in the environment or accumulate in aquatic organisms to levels that result in harmful concentrations in edible portions of fish, shellfish, other aquatic life, or wildlife that might consume aquatic life.

c) The Permittee shall demonstrate the accuracy of the effluent flow measurement device weekly and report the results on the monthly report forms. The acceptable limit of error is ± 10%.

d) The discharge shall be free from substances in kind or quantity that settle to form harmful benthic deposits; float as foam, debris, scum or other visible substances; produce odor, color, taste or turbidity that is not naturally occurring and would render the surface water unsuitable for its designated uses; result in the dominance of nuisance species; or interfere with recreational activities; or which would cause a violation of the Vermont Water Quality Standards.

e) If the effluent discharged for a period of 90 consecutive days exceeds 80 percent of the permitted flow limitation, the Permittee shall submit to the Secretary projected loadings and a program for maintaining satisfactory treatment levels.

f) The Permittee shall operate the facility to meet the concentration limitations or pounds limitation, whichever is more restrictive.

g) Any action on the part of the Secretary in reviewing, commenting upon or approving plans and specifications for the construction of WWTFs shall not relieve the Permittee from the responsibility to achieve effluent limitations set forth in this permit and shall not constitute a waiver of, or act of estoppel against any remedy available to the Secretary, the State of Vermont or the federal government for failure to meet any requirement set forth in this permit or imposed by state or federal law.

h) The monthly average concentrations of Biochemical Oxygen Demand (BOD_5) and Total Suspended Solids (TSS) in the effluent shall not exceed 15 percent of the monthly average concentrations of BOD_5 and TSS in the influent into the WWTF.

i) The Permittee shall maintain sufficient reserve capacity at the wastewater treatment facility to enable the connection of wastewater flows from all existing developments within the expanded sewer service area.

l) The Permittee shall maintain processing capacity for use only in receiving and processing septage for the useful life of the facility. Such septage shall be accepted from any Vermont municipality, and shall not be restricted to specific municipalities. The rate or rates charged for acceptance by the plant of septage from sources other than the users for whom the plant is designed primarily to serve, shall be equal to the rate or rates charged the primary users, and shall not subsidize the primary users.

m) Monthly average flow shall be calculated by summing the daily effluent flow for each day in the given month and dividing the sum by the number of days of discharge in that month.

n) Total Phosphorus shall be reported as Total Monthly Pounds, Running Total Annual Pounds, and Percentage of Running Total Annual Pounds to Annual Permit Limitation.
o) Total Nitrogen (TN) shall be reported as pounds TN and calculated as: Average TN (mg/L) x Total Daily Flow x 8.34; where TN (mg/L) = TKN (mg/L) + NO_x (mg/L).

(p) Settleable solids samples shall be collected during the period of peak flow.

(q) The Ultimate Oxygen Demand (UOD) limit shall be in effect during the period of June 1 to October 31 each year. UOD shall be calculated using the following equation: UOD (lbs/day) = Flow (MGD) x 8.34 [(BOD_5 mg/L x 1.43) + (TKN mg/L x 4.57)].

(r) The quantity of BOD_5 and TKN discharged shall be limited such that the discharge does not exceed the UOD maximum daily limitation of 300 pounds or the BOD_5 limitations, whichever are more stringent.

(s) The Permittee shall operate the facility to meet the Total Suspended Solids concentration limitation, or the Total Suspended Solids pounds limitation, or to provide a Total Suspended Solids concentration which ensures that the ultraviolet light disinfection system can meet the E. coli bacteria effluent limitation, whichever is more restrictive.

B. WASTE MANAGEMENT ZONE

In accordance with 10 V.S.A. § 1252, this permit hereby establishes a waste management zone that extends from the outfall of the WWTF in the Little River downstream 1.40 mile(s).

C. ANNUAL CONSTITUENT MONITORING

1. Unless monitoring more frequently than annually, the Permittee shall monitor outfall serial number S/N 001 and submit the results, including units of measurement, as an attachment to the DMR form WR-43 for the month in which the samples were taken for the following parameters:

Ammonia (as N)
Chlorine (total residual, TRC)
Dissolved oxygen
Nitrate/Nitrite
Total Kjeldahl nitrogen
Oil and grease
Phosphorus
Total dissolved solids
Temperature

2. Grab samples shall be used for Temperature, Ammonia, Dissolved Oxygen, and Oil & Grease; all other parameters shall be composite samples. Samples shall be representative of the seasonal variation in the discharge.

3. Facilities that do not use chlorine for disinfection, do not use chlorine elsewhere in the treatment process, and have no reasonable potential to discharge chlorine in their effluent are not required to sample for chlorine during Annual Constituent Monitoring.

4. In the event this permit is administratively continued pursuant to 3 V.S.A. § 814, the Permittee shall continue annual monitoring of the above parameters on a schedule that assures samples are representative of the seasonal variation in the discharge and report by December 31 each year.

5. The Permittee shall sample and report according to the following table:

Due Date	Event Description
12/31/2020	The Permittee shall submit results of Annual Constituent Monitoring.
12/31/2021	The Permittee shall submit results of Annual Constituent Monitoring.
12/31/2022	The Permittee shall submit results of Annual Constituent Monitoring.
12/31/2023	The Permittee shall submit results of Annual Constituent Monitoring.
12/31/2024	The Permittee shall submit results of Annual Constituent Monitoring.

D. EMERGENCY POWER FAILURE PLAN

1. The Permittee shall indicate in writing to the Secretary that in the event the primary source of electric power to the WWTF (including pump stations) fails, the Permittee shall either provide an alternative source of power for the operation of its WWTF, or demonstrate that the treatment facility has the capacity to store the wastewater volume that would be generated over the duration of the longest power failure that would have affected the facility in the last five years, excluding catastrophic events.

The alternative power supply, whether from a generating unit located at the WWTF or purchased from an independent source of electricity, must be separate from the existing power source used to operate the WWTF. If a separate unit located at the WWTF is to be used, the Permittee shall certify in writing to the Secretary when the unit is completed and prepared to generate power.

2. The determination of treatment system storage capacity shall be submitted to the Secretary upon completion.

3. The Permittee shall report according to the following table:

Due Date	Event Description
3/1/2021	The Permittee shall submit the EPFP within 90 days of the permit effective date.

E. ENGINEERING EVALUATION

1. The Permittee shall conduct an in-depth engineering inspection/evaluation of the wastewater treatment facility and shall submit a written report of the results to the Secretary. The evaluation can be combined with or part of an Asset Management Plan provided the Plan includes an inspection of the treatment facility and collection system. The engineering inspection and report shall be conducted and prepared in accordance with the following conditions:

a) A professional engineer with experience in the design of municipal wastewater treatment facilities shall be hired to perform an in-depth inspection of the wastewater treatment facility, pump stations, collection system, and manholes. At the treatment facility, all components which are critical to the treatment process or which could adversely affect effluent quality in the event of their failure shall be evaluated. In the pump stations, all components critical to the proper conveyance of sewage, the prevention of sewage bypass, and the supporting appurtenances shall be evaluated.

b) The inspection is to be comprised of visual observation of equipment operability and condition as well as a review of maintenance records to determine recurring equipment problems and to estimate future life. Calibration checks shall be performed on all flow meters.

c) The resulting written inspection report shall document the components inspected, their condition, and include recommendations for all currently needed repairs and replacements and the need for on-site spare parts. The projected date of replacement or major rehabilitation of each component and the anticipated cost shall be estimated. The Permittee shall determine how the future anticipated costs will be met and advise the Secretary in a letter transmitted with the written inspection report.

d) Should the Secretary determine that certain critical components are in need of repair or replacement due to the results of the inspection report, this permit may be reopened and amended to include an implementation schedule for repair or replacement of those components.

2. The Permittee shall report according to the following table:

Due Date	Event Description
12/31/2022	The Permittee shall submit an engineering evaluation for the lower village pump station.
12/31/2024	The Permittee shall submit an engineering evaluation prepared by a professional engineer for the wastewater treatment facility and collection system not evaluated previously.

F. OPERATIONS MANAGEMENT AND EMERGENCY RESPONSE PLAN (OMERP)

1. The Permittee submitted the Operation, Management, and Emergency Response Plan for the sewage collection system to the Secretary on June 28, 2010. Through issuance of this permit the Secretary

approves the inspection schedule for the plan. The Permittee shall implement the plan in accordance with that schedule.

2. The Permittee has an Operation, Management, and Emergency Response Plan for the treatment facility, sewage pumping stations, and sewer line stream crossings on file. The Permittee shall prepare and submit to the Secretary for review and approval, an updated Operation, Management, and Emergency Response Plan for the treatment facility, sewage pumping stations, and sewer line stream crossings and sewage collection system. The Plan shall be immediately implemented upon approval by the Secretary. The Permittee shall revise these plans upon the Secretary's request or on its own motion to reflect equipment or operational changes. This plan shall comply with the provisions of 10 V.S.A. § 1278, which require:

   a) Identification of those elements of the facility, including collection systems that are determined to be prone to failure based on installation, age, design, or other relevant factors.

   b) Identification of those elements of the facility identified under subdivision (a) of this subsection which, if one or more failed, would result in a significant release of untreated or partially treated sewage to surface waters of the State.

   c) The elements identified in subdivision (b) of this subsection shall be inspected in accordance with a schedule approved by the Secretary.

   d) An emergency contingency plan to reduce the volume of a detected spill and to mitigate the effect of such a spill on public health and the environment.

3. The Permittee shall sample and report according to the following table:

Due Date	Event Description
12/31/2021	The Permittee shall submit the OMERP by December 31, 2021.

G. PHOSPHORUS OPTIMIZATION PLAN

1. Wasteload Allocation for Phosphorus

This permit includes a total phosphorus (TP) water quality based effluent limitation of consistent with the waste load allocation (WLA) for TP, established by the U.S. Environmental Protection Agency (U.S. EPA) in the 2016 "Phosphorus TMDLs for Vermont Segments of Lake Champlain" (LC TMDL). The Secretary reserves the right to reopen and amend this permit to include an alternate TP limitation or additional monitoring requirements based on the monitoring data, the results of phosphorus optimization activities, or a reallocation of phosphorus wasteload allocations between the Permittee and another WWTF pursuant to the requirements of TMDL and Vermont's "Wasteload Allocation Process" Rule (Environmental Protection Rule, Chapter 17).

2. Total Phosphorus Calculations and Reporting

Total Phosphorus shall be reported monthly, via electronic Discharge Monitoring Report, in the following ways:

a) Monthly Average Phosphorus Concentration = The average concentration of phosphorus discharged this monitoring period. (sum of all daily discharges (mg/l) measured during the month divided by the number of daily discharges measured during the month)

b) Total Monthly Pounds Phosphorus = The total pounds of phosphorus discharged this monitoring period. ((Monthly Average Phosphorus Concentration) x (Total Monthly Flows) x 8.34)

c) Running Total Annual Pounds = The 12-month running annual TP load. (Sum the Total Monthly Pounds results for the immediately preceding 12 months)

d) Comparison (%) of Running Total Annual Pounds to Annual Permit Limitation = The percentage of the Running Total Annual Pounds to the Annual TP Limitation. The comparison shall be calculated as: % = Running Total Annual Pounds / Annual TP Permit Limit × 100

3. Phosphorus Optimization Plan

a) 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 POP shall:

(i) Be developed by a qualified professional with experience in the operation and/or design of WWTFs in consultation with the WWTF;

(ii) Evaluate alternative methods of operating the existing WWTF, including operational, process, and equipment changes designed to enhance phosphorus removal. The techniques to be evaluated may include operational process changes to enhance biological and/or chemical phosphorous removal, incorporation of anoxic/anaerobic zones, septage receiving policies and procedures, and side stream management;

(iii) Determine which alternative methods of operating the existing WWTF, including operational, process, and equipment changes will be most effective at increasing phosphorus removal; and

(iv) Include a proposed implementation schedule for those methods of operating the WWTF determined to be most effective at increasing phosphorus removal.

b) The Secretary shall review the POP. The Permittee shall commence implementation of the POP 60 days after submittal to the Secretary, unless the Secretary rejects the POP prior to that date.

c) The Permittee shall annually submit a report to the Secretary as an attachment to the monthly electronic Discharge Monitoring Reporting (DMR) form WR-43 that documents:

(i) The optimization techniques implemented under the POP during the previous year.

(ii) Whether the techniques are performing as expected.

(iii) The phosphorus discharge trends relative to the previous year.

4. Phosphorus Elimination and Reduction Plan (PERP)

a) The WWTF shall have 12 months from the permit effective date to optimize removal of TP.

b) If, after the optimization period, the WWTF's actual, TP loads reach or exceed 80% of the annual

mass limit for the WWTF, based on the WWTF's 12-month running annual load calculated using the Running Total Annual Pounds Calculation, the Permittee shall, within 90 days of reaching or exceeding 80% of the annual mass limit 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 annual mass limit during the permit term.

c) If the WWTF is not projected to exceed its annual mass limit within the permit term, the WWTF shall reassess when it is projected to reach its annual mass limit prior to permit renewal and submit that information with its next permit application.

d) If the WWTF is projected to exceed its annual mass limit during the permit term, the Permittee shall submit a Phosphorus Elimination and Reduction Plan (PERP) within 6 months from the date of submittal of the projection submitted under Part 2 of this Section. The PERP shall be submitted to the Secretary to ensure the WWTF continues to comply with its annual mass limit.

e) 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 Permittee shall revise the PERP, if required by the Secretary.

f) The PERP shall be developed by qualified professionals in consultation with the WWTF operator. The PERP shall include:

(i) An evaluation of alternatives to ensure the WWTF's compliance with its annual mass limit;

(ii) An identification of the chosen alternative or alternatives to ensure the WWTF's compliance with its annual mass limit;

(iii) A proposed schedule, including an engineer approved design and construction schedule and, if the chosen alternative or alternatives require a pilot study, a schedule for testing, that shall ensure the WWTF's compliance with its annual mass limit as soon as possible; and

(iv) A financing plan that estimates the costs for implementing the PERP and describes a strategy for financing the project.

g) The Permittee shall report according to the following table:

Due Date	Event Description
2/1/2021	The Permittee shall submit a POP and implement optimization techniques to achieve reductions in TP.
4/1/2021	The Permittee shall commence implementation of the POP 60 days after submittal to the Secretary.
12/31/2021	The Permittee shall submit an annual report documenting TP trends and optimization techniques.
12/31/2022	The Permittee shall submit an annual report documenting TP trends and optimization techniques.
12/31/2023	The Permittee shall submit an annual report documenting TP trends and optimization techniques.

12/31/2024	The Permittee shall submit an annual report documenting TP trends and optimization techniques.

H. POLLUTANT SCAN

1. The Permittee shall conduct an effluent analysis of outfall serial number S/N 001 for the pollutants included in Appendix J, Table 2 of 40 CFR Part 122 (see Attachment A) and submit the results to the Secretary.

2. When WET testing is required by this permit sampling for both the WET test and the Pollutant Scan shall coincide.

3. In the event this permit is administratively continued pursuant to 3 V.S.A. § 814, the Permittee shall include the results of this effluent analysis with each WET test conducted.

4. The Permittee shall sample and report according to the following table:

Due Date	Event Description
6/30/2021	The Permittee shall submit pollutant scan results.
12/31/2022	The Permittee shall submit pollutant scan results.
6/30/2023	The Permittee shall submit pollutant scan results.

I. QUALITY ASSURANCE REPORT / PROFICIENCY TESTING

1. In accordance with 10 V.S.A. § 1263.d.2, the Secretary may require a laboratory quality assurance sample program to ensure qualification of laboratory analysts. For purposes of demonstrating compliance with the requirements of this permit regarding adequate laboratory controls and appropriate quality assurance procedures, the Permittee shall conduct and pass an annual laboratory proficiency test, via an accredited laboratory, for the analysis of all pollutant parameters performed within their facility laboratory and reported as required by this permit. This can be carried out as part of an EPA DMR-QA study.

2. In the event this permit is administratively continued pursuant to 3 V.S.A. § 814, the Permittee shall continue to complete annual proficiency tests and report by December 31 each year.

3. The Permittee shall report on quality assurance according to the following table:

Due Date	Event Description
12/31/2021	The Permittee shall submit passing results for proficiency testing.
12/31/2022	The Permittee shall submit passing results for proficiency testing.
12/31/2023	The Permittee shall submit passing results for proficiency testing.
12/31/2024	The Permittee shall submit passing results for proficiency testing.

J. WHOLE EFFLUENT TOXICITY (WET) TESTING ACUTE/CHRONIC

1. The Permittee shall conduct two-species (*Pimephales promelas* and *Ceriodaphnia dubia*) modified acute/chronic WET tests (48-hour acute endpoints within a 7-day chronic test) on a composite effluent

sample collected from outfall serial number S/N 001. Total Ammonia shall be measured in the highest concentration of test solution at the beginning of the test. If chlorine is used in the WWTF's system, Total Residual Chlorine shall be measured in the highest concentration of test solution at the beginning of the test.

2. The WET tests shall be conducted according to the procedures and guidelines specified in "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms" and "Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" (both documents U.S. EPA October 2002 or, if a newer edition is available, the most recent edition).

3. Based upon the results of these tests or any other toxicity tests conducted, the Secretary reserves the right to reopen and amend this permit to require additional WET testing or a Toxicity Reduction Evaluation.
4. Permittees may request the use of lab water for controls and dilution if:

a) acquiring receiving water is hazardous due to weather or topography;

b) previous WET tests have shown that receiving water has had poor performance in the lab controls or dilution; and

c) requested by the Permittee and approved by the Secretary.

4. In the event this permit is administratively continued pursuant to 3 V.S.A. § 814, the Permittee shall sample and report as prescribed below in a manner that assures WET results are:
(a) obtained in January or February and submitted to the Secretary by June 30 in odd-numbered years; and
(b) obtained in August, September, or October and submitted to the Secretary by December 31 in even-numbered years.

5. In the event this permit is administratively continued pursuant to 3 V.S.A. § 814, the Permittee shall sample and report as prescribed below in a manner that assures WET results are:
(a) obtained in January or February and submitted to the Secretary by June 30 in odd-numbered years; and
(b) obtained in August, September, or October and submitted to the Secretary by December 31 in even-numbered years.

6. The Permittee shall sample and report according to the following table:

Due Date	Event Description
6/30/2021	The Permittee shall submit results of the January/February WET test.
12/31/2022	The Permittee shall submit results of the August-October WET test.
6/30/2023	The Permittee shall submit results of the January/February WET test.
12/31/2024	The Permittee shall submit results of the August-October WET test.

II. GENERAL CONDITIONS

A. GENERAL REQUIREMENTS

1. Authority

This permit is issued under authority of 10 V.S.A. §§ 1258 and 1259 of the Vermont Water Pollution Control Act, the Vermont Water Pollution Control Permit Regulation (Environmental Protection Rule, Chapter 13), and § 402 of the Clean Water Act, as amended.

2. Operating Fees

This discharge is subject to operating fees as required by 3 V.S.A. § 2822.

3. Duty to Comply

The Permittee shall comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application. Except as provided in Bypass (Condition II.B.5) and "Emergency Pollution Permits" (Condition II.B.8), nothing in this permit shall be construed to relieve the Permittee from civil or criminal penalties for noncompliance.

4. Civil and Criminal Liability

Civil and criminal penalties for non-compliance are provided for in 40 C.F.R. § 122.41(a)(2)-(3) and 10 V.S.A. Chapters 47, 201, and 211. As of the effective date of this permit, the Vermont statutory penalties, which are subject to change, are as follows:

a. Pursuant to 10 V.S.A. Chapter 47, a civil penalty not to exceed $10,000.00 a day for each day of violation.

b. Pursuant to 10 V.S.A. Chapter 47, a fine not to exceed $25,000.00 or imprisonment for not more than six months, or both.

c. Pursuant to 10 V.S.A. Chapter 47, any person who knowingly makes any false statement, representation or certification in any application, record, report, plan, or other document filed or required to be maintained by this permit, or who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained by this permit, shall upon conviction, be punished by a fine of not more than $10,000.00 or by imprisonment for not more than six months, or by both.

d. Pursuant to 10 V.S.A. Chapter 201, a penalty of not more than $42,500.00 for each determination of a separate violation. In addition, if the Secretary determines that a violation is continuing, the Secretary may assess a penalty of not more than $17,000.00 for each day the violation continues. The maximum amount of penalty assessed under this provision shall not exceed $170,000.00.

e. Pursuant to 10 V.S.A. Chapter 211, a civil penalty of not more than $85,000.00 for each violation. In addition, in the case of a continuing violation, a penalty of not more than $42,500.00 may be imposed for each day the violation continues.

5. Reopener Clause

In accordance with 40 C.F.R. § 122.44(c), this permit may be reopened and modified during the life of the permit to incorporate any applicable standard for sewage sludge use or disposal promulgated under section 405(d) of the Clean Water Act. The Secretary may promptly modify or revoke and reissue this permit if the

standard for sewage sludge use or disposal is more stringent than any requirements for sludge use or disposal in the permit, or controls a pollutant or practice not limited in the permit.

6. Permit Modification, Suspension, and Revocation

After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including the following:

a. Violation of any terms or conditions of this permit;

b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts;

c. Reallocation of WLA under the LC TMDL;

d. Development of an integrated WWTF and stormwater runoff NPDES permit; or

e. A change in any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge.

f. The filing of a request by the Permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance shall not stay any permit condition.

7. Toxic Effluent Standards

If a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under § 307(a) of the Clean Water Act for a toxic pollutant which is present in the Permittee's discharge and such standard or prohibition is more stringent than any limitation upon such pollutant in this permit, then this permit shall be modified or revoked and reissued, pursuant to Condition II.A.6 of this permit, in accordance with the toxic effluent standard or prohibition and the Permittee so notified.

8. Other Materials

Other materials ordinarily produced or used in the operation of this facility, which have been specifically identified in the application, may be discharged at the maximum frequency and maximum level identified in the application, provided:

a. They are not:

(i) Designated as toxic or hazardous under provisions of Sections 307 and 311, respectively, of the Clean Water Act, or

(ii) Known to be hazardous or toxic by the Permittee, except that such materials indicated in (i) and (ii) above may be discharged in certain limited amounts with the written approval of, and under special conditions established by, the Secretary or their designated representative, if the substances will not pose any imminent hazard to the public health or safety;

b. The discharge of such materials will not violate the Vermont Water Quality Standards; and

c. The Permittee is not notified by the Secretary to eliminate or reduce the quantity of such materials entering the water.

9. Removed Substances

Collected screenings, sludges, and other solids removed in the course of treatment and control of wastewaters shall be stored, treated, and disposed of in accordance with 10 V.S.A. Chapter 159 and with the terms and conditions of any certification, interim or final, transitional operation authorization, or order issued pursuant to 10 V.S.A. Chapter 159 that is in effect on the effective date of this permit or is issued during the term of this permit.

10. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

11. Duty to Provide Information

The Permittee shall provide to the Secretary, within a reasonable time, any information which the Secretary may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The Permittee shall also furnish to the Secretary upon request, copies of records required to be kept by this permit.

12. Other Information

If the Permittee becomes aware that it failed to submit any relevant facts in a permit application or submitted incorrect information in a permit application or in any report to the Secretary, it shall promptly submit such facts or information.

13. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of legal action or relieve the Permittee from any responsibilities, liabilities, or penalties to which the Permittee is or may be subject under 10 V.S.A. § 1281.

14. Confidentiality

Pursuant to 10 V.S.A. § 1259(b):

Any records or information obtained under this permit program that constitutes trade secrets under 1 V.S.A. § 317(c)(9) shall be kept confidential, except that such records or information may be disclosed to authorized representatives of the State and the United States when relevant to any proceedings under 10 V.S.A. Chapter 47.

Claims for confidentiality for the following information will be denied:

a. The name and address of any permit applicant or Permittee.

b. Permit applications, permits, and effluent data.

c. Information required by application forms, including information submitted on the forms themselves and any attachments used to supply information required by the forms.

15. Navigable Waters

This permit does not authorize or approve the construction of any onshore or offshore physical structures or facilities or the undertaking of any work in any navigable waters.

16. Property Rights

Issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations.

17. Duty to Reapply

If the Permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the Permittee must apply for and obtain a new permit. The Permittee shall submit a new application at least 180 days before the expiration date of the existing permit unless permission for a later date has been granted by the Director. The Director shall not grant permission for applications to be submitted later than the expiration date of the existing permit.

18. Other State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the Permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by Section 510 of the Clean Water Act.

B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

1. Proper Operation and Maintenance

All waste collection, control, treatment, and disposal facilities shall be operated in a manner consistent with the following:

a. The Permittee shall at all times properly operate and maintain in good working order all facilities and systems of treatment and control (and related appurtenances) installed or used by the Permittee to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by the Permittee only when the operation is necessary to achieve compliance with the conditions of this permit.

b. The Permittee shall provide an adequate operating staff, consistent with the Operator Rule (Environmental Protection Rule, Chapter 4), which is duly qualified to carry out the operation, maintenance, and testing functions required to ensure compliance with the conditions of this permit; and

c. The operation and maintenance of the WWTF shall be performed only by a person or persons holding a valid license to engage in the practice of pollution abatement facility operation.

2. Need to Halt or Reduce Activity not a Defense

It shall not be a defense for the Permittee in an enforcement action that it would have been necessary to halt or reduce the activity in order to maintain compliance with the conditions of this permit.

3. Duty to Mitigate

The Permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the

environment. The Permittee shall also take all reasonable steps to minimize or prevent any adverse impact to waters of the State, the environment, or human health resulting from non-compliance with any condition specified in this permit, including accelerated or additional monitoring as necessary to determine the nature and impact of the non-complying discharge.

4. Dry Weather Flows

Dry weather flows of untreated municipal wastewater from any sanitary or combined sewers are not authorized by this permit and are specifically prohibited by state and federal laws and regulations. If for any reason there is a discharge to waters of the State of dry weather flows of untreated municipal wastewater from any sanitary or combined sewer, the operator of the WWTF or the operator's delegate shall comply with the notice requirements outlined in this permit.

5. Bypass

The bypass of facilities (including pump stations) is prohibited, except where authorized under the terms and conditions of an Emergency Pollution Permit issued pursuant to 10 V.S.A. § 1268.

In addition to § 1268 findings, such bypass must meet the following three conditions:

a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

b. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

c. The Permittee submitted notices as required under 40 C.F.R. § 122.41(m)(3):

(i) Anticipated bypass. If the Permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible, at least ten days before the date of the bypass.

(ii) Unanticipated bypass. The Permittee shall submit notice of an unanticipated bypass as required in Condition II.D.3 (24–hour notice).

6. Upset

a. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of Condition II.B.6.b of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

b. Conditions necessary for a demonstration of upset. A Permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

(i) An upset occurred and that the Permittee can identify the cause(s) of the upset;

(ii) The permitted facility was at the time being properly operated; and

(iii) The Permittee submitted notice of the upset as required in condition II.D.3 (24-hour notice).

(iv) The Permittee complied with any remedial measures required under Condition II.B.3.

c. Burden of proof. In any enforcement proceeding the Permittee seeking to establish the occurrence of an upset has the burden of proof.

7. Sewer Ordinance

The Permittee shall have in effect a sewer use ordinance acceptable to the Secretary which, at a minimum, shall:

a. prohibit the introduction by any person into the Permittee's sewerage system or WWTF of any pollutant which:

(i) Is a toxic pollutant in toxic amounts as defined in standards issued from time to time under § 307(a) of the Clean Water Act;

(ii) Creates a fire or explosion hazard in the Permittee's treatment works;

(iii) Causes corrosive structural damage to the Permittee's treatment works, including all wastes with a pH lower than 5.0;

(iv) Contains solid or viscous substances in amounts which would cause obstruction to the flow in sewers or other interference with proper operation of the Permittee's treatment works; or

(v) In the case of a major contributing industry, as defined in this permit, contains an incompatible pollutant, as defined in this permit, in an amount or concentration in excess of that allowed under standards or guidelines issued from time to time pursuant to Sections 304, 306, and/or 307 of the Clean Water Act.

b. Require 45 days prior notification to the Permittee by any person or persons of a:

(i) Proposed substantial change in volume or character of pollutants over that being discharged into the Permittee's treatment works at the time of issuance of this permit;

(ii) Proposed new discharge into the Permittee's treatment works of pollutants from any source which would be a new source as defined in § 306 of the Clean Water Act if such source were discharging pollutants; or

(iii) Proposed new discharge into the Permittee's treatment works of pollutants from any source which would be subject to § 301 of the Clean Water Act if it were discharging such pollutants.

c. Require any industry discharging into the Permittee's treatment works to perform such monitoring of its discharge as the Permittee may reasonably require, including the installation, use, and maintenance of monitoring equipment and monitoring methods, keeping records of the results of such monitoring, and reporting the results of such monitoring to the Permittee. Such records shall be made available by the Permittee to the Secretary upon request.

d. Authorize the Permittee's authorized representatives to enter into, upon, or through the premises of any industry discharging into the Permittee's treatment works to have access to and copy any records, to inspect any monitoring equipment or method required by this permit, and to sample any discharge into the Permittee's treatment works.

8. Emergency Pollution Permits

a. Maintenance activities, or emergencies resulting from equipment failure or malfunction, including power outages, which result in an effluent which exceeds the effluent limitations specified herein, shall be considered a violation of the conditions of this permit, unless the Permittee's discharge is covered under an emergency pollution permit under the provisions of 10 V.S.A. § 1268. The Permittee shall notify the Secretary of the emergency situation by the next working day unless notice is required sooner under Condition II.D.2.

10 V.S.A. § 1268 reads as follows:

When a discharge permit holder finds that pollution abatement facilities require repairs, replacement, or other corrective action in order for them to continue to meet standards specified in the permit, the holder may apply in the manner specified by the Secretary for an emergency pollution permit for a term sufficient to effect repairs, replacements or other corrective action. The Secretary shall proceed in accordance with Chapter 170 of this title. No emergency pollution permit shall be issued unless the applicant certifies and the Secretary finds that:

(i) there is no present, reasonable alternative means of disposing of the waste other than by discharging it into the waters of the State during the limited period of time of the emergency;

(ii) the denial of an emergency pollution permit would work an extreme hardship upon the applicant;

(iii) the granting of an emergency pollution permit will result in some public benefit;

(iv) the discharge will not be unreasonably harmful to the quality of the receiving waters; and

(v) the cause or reason for the emergency is not due to willful or intended acts or omissions of the applicant.

b. Application shall be made to the Secretary at the following address: Agency of Natural Resources, Department of Environmental Conservation, One National Life Drive, Davis 3, Montpelier VT 05620-3522.

C. MONITORING REQUIREMENTS

1. Monitoring and Records

a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

b. Except for records of monitoring information required by this permit related to the Permittee's sewage sludge use and disposal activities, which shall be retained for a period of at least 5 years (or longer as required by 40 C.F.R. § 503), the Permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application. This period shall be extended during the course of unresolved litigation and may be extended by request of the Secretary at any time.

c. Records of monitoring information shall include:

(i) The date, exact place, and time of sampling or measurements;

(ii) The individual(s) who performed the sampling or measurements;

(iii) The date(s) analyses were performed;

(iv) The individual(s) who performed the analyses;

(v) The analytical techniques or methods used; and

(vi) The results of such analyses.

(vii) The records of monitoring activities and results, including all instrumentation and calibration and maintenance records;

(viii) The original calculation and data bench sheets of the operator who performed analysis of the influent or effluent pursuant to requirements of this permit; and

(ix) For analyses performed by contract laboratories:

(a) The detection level reported by the laboratory for each sample; and

(b) The laboratory analytical report including documentation of the QA/QC and analytical procedures.

(x) When "non-detects" are recorded, the method detection limit shall be reported and used in calculating any time-period averaging for reporting on DMRs.

d. Monitoring must be conducted according to test procedures approved under 40 C.F.R. § 136 unless another method is required under 40 C.F.R. Subchapters N or O.

2. Quality Control

a. The Permittee shall calibrate and perform maintenance procedures on all monitoring and analytical instrumentation at regular intervals to ensure accuracy of measurements or shall ensure that both activities will be conducted.

b. The Permittee shall keep records of these activities and shall provide such records upon request of the Secretary.

3. Right of Entry

The Permittee shall allow the Secretary, or an authorized representative (including an authorized contractor acting as a representative of the Administrator), upon presentation of credentials and other documents as may be required by law, to:

a. To enter upon the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

b. To have access to and copy, at reasonable times, any records required to be kept under the terms and conditions of this permit;

c. To inspect, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

d. To sample or monitor, at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location.

D. REPORTING REQUIREMENTS

1. Facility Modification / Change in Discharge

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant more frequently than, or at a level in excess of, that identified and authorized by this permit shall constitute a violation of the terms and conditions of this permit. Such a violation may result in the imposition of civil and/or criminal penalties pursuant to 10 V.S.A. Chapters 47, 201, and/or 211. Any anticipated facility alterations or expansions or process modifications which will result in new, different, or increased discharges of any pollutants must be reported by submission of a new permit application or, if such changes will not violate the effluent limitations specified in this permit, by advance notice to the Secretary of such changes. This notification applies to pollutants which are subject neither to effluent limitations in this permit, nor to notification requirements for toxic pollutants under 40 C.F.R. § 122.42(a)(1). Following such notice, the permit may be modified, pursuant to Condition II.A.6 of this permit, to specify and limit any pollutants not previously limited.

2. Change in Introduction of Pollutants to WWTF

a. The Permittee, within 30 days of the date on which the Permittee is notified of such discharge, shall provide notice to the Secretary of the following:

(i) Any new introduction of pollutants into the treatment works from a source which would be a new source as defined in § 306 of the Clean Water Act if such source were discharging pollutants;

(ii) Except for such categories and classes of point sources or discharges specified by the Secretary, any new introduction of pollutants into the treatment works from a source which would be subject to § 301 of the Clean Water Act if such source were discharging pollutants; and

(iii) Any substantial change in volume or character of pollutants being introduced into the treatment works by a source introducing pollutants into such works at the time of issuance of the permit.

b. The notice shall include:

(i) The quality and quantity of the discharge to be introduced into the system, and

(ii) The anticipated impact of such change in the quality or quantity of the effluent to be discharged from the WWTF.

3. Noncompliance Notification

a. The Permittee shall give advance notice to the Secretary of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

b. In the event the Permittee is unable to comply with any of the conditions of this permit due, among other reasons, to:

(i) Breakdown or maintenance of waste treatment equipment (biological and physical-chemical systems including all pipes, transfer pumps, compressors, collection ponds or tanks for the segregation of treated or untreated wastes, ion exchange columns, or carbon absorption units);

(ii) Accidents caused by human error or negligence;

(iii) Any unanticipated bypass or upset which exceeds any effluent limitation in the permit;

(iv) Violation of a maximum day discharge limitation for any of the pollutants listed by the Secretary in this permit; or

(v) Other causes such as acts of nature,

the Permittee shall provide notice as specified in subdivisions c and d of this subsection.

c. Pursuant to 10 V.S.A. § 1295, notice for "untreated discharges," as defined in section III.

(i) Public notice. For "untreated discharges" an operator of the WWTF or the operator's delegate shall as soon as possible, but no longer than one hour from discovery of an untreated discharge from the WWTF, post on a publicly accessible electronic network, mobile application, or other electronic media designated by the Secretary an alert informing the public of the untreated discharge and its location, except that if the operator or his or her delegate does not have telephone or Internet service at the location where he or she is working to control or stop the untreated discharge, the operator or his or her delegate may delay posting the alert until the time that the untreated discharge is controlled or stopped, provided that the alert shall be posted no later than four hours from discovery of the untreated discharge.

(ii) Secretary notification. For "untreated discharges" an operator of the WWTF shall within 12 hours from discovery of an untreated discharge from the WWTF notify the Secretary and the local health officer of the municipality where the facility is located of the untreated discharge. The operator shall notify the Secretary through use of the Department of Environmental Conservation's online event reporting system. If, for any reason, the online event reporting system is not operable, the operator shall notify the Secretary via telephone or e-mail. The notification shall include:

(a) The specific location of each untreated discharge, including the body of water affected. For combined sewer overflows, the specific location of each untreated discharge means each outfall that has discharges during the wet weather storm event.

(b) Except for discharges from the WWTF to a separate storm sewer system, the date and approximate time the untreated discharge began.

(c) The date and approximate time the untreated discharge ended. If the untreated discharge is still ongoing at the time of reporting, the entity reporting the untreated discharge shall amend the report with the date and approximate time the untreated discharge ended within three business days of the untreated discharge ending.

(d) Except for discharges from the WWTF to a separate storm sewer system, the approximate total volume of sewage and, if applicable, stormwater that was released. If the approximate total volume is unknown at the time of reporting, the entity reporting the untreated discharge shall amend the report with the approximate total volume within three business days.

(e) The cause of the untreated discharge and a brief description of the noncompliance, including the type of event and the type of sewer structure involved.

(f) The person reporting the untreated discharge.

d. For any non-compliance not covered under Condition II.D.3.c of this permit, an operator of the WWTF or the operator's delegate shall notify the Secretary within 24 hours of becoming aware of such condition and shall provide the Secretary with the following information, in writing, within five days of becoming aware of such condition:

(i) Cause of non-compliance;

(ii) A description of the non-complying discharge including its impact upon the receiving water;

(iii) Anticipated time the condition of non-compliance is expected to continue or, if such condition has been corrected, the duration of the period of non-compliance;

(iv) Steps taken by the Permittee to reduce and eliminate the non-complying discharge; and

(v) Steps to be taken by the Permittee to prevent recurrence of the condition of non-compliance.

e. For noncompliance events related to combined sewer overflows, sanitary sewer overflows, or bypass events, these reports must include the data described above (with the exception of time of discovery) as well as the type of event (combined sewer overflows, sanitary sewer overflows, or bypass events), type of sewer overflow structure (e.g., manhole, combined sewer overflow outfall), discharge volumes untreated by the treatment works treating domestic sewage, types of human health and environmental impacts of the sewer overflow event, and whether the noncompliance was related to wet weather.

4. Planned Changes

a. The Permittee shall give notice to the Secretary as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

(i) The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 C.F.R. § 122.29(b); or

(ii) The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements at 40 C.F.R. § 122.42(a)(1).

(iii) The alteration or addition results in a significant change in the Permittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan.

5. Transfer of Ownership or Control

This permit is not transferable without prior written approval of the Secretary. All application and operating fees must be paid in full prior to transfer of this permit. In the event of any change in control or ownership of facilities from which the authorized discharges emanate, the Permittee shall provide a copy of this permit to the succeeding owner or controller and shall send written notification of the change in ownership or control to the Secretary at least 30 days in advance of the proposed transfer date. The notice to the Secretary shall include a written agreement between the existing and new Permittees containing a specific date for transfer of permit responsibility, coverage, and liability between them. The Permittee shall also inform the prospective owner or operator of their responsibility to make an application for transfer of this permit.

This request for transfer application must include as a minimum:

a. A properly completed application form provided by the Secretary and the applicable processing fee.

b. A written statement from the prospective owner or operator certifying:

(i) The conditions of the operation that contribute to, or affect, the discharge will not be materially different under the new ownership;

(ii) The prospective owner or operator has read and is familiar with the terms of the permit and agrees to comply with all terms and conditions of the permit; and

(iii) The prospective owner or operator has adequate funding to operate and maintain the treatment system and remain in compliance with the terms and conditions of the permit.

c. The date of the sale or transfer.

The Secretary may require additional information dependent upon the current status of the facility operation, maintenance, and permit compliance.

6. Monthly Reporting

a. The Permittee is required to submit monthly reports of monitoring results and operational parameters on Discharge Monitoring Report (DMR) form WR-43 or through an electronic reporting system made available by the Secretary. Reports are due on the 15th day of each month, beginning with the month following the effective date of this permit.

b. Unless waived by the Secretary, the Permittee shall electronically submit its DMRs via Vermont's on-line electronic reporting system. The Permittee shall electronically submit additional compliance monitoring data and reports specified by the Secretary. When the Permittee submits DMRs using an electronic system designated by the Secretary, which requires attachment of scanned DMRs in PDF format, it is not required to submit hard copies of DMRs. The electronic submittals are submitted through the State of Vermont Agency of Natural Resources' Online Services Portal, or its replacement.

c. If, in any reporting period, there has been no discharge, the Permittee must submit that information by the report due date.

7. Signature Requirements

a. All reports shall be signed:

(i) For a corporation. By a responsible corporate officer or a duly authorized representative of that person. For the purpose of this section, a responsible corporate officer means: (1) A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (2) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

(ii) For a partnership or sole proprietorship. By a general partner or the proprietor, respectively; or

(iii) For a municipality, state, or other public agency. By either a principal executive officer or ranking elected official, or a duly authorized representative of that person.

b. For the purposes of subdivision (d) of this subsection, a person is a duly authorized representative only if:

(i) The authorization is made in writing by a person described in subdivision (d) of this subsection;

(ii) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, or an individual or position having overall responsibility for environmental matters for the company; and

(iii) The written authorization is submitted to the Secretary.

c. Changes to authorization. If an authorization under subdivision (e) of this subsection is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of subdivision (e) of this subsection must be submitted to the Secretary prior to or together with any reports, information, or applications to be signed by an authorized representative.

d. Certification. Any person signing a document under subdivisions (d) or (e) of this subsection shall make the following certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

8. Additional Monitoring

If the Permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the DMR form WR-43. Such increased frequency shall also be indicated.

III. DEFINITIONS

For purposes of this permit, the following definitions shall apply.

Agency – means the Vermont Agency of Natural Resources.

Annual Average – means the highest allowable average of daily discharges calculated as the sum of all daily discharges (mg/L, lbs or gallons) measured during a calendar year divided by the number of daily discharges measured during that year.

Average – means the arithmetic means of values taken at the frequency required for each parameter over the specified period.

Bypass – means the intentional diversion of waste streams from any portion of the treatment facility.

The Clean Water Act – means the federal Clean Water Act, as amended (33 U.S.C. § 1251, et seq.).

Composite Sample – means a sample consisting of a minimum of one grab sample per hour collected during a 24-hour period (or lesser period as specified in the section on Monitoring and Reporting) and combined proportionally to flow over that same time period.

Daily Discharge – means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling.

For pollutants with limitations expressed in pounds the daily discharge is calculated as the total pounds of pollutants discharged over the day.

For pollutants with limitations expressed in mg/L the daily discharge is calculated as the average measurement of the pollutant over the day.

Discharge – means the placing, depositing, or emission of any wastes, directly or indirectly, into an injection well or into the waters of the State.

Grab Sample – means an individual sample collected in a period of less than 15 minutes.

Incompatible Substance – means any waste being discharged into the treatment works which interferes with, passes through without treatment, or is otherwise incompatible with said works or would have a substantial adverse effect on the works or on water quality. This includes all pollutants required to be regulated under the Clean Water Act.

Instantaneous Maximum – means a value not to be exceeded in any grab sample.

Major Contributing Industry – means one that: (1) has a flow of 50,000 gallons or more per average work day; (2) has a flow greater than five percent of the flow carried by the municipal system receiving the waste; (3) has in its wastes a toxic pollutant in toxic amounts as defined in standards issued under § 307(a) of the Clean Water Act; or (4) has a significant impact, either singly or in combination with other contributing industries, on a treatment works or on the quality of effluent from that treatment works.

Maximum Day or **Maximum Daily Discharge Limitation** – means the highest allowable "daily discharge" (mg/L, lbs or gallons).

Mean – means the arithmetic mean.

Monthly Average or **Average Monthly Discharge Limitation** – means the highest allowable average of daily discharges (mg/L, lbs or gallons) over a calendar month, calculated as the sum of all daily discharges (mg/L, lbs or gallons) measured during a calendar month divided by the number of daily discharges measured during that month.

NPDES –means the National Pollutant Discharge Elimination System.

Secretary – means the Secretary of the Agency of Natural Resources or the Secretary's duly authorized representative.

Septage – means the liquid and solid material pumped from a septic tank, cesspool, or similar domestic sewage treatment system, or a holding tank when the system is cleaned or maintained.

Untreated Discharge – means (1) combined sewer overflows from a WWTF; (2) overflows from sanitary sewers and combined sewer systems that are part of a WWTF during dry weather flows, which result in a discharge to waters of the State; (3) upsets or bypasses around or within a WWTF during dry or wet weather conditions that are due to factors unrelated to a wet weather storm event and that result in a discharge of sewage that has not been fully treated to waters of the State; and (4) discharges from a WWTF to separate storm sewer systems.

Waste – means effluent, sewage or any substance or material, liquid, gaseous, solid, or radioactive, including heated liquids, whether or not harmful or deleterious to waters.

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

Waters – means all rivers, streams, creeks, brooks, reservoirs, ponds, lakes, springs, and all bodies of surface waters, artificial or natural, which are contained within, flow through, or border upon the State or any portion of it.

Weekly Average or **Average Weekly Discharge Limitation** – means the highest allowable average of daily discharges (mg/L, lbs or gallons) over a calendar week, calculated as the sum of all daily discharges (mg/L, lbs or gallons) measured during a calendar week divided by the number of daily discharges measured during that week.

Whole Effluent Toxicity (WET) – means the aggregate toxic effect of an effluent measured directly by a toxicity test.

Wastewater Treatment Facility (WWTF) – means a treatment plant, collection system, pump station, and attendant facilities permitted by the Secretary for the purpose of treating domestic, commercial, or industrial wastewater.

IV. TABLE OF PERMITTED DISCHARGE POINTS

Discharge ID	Discharge Activity	Discharge Status	Receiving Water	Latitude	Longitude
001	Sanitary Waste Outfall	A	LITTLE RIVER	44.46145	-72.69281

ATTACHMENT A [65 CFR 42469, August 4, 1999]

Hardness (of receiving water, upstream of outfall)

Metals (total recoverable), cyanide and total phenols:
Antimony
Arsenic
Beryllium
Cadmium Chromium
Copper
Lead
Mercury
Nickel
Selenium
Silver
Thallium
Zinc
Cyanide
Total phenolic compounds

Volatile organic compounds:
acrolein
acrylonitrile
benzene
bromoform
carbon tetrachloride
chlorobenzene
chlorodibromomethane
chloroethane
2-chloroethylvinyl ether
chloroform
dichlorobromomethane
1,1-dichloroethane
1,2-dichloroethane
Trans-1,2-dichloroethylene
1,1-dichloroethylene
1,2-dichloropropane
1,3-dichloropropylene
ethylbenzene
methyl bromide
methyl chloride
methylene chloride
1,1,2,2-tetrachloroethane
tetrachloroethylene
toluene
1,1,1-trichloroethane
1,1,2-trichloroethane
trichloroethylene
vinyl chloride

Acid-extractable compounds:
p-chloro-m-cresol
2-chlorophenol2,4-dichlorophenol
2,4-dimethylphenol
4,6-dinitro-o-cresol
2,4-dinitrophenol
2-nitrophenol
4-nitrophenol
pentachlorophenol
phenol
2,4,6-trichlorophenol

Base-neutral compounds:
acenaphthene
acenaphthylene
anthracene
benzidine
benzo(a)anthracene
benzo(a)pyrene
3,4-benzofluoranthene
benzo(ghi)perylene
benzo(k)fluoranthene
bis(2-chloroethoxy)methane
bis(2-chloroethyl)ether
bis(2-chloroisopropyl)ether
bis(2-ethylhexyl)phthalate
4-bromophenyl phenyl ether
butyl benzyl phthalate
2-chloronaphthalene
4-chlorophenyl phenyl ether
chrysene
di-n-butyl phthalate
di-n-octyl phthalate
dibenzo(a,h)anthracene
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
3,3'-dichlorobenzidine
diethyl phthalate
dimethyl phthalate
2,4-dinitrotoluene
2,6-dinitrotoluene
1,2-diphenylhydrazine
fluroranthene
fluorene
hexachlorobenzene
hexachlorobutadiene
hexachlorocyclo-pentadiene
hexachloroethane
indeno(1,2,3-cd)pyrene
isophorone
naphthalene nitrobenzene
N-nitrosodi-n-propylamine
N-nitrosodimethylamine
N-nitrosodiphenylamine
phenanthrene
pyrene
1,2,4-trichlorobenzene

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
(August 2020)
Revised: October 2020

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

PERMIT NO: **3-1232**
PIN: **BR95-0001**
NPDES NO: **VT0100455**

NAME OF APPLICANT AND ADDRESS WHERE DISCHARGE OCCURS:

Town of Stowe
56 River Rd
Stowe, VT 05672

Approximate Facility Coordinates: Lat: **44.4592** Long: **-72.6946**

I. Facility and Proposed Action

The Secretary of the Vermont Agency of Natural Resources (hereinafter referred to as the "Secretary") received a renewal application for the permit to discharge into the designated receiving water from the above-named applicant on **July 9, 2013**. The facility's previous permit was issued on **February 27, 2009**. The previous permit (hereafter referred to as 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.

The facility is engaged in the treatment of municipal wastewater. *It is classified as a **Grade IV Domestic Major NPDES** WWTF.*

A map showing the location of the facility, outfalls and the receiving water is provided in the Reasonable Potential Determination (RPD) (see Attachment A).

II. Statutory and Regulatory Authority

A. Clean Water Act and NPDES Background

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

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

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

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

Receiving stream requirements are established according to numerical and narrative standards adopted under state law for each stream classification. When using chemical-specific numeric criteria from the State's water quality standards to develop permit limits, both the acute and chronic aquatic life criteria are used and expressed in terms of maximum allowable 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 Section 304(a) recommended water quality criteria, supplemented as necessary by other relevant information; or, in certain circumstances, based on an "indicator parameter." 40 CFR § 122.44(d)(1)(vi)(A-C).

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

1. Reasonable Potential Determination

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

1) Existing controls on point and non-point sources of pollution as evidenced by the Vermont surface water assessment database;

2) Pollutant concentration and variability in the effluent as determined from the permit application materials, monthly discharge monitoring reports (DMRs), or other facility reports;

3) Receiving water quality based on targeted water quality and biological assessments of receiving waters, as applicable, or other State or Federal water quality reports;

4) Toxicity testing results based on the Vermont Toxic Discharge Control Strategy, and compelled as a condition of prior permits;

5) Available dilution of the effluent in the receiving water, expressed as the instream waste concentration. In accordance with the applicable Vermont Water Quality Standards, available dilution for rivers and streams is based on a known or estimated value of the lowest average flow which occurs for seven (7) consecutive days with a recurrence interval of once in ten (10) years (7Q10) for aquatic life and human health criteria for non-carcinogens, or at all flows for human health (carcinogens only) in the receiving water. For nutrients, available dilution for stream and river discharges is assessed using the low median monthly flow computed as the median flow of the month containing the lowest annual flow. Available dilution for lakes is based on mixing zones of no more than 200 feet in diameter, in any direction, from the effluent discharge point, including as applicable the length of a diffuser apparatus; and

6) All effluent limitations, monitoring requirements, and other conditions of the proposed

draft permit.

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

B. Anti-Backsliding

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

III. Facility Information

a. History and Background

In November 2002, the Town completed construction of an expanded wastewater treatment facility that lead to an increase in design flow from 0.25 MGD to 1.0 MGD. The expansion included the addition of an influent equalization tank, a four basin Sequential Batch Reactor (SBR), four secondary solids contact clarifiers, an effluent filtration system and UV disinfection. The wastewater treatment facility provides wastewater treatment capacity for both existing residential and commercial properties and for new development, in areas that lie within and outside the existing sewer service area. The collection system was expanded in the late 1990's and early 2000's along with the WWTF upgrade. The collection system now includes development along the Mountain Road up to and including the Stowe Mountain Resort and the Trapp Family Lodge.

The facility collects *E. coli* and ammonia samples after the V-notch weir while samples for all other parameters are collected in the well prior to the weir. Due to engineering constraints, influent samples are collected in the influent line between the EQ tank and the SBRs. The EQ tank follows the headworks, therefore influent has been screened and grit has been removed prior to sample collection.

b. Pretreaters

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

Pretreater	**Discharge Activity**
Alchemist - Stowe	Food/Beverage Processing
Trapp Lager Brewery	Food/Beverage Processing

IV. Description of Discharge

The facility is engaged in the treatment of municipal wastewater including domestic commercial,

and industrial wastewaters. The wastewater treatment facility is a Sequential Batch Reactor. The design flow of the facility is 1.0 million gallons per day (MGD) and design BOD loading is 300 mg/l (2500 lbs/day). The average flow to the facility over the last 3 years is about 0.329 MGD.

The WWTF maintains a constant discharge to the **Little River**.

RECEIVING WATER: Little River

CLASSIFICATION: All uses Class B(2) 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.

V. Description of Receiving Water

The receiving water for this discharge is the **Little River**, a designated **Cold** Water Fish Habitat. At the point of discharge, the river has a contributing drainage area of 53.6 square miles. The summer 7Q10 flow of the river is estimated to be 10.7 cubic feet per second (CFS) and the summer Low Median Monthly flow is estimated to be 28.1 CFS. The instream waste concentration at the summer 7Q10 flow is 0.126 (12.6%) and the instream waste concentration at the summer Low Median Monthly flow is 0.052 (5.2%).

In addition, the **Little River** drains into Lake Champlain, which is impaired for phosphorus and is subject to a Total Maximum Daily Load (TMDL) for phosphorus. This is discussed further in Section VIII.C.1. of this Fact Sheet.

VI. 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.

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)).

VII. Limitations and Conditions

The draft permit contains limitations for effluent flow, biochemical oxygen demand, ultimate oxygen demand, total suspended solids, total phosphorus, settleable solids, Escherichia coli, total copper, Total Ammonia Nitrogen, and pH. It also contains monitoring requirements for total nitrogen, Total Kjeldahl Nitrogen, nitrate/nitrite and septage received. The effluent limitations of the draft permit and the monitoring requirements may be found on the following pages of the draft permit:

Effluent Limitations:	Pages 2-3 of 30
Monitoring Requirements:	Pages 4-5 of 30

VIII. Permit Basis and Explanation of Effluent Limitation Derivation

A. Flow – The draft permit maintains the annual average flow limitation of **1.00** MGD. This facility maintains a constant discharge. **Continuous** flow monitoring is required.

B. Conventional Pollutants

1. Biochemical Oxygen Demand (BOD_5) – The effluent limitations for BOD_5 remain unchanged from the current permit. The monthly average (30 mg/L) and weekly average (45

mg/L) reflect the minimum level of effluent quality specified for secondary treatment in 40 CFR Part 133.102. In addition, the draft permit contains a 50 mg/L, maximum day, BOD_5 limitation. This is the Agency standard applied to all such discharges pursuant to 13.4 c. of the Vermont Water Pollution Control Permit Regulations. The Secretary implements the 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 (168 lbs/day, monthly average and 252 lbs/day, weekly average) are calculated using the concentration limits outlined above. The BOD_5 weekly monitoring requirement is unchanged from the current permit.

2. **BOD, 5-Day (% Removal) -** The BOD_5 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.

2. **Ultimate Oxygen Demand (UOD)** - The UOD limit remains in place from the current permit. The UOD mass limitation is 300 lbs/day, maximum day, and is effective from June 1st through September 30th of each year.

   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:

   UOD (lbs/day) = [(BOD5 (lbs/day) x 1.43) + (TKN (lbs/day) x 4.57)]

   Calculation of the UOD concentration in the discharge is required weekly from the period of June 1st through September 30th. The sampling frequency is unchanged from the current permit. The BOD and TKN analyses used to calculate UOD must be conducted on the same effluent sample.

   Since receiving waters are the most sensitive to oxygen depleting wastes during periods of high water temperature and low flow, the UOD limitation is in effect from June 1st - September 30th 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.

   Based on assimilative capacity modeling conducted on the Little River, the Secretary previously determined the assimilative capacity of the Little River to be 400 lbs UOD/day during the summer period in the reach below the outfall of the Stowe WWTF. During a previous review of the design of the upgrade and expansion of the Stowe WWTF, it was determined that the facility was designed to reliably meet a maximum daily UOD discharge of 300 lbs UOD/day.

   TKN monitoring is required weekly during the period in which the UOD limit is in effect. The UOD analysis weekly frequency in the draft permit is unchanged from the previous permit.

3. **Total Suspended Solids (TSS)** – The effluent limitations for TSS remain unchanged from the current permit. The monthly average (30 mg/L) and weekly average (45 mg/L) reflect the minimum level of effluent quality specified for secondary treatment in 40 CFR Part 133.102. In addition, the draft permit contains a 50 mg/L, maximum day, TSS limitation. This is the Agency standard applied to all such discharges pursuant to 13.4 c. of the Vermont Water Pollution Control Permit Regulations. The Secretary implements the 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 (168 lbs/day, monthly average and 252 lbs/day, weekly average) are calculated using the concentration limits outlined above. TSS weekly monitoring requirement is unchanged from the current permit.

4. **Total Suspended Solids (% 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.

5. ***Escherichia coli*** – The draft permit contains an E. coli limit of 20/100 ml in order to protect the existing contact recreational uses identified in the Little River near the confluence with Gold Brook and near the Moscow Bridge. This limitation is unchanged from the previous permit. This limitation was derived by decreasing the original E. coli permit limitation established on December 23, 1993 of 77/100ml in proportion to the increase in flow from the expanded facility (from 0.25 MGD to 1.0 MGD, a four (4) times increase in flow). By using an E. coli limitation of 20/100ml, the instream risk associated with this discharge will be kept the same as the original 0.25 MGD discharge. E. coli monitoring is required once per week and is unchanged from the previous permit.

6. **pH** – The pH limitation remains at 6.5 - 8.5 Standard Units as specified in Section 29A-303(6) in the Vermont Water Quality Standards. Monitoring remains at daily.

7. **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).

C. <u>Non-Conventional and Toxics</u>

1. Total Phosphorus (TP)

Background:

Excess phosphorus entering Lake Champlain from a variety of sources has impaired the water quality of the lake. The Lake Champlain Total Maximum Daily Load (LC TMDL), 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's watershed. 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 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 significant (defined as being 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 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 million gallons per day (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 a WLA 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 limits for TP in their NPDES permit, as monthly effluent concentration limits.

Phosphorus Limit in Draft Permit:

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

This proposed draft permit contains a phosphorous effluent concentration limit of 0.8 mg/l, monthly average, and a mass effluent limit of 608 total pounds, annual limitation. The concentration effluent limitation is based on the requirements of 10 V.S.A. § 1266a and is unchanged from the current permit. The mass annual effluent limitation is based on the LC TMDLs. The LC TMDL allocated 0.276 metric tons per year or 608 pounds per year to the **Stowe** WWTF.

To convert units of the WLA from metric tons to pounds for the annual, mass-based TP permit limit, the following equation was used and the resulting WLA rounded down to the nearest pound:

(0.276 mt/yr) (2204.62lbs/mt) = 608 lbs/yr

The LC TMDL includes WLAs for WWTFs expressed as total annual mass loads. Compliance with the annual limit will be calculated each month using the Running Total Annual Pounds Calculation (Condition I.G.2.c. of the permit), rather than once at the end of the calendar year. The LC TMDL does not include monthly average concentration effluent limits for WWTFs. State law (10 V.S.A. 1266a) requires that, "No person directly discharging into the drainage basins of Lake Champlain or Lake Memphremagog shall discharge any waste that contains a phosphorus concentration in excess of 0.80 milligrams per liter on a monthly average basis." Therefore, in addition to the annual mass load effluent limitation required by the TMDL, the permit must also include a monthly average concentration limit for

phosphorus. While the WLA in the TMDL was calculated based on a TP effluent concentration of 0.20 mg/L, the permit does not include 0.20 mg/L as the concentration effluent limitation because a Permittee may not need to achieve 0.20 mg/L to ensure compliance with the WLA established in the TMDL. Rather the permit includes a monthly average concentration limit for phosphorus of 0.80 mg/L to ensure compliance with state law and to recognize seasonal variations in the facility's discharge. It is important to note that because the annual mass load and average monthly concentration limits are not mathematically consistent in the permit, meeting a 0.8 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.

Condition I.G.3.c. of this draft permit requires the submission of monitoring reports to the Secretary specific to tracking TP in the discharge. A report that documents the annual TP discharged from the facility, summarizes phosphorus removal optimization and efficiencies, and tracks trends relative to the previous year shall be attached to the December 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[1] 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[2], 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.

First, the State has largely met the milestones in the LC TMDL Accountability Framework[3] and is actively working to meet those that are still outstanding. For 2016, EPA has already given

[1] Available at: https://ofmpub.epa.gov/waters10/attains_impaired_waters.show_tmdl_document?p_tmdl_doc_blobs_id=79000
[2] The LC TMDL was issued June 17, 2016.
[3] For the Accountability Framework, see pages 54-59 of the LC TMDL.

Vermont an "excellent" report card for meeting milestones by December 30, 2016 (see below). For 2017, as outlined in the 2018 Vermont Lake Champlain Phosphorus Total Maximum Daily Loads Accountability Framework Report[4], the State has completed a majority of the milestones in the LC TMDL Accountability Framework due by December 30, 2017 and is actively working to complete those that are still outstanding. While not every milestone was completed by December 30, 2017, this is not sufficient to undermine the assumption that reductions in other sectors will occur in the future. For example, while the "Developed Lands General Permit" has not yet been issued, the State is actively working to adopt the rules necessary to issue and implement this permit, and the date by which applicants must apply for coverage under the permit – October 1, 2023 – has not changed. Thus, despite a delay in issuance of this permit, it is still appropriate to assume that reductions will be achieved in this sector based upon the timeframe envisioned when the LC TMDL was issued.

Second, the EPA's assessment of the State's progress under the LC TMDL has found that the State is making satisfactory progress. EPA's "overall assessment is that Vermont has made excellent progress in achieving the milestones in the [LC TMDL] Accountability Framework" through December 30, 2016.[5] EPA's next "report card" is expected within a couple months. If EPA finds that the State's progress is not satisfactory, EPA may, amongst other things, revise the TMDLs to reallocate additional load reductions from nonpoint to point sources (i.e. create more stringent WLAs). EPA has taken no such actions, but rather, has thus far provided positive assessment of the State's compliance with the LC TMDL Accountability Framework. Therefore, the State has nothing from EPA indicating that the assumptions upon which the WLA was developed are no longer reliable.

With so little time having passed since adoption of the LC TMDL, with the State having completed or working to complete milestones, and with positive reports thus far from EPA, 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.G.4. 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.

[4] Submitted by the State to EPA on March 7, 2018; available at: http://dec.vermont.gov/sites/dec/files/wsm/erp/docs/2018VermontLakeChamplainPhosphorusTMDLAccountabilityFrameworkReport.pdf

[5] Letter dated February 15, 2017 from EPA Acting Regional Administrator Deborah A. Szaro to Secretary of Natural Resources Julie Moore and Secretary of Agriculture, Food and Markets Anson Tebbetts.

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.G.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.

2. Total Nitrogen (TN)

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 Nitrate/Nitrite (NOx) and Total Kjeldahl Nitrogen (TKN) 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 8.34

where, TN (mg/L) = TKN (mg/L) + NO_x (mg/L)

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

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

Facilities with design flow greater than 1 MGD will complete monthly monitoring unless more frequent sampling is already required by the permit. Facilities with design flows less than 1 MGD will complete quarterly, unless more frequent sampling is already required by the permit.

Total Nitrogen monitoring remains at a monthly frequency for this facility.

For more information, see:
https://www.epa.gov/sites/production/files/documents/nandpfactsheet.pdf.

3. **Total Kjeldahl Nitrogen (TKN)** – TKN is the sum of nitrogen in the forms of ammonia (un-ionized (NH_3) and ionized (NH_{4+})), 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 monthly "monitor only" requirement has been included in the draft permit during the winter months and a weekly monitor requirement during the summer months was retained to support UOD calculations.

4. **Nitrate/Nitrite (NO_x)** – Nitrite and nitrate are oxygenated forms of nitrogen. To gather data on the amount of NO_x in this discharge and its potential impact on the receiving water, a monthly "monitor only" requirement is included in the draft permit.

5. **Total Ammonia Nitrogen (TAN)** – Ammonia has two forms of nitrogen, un-ionized (NH3) and ionized (NH_4^+)). TAN is the sum of both forms. A weekly monitoring requirement with a monthly average of 59.6 lbs/day during the summer months and a bi-weekly requirement of 201 lbs/day during the winter months has been included in the draft permit.

6. **Copper** – Based an investigation of the potential for heavy metals from this discharge to impact the receiving water conducted during the previous permit renewal, the Secretary determined that copper had a reasonable potential to cause an impact in the Little River. Consequently, a water quality based effluent limitation for Total Copper was previously established for this discharge.

   The draft permit contains a Total Copper daily maximum limit of 0.47 lbs/day and a monthly average limit of 0.33 lbs/day with monthly monitoring. With the exception of a small adjustment in in the monthly average limit from 0.34 to 0.33 lbs/day, limitations and the monitoring frequency are unchanged from the previous permit.

   Based on a review of the data reported on the WR-43 forms, reported Total Copper effluent values from the Stowe WWTF were at least one order of magnitude lower than the calculated limits. In order to facilitate future Reasonable Potential Determinations for Copper, a monitor only condition is included in the permit for daily maximum and monthly average total copper concentrations.

7. **Settleable Solids** – The 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 Section 29A-303(2) of the Vermont Water Quality Standards.

8. **Toxicity Testing** – 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. Per these federal requirements, the Permittee shall conduct WET testing and toxic pollutant analyses according to the schedule outlined in Section I.J of 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.

40 CFR Part 122.21(j)(4) requires all publicly owned treatment works (POTW) with flows greater than or equal to 1.0 MGD to complete a minimum of three samples in four and a half years for analysis of the pollutants listed in Table 2 of Appendix J, 40 CFR Part 122 (**ATTACHMENT A** to the permit) and submit the results to the Agency.

9. **Annual Constituent Monitoring -** For all facilities with a design flow of greater than 0.1 MGD, 40 CFR § 122.21(j) requires the submittal of effluent monitoring data for those parameters identified in Section I.C. of 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. Sampling in 2021 should be completed in **fall** (July1 to September 30). For subsequent sampling, the "Guidance for Annual Constituent Monitoring" document should be referred to determine the season in which samples should be taken each year.

D. Special Conditions

1. **Waste Management Zone (WMZ)** – As defined under 10 V.S.A. §1251(16), a WMZ is "a specific reach of Class B waters designated by a permit to accept the discharge of properly treated wastes that prior to treatment contained organisms pathogenic to human beings. Throughout the receiving waters, water quality criteria must be achieved but increased health risks exist due to the authorized discharge".

   The proposed permit retains the existing waste management zone (WMZ) that extends downstream from the outfall for approximately one and four-tenths miles in the **Little River**.

2. **Laboratory 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.

3. **Operation, Management, and Emergency Response Plans** – As required by the revisions to 10 V.S.A. Section 1278, promulgated in the 2006 legislative session, Section I.F has been included in the draft permit. This condition requires that the Permittee implement the Operation, Management, and Emergency Response Plans for the WWTF, sewage pump/ejector stations, and stream crossings as approved by the Agency on October 6, 2008. Updates to the inspection schedule will be approved by the Agency prior to issuing the final permit.

4. **Engineering Evaluation** – 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. The Stowe WWTF completed construction in circa 2000. The engineering evaluation for the WWTF is due in December 2024. The lower village pump station was built in 1978 and has upgrades but is the oldest part of the collection system. Approximately 60% of the total wastewater flow enters the WWTF through this pump station. The engineering evaluation for this pump station is due in December 2022.

5. **Emergency Power Failure Plan** – To ensure the facility can continue operations even 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.

6. **Electronic Reporting -** The EPA recently promulgated a final rule to modernize the Clean Water Act reporting for municipalities, industries, and other facilities by converting to an electronic data reporting system. The final rule 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 2016. The Secretary has created an electronic reporting system for DMRs and has recently trained facilities in its use. As of December 2020, these NPDES facilities will also be expected to submit additional information electronically as specified in Appendix A in 40 CFR part 127.

7. **Noncompliance Notification -** As required by the passage of 10 V.S.A. §1295, promulgated in the 2016 legislative session, Condition II.D.3. has been included in the proposed 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.

8. ***Weekend hours of operation –*** *Section I.A.3.(j) of the current permit required that the permittee "shall provide operational coverage at the facility during normal working hours (i.e. 8 hour workday) during weekends and holidays for the period of May 15 through September 15". This condition has been removed from the draft permit. The facility maintains a SCADA system that alerts operators of issues in real time. Moreover, it has been determined through inspections and reviews or the facility performance that operators do not need to provide weekend coverage of the WWTF during the summer months.*

9. ***UV monitoring requirements*** *– Section I.A.3.(j) of the current permit required that the permittee "maintain an alarm system on all components of the disinfection system and treatment units critical to the effective operation of the ultraviolet light disinfection system". This condition has been removed from the draft permit. The facility maintains a SCADA system that alerts operators of issues in real time. Moreover, it has been determined through inspections and reviews or the facility performance that the UV system has performed well*

since being installed. This condition is also covered under Section B.1. Proper Operation and Maintenance of the WWTF.

10. **Reopener -** This draft permit includes a reopener whereby the Secretary reserves the right to reopen and amend the permit to implement an integrated plan to address multiple Clean Water Act obligations.

A. Reasonable Potential Analysis

The Secretary has conducted a reasonable potential analysis, which is attached to this Fact Sheet as Attachment A. Based on this analysis, the Secretary has determined there is not a reasonable potential for the discharge to cause or contribute to a water quality violation, and as such, the development of additional WQBELs will not be necessary. 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.

IX. Procedures for Formulation of Final Determinations

*The public comment period for receiving comments on this draft permit extended from **August 20, 2020 through September 21, 2020**. The Town of Stowe requested Discharge Special Conditions I.3.j and I.3.k on page 4 of the draft permit be removed. Because of this change, the permit was put back out for public comment.*

*The second public comment period for receiving comments on this draft permit extended from **October 2, 2020 through November 2, 2020**. No comments were received.*

Attachment A

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: July 23, 2020

Subject: Reasonable Potential Determination for the Stowe WWTF Facility

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Facility Information:
Stowe Wastewater Treatment Facility
Stowe, VT
Permit No. 3-1232
NPDES No. VT0100455
Facility Location: 44.45926, -72.6946 (NAD 83)
Approximate Outfall Location: 44.4614, -72.6928 (NAD 83)

Receiving water: Little River

Hydrology:
Facility Design Flow: 1.000 MGD = 1.547 CFS
Estimated 7Q10[1] = 10.7 CFS
Estimated LMM[2] = 28.1 CFS
Instream Waste Concentration at 7Q10 Flow (IWC-7Q10) = 0.126 (>10%)
Instream Waste Concentration at Low Median Monthly Flow (IWC-LMM) = 0.052 (>1%)

The Town of Stowe owns and operates the Stowe Wastewater Treatment Facility which has flow equalization and fine screening, 4 sequencing batch reactors (SBRs) for secondary treatment, auto thermal aerobic digestion (ATAD), nitrification, biological phosphorus removal, clarification and filtration for additional phosphorus removal, and UV disinfection.

The Little River downstream of the Stowe 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 53.6 square miles. The existing permit waste management zone (WMZ) in the Little River begins at the outfall of the WWTF and extends downstream approximately 1.4 miles pursuant to 10 V.S.A., Section 1252.

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[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.

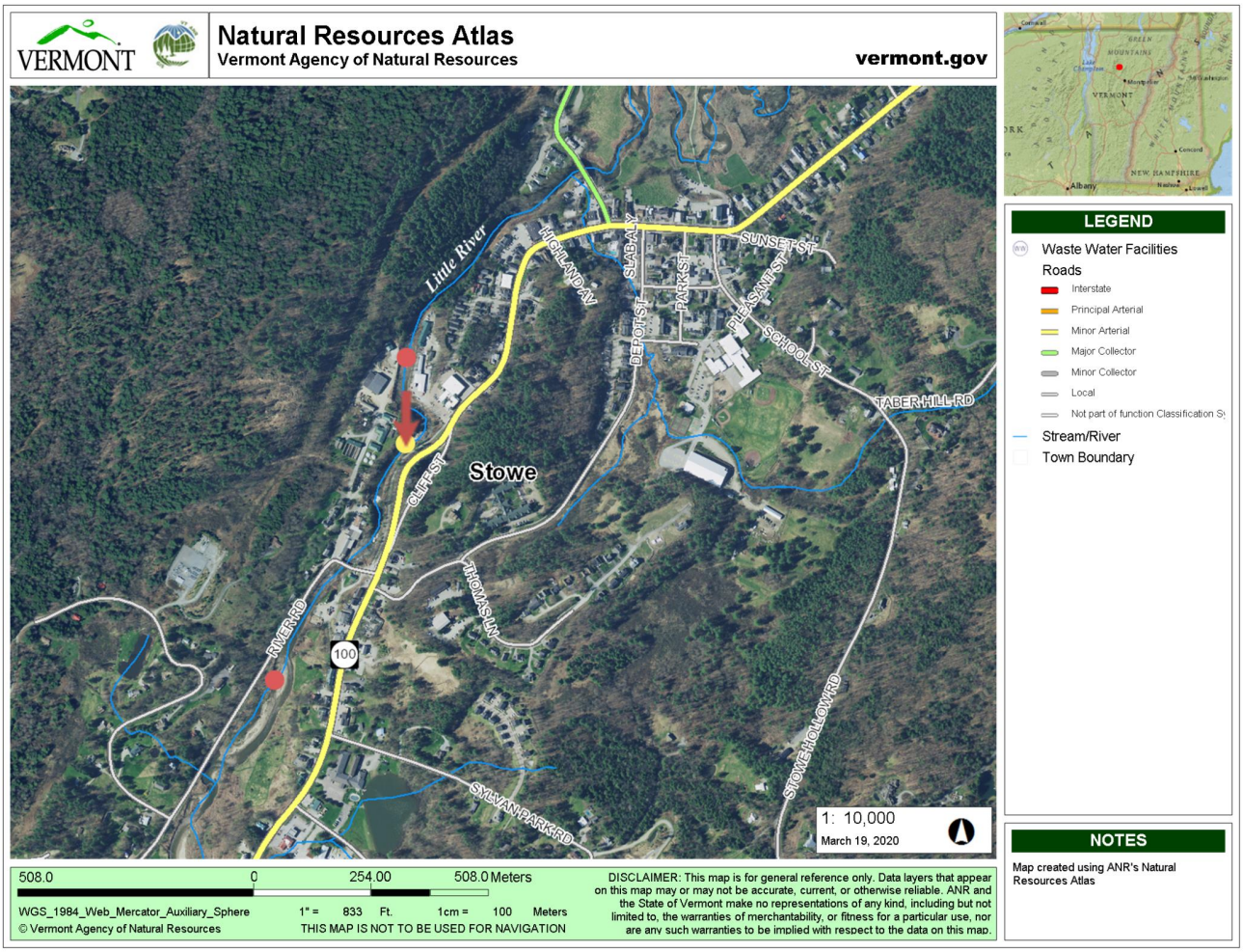

*Figure 1. Little River near the Stowe WWTF. The outfall location is represented by a yellow dot, and upstream (River Mile (RM) 12.2) and downstream (RM 11.8) monitoring locations are represented by red dots. Figure produced with the Vermont Agency of Natural Resources Natural Resource Atlas (*https://anrmaps.vermont.gov/websites/anra5/).

This memo is organized into the following sections:

- Summary of Effluent Data for the Stowe WWTF
- Biological Assessments and Ambient Chemistry Data for the Little River above and below the Stowe WWTF
- Assessment of Reasonable Potential of the Stowe WWTF discharge to exceed Vermont Water Quality Standards (VWQSs)

Effluent Data for the Stowe WWTF

Table 1a. Effluent Data for the Stowe WWTF from 3/31/2015 to 12/31/2019.

Parameter	Current Permit Limit	Minimum Value	Average Value	Maximum Value	n
Annual Flow (MGD)	1	0.221	0.32	0.427	58
Monthly Average BOD_5 (mg/L)	30	1.00	3.89	21.00	58
Monthly Average BOD_5 (lbs/day)	168	2.00	6.91	32.10	58
Ultimate Oxygen Demand (lbs/day) (summer)	300	11.50	38.64	183.90	25
pH	6.5-8.5	6.60	7.15	7.65	59
Monthly Average Total Suspended Solids (mg/L)	30	1.00	2.96	19.00	58
Monthly Average Total Suspended Solids (lbs/day)	168	1.70	5.23	19.84	58
Total Phosphorus (mg/l)	0.8	0.03	0.21	0.59	58
Total Phosphorus (lbs/year)	621	138.00	190.44	217.37	5
Total Nitrogen (mg/l)	monitor only	0.01	12.95	122.50	58
Total Nitrogen (lbs/day)	monitor only	0.02	31.48	108.00	58
Total Kjeldahl Nitrogen (mg/L)	monitor only	0.80	2.15	18.00	25
Total Kjeldahl Nitrogen (lbs/day)	monitor only	1.71	4.94	39.48	25
Total Ammonia (as N) (mg/L) (summer)	NA	0.22	0.32	0.50	3
Total Ammonia (as N) (lbs/day) (summer)	59.6	0.30	1.27	3.20	25
Total Ammonia (as N) (mg/L) (winter)	NA	0.50	0.50	0.50	1
Total Ammonia (as N) (lbs/day) (winter)	217	0.33	14.22	91.20	33
E.coli (CFU/100 ml)	20	1.00	1.64	19.00	58
Total Copper (lbs/day) Monthly Average	0.34	0.01	0.01	0.03	58
Total Copper (lbs/day) Max Day	0.47	0.01	0.02	0.07	58

Whole Effluent Toxicity Data Summary:

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

Table 1b. Whole Effluent Toxicity Test Results for the Stowe WWTF.

	Pimphales promelas				Ceriodaphnia dubia			
Test Start Date	Acute		Chronic		Acute		Chronic	
	NOEC %	LC50 %	NOEC %	LOEC %	NOEC %	LC50 %	NOEC %	LOEC %
9/19/2018					100	>100		
6/28/2017	100	>100						
1/20/2017					100	>100		
1/23/2015	50	89.1						
8/15/2014					100	>100		
11/8/2013	100	>100						
1/20/2012	25	63.6						
1/20/2010					100	>100		
8/5/2009	100	>100						

Analysis of the acute WET test data indicates that this facility's effluent does not contain toxic substances that cause acute toxicity in the receiving water. The IWC for this facility is 0.126 at 7Q10. The lowest observed acute No Observable Effect Concentration (NOEC) is 25% which is approximately ½ the concentration found in the receiving waters under 7Q10 and full design flow conditions.

To provide additional data for future assessments of WET reasonable potential, it is recommended that four 2-species (*Ceriodaphnia dubia* and *Pimephales promelas)* modified acute/chronic WET tests (48-hour acute endpoints within a 7 day chronic test) on a composite effluent sample collected from outfall serial number S/N 001 be included in the draft permit, during the summer (August/October 2022&2024) and during the winter (January/February 2021&2023). It is also suggested that concurrent sampling and analysis for ammonia and priority pollutants be conducted with each of these tests.

Biological Assessments and Ambient Chemistry Data for the Little River above and below the Stowe WWTF

MAP maintains the VTDEC assessment database, an EPA-required database which describes the conditions of Vermont's surface waters with respect to their attainment of VWQS. For the Little River segment to which this facility discharges, the database indicates the receiving water does not fully support all designated uses. MAP maintains the VTDEC assessment database, an EPA-required database which describes the conditions of Vermont's surface waters with respect to their attainment of VWQS. The Little River segment to which this facility discharges, from West Branch down to Reservoir is on the 2016 Stressed Waters List. The problems of channel instability, channel manipulation, urban/suburban development and the pollutants urban runoff and sediment prohibit the waters from attaining a higher water quality.

Biological Assessments:
Biological assessments were conducted above the facility at River Mile (RM) 12.2 by VTDEC on 9/23/2015 and below the facility at RM 11.8 on 9/23/2015. The 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 Little River, (RM 11.8& RM 12.2) near the Stowe WWTF outfall.

Little River Macroinvertebrate Site Summary											
Date	RM	Location	Density	Richness	EPT Richness	PMA-O	B.I.	Oligo.	EPT/EPT + Chiro	PPCS-F	Community Assessment
8/30/2005	11.8	Below	3988	62.0	32.0	74.1	4.23	0.10	0.58	0.51	Meets WQS
9/27/2010	11.8	Below	1711	56.0	27.0	89.5	3.48	2.41	0.87	0.56	Meets WQS
9/23/2015	11.8	Below	3104	62.0	33.0	68.9	4.22	1.29	0.92	0.59	Meets WQS
	12.2	Above	1472	57.0	32.0	91.1	3.94	0.27	0.88	0.53	Meets WQS
Full Support			≥ 300	≥ 30	≥ 18	≥ 45	≤ 5	≤ 12	≥ 0.45	≥ 0.4	
Indeterminate			≥ 250	≥ 28	≥ 16	≥ 40	≤ 5.15	≤ 14.5	≥ 0.43	≥ 0.35	
Non-Support			< 250	< 28	< 16	< 40	> 5.15	> 14.5	< 0.43	< 0.35	

Ambient Chemistry Data:
The most recent ambient chemistry data available from VTDEC sampling is from 8/6/2019, when surface waters were sampled above the outfall at River Mile (RM) 12.2 and below the outfall at RM 11.8. No data was available from LaRosa volunteers. The upstream sampling location is approximately 0.1 miles upstream and the downstream sampling location is approximately 0.3 miles downstream from the Stowe 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 flows based upon review of available streamflow observations. Thus, the data presented below are relevant for inclusion in this analysis. Water chemistry measures of relevant parameters for this assessment are summarized in Tables 3a and 3b.

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

Table 2a. Surface-water quality data above and below the Stowe Wastewater Treatment Facility collected by VTDEC.

Visit Date	Above or Below (A/ B)	RM	Water Temp (deg C)	pH	Alkalinity (mg/l)	Conductivity (umho/cm)	Hardness (mg/l as CaCO3)	DO (%)	DO (mg/l)	Turbidity (NTU)	Total Color (PCU)	Dissolved Inorganic Carbon (mg/l)	Dissolved Organic Carbon (mg/l)	Chloride (mg/l)	Total Phosphorus (ug/l)	Total Dissolved Phosphorus (ug/l)	Total Nitrogen (mg/l)	Total Ammonia Nitrogen (mg/l)	Total Nitrate/ Nitrite Nitrogen (mg/l)
8/30/2005	B	11.8	20.3	7.46	42.2	208.0	58.0	97.0	8.6	0.8	7.5	-	-	28.80	9.66	6.05	0.46	-	0.36
9/27/2010	A	12.2	13.7	7.20	31.6	140.0	42.3	79.1	8.1	0.7	10.0	-	-	17.40	9.30	7.71	0.19	<0.05	-
9/27/2010	B	11.8	14.1	7.55	38.6	183.0	50.0	86.1	8.7	0.7	10.0	-	-	24.80	12.40	10.20	0.59	<0.05	-
8/25/2014	B	11.8	-	-	-	-	-	-	-	-	-	-	-	-	9.68	-	0.35	<0.05	0.15
7/29/2015	A	12.2	18.4	7.26	-	166.0	-	96.0	8.6	0.8	-	-	-	-	7.08	-	0.37	-	0.34
7/29/2015	B	11.8	18.8	7.59	-	162.2	-	98.2	8.9	1.1	-	-	-	-	10.20	-	0.33	-	0.12
8/4/2015	A	12.2	18.8	7.25	-	194.4	-	89.3	8.1	0.7	-	-	-	-	7.29	-	0.38	-	0.52
8/4/2015	B	11.8	19.0	8.01	-	207.9	-	103.6	9.3	0.7	-	-	-	-	7.65	-	0.40	-	-
8/26/2015	A	12.2	18.4	7.36	-	169.9	-	89.0	8.1	1.8	-	-	-	-	11.20	-	0.37	<0.05	-
8/26/2015	B	11.8	18.6	7.67	-	192.2	-	93.8	8.6	1.4	-	-	-	-	17.70	-	0.55	<0.05	-
9/23/2015	A	12.2	13.4	7.26	39.5	177.8	59.0	86.2	9.0	1.1	15.0	-	-	28.36	7.54	-	0.21	<0.05	-
9/23/2015	B	11.8	13.8	7.66	43.0	199.6	65.1	96.1	10.0	1.2	15.0	-	-	32.18	10.00	-	0.32	<0.05	-
8/6/2019	A	12.2	17.3	7.42	39.0	207.8	50.8	93.0	8.6	1.3	20.0	8.96	1.84	30.75	9.00	-	0.34	<0.05	0.25
8/6/2019	B	11.8	17.4	7.65	42.5	232.5	60.0	95.1	8.7	0.8	20.0	9.07	2.30	34.00	16.00	-	0.39	-	0.38

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

Visit Date	Above or Below (A/ B)	RM	Water Temp (deg C)	pH	Conductivity (umho/cm)	Hardness (mg/l as CaCO3)	Total Aluminum (ug/l)	Total Antimony (ug/l)	Total Arsenic (ug/l)	Total Beryllium (ug/l)	Total Cadmium (ug/l)	Total Calcium (mg/l)	Total Chromium (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 Sulfate (mg/l)	Total Thallium (ug/l)	Total Zinc (ug/l)
8/30/2005	B	11.8	20.3	7.46	208	58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.80	-	-
9/27/2010	A	12.2	13.7	7.20	140	42	14	-	<1	-	<1	13.10	<5	<10	228	<1	2.33	84	-	<5	0.71	-	-	9.62	9.26	-	<50
9/27/2010	B	11.8	14.1	7.55	183	50	14	-	<1	-	<1	14.50	<5	<10	201	<1	3.33	74	-	<5	1.33	-	-	15.60	10.60	-	<50
8/25/2014	B	11.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7/29/2015	A	12.2	18.4	7.26	166	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7/29/2015	B	11.8	18.8	7.59	162	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8/4/2015	A	12.2	18.8	7.25	194	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8/4/2015	B	11.8	19.0	8.01	208	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8/26/2015	A	12.2	18.4	7.36	170	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8/26/2015	B	11.8	18.6	7.67	192	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9/23/2015	A	12.2	13.4	7.26	178	59	<50	<10	<1	<1	<1	18.05	<5	<10	334	<1	3.37	150	<5	<5	0.94	<5	<1	17.69	10.72	<1	<50
9/23/2015	B	11.8	13.8	7.66	200	65	<50	<10	<1	<1	<1	19.18	<5	<10	307	<1	4.17	126	<5	<5	1.36	<5	<1	22.06	11.71	<1	<50
8/6/2019	A	12.2	17.3	7.42	208	51	<20	-	-	-	-	15.66	-	-	277	-	2.84	168	-	-	0.85	-	-	18.74	9.79	-	-
8/6/2019	B	11.8	17.4	7.65	233	60	28	-	-	-	-	17.81	-	-	302	-	3.77	159	-	-	1.33	-	-	23.68	10.41	-	-

Assessment of Reasonable Potential of the Stowe WWTF discharge to exceed Vermont Water Quality Standards

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 4a, 4b and 5 present this analysis for the Stowe 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 Reporting Limit (RL) when data were censored at the Reporting Limit. The reporting limit (RL) is the minimum value reported as a detection.
- Effluent pollutant concentrations (C_e) were set to the maximum observed effluent concentrations * TSD 95th percentile multiplier over the last 5 years of data collected except for E. coli which was set at the instantaneous limit. The symbol C_{etsd} is used to represent this value.
- Winter and summer TAN limits were calculated at the highest observed pH and at assumed temperatures of 5°C and 25°C respectively.
- Hardness for determining hardness-dependent metal criteria is based upon the lowest observed downstream concentration.
- The facility uses UV for disinfection and therefore the RP of Chlorine was not assessed

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

Table 4a. Mass Balance for Ammonia, and E. coli around the Stowe WWTF

	Total Ammonia Nitrogen - Summer (mg/L)	Total Ammonia Nitrogen - Winter (mg/L)	*E.coli (CFU/100 ml)*	Notes
Qs (cfs)	10.73			*Estimated 7Q10 flow*
Qe (cfs)	1.547			*permitted effluent discharge*
Qr = Qs + Qe (cfs)	12.28			*Qs+Qe*
7Q10 IWC	0.126			*Qe/(Qs+Qe)*
Cs	0.03	0.03	0	*upstream pollutant concentration*
C_{etsd}	1.50	3.10	20	*effluent pollutant concentration adjusted by TSD factor (permit limit for E.coli)*
Cr = (CsQs+CetsdQe)/Qr	0.21	0.41	2.52	*resultant pollutant concentration in receiving water*
Temp (deg C)	25.00	5.00		*Values used in analysis.*
pH	8.01	8.01		*Values used in analysis.*
Hardness as $CaC0_3$ (mg/L)	50.00			*Min. Downstream Value*
Fish Habitat	Cold Water			*Fishery Type*
	Oncorhynchus (e.g., Rainbow trout) Present			*Additional Fishery Information*
VWQS Criteria (2017)				
Primary Contact Recreation			235	
Protection of Aquatic Biota - Acute	2.53	5.51		
Protection of Aquatic Biota - Chronic	1.39	4.43		
Exceedance Calculated?				
Primary Contact Recreation			NO	
Protection of Aquatic Biota - Acute	NO	NO		VWQS/EPA Aquatic Life Ambient Water Quality Criteria for Ammonia – Freshwater was updated in 2013.
Protection of Aquatic Biota - Chronic	NO	NO		

Table 4b. Mass Balance for Metals of Concern around the Stowe WWTF

		Metal (Total)											
	unit	Antimony	Arsenic	Beryllium	Cadmium	Chromium III	Copper	Lead	Nickel	Selenium	Silver	Thallium	Zinc
Hardness as $CaCO_3$	**mg/L**	50.00											
Qe	**cfs**	1.55											
Cetsd	**ug/L**	6.2	3.1	3.1	6.2	0.0	62	3.1	15.5	0.0	62.0	3.1	285.2
Cs (Average)	**ug/L**	5.0	0.5	0.5	0.5	2.5	5.0	0.5	2.5	2.5	0.5	0.5	25.0
Qr = Qs+Qe	**cfs**	12.28											
Cr = (QeCetsd+QsCs)/Qr	**ug/L**	5.2	0.8	0.8	1.2	2.2	12.2	0.8	4.1	2.2	8.3	0.8	57.8
Aquatic Biota Acute limit	**ug/L**	none	340	none	1.0	1022	7.3	33.8	261	5	1.1	none	66.6
Aquatic Biota Chronic limit	**ug/L**	none	150	none	0.5	48.8	5.2	1.3	29.0	3	-	none	66.6
Water Quality Standard Exceedances	**Cadmium exceeds the Aquatic Biota Acute limit. Cadmium exceeds the Aquatic Biota Chronic limit. Copper exceeds the Aquatic Biota Acute limit. Copper exceeds the Aquatic Biota Chronic limit. Silver exceeds the Aquatic Biota Acute limit.**												

Exceedances of VWQS were calculated for Cadmium, Copper, and Silver as shown in Table 4b. However, the data set used to perform the calculations is very limited in the number of measurements. The TSD method includes a large multiplier for single sample values and values calculated with that should be treated with caution. For these reasons there is no Reasonable Potential for Total Cadmium, Total Copper, or Total Silver. Additional monitoring data should be collected to improve the calculations by reducing uncertainty induced by the TSD statistical algorithm.

The existing permit contains mass limits for copper, but no concentration limits. As a result, a single data point was used for copper analysis. This point was based upon a lab result with an unusually high detection limit and a large TSD multiplicative factor. However, after performing a WQBEL calculation for Total Copper and a review of the data reported on the WR-43 forms, it became clear that the reported Total Copper Effluent values were generally at least one order of magnitude lower than the calculated limits. In order to facilitate future Reasonable Potential Determinations for Copper, a monitor only condition should be included in the permit for daily maximum and monthly average total copper concentrations.

Receiving water quality should continue to be monitored, and the potential for metals in the effluent to violate VWQS should be revisited as analysis methodology improves.

Nutrients

The results of mass balance calculations for Total Nitrogen and Total Phosphorus were calculated using Equation 1 are presented in Table 5 below.

Table 5. Assessment of Nutrients of Concern around the Stowe WWTF

	Total Phosphorus (ug/l)	Total Nitrogen (mg/l)	Notes
Qs (cfs)	28.08		*Estimated LMM flow*
Qe (cfs)	1.547		*permitted effluent discharge*
Qr = Qs + Qe (cfs)	29.63		*Qs+Qe*
IWC	0.0522		*Qe/(Qs+Qe)*
Cs	8.57	0.31	*upstream pollutant concentration (average)*
Cetsd	826	220.5	*effluent pollutant concentration adjusted by TSD method.*
Cr = (CsQs+CetsdQe)/Qr	51.3	11.8	*calculated resultant downstream pollutant concentration*
Stream Type	B2 Medium, High-Gradient		
Calculated Instream Contribution from Effluent	42.6	11.5	*difference between observed upstream concentration and calculated resultant downstream concentration. Mass Balance Method*
VWQS Criteria (2017)		None for Streams	
Threshold Criteria	15		
VWQS Exceeded?	Yes		

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 Ammonia Nitrogen (TAN) and Total Kjeldahl Nitrogen (TKN) are suggested for inclusion 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 (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).

The range and average concentrations of Total Nitrogen in the Stowe WWTF discharge from 3/31/2015 to 12/31/2019 are presented in Table 1 and the mass balance of Total Nitrogen around the facility is presented in Table 5 above. The calculated change in the in-stream Total Nitrogen concentration attributable to the Stowe WWTF effluent is 11.5 mg/l.

Total Ammonia:
The previous permit was issued prior to the promulgation of the 2013 EPA Aquatic Life Criteria for Ammonia – Freshwater. Although no RP was calculated based upon the reported effluent data it was necessary to compare the existing Total Ammonia limits to the new WQS. This was done on a seasonal basis and new Monthly Average Daily load limits for both the summer and winter should be included. The spreadsheet with these calculations is available as part of the permit record upon request.

The existing Maximum Day loads should be retained, as well as the Summer Monthly Average load. The new Winter (November 1 to May 31) Monthly Average Daily Load permit limit for Total Ammonia should be 201 lbs.

Maximum daily and weekly average monitor only requirements for Total Ammonia concentrations should be added to the new permit. These values are already collected on the WR-43 forms and it would be helpful to have them reported monthly.

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 Little River are greater than the 2017 nutrient criteria threshold of 15ug/L Total Phosphorus in a Class B Medium, High-Gradient stream. The calculated change in the in-stream TP concentration attributable to the Stowe WWTF is 42.6 ug/L. This calculation is presented above in Table 5.

Total Phosphorus Nutrient Response Conditions Analysis:

The Combined Nutrient Response Conditions for Aquatic Biota and Wildlife in Rivers and Streams at RM 11.8 on 8/6/2019 meets VWQS for pH, meets VWQS for Turbidity , meets VWQS for Dissolved Oxygen and meets VWQS for Aquatic Biota as shown below in Table 6. Therefore, the narrative standard presented in §3-01.B.2 of the VWQS is supported and the receiving waters are in compliance with VQWS for Total Phosphorus but is still be subject to limits proscribed by VSA 1266a or a Phosphorus TMDL.

Table 6. Assessment of Phosphorus Response Variables around the Stowe WWTF

Response variable (VWQS reference)	Target Value	River-mile: 12.2 (Upstream) 8/6/2019	River-mile: 11.8 (Downstream) 8/6/2019
pH (§3-01.B.9)	6.5-8.5 s.u.	*7.42*	*7.65*
Turbidity (§3-04.B.1)	< 10 NTU at low mean annual flow	*1.26*	*0.84*
Dissolved Oxygen (min) (§3-04.B.2)	>6 mg/L and 70% saturation	*8.57 (93%)*	*8.66 (95.1%)*
Aquatic biota, based on macroinvertebrates.	Attaining an assessment of good, or better.	*Meets WQS*	*Meets WQS*

Total Phosphorus Reasonable Potential Determination:

The numeric criteria for TP are exceeded by when calculated at this facility's full design flow and with the receiving water at 7Q10 conditions. The narrative criteria for TP are satisfied and therefore this facility does not have reasonable potential to violate VWQS.

This facility is subject to the 2016 Lake Champlain Phosphorus TMDL. That document reduces the facility's Annual Waste Load Allocation to 0.276 mt/year or 608 lbs/year.

Summary of Reasonable Potential Determinations

Calculations indicate that Total Copper continues to have reasonable potential and the existing limit should be retained and consideration should be paid to including concentration limits in addition to mass limits.

Calculations indicate that the discharge of TP may contribute to TP concentrations in the receiving water greater than the numeric thresholds listed in the VWQS. However, because the narrative standard associated with Total Phosphorus is met, there is not RP exists for Total Phosphorus to exceed the numeric VWQS in the receiving water. Continued or additional monitoring should be considered.

Recommended Biological and Water Quality Monitoring:

As biological monitoring results indicate attainment of all 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.

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:

- Four 2-species (*Pimephales promelas* and *Ceriodaphnia dubia*) 48-hour acute and 96-hour chronic WET tests on composite effluent samples should be conducted in the upcoming permit cycle: twice during the winter (January/February 2021 and 2023) and twice during the summer (August/October 2022 and 2024). Ammonia and Appendix J testing should be conducted concurrently with the WET tests. These tests should replace the current Acute only tests in the current permit.

- Total Phosphorus should continue to be sampled weekly to ensure compliance with the new Monthly Average Total Phosphorus limit of 0.8 mg/l and Annual Waste Load Allocation of 0.276 mt or 608 lbs.

- The existing Total Ammonia limits should be revised to reflect the updated VWQS based upon the 2013 EPA Freshwater Criteria. The existing Summer Daily Maximum and Monthly Average Loads of 59.5 lbs/day should be retained. The existing Winter Daily Maximum Loads of 217 lbs/day should be retained. The Winter Monthly Average Daily Loads should be revised to 201 lbs/day. Maximum daily and weekly average monitor only requirements for Total Ammonia concentrations should be added to the new permit. Ammonia testing should be conducted concurrently with WET tests when WET testing occurs. Winter is defined as November 1-May 31 and Summer as June 1-October 31.

- Maximum Day and Monthly Average monitor only requirements should be added for Total Copper Concentration. This data is already collected by the facility and no additional laboratory costs are associated with these monitor only requirements. The Monthly Average daily load should be reduced to 0.33 lbs/day to reflect changes in methodology.

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, and as such, the development of additional WQBELs will not be necessary. 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.

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Watershed Management Division
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MEMORANDUM

Prepared by: John Merrifield, Wastewater Program (WWP)

Cc: Amy Polaczyk, Manager, WWP
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Rick Levey, MAP

Date: April 13, 2020

Subject: WQBEL Permit Limit Review and Calculations for the Stowe WWTF Facility (3-1232)

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

	WQBEL Discharge Limitations									
	Annual Average	Annual Limit	Monthly Average	Weekly Average	Maximum Day	Monthly Average	Weekly Average	Maximum Day	Instantaneous Maximum	Sampling Frequency
Effluent Characteristics (Constituents)		lbs/year	Mass (lbs/day)			Concentration (mg/L)				(per month)
Total Ammonia Nitrogen as N (summer)			59.6		59.6	Monitor Only		Monitor Only		Weekly (4)
Total Ammonia Nitrogen as N (winter)			201		217	Monitor Only		Monitor Only		Twice a Month (2)
Total Copper			0.33		0.47	Monitor Only		Monitor Only		Monthly (1)
Total Phosphorus		608.5				0.8				Weekly (4)

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, TKN, TN, 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 in the calculation spreadsheet 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 Ammonia Nitrogen as N (Summer)

The existing seasonal summer Maximum Day and Monthly Average limits of 59.6 lbs/day are retained from the previous limit. Summer limits apply between June 1 and October 31. Monitor only limits for Maximum Day and Monthly Average concentrations should be added to the permit to facilitate future data analysis. These values are already analyzed and will not result in additional laboratory costs. Since the issuance of the last permit new water quality standards for ammonia have been adopted. New limit calculations were performed based upon the 2013 EPA Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater and compared to the existing permit limits. Existing limits were found be to more protective of water quality than the newly calculated ones and are therefore retained.

2. Total Ammonia Nitrogen as N (Winter)

A new Monthly Average limit of 201 lbs/day for Total Ammonia Nitrogen as N (Winter) is proposed based upon the 2013 EPA Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater. The existing Maximum Day limit of 217 lbs/day should be retained. The existing permit limits were based upon older water quality standards for Total Ammonia Nitrogen. Winter limits apply between November 1 and May 31. Monitor only limits for Maximum Day and Monthly Average concentrations should be added to the permit to facilitate future data analysis. These values are already analyzed and will not result in additional laboratory costs.

3. Total Copper

The existing Maximum Day limit of 0.47 lbs/day for Total Copper is protective of VWQS and should be retained. A new Monthly Average limit of 0.33 lbs/day for Total Copper should be included in the permit. This limit is slightly lower than the existing limit due to an assumed upstream Total Copper concentration of 5% of the VWQS. Monitor only limits for Maximum Day and Monthly Average concentrations should be added to the permit to facilitate future data analysis. These values are already analyzed and will not result in additional laboratory costs.

4. Total Phosphorus

This facility has been assigned an Annual Limit of 608.5 lbs of Total Phosphorus in the Lake Champlain Phosphorus TMDL. This facility is subject to 10 VSA 1266a which limits the discharge of Total Phosphorus to a Monthly Average of 0.80 mg/l. These limits should be included in the permit.

Agency of Natural Resources
Department of Environmental Conservation
Watershed Management Division
One National Life Drive, Main Building, 2nd Floo
Montpelier, VT 05620-3522

Permittee:	
NPDES Permit No.	
Preparer/Contact:	
Telephone:	
Email:	
Month/Year:	

Total Phosphorus Waste Load Allocation from Lake Champlain Phosphorus TMDL:		metric tons/year lbs/year	Select your facility in the pulldown list next to Permittee above.
Monthly Average TP concentration		mg/L	Enter this value from WR-43.
Monthly Average Daily Flow Rate		MGD	Enter this value from WR-43.
Number of days with discharge		days	Enter the number of days with discharge.
Average TP Concentration * Average Flow Rate * Days of Discharge * 8.34	0.00	lbs	Pounds of Phosphorus discharged this month.
12 Month Running Total Pounds of Phosphorus		lbs/year	Enter the 12 Month Running Total Pounds of Phosphorus.
12 Month Running Total / Waste Load Allocation * 100		%	Percentage of Annual Phosphorus Load from TMDL

This form should be submitted monthly by facilities that have a Total Phosphorus Waste Load Allocation under the Lake Champlain Phosphorus TMDL. If you have a permit issued before 2017 DO NOT USE this form.

Notes: