

AGENCY OF NATURAL RESOURCES  
DEPARTMENT OF ENVIRONMENTAL CONSERVATION  
WATERSHED MANAGEMENT DIVISION  
ONE NATIONAL LIFE DRIVE, DAVIS BUILDING, 3<sup>rd</sup> FLOOR  
MONTPELIER, VT

Permit Number: 3-1195  
PIN: BR95-0077  
NPDES Number: VT0100471

Applicant Contact: Village of Marshfield  
PO Box 244  
Marshfield, VT 05658

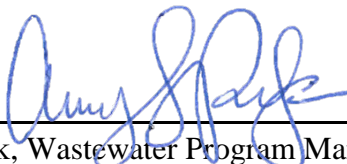
Facility Name: Marshfield Wastewater Treatment Facility  
Facility Address: 232 School Street Marshfield, VT 05658  
Facility Coordinates: Lat: 44.34852 Long: -72.35622

Expiration Date: December 31, 2025  
Reapplication Date: June 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), the federal Clean Water Act as amended (33 U.S.C. § 1251 *et seq.*), and implementing federal regulations, the Village of Marshfield (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 Marshfield Wastewater Treatment Facility (hereinafter referred to as the "WWTF") to the Winooski River in accordance with the following conditions.

This permit shall be effective on March 1, 2021

Peter Walke, Commissioner  
Department of Environmental Conservation

By:   
Amy Polaczyk, Wastewater Program Manager  
Watershed Management Division

Date: 2/11/2021

## I. PERMIT SPECIAL CONDITIONS

### A. EFFLUENT LIMITS AND MONITORING REQUIREMENTS

**1. Discharge Point S/N 001, Lat. 44.34925, Long. -72.35791:** During the term of this permit, the Permittee is authorized to discharge from outfall S/N 001 of the Marshfield WWTF to the Winooski River, an effluent for which the characteristics shall not exceed the values listed below:

| Discharge Monitoring                                 |                                     |                             |                              |                             |                       |                            |
|--|-------------------------------------|-----------------------------|------------------------------|-----------------------------|-----------------------|----------------------------|
| Constituent;<br>Sampling Point<br>and Sample Type    | Season and<br>Sampling<br>Frequency | Limit 1                     | Limit 2                      | Limit 3                     | Limit 4               | Limit 5                    |
| Flow;<br>Effluent; Continuous                        | Year Round<br>Daily                 | Monitor MGD<br>Monthly Avg  |                              |                             |                       |                            |
| BOD, 5-Day;<br>Influent; 8 Hour Comp                 | Year Round<br>Monthly               |                             |                              | Monitor mg/l<br>Monthly Avg |                       |                            |
| BOD, 5-Day;<br>Effluent; 8 Hour Comp                 | Year Round<br>Monthly               | 11.3 lbs/day<br>Monthly Avg | 16.9 lbs/day<br>Weekly Avg   | 30 mg/l<br>Monthly Avg      | 45 mg/l<br>Weekly Avg | 50 mg/l<br>Daily Max       |
| Chlorine, Total Residual;<br>Effluent; Grab          | Year Round<br>Daily                 |                             |                              |                             | 1 mg/l<br>Weekly Avg  | 2 mg/l<br>Instant Max      |
| E. Coli;<br>Effluent; Grab                           | Year Round<br>Monthly               |                             |                              |                             |                       | 77 #/100 ml<br>Instant Max |
| Nitrite Plus Nitrate Total;<br>Effluent; 8 Hour Comp | 01/01 - 03/31<br>Quarterly          |                             |                              |                             |                       | Monitor mg/l<br>Daily Max  |
| Nitrite Plus Nitrate Total;<br>Effluent; 8 Hour Comp | 04/01 - 06/30<br>Quarterly          |                             |                              |                             |                       | Monitor mg/l<br>Daily Max  |
| Nitrite Plus Nitrate Total;<br>Effluent; 8 Hour Comp | 07/01 - 09/30<br>Quarterly          |                             |                              |                             |                       | Monitor mg/l<br>Daily Max  |
| Nitrite Plus Nitrate Total;<br>Effluent; 8 Hour Comp | 10/01 - 12/31<br>Quarterly          |                             |                              |                             |                       | Monitor mg/l<br>Daily Max  |
| Nitrogen, Kjeldahl Total;<br>Effluent; 8 Hour Comp   | 01/01 - 03/31<br>Quarterly          |                             |                              |                             |                       | Monitor mg/l<br>Daily Max  |
| Nitrogen, Kjeldahl Total;<br>Effluent; 8 Hour Comp   | 04/01 - 06/30<br>Quarterly          |                             |                              |                             |                       | Monitor mg/l<br>Daily Max  |
| Nitrogen, Kjeldahl Total;<br>Effluent; 8 Hour Comp   | 07/01 - 09/30<br>Quarterly          |                             |                              |                             |                       | Monitor mg/l<br>Daily Max  |
| Nitrogen, Kjeldahl Total;<br>Effluent; 8 Hour Comp   | 10/01 - 12/31<br>Quarterly          |                             |                              |                             |                       | Monitor mg/l<br>Daily Max  |
| Nitrogen, Total;<br>Effluent; Calculated             | 01/01 - 03/31<br>Quarterly          |                             | Monitor lbs/day<br>Daily Max |                             |                       | Monitor mg/l<br>Daily Max  |
| Nitrogen, Total;<br>Effluent; Calculated             | 04/01 - 06/30<br>Quarterly          |                             | Monitor lbs/day<br>Daily Max |                             |                       | Monitor mg/l<br>Daily Max  |
| Nitrogen, Total;<br>Effluent; Calculated             | 07/01 - 09/30<br>Quarterly          |                             | Monitor lbs/day<br>Daily Max |                             |                       | Monitor mg/l<br>Daily Max  |
| Nitrogen, Total;<br>Effluent; Calculated             | 10/01 - 12/31<br>Quarterly          |                             | Monitor lbs/day<br>Daily Max |                             |                       | Monitor mg/l<br>Daily Max  |

|  |  |                                     |                                      |                                     |                               |                               |
|--|--|-------------------------------------|--------------------------------------|-------------------------------------|-------------------------------|-------------------------------|
| <b>pH;<br/>Effluent; Grab</b>  | <b>Year Round<br/>Daily</b>                  |                                     |                                      | <b>6.5 s.u.<br/>Min</b>             |                               | <b>8.5 s.u.<br/>Max</b>       |
| <b>Phosphorus, Total;<br/>Effluent; Calculated</b>                           | <b>Year Round<br/>Monthly</b>                | <b>Monitor lbs<br/>Annual Total</b> | <b>Monitor lbs<br/>Monthly Total</b> | <b>Monitor %<br/>Monthly Total</b>  |                               |                               |
| <b>Phosphorus, Total;<br/>Effluent; 8 Hour Comp</b>                          | <b>Year Round<br/>Monthly</b>                |                                     |                                      | <b>Monitor mg/l<br/>Monthly Avg</b> |                               |                               |
| <b>Settleable Solids;<br/>Effluent; Grab</b>                                 | <b>Year Round<br/>Daily</b>                  |                                     |                                      |                                     |                               | <b>1 ml/l<br/>Instant Max</b> |
| <b>Suspended Solids, Total;<br/>Effluent; 8 Hour Comp</b>                    | <b>Year Round<br/>Monthly</b>                | <b>16.9 lbs/day<br/>Monthly Avg</b> | <b>16.9 lbs/day<br/>Weekly Avg</b>   | <b>45 mg/l<br/>Monthly Avg</b>      | <b>45 mg/l<br/>Weekly Avg</b> | <b>50 mg/l<br/>Daily Max</b>  |
| <b>Suspended Solids, Total;<br/>Influent; 8 Hour Comp</b>                    | <b>Year Round<br/>Monthly</b>                |                                     |                                      | <b>Monitor mg/l<br/>Monthly Avg</b> |                               |                               |
| <b>Additional Monitoring</b>   |  |                                     |                                      |                                     |                               |                               |
| <b>Constituent;<br/>Sampling Point<br/>and Sample Type</b>                   | <b>Season and<br/>Sampling<br/>Frequency</b> | <b>Limit 1</b>                      | <b>Limit 2</b>                       | <b>Limit 3</b>                      | <b>Limit 4</b>                | <b>Limit 5</b>                |
| <b>Flow;<br/>Annual Average;<br/>Calculated</b>                              | <b>12/01 - 12/31<br/>Annual</b>              | <b>0.045 MGD<br/>Annual Avg</b>     |                                      |                                     |                               |                               |
| <b>BOD, 5-Day (%R);<br/>Percent Removal;<br/>Calculated</b>                  | <b>Year Round<br/>Monthly</b>                |                                     |                                      | <b>85 %<br/>Monthly Min</b>         |                               |                               |
| <b>Phosphorus, Total;<br/>Annual Average;<br/>Calculated</b>                 | <b>12/01 - 12/31<br/>Annual</b>              | <b>685 lbs/yr<br/>Annual Total</b>  |                                      |                                     |                               |                               |
| <b>Suspended Solids, Total<br/>(%R);<br/>Percent Removal;<br/>Calculated</b> | <b>Year Round<br/>Monthly</b>                |                                     |                                      | <b>85 %<br/>Monthly Min</b>         |                               |                               |

## 2. Discharge Sampling Points

- a. Effluent sampling: The Permittee shall collect samples in the chlorine contact tank, after the effluent receives disinfection and flows through the weir.
- b. Influent sampling: The Permittee shall collect samples at the wet well of the onsite pump station.

## 3. Discharge Special Conditions

- a. The Permittee shall calculate monthly average flow 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.
- b. The Permittee shall operate the facility to meet the concentration limitations or pounds limitation, whichever is more restrictive.
- c. Total nitrogen (TN) shall be reported as pounds TN and calculated as:  $TN \text{ (mg/L)} \times \text{Total Daily Flow} \times 8.34$ ; where,  $TN \text{ (mg/L)} = TKN \text{ (mg/L)} + NOx \text{ (mg/L)}$ .

- d.** Total Phosphorus shall be reported as Total Monthly Pounds, Running Total Annual Pounds, and Percentage of Running Total Annual Pounds to Annual Permit Limitation.
- e.** Composite samples for BOD<sub>5</sub>, TSS, TP, TKN, and NO<sub>x</sub> shall be taken during the hours of 6:00 AM to 6:00 PM, unless otherwise specified. Eight hours is the minimum period for the composite, 24 hours is the maximum for the composite.
- f.** The Permittee shall collect settleable solids samples between 5:00 AM and 6:00 PM or during the period of peak flow.
- g.** The Permittee shall collect the monthly E. coli sample at the same time and location as the daily Total Residual Chlorine sample. The Permittee shall collect samples between the hours of 6:00 AM and 6:00 PM.
- h.** The monthly average concentrations of BOD<sub>5</sub> and TSS in the effluent shall not exceed 15 percent of the monthly average concentrations of BOD<sub>5</sub> and TSS in the influent into the WWTF.
- i.** 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.
- j.** 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  $\pm 10\%$ .
- k.** The effluent shall not cause visible discoloration of the receiving waters.
- l.** 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.
- m.** 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.
- n.** 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.

## **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 Winooski River downstream one mile.

## **C. EMERGENCY POWER FAILURE PLAN**

The current Emergency Power Failure Plan for the facility was submitted on December 7, 2005 and it was approved by the Secretary on December 29, 2005.

**1.** The Permittee shall revise the Emergency Power Failure Plan and 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   |
|----------|---|
| 6/1/2021 | The Permittee shall submit a revised Emergency Action Power Failure Plan. |

## **D. ENGINEERING EVALUATION AND REPORT/ASSET MANAGEMENT PLAN**

The current Engineering Evaluation for the facility was submitted on February 23, 2004 and it was approved by the Secretary on March 30, 2004.

**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.

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**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   |
|------------|---|
| 12/31/2024 | The Permittee shall submit an engineering evaluation prepared by a professional engineer. |

**E. OPERATION MANAGEMENT AND EMERGENCY RESPONSE PLAN (OMERP)**

The Operation Management and Emergency Response Plan (OMERP) for the sewage collection system was submitted on July 1, 2010. Through issuance of this permit the Secretary approves the inspection schedule for the plan. The Permittee shall implement in accordance with that schedule.

The Permittee shall revise the plan upon the Secretary’s request or on its own motion to reflect equipment or operational changes.

The OMERP for the treatment facility, sewage pumping stations, and sewer line stream crossings was submitted on December 31, 2008 and it was approved by the Secretary on January 5, 2009.

**1.** The Permittee shall prepare and submit to the Secretary for review and approval, an updated OMERP for the treatment facility, sewage pumping stations, and sewer line stream crossings. 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.

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

| Due Date   | Event Description                           |
|------------|---|
| 12/31/2022 | The Permittee shall submit a revised OMERP. |

## F. 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:  

$$\% = \text{Running Total Annual Pounds} / \text{Annual TP Permit Limit} \times 100$$

### 3. Phosphorus Optimization Plan (POP)

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/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;

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- (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   |
|-----------|---|
| 10/1/2021 | The Permittee shall submit a Phosphorus Optimization Plan (POP).  |
| 12/1/2021 | The Permittee shall commence implementation of the POP 60 days after submittal to the Secretary.                        |
| 1/31/2023 | The Permittee shall submit an annual report that documents TP trends and optimization techniques for the previous year. |
| 1/31/2024 | The Permittee shall submit an annual report that documents TP trends and optimization techniques for the previous year. |
| 1/31/2025 | The Permittee shall submit an annual report that documents TP trends and optimization techniques for the previous year. |

### **G. 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 proficiency test results. |
| 12/31/2022 | The Permittee shall submit passing proficiency test results. |
| 12/31/2023 | The Permittee shall submit passing proficiency test results. |
| 12/31/2024 | The Permittee shall submit passing proficiency test results. |
| 12/31/2025 | The Permittee shall submit passing proficiency test results. |

## H. ANNUAL SLUDGE DEPTH MONITORING

1. Annually, The Permittee shall submit sludge depth monitoring results for the samples taken during August, September, or October. The results of the sludge measurements and a copy of a plan depicting the grid location of the measurements shall be submitted with the applicable Discharge Monitoring Report (DMR) form WR-43.
2. In the event this permit is administratively continued pursuant to 3 V.S.A. § 814, the Permittee shall continue to monitor sludge depths as required above.
3. The Permittee shall submit report to the schedule table below:

| Due Date   | Event Description  |
|------------|--|
| 11/15/2021 | The Permittee shall submit annual sludge depth results for the samples taken during August, September, or October. |
| 11/15/2022 | The Permittee shall submit annual sludge depth results for the samples taken during August, September, or October. |
| 11/15/2023 | The Permittee shall submit annual sludge depth results for the samples taken during August, September, or October. |
| 11/15/2024 | The Permittee shall submit annual sludge depth results for the samples taken during August, September, or October. |
| 11/15/2025 | The Permittee shall submit annual sludge depth results for the samples taken during August, September, or October. |

## I. WHOLE EFFLUENT TOXICITY TESTING (WET) ACUTE

1. The Permittee shall conduct two-species (*Pimephales promelas* and *Ceriodaphnia dubia*) acute WET tests 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. The Permittee 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;  
or

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

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

| Due Date   | Event Description  |
|------------|--|
| 12/31/2021 | The Permittee shall submit the WET test results for the sample taken during August-October 2021.   |
| 6/30/2023  | The Permittee shall submit the WET test results for the sample taken during January-February 2023. |

## **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 as required in 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 online 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.

**Attachment A.**

| Discharge ID | Discharge Activity     | Discharge Status | Receiving Water | Latitude | Longitude |
|--------------|------------------------|------------------|-----------------|----------|-----------|
| 001          | Sanitary Waste Outfall | A                | Winooski River  | 44.34925 | -72.35791 |

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

**FACT SHEET FOR PERMIT  
December 2020**

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

**PERMIT NO:** 3-1195  
**PIN:** BR95-0077  
**NPDES NO:** VT0100471

**NAME AND ADDRESS OF APPLICANT:**

Village of Marshfield  
PO Box 244  
Marshfield, VT 05658

**NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:**

Marshfield Wastewater Treatment Facility  
232 School Street  
Marshfield, VT 05658

**FACILITY COORDINATES:** Lat: 44.34852 Long: -72.35622

**RECEIVING WATER:** Winooski 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.

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

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 March 30, 2010. The facility’s previous permit was issued on July 21, 2005 with an effective date of October 1, 2005. The previous permit

(hereinafter 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 Section 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 and is classified as a Grade I Domestic Non-Major NPDES Wastewater Treatment Facility (WWTF).

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

## **II. Description of Discharge**

The WWTF is engaged in the treatment of municipal wastewater with a majority of the waste stream consisting of residential wastewater and the remainder being comprised of minor commercial wastewaters. There are no pretreaters permitted under the NPDES program discharging to the collection system. The WWTF consists of two aerated lagoons and a chlorine contact chamber that uses sodium hypochlorite for disinfection. The design flow of the WWTF is 0.045 million gallons per day (MGD) and the design Biochemical Oxygen Demand (BOD<sub>5</sub>) loading is 75.8 lbs./day. The average flow from the facility over the last 5 years is approximately 0.017 MGD.

The WWTF has not reported any incidents or discharge permit limit violations within the last five years. Reconnaissance inspections were conducted on September 26, 2014 and May 6, 2019 and a Performance Audit and Facility inspection was conducted on December 16, 2008. The facility received an "Excellent" rating on all of the abovementioned inspections, which is the highest rating in the Wastewater Program's rating system.

The WWTF maintains a constant discharge to the Winooski River.

## **III. Limitations and Conditions**

The draft permit contains limitations for effluent flow, Biochemical Oxygen Demand (BOD<sub>5</sub>), Total Suspended Solids (TSS), Total Phosphorus (TP), Settleable Solids, *Escherichia coli*, Total Residual Chlorine (TRC), and pH. It also contains monitoring requirements for Total Nitrogen (TN), Total Kjeldahl Nitrogen (TKN), and Nitrate/Nitrite (NO<sub>x</sub>). 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 27

Monitoring Requirements:   Pages 2-4 of 27

## **IV. Statutory and Regulatory Authority**

### **A. Clean Water Act and NPDES Background**

Congress enacted the Clean Water Act (CWA or Act), "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." CWA § 101(a). To achieve this

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

Section 301 of the CWA provides for two types of effluent limitations to be included in NPDES permits: “technology-based” limitations and “water quality-based” limitations. CWA §§ 301, 303, 304(b); 40 C.F.R. Parts 122, 125, 131. Technology-based limitations, generally developed on an industry-by-industry basis, reflect a specified level of pollutant-reducing technology available and economically achievable for the type of facility being permitted. CWA § 301(b). As a class, WWTFs must meet performance-based requirements based on available wastewater treatment technology. CWA § 301(b)(1)(B). The performance level for WWTFs is referred to as “secondary treatment.” Secondary treatment is comprised of technology-based requirements expressed in terms of BOD<sub>5</sub>, 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 C.F.R. § 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 § 304(a) recommended water quality criteria, supplemented as necessary by other relevant information; or, in certain circumstances, based on an “indicator parameter.” 40 C.F.R. § 122.44(d)(1)(vi)(A-C).

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

### **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 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.

## **V. Description of Receiving Water**

The receiving water for this discharge is the Winooski River, a designated Cold-Water Fish Habitat. At the point of discharge, the river has a contributing drainage area of 57.4 square miles. The summer 7Q10 flow of the river is estimated to be 9.2 cubic feet per second (CFS) and the summer Low Median Monthly flow is estimated to be 22.9 CFS. The instream waste concentration at the summer 7Q10 flow is 0.008 (0.8%) and the instream waste concentration at the summer Low Median Monthly flow is 0.003 (0.3%).

In addition, the Winooski 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. 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.

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

The draft permit retains the existing waste management zone (WMZ) that extends downstream from the outfall for approximately one mile in the Winooski River.

**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.

## **VII. Facility History and Background**

The Village of Marshfield (Permittee) owns the WWTF, which is currently operated by Utility Partners LLC. The WWTF discharges secondary treated, disinfected (chlorinated) wastewater to the Winooski River. The facility does not dechlorinate prior to discharge to the Winooski River. The WWTF was constructed in 1981. The sewer system flows by gravity to the WWTF, therefore there are no pump stations in the collection system. The WWTF consists of an influent pump station with two pumps, two aerated lagoons, and a chlorine contact chamber for disinfection with sodium hypochlorite.

Lagoon #1 contains four floating air lateral lines with 32 diffusers. Lagoon #2 has three floating lateral air lines with 12 diffusers. The typical detention time for the lagoons is approximately 27 days. An air distribution line and floating diffused aeration system was installed in both lagoons in 2007. Influent pump #1 was replaced in 2015 with a vortex pump.

## **VIII. Permit Basis and Explanation of Effluent Limitation Derivation**

**A. Flow** – The draft permit maintains the annual average flow limitation of 0.045 MGD. This facility maintains a constant discharge. Continuous flow monitoring is required.

### **B. Conventional Pollutants**

**1. Biochemical Oxygen Demand (BOD<sub>5</sub>)** – The effluent limitations for BOD<sub>5</sub> 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 C.F.R. Part 133.102. In addition, the draft permit contains a 50 mg/L, maximum day, BOD<sub>5</sub> limitation. This is applied to all such discharges pursuant to 13.4 c. of the Vermont Water Pollution Control Permit Regulations. The Secretary implements the limit to supplement the federal technology-based limitations to prevent a gross one-day permit effluent violation to be offset by multiple weekly and monthly sampling events which would enable a discharger to comply with the weekly average and monthly average permit limitations. Mass limits (11.3 lbs/day, monthly average and 16.9 lbs/day, weekly average) are calculated using the concentration limits outlined above. The BOD<sub>5</sub> monthly monitoring requirement is unchanged from the current permit.

The monthly “monitor only” monitoring requirement for influent BOD<sub>5</sub> is unchanged from the current permit.

**2. Total Suspended Solids (TSS)** – The facility has been achieving the secondary treatment standard TSS effluent limitations set forth under 40 C.F.R. § 133.102(b) for at least the past five years based upon the Discharge Monitoring Report (DMR) WR-43 forms submitted by the facility. The effluent limitations for TSS remain unchanged from the current permit. The monthly average (45 mg/L) and weekly average (45 mg/L) reflect a level of effluent quality attainable by facilities eligible for treatment equivalent to secondary treatment. In addition, the

draft permit contains a 50 mg/L, maximum day, TSS limitation. This is applied to all such discharges pursuant to 13.4 c. of the Vermont Water Pollution Control Permit Regulations. The Secretary implements the limit to supplement the federal technology-based limitations to prevent a gross one-day permit effluent violation to be offset by multiple weekly and monthly average permit limitations. Mass limits (16.9 lbs/day, monthly average and 16.9 lbs/day, and weekly average) are calculated using the concentration limits outlined above and the permitted flow. The TSS monthly monitoring requirement is unchanged from the current permit.

The monthly “monitor only” monitoring requirement for influent TSS is unchanged from the current permit.

3. ***Escherichia coli*** – The *E. coli* limitation is 77 cfu/100ml, instantaneous maximum, based upon the limitation in the current permit and the anti-backsliding provisions of Section 402(o) of the CWA. As in the current permit, monthly monitoring is required.
4. **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.

### C. **Non-Conventional and Toxics**

#### 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 685 pounds of TP per year. This annual mass limitation was based on an allocation of 0.311 metric tons established in the 2002 Lake Champlain Phosphorus TMDL.

The concentration effluent limitation is based on the requirements of 10 V.S.A. § 1266a and is unchanged from the current permit. The LC TMDL allocated 0.311 metric tons per year or 685 pounds per year to the Marshfield 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:

$$(0.311 \text{ mt/yr}) (2204.62 \text{ lbs/mt}) = 685 \text{ lbs/yr}$$

The LC TMDL includes WLAs for WWTFs expressed as total annual mass loads. Compliance with the annual limit will be calculated each month using the Running Total Annual Pounds Calculation (Condition I.F.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.

Monthly sampling for total phosphorus is required.

Condition I.F.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<sup>1</sup> 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<sup>2</sup>, an analysis of the assumptions underlying the TMDL is not required. *In re Montpelier WWTF Discharge Permit*, 2009 WL 4396740, 6, 9-10 (Vt. Env'tl. 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<sup>3</sup> and is actively working to meet those that are still outstanding. For 2016, EPA has already given 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<sup>4</sup>, 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.<sup>5</sup> 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

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<sup>1</sup> Available at:

[https://ofmpub.epa.gov/waters10/attains\\_impaired\\_waters.show\\_tmdl\\_document?p\\_tmdl\\_doc\\_blobs\\_id=79000](https://ofmpub.epa.gov/waters10/attains_impaired_waters.show_tmdl_document?p_tmdl_doc_blobs_id=79000)

<sup>2</sup> The LC TMDL was issued June 17, 2016.

<sup>3</sup> For the Accountability Framework, see pages 54-59 of the LC TMDL.

<sup>4</sup> Submitted by the State to EPA on March 7, 2018; available at:

<http://dec.vermont.gov/sites/dec/files/wsm/erp/docs/2018VermontLakeChamplainPhosphorusTMDLAccountabilityFrameworkReport.pdf>

<sup>5</sup> 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.

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, the Permittee shall develop or update (as appropriate), and submit to the Secretary, a Phosphorus Optimization Plan (POP) to increase the WWTF's phosphorus removal efficiency by implementing optimization techniques that achieve phosphorus reductions using primarily existing facilities and equipment. The techniques to be evaluated may include operational process changes to enhance biological and/or chemical phosphorous removal, incorporation of anaerobic/anoxic zones, septage receiving policies and procedures, and side-stream management.

The facility shall have 12 months from the permit effective date to optimize removal of total phosphorus. If, after the 12-month optimization period, the WWTF's actual TP loads reach or exceed 80% of the LC TMDL WLA for the WWTF, based on the WWTF's 12-month running annual load calculated using the Phosphorus Load Calculation (Condition I.F.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)**

A quarterly "monitor only" requirement for TN has been included in this permit. TN is a calculated value based on the sum of  $\text{NO}_x$  and TKN, and, shall be reported as pounds, calculated as:

**TN (mg/L) x Total Daily Flow x 8.34****where, TN (mg/L) = TKN (mg/L) + NO<sub>x</sub> (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.

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<sub>3</sub>) and ionized (NH<sub>4</sub><sup>+</sup>)), soluble organic nitrogen, and particulate organic nitrogen. A quarterly “monitor only” requirement has been included in the draft permit.
4. **Nitrate/Nitrite (NO<sub>x</sub>)** – Nitrite and nitrate are oxygenated forms of nitrogen. A quarterly “monitor only” requirement has been included in the draft permit.
5. **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.
6. **Total Residual Chlorine (TRC)** – The TRC limits of 1.0 mg/L, weekly average and 2.0 mg/L, instantaneous maximum, are set in accordance with the Policy for the protection of aquatic biota. These limits ensure compliance with the Vermont Water Quality Standards. Monitoring remains at daily.
7. **Toxicity Testing** – 40 C.F.R. Part 122.44(d)(1) requires the Secretary to assess whether the discharge causes or has the reasonable potential to cause or contribute to an excursion above any narrative or numeric water quality criteria. Per these federal requirements, the Permittee

shall conduct WET testing and toxic pollutant analyses according to the schedule outlined in Condition I.I. 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.

**D. Special Conditions**

- 1. 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, beginning in **2021**.
- 2. Operation Management and Emergency Response Plan (OMERP)** – The Operation Management and Emergency Response Plan (OMERP) for the sewage collection system was submitted on July 1, 2010. Through issuance of this permit the Secretary approves the inspection schedule for the plan. The Permittee shall implement in accordance with that schedule.

The Permittee shall revise the plan upon the Secretary's request or on its own motion to reflect equipment or operational changes.

The OMERP for the treatment facility, sewage pumping stations, and sewer line stream crossings was submitted on December 31, 2008 and it was approved by the Secretary on January 5, 2009.

As required by the revisions to 10 V.S.A. Section 1278 the Permittee shall implement the OMERP on file. To ensure this plan remains up to date, the Permittee shall prepare and submit to the Agency for review and approval a revised OMERP for the WWTF, sewage pump/ejector stations, and stream crossings.

- 3. 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 and per DEC records was last completed on February 23, 2004.
- 4. Sludge Depth Monitoring** – Annually, The Permittee shall submit sludge depth monitoring results for the samples taken during August, September, or October. The results of the sludge measurements and a copy of a plan depicting the grid location of the measurements shall be submitted with the applicable Discharge Monitoring Report (DMR) form WR-43.
- 5. Emergency Power Failure Plan** – The current Emergency Power Failure Plan for the facility was submitted on December 7, 2005 and it was approved by the Secretary on December 29, 2005.



To ensure the facility can continue operations during the event of a power failure, Permittees are required to have Emergency Power Failure Plans on file. Within **90** days of the effective date of the permit, the Permittee must ensure this plan is up to date by submitting to the Secretary updated documentation addressing how the discharge will be handled in the event of an electric power outage.

- 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 non-majors, 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 C.F.R. 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 draft permit. Section 1295 requires the Permittee to provide public notification of untreated discharges from wastewater facilities. The Permittee is required to post a public alert within one hour of discovery and submit to the Secretary specified information regarding the discharge within 12 hours of discovery.
- 8. 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.

**E. 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 the available data indicate that this discharge does not cause, have a reasonable potential to cause, or contribute to an instream toxic impact or instream excursion above the water quality criteria. As such, the development of water quality based effluent limitations (WQBELs) will not be necessary.

**IX. Procedures for Formulation of Final Decision**

The public comment period for receiving comments on this draft permit was from December 22, 2020 to January 22, 2021. Comments were received and considered in the formulation of the final determination to issue, deny, or modify the draft permit. Those comments and the replies are included below as Attachment B.

**ATTACHMENT A.**  
**REASONABLE POTENTIAL DETERMINATION**

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

MEMORANDUM

Prepared by: John Merrifield, Wastewater Program (WWP)



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

Date: December 3, 2020

Subject: Reasonable Potential Determination for the Marshfield Wastewater Treatment Facility

***I. Facility Information:***

Marshfield Wastewater Treatment Facility (WWTF)  
Marshfield, VT  
Permit No. 3-1195  
NPDES No. VT0100471  
Facility Location: 44.3485, -72.3562 (NAD 83)  
Approximate Outfall Location: 44.3492, -72.3579 (NAD 83)

***Receiving water:*** WINOOSKI RIVER

***II. Hydrology:***

Facility Design Flow: 0.045 MGD = 0.070 CFS  
Estimated 7Q10<sup>1</sup> = 9.2 CFS  
Estimated LMM<sup>2</sup> = 22.9 CFS  
Instream Waste Concentration at 7Q10 Flow (IWC-7Q10) = 0.008 (<1%)  
Instream Waste Concentration at Low Median Monthly Flow (IWC-LMM) = 0.003 (<1%)

The Town of Marshfield owns and operates the Marshfield Wastewater Treatment Facility (WWTF) which is two aerated lagoons with hypochlorination disinfection.

The WINOOSKI RIVER downstream of the Marshfield 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 57.4 square miles. This river segment is listed on the 303d Impaired Waters List for consistently elevated *E. coli*. The existing

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<sup>1</sup> 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.

<sup>2</sup> “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.

permitted waste management zone (WMZ) begins at the outfall of the WWTF and extends downstream 1 mile (Figure 1) pursuant to 10 V.S.A., Section 1252.

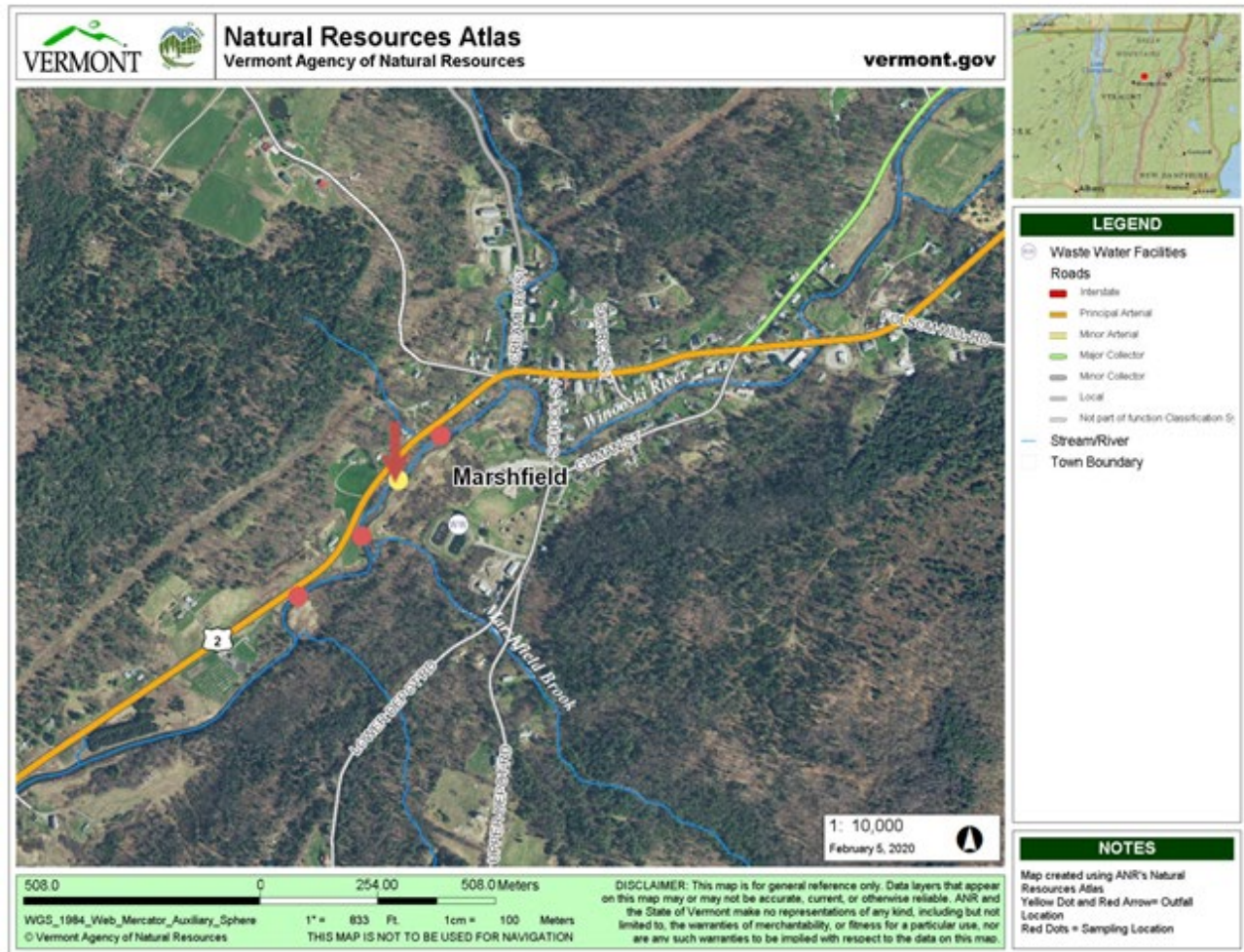


Figure 1. WINOOSKI RIVER near the Marshfield WWTF. Facility location represented by white dot containing "WW" and outfall location indicated by the arrow and a yellow dot. Upstream monitoring location at River Mile (RM) 81.8 and two downstream monitoring locations at RM 81.6/81.7 are shown by red dots. Figure produced with the Vermont Integrated Watershed Assessment System on the VT Agency of Natural Resources Atlas (<https://anrweb.vt.gov/DEC/IWIS/>).

This memo is organized into the following sections:

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

### III. Effluent Data for the Marshfield WWTF

Table 1. Effluent Data for the Marshfield WWTF from 1/31/2015 to 12/31/2019.

| Parameter  | Current Permit Limit | Minimum Discharge | Average Discharge | Maximum Discharge | n  |
|--|----------------------|-------------------|-------------------|-------------------|----|
| Annual Flow (MGD)                                | 0.045                | 0.010             | 0.02              | 0.035             | 60 |
| Monthly Average BOD <sub>5</sub> (mg/L)          | 30                   | 3.00              | 10.55             | 32.00             | 60 |
| Monthly Average BOD <sub>5</sub> lbs/day         | 11.3                 | 0.30              | 1.72              | 7.73              | 60 |
| pH   | 6.5-8.5              | 6.60              | 7.27              | 8.00              | 60 |
| Monthly Average Total Suspended Solids (mg/L)    | 45                   | 1.80              | 15.11             | 42.00             | 60 |
| Monthly Average Total Suspended Solids (lbs/day) | 16.9                 | 0.20              | 2.39              | 11.10             | 60 |
| Total Residual Chlorine (mg/L)                   | 1                    | 0.60              | 0.80              | 0.99              | 60 |
| Total Phosphorus (mg/l)                          | Monitor Only         | 2.20              | 4.14              | 7.10              | 60 |
| E.coli (CFU/100 ml)                              | 77                   | 1.00              | 5.32              | 40.00             | 60 |

#### Whole Effluent Toxicity Data Summary:

##### A. Whole Effluent Toxicity (WET) Data Summary:

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. The current permit for the Marshfield WWTF does not have any WET testing requirements and therefore no analysis was possible to determine if there is reasonable potential for this facility to violate VWQS through the discharge of toxics in toxic amounts.

As such, no WET limits are proposed for the draft permit. However, to provide additional data for future assessments of WET reasonable potential, it is recommended that two 2-species (*Ceriodaphnia dubia* and *Pimephales promelas*) acute tests be included in the draft permit, one during the summer (August/October 2021) and winter (January/February 2023). It is also suggested that concurrent sampling for ammonia be conducted with each of these tests.

##### B. Biological Assessments and Ambient Chemistry Data for the WINOOSKI RIVER upstream and downstream of the Marshfield WWTF

The VTDEC assessment database is an EPA-required database which describes the conditions of Vermont's surface waters with respect to their attainment of VWQS. For the WINOOSKI RIVER segment to which this facility discharges, the database indicates the receiving water does not fully support all designated uses. This reach of the WINOOSKI RIVER is on the 303(d) list for E. coli.

#### Biological Assessments:

Biological assessments were conducted upstream of the facility at RM 81.8 by VTDEC on 9/21/2015 and downstream of the facility at RM 81.6 on 9/21/2015. 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 WINOOSKI RIVER, ( RM 81.6 & RM 81.8) near the Marshfield WWTF outfall.

| Macroinvertebrate Assessment Summary |          |      |         |          |              |       |        |        |                 |        |                      |
|--------------------------------------|----------|------|---------|----------|--------------|-------|--------|--------|-----------------|--------|----------------------|
| Date                                 | Location | RM   | Density | Richness | EPT Richness | PMA-O | B.I.   | Oligo. | EPT/EPT + Chiro | PPCS-F | Community Assessment |
| 9/9/2005                             | Below    | 81.6 | 3144    | 53.0     | 31.0         | 74.2  | 3.83   | 0.25   | 0.94            | 0.52   | Meets WQS            |
| 9/21/2010                            | Below    | 81.6 | 9372    | 72.0     | 37.0         | 75.4  | 4.55   | 0.00   | 0.91            | 0.47   | Meets WQS            |
|                                      | Above    | 81.8 | 4832    | 71.0     | 39.0         | 74.1  | 4.42   | 0.00   | 0.89            | 0.45   | Meets WQS            |
| 10/23/2012                           | Above    | 81.8 | 1828    | 56.0     | 28.0         | 64.2  | 4.24   | 0.66   | 0.69            | 0.56   | Meets WQS            |
| 10/5/2013                            | Above    | 81.8 | 3008    | 58.0     | 30.0         | 85.3  | 4.37   | 0.00   | 0.87            | 0.53   | Meets WQS            |
| 9/21/2015                            | Below    | 81.6 | 6504    | 70.0     | 35.0         | 78.9  | 4.86   | 0.43   | 0.82            | 0.50   | Meets WQS            |
|                                      | Above    | 81.8 | 6628    | 61.0     | 31.0         | 65.1  | 4.87   | 0.18   | 0.95            | 0.48   | Meets WQS            |
| <b>Full Support</b>                  |          |      | ≥ 300   | ≥ 30     | ≥ 18         | ≥ 45  | ≤ 5    | ≤ 12   | ≥ 0.45          | ≥ 0.4  |                      |
| <b>Indeterminate</b>                 |          |      | ≥ 250   | ≥ 28     | ≥ 16         | ≥ 40  | ≤ 5.15 | ≤ 14.5 | ≥ 0.43          | ≥ 0.35 |                      |
| <b>Non-Support</b>                   |          |      | < 250   | < 28     | < 16         | < 40  | > 5.15 | > 14.5 | < 0.43          | < 0.35 |                      |

### C. Ambient Chemistry Data:

The most recent ambient chemistry data available from VTDEC sampling is from 7/16/2019, when surface waters were sampled upstream of the outfall at River Mile (RM) 81.8 and downstream of the outfall at RM 81.6/81.7. The most recent ambient chemistry data available from LaRosa volunteers is from 9/5/2017. The upstream sampling location is 0.1 miles upstream and the downstream sampling location is 0.1/0.2 miles downstream from the WWTF outfall (Figure 1).

Data representativeness for VTDEC sampling are assessed by evaluating the observed flow conditions from field sheets, whether measured or qualitatively described, at which samples were collected. Other contemporaneous streamflow data, such as the U.S. Geological Survey stream gage network, are also taken into consideration where proximal and representative of the hydrologic conditions at the time (e.g., unimpacted by artificial flow regulation). The downstream sampling location at this site is the most sensitive location, and the sampling results are determined to be representative of low flow based on a review of available streamflow observations. Thus, the data presented below are relevant for inclusion in this analysis. Water chemistry measures of relevant parameters for this assessment are summarized in Table 3a., 3b and 3c.

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 3a. Surface-water quality (non-metals) upstream and downstream of the Marshfield 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 | 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) | Total Calcium (mg/l) | Total Potassium (mg/l) | Total Sodium (mg/l) | Total Sulfate (mg/l) |
|------------|----------------------|------|--------------------|-----|-------------------|------------------------|----------|--------|-----------|-----------------|-------------------|-----------------------------------|---------------------------------|-----------------|-------------------------|-----------------------------------|-----------------------|-------------------------------|--|----------------------|------------------------|---------------------|----------------------|
| 9/21/2010  | A                    | 81.8 | 10.2               | 8.2 | 87.5              | 221.0                  | 90.7     | 102.3  | 10.7      | 1.3             | 12.5              | -                                 | -                               | 12.4            | 9.4                     | 7.2                               | 0.2                   | -                             | 0.1                                    | 32.2                 | 1.7                    | 8.9                 | 6.1                  |
| 10/23/2012 | A                    | 81.8 | 8.1                | 8.2 | 96.0              | 264.0                  | 107.0    | -      | -         | 0.8             | 25.0              | -                                 | -                               | 12.7            | 6.2                     | -                                 | 0.3                   | -                             | -                                      | 38.3                 | 2.1                    | 8.8                 | 8.7                  |
| 8/28/2014  | A                    | 81.8 | -                  | -   | -                 | -                      | -        | -      | -         | -               | -                 | -                                 | -                               | -               | 8.8                     | -                                 | 0.4                   | -                             | -                                      | -                    | -                      | -                   | -                    |
| 8/25/2015  | A                    | 81.8 | 19.9               | 8.1 | -                 | 274.0                  | -        | 89.6   | 7.9       | 0.9             | -                 | -                                 | -                               | -               | 10.2                    | -                                 | 0.3                   | <0.05                         | -                                      | -                    | -                      | -                   | -                    |
| 9/21/2015  | A                    | 81.8 | 12.3               | 8.1 | 103.1             | 256.3                  | 115.9    | 96.7   | 10.2      | 1.2             | 20.0              | -                                 | -                               | 18.3            | 8.6                     | -                                 | 0.3                   | <0.05                         | 0.2                                    | 41.3                 | 2.1                    | 11.7                | 6.0                  |
| 7/16/2019  | A                    | 81.8 | 18.8               | 8.1 | 100.5             | 263.1                  | 102.8    | 95.7   | 8.6       | 0.5             | 25.0              | 22.8                              | 3.8                             | 17.6            | 9.0                     | -                                 | 0.3                   | <0.05                         | 0.2                                    | 36.9                 | 1.8                    | 10.8                | 5.2                  |
| 9/21/2010  | B                    | 81.6 | 11.0               | 8.2 | 84.4              | 216.0                  | 88.1     | 102.1  | 10.9      | 1.3             | 15.0              | -                                 | -                               | 12.4            | 51.2                    | 47.5                              | 0.4                   | -                             | 0.1                                    | 31.3                 | 1.7                    | 9.0                 | 5.9                  |
| 8/25/2015  | B                    | 81.6 | 19.9               | 8.1 | -                 | 267.0                  | -        | 89.2   | 7.9       | 0.6             | -                 | -                                 | -                               | -               | 13.3                    | -                                 | 0.4                   | <0.05                         | -                                      | -                    | -                      | -                   | -                    |
| 9/21/2015  | B                    | 81.6 | 13.4               | 8.1 | 100.0             | 253.1                  | 115.0    | 90.9   | 10.1      | 1.5             | 17.5              | -                                 | -                               | 18.3            | 15.7                    | -                                 | 0.3                   | <0.05                         | 0.2                                    | 41.1                 | 2.3                    | 12.0                | 5.8                  |
| 7/16/2019  | B                    | 81.7 | 19.9               | 8.1 | 100.0             | 263.6                  | 99.8     | 98.0   | 8.6       | 0.5             | 25.0              | 22.5                              | 4.3                             | 17.4            | 13.0                    | -                                 | 0.4                   | 0.1                           | 0.2                                    | 35.8                 | 1.8                    | 10.9                | 5.2                  |

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

| Date      | RM   | A/B | pH   | Hardness (as mg/L CaCO <sub>3</sub> ) | 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) |
|-----------|------|-----|------|---------------------------------------|-----------------------|-----------------------|----------------------|------------------------|----------------------|----------------------|-----------------------|---------------------|-------------------|-------------------|------------------------|------------------------|-------------------------|---------------------|------------------------|
| 9/21/2010 | 81.8 | A   | 8.20 | 90.70                                 | 12.20                 | -                     | <1                   | -                      | <1                   | 32.20                | <5                    | <10                 | 86.60             | <1                | 2.47                   | 21.10                  | -                       | <5                  | 1.68                   |
| 9/21/2015 | 81.8 | A   | 8.10 | 115.85                                | <50                   | <10                   | <1                   | <1                     | <1                   | 41.30                | <5                    | <10                 | 330.60            | <1                | 3.07                   | 83.73                  | <5                      | <5                  | 2.15                   |
| 7/16/2019 | 81.8 | A   | 8.10 | 102.76                                | <20.00                | <5.00                 | <1.00                | <1.00                  | <1.00                | 36.90                | <1.00                 | <5.00               | 139.00            | <1.00             | 2.58                   | 47.60                  | <5.00                   | <1.00               | 1.84                   |
| 9/21/2010 | 81.6 | B   | 8.20 | 88.10                                 | 12.10                 | -                     | <1                   | -                      | <1                   | 31.30                | <5                    | <10                 | 85.00             | <1                | 2.43                   | 20.00                  | -                       | <5                  | 1.72                   |
| 9/21/2015 | 81.6 | B   | 8.10 | 115.02                                | <50                   | <10                   | <1                   | <1                     | <1                   | 41.10                | <5                    | <10                 | 342.00            | <1                | 3.03                   | 79.93                  | <5                      | <5                  | 2.29                   |
| 7/16/2019 | 81.7 | B   | 8.10 | 99.81                                 | <20.0                 | -                     | -                    | -                      | -                    | 35.80                | -                     | -                   | 129.00            | -                 | 2.53                   | 42.90                  | -                       | -                   | 1.83                   |
|           |      |     |      |                                       |                       |                       |                      |                        |                      |                      |                       |                     |                   |                   |                        |                        |                         |                     |                        |
| Date      | RM   | A/B | pH   | Hardness (as mg/L CaCO <sub>3</sub> ) | Total Selenium (ug/l) | Total Silver (ug/l)   | Total Sodium (mg/l)  | Total Thallium (ug/l)  | Total Zinc (ug/l)    |                      |                       |                     |                   |                   |                        |                        |                         |                     |                        |
| 9/21/2010 | 81.8 | A   | 8.20 | 90.70                                 | 21.10                 | -                     | <5                   | -                      | -                    |                      |                       |                     |                   |                   |                        |                        |                         |                     |                        |
| 9/21/2015 | 81.8 | A   | 8.10 | 115.85                                | 20.00                 | -                     | <5                   | -                      | -                    |                      |                       |                     |                   |                   |                        |                        |                         |                     |                        |
| 7/16/2019 | 81.8 | A   | 8.10 | 102.76                                | 83.73                 | <5                    | <5                   | <5                     | <1                   |                      |                       |                     |                   |                   |                        |                        |                         |                     |                        |
| 9/21/2010 | 81.6 | B   | 8.20 | 88.10                                 | 79.93                 | <5                    | <5                   | <5                     | <1                   |                      |                       |                     |                   |                   |                        |                        |                         |                     |                        |
| 9/21/2015 | 81.6 | B   | 8.10 | 115.02                                | 47.60                 | <5.00                 | <1.00                | <5.00                  | <1.00                |                      |                       |                     |                   |                   |                        |                        |                         |                     |                        |
| 7/16/2019 | 81.7 | B   | 8.10 | 99.81                                 | 42.90                 | -                     | -                    | -                      | -                    |                      |                       |                     |                   |                   |                        |                        |                         |                     |                        |



Table 3c. Surface-water quality (metals) upstream and downstream of the Marshfield Wastewater Treatment Facility collected by LaRosa Volunteer

| Visit Date | Location | RM    | Alkalinity (mg/l) | Turbidity (NTU) | Total Chloride (mg/l) | Total Phosphorus (ug/l) | Total Nitrogen (mg/l) |
|------------|----------|-------|-------------------|-----------------|-----------------------|-------------------------|-----------------------|
| 6/20/2010  | Above    | 81.80 | -                 | 0.53            | -                     | 14.20                   | 0.35                  |
| 7/20/2010  | Above    | 81.80 | -                 | 0.88            | -                     | 11.30                   | 0.40                  |
| 8/16/2010  | Above    | 81.80 | -                 | 1.10            | -                     | 13.70                   | 0.26                  |
| 6/23/2015  | Above    | 81.80 | -                 | 2.34            | -                     | 19.90                   | 0.28                  |
| 7/7/2015   | Above    | 81.80 | -                 | 0.61            | -                     | 8.53                    | 0.29                  |
| 7/28/2015  | Above    | 81.80 | 95.00             | 1.99            | 16.59                 | 17.40                   | 0.51                  |
| 8/4/2015   | Above    | 81.80 | -                 | 0.39            | -                     | 7.36                    | 0.30                  |
| 8/18/2015  | Above    | 81.80 | -                 | 0.68            | -                     | 9.21                    | -                     |
| 9/1/2015   | Above    | 81.80 | -                 | 1.07            | -                     | 10.80                   | 0.48                  |
| 7/5/2016   | Above    | 81.80 | -                 | 1.32            | -                     | 11.70                   | 0.34                  |
| 7/19/2016  | Above    | 81.80 | -                 | 9.11            | -                     | 30.90                   | 0.31                  |
| 8/2/2016   | Above    | 81.80 | 98.00             | 1.90            | 11.00                 | 13.60                   | 0.30                  |
| 8/30/2016  | Above    | 81.80 | -                 | 0.76            | -                     | 10.30                   | 0.39                  |
| 6/20/2010  | Below    | 81.60 | -                 | 0.98            | -                     | 19.90                   | 0.32                  |
| 7/20/2010  | Below    | 81.60 | -                 | 1.39            | -                     | 17.40                   | 0.39                  |
| 8/16/2010  | Below    | 81.60 | -                 | 1.14            | -                     | 18.60                   | 0.32                  |
| 6/23/2015  | Below    | 81.70 | -                 | 3.00            | -                     | 21.10                   | 0.30                  |
| 6/23/2015  | Below    | 81.60 | -                 | 2.15            | -                     | 18.40                   | 0.29                  |
| 7/7/2015   | Below    | 81.60 | -                 | 0.97            | -                     | 11.90                   | 0.30                  |
| 7/28/2015  | Below    | 81.70 | 93.00             | 1.61            | 15.10                 | 61.60                   | 0.31                  |
| 8/4/2015   | Below    | 81.60 | -                 | 0.62            | -                     | 10.50                   | 0.25                  |
| 8/18/2015  | Below    | 81.60 | -                 | 0.97            | -                     | 11.40                   | 0.28                  |
| 9/1/2015   | Below    | 81.60 | -                 | 0.98            | -                     | 15.00                   | 0.45                  |
| 7/5/2016   | Below    | 81.60 | -                 | 1.38            | -                     | 16.40                   | -                     |
| 7/19/2016  | Below    | 81.60 | -                 | 9.05            | -                     | 32.00                   | 0.29                  |
| 8/2/2016   | Below    | 81.60 | 96.00             | 1.72            | 10.40                 | 15.50                   | 0.32                  |
| 8/30/2016  | Below    | 81.60 | -                 | 0.74            | -                     | 16.40                   | 0.39                  |
| 6/27/2017  | Below    | 81.60 | 86.00             | 1.99            | 12.50                 | 14.70                   | 0.24                  |
| 7/11/2017  | Below    | 81.60 | -                 | 2.48            | -                     | 20.90                   | 0.23                  |
| 7/25/2017  | Below    | 81.60 | -                 | 5.97            | -                     | 35.00                   | 0.33                  |
| 8/8/2017   | Below    | 81.60 | -                 | 1.08            | -                     | 15.90                   | 0.40                  |
| 8/22/2017  | Below    | 81.60 | -                 | 0.66            | -                     | 14.50                   | 0.42                  |
| 9/5/2017   | Below    | 81.80 | -                 | 1.52            | -                     | 18.70                   | 0.29                  |

#### IV. *Assessment of Reasonable Potential of the Marshfield WWTF discharge to exceed Vermont Water Quality Standards*

##### A. Methodology:

A steady-state mass balance approach was used to assess reasonable potential for the potential pollutants of concern based on the methods described in the Technical Support Document for Water Quality-based Toxics Control (TSD; EPA/505/2-90-001). The expected receiving water concentrations (RWC;  $C_r$ ) of Chlorine, and Phosphorus were calculated according to Equation 1: at critical conditions. The expected resultant receiving water concentrations ( $C_r$ ) pollutants for the following pollutants was calculated using Equation 1 below. If the expected receiving water concentration determined exceeds the applicable Vermont Water Quality Standard, limits must be included in the permit. Tables 4 and 6 present this analysis for the Marshfield WWTF.

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

Where:

$C_r$  = resultant effluent 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 ( $C_e$ ) of the 95<sup>th</sup> percentile of a lognormal distribution of observed effluent concentrations over 5 years. The 95<sup>th</sup> 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 to determine  $C_e$ .

If the expected receiving water concentration ( $C_r$ ) determined exceeds the applicable Vermont Water Quality Standard, limits must be included in the permit. Tables 4 and 6 presents this analysis for the Marshfield WWTF.

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 2:

$$\text{Equation 2. } IWC = \frac{(Q_e)}{(Q_r)}$$

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

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

- Average values of observed upstream and downstream chemical data were used for most calculations; exceptions are described below.
- Upstream pollutant concentrations ( $C_s$ ) and effluent concentrations ( $C_e$ ) were set equal to one half the method detection limit when data were censored at the detection limit.
- Effluent pollutant concentrations ( $C_e$ ) were set to the maximum observed effluent concentrations \* TSD 95<sup>th</sup> percentile multiplier over the last 5 years of data collected.
- TAN analyses were not conducted since no discharge information was available.
- Hardness for determining hardness-dependent metal criteria is based upon the lowest observed downstream concentration.
- Chlorine analysis was conducted using the maximum weekly average concentration \* TSD 95<sup>th</sup> percentile multiplier.

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

### **B. Total Ammonia**

This facility does not collect data for TAN and therefore no analysis was conducted. Due to its IWC, it is unlikely that this facility discharges ammonia in toxic quantities and therefore quarterly monitoring for TAN is not recommended. However, it is recommended that TAN analysis be performed concurrently with WET testing since it is a toxin that is expected to be present in the effluent. A reopener should be included in the permit.

### **C. Metals**

The potential for municipal WWTFs to discharge metals was evaluated by collecting and analyzing over 15 years of effluent data from facilities in Vermont. Using statistical analysis and the methodology described in the EPA's TSD a screening value was developed for each individual metal based on the number of samples, the coefficient of variability and the maximum observed values. Hardness-based VWQS were calculated for each metal, and these values were used to determine the in-stream waste concentration at which a discharge is likely to exceed VWQS for metals based on hardness and the potential metal effluent concentrations.

Based on the IWC, the receiving water not being identified as impaired or stressed for metals, and the absence of known toxic discharges, this facility does not have Reasonable Potential to discharge metals in toxic amounts. No additional monitoring should be included in the permit. In the event of an upset, toxic bypass or failing WET test, metals analysis may be required as part of the process to identify the source of toxicity.

**D. Nutrients**

The results of mass balance calculations for Total Phosphorus were calculated using Equation 1 are presented in Table 4.

Table 4. Mass Balance of Nutrients of Concern around the Marshfield WWTF.

|   | <b>Total Phosphorus (ug/l)</b> | <b>Notes</b>   |
|---|--------------------------------|--|
| <b>Qs (cfs)</b>                                       | 22.91                          | <i>Estimated LMM flow</i>  |
| <b>Qe (cfs)</b>                                       | 0.070                          | <i>permitted effluent discharge</i>  |
| <b>Qr = Qs + Qe (cfs)</b>                             | 22.98                          | <i>Qs+Qe</i>   |
| <b>IWC</b>  | 0.0030                         | <i>Qe/(Qs+Qe)</i>  |
| <b>Cs</b>   | 12                             | <i>upstream pollutant concentration (average)</i>  |
| <b>Cetsd</b>  | 8520                           | <i>effluent pollutant concentration adjusted by TSD method.</i>  |
| <b>Cr = (CsQs+CetsdQe)/Qr</b>                         | 37.9                           | <i>calculated resultant downstream pollutant concentration using mass balance method</i>                     |
| <b>Stream Type</b>                                    | B2 - Medium, High-Gradient     |  |
| <b>Calculated Instream Contribution from Effluent</b> | 25.8                           | <i>difference between observed upstream concentration and calculated resultant downstream concentration.</i> |
| <b>VWQS Criteria (2017)</b>                           |                                |  |
| <b>Threshold Criteria</b>                             | 15                             |  |
| <b>Threshold Exceeded?</b>                            | Yes                            | <i>Need to check nutrient response conditions.</i>   |

**E. Total Nitrogen:**

**Total Nitrogen (TN)** - TN is the sum of nitrate, nitrite, ammonia, soluble organic nitrogen, and particulate organic nitrogen. No data for nitrogen containing pollutants was available to analysis and therefore it is not possible to make a determination of reasonable potential for TN discharged from this facility to cause exceedances of VWQS. To gather data on the amount of Total Nitrogen (TN) in this discharge and its potential impact on the receiving water, quarterly “monitor only” requirements for Nitrate/Nitrite (NOx) 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).

#### **F. Total Phosphorus:**

##### ***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 Winooski River are greater than the 2017 nutrient criteria threshold of 15ug/L TP in a Class B Medium, High Gradient stream. The calculated change in the in-stream TP concentration attributable to the Marshfield WWTF is 25.8 ug/L. This calculation is presented above in Table 4.

***Total Phosphorus Nutrient Response Conditions Analysis:***

The Combined Nutrient Response Conditions for Aquatic Biota and Wildlife in Rivers and Streams at RM 81.7 on 7/16/2019 meets VWQS for pH, meets VWQS for Turbidity, meets VWQS for Dissolved Oxygen and meets VWQS for Aquatic Biota at RM 81.6 on 9/21/2015 as shown below in Table 5. Therefore, the narrative standard presented in §3-01.B.2 of the VWQS is supported and the receiving waters are in compliance with VWQS Nutrient Response Conditions for TP.

*Table 5. Assessment of Phosphorus Response Variables around the Marshfield WWTF*

| Response variable (VWQS reference)          | Target Value                                | River-mile: 81.8 (Upstream) 7/16/2019 | River-mile: 81.7 (Downstream) 7/16/2019 |
|---|---|---------------------------------------|---|
| pH (§3-01.B.9)                              | 6.5-8.5 s.u.                                | 8.1                                   | 8.1                                     |
| Turbidity (§3-04.B.1)                       | < 10 NTU at low mean annual flow            | 0.5                                   | 0.5                                     |
| Dissolved Oxygen (min) (§3-04.B.2)          | >6 mg/L and 70% saturation                  | 8.57 (95.7%)                          | 8.58 (98.0%)                            |
| Aquatic biota, based on macroinvertebrates. | Attaining an assessment of good, or better. | Meets VWQS (9/21/2015)                | Meets VWQS (9/21/2015 at RM 81.6)       |

***Total Phosphorus Reasonable Potential Determination:***

The numeric threshold criteria for TP are exceeded by when calculated at this facility's full design flow and with the receiving water at LMM flow conditions, however the narrative criteria for TP are satisfied and therefore it is inconclusive whether this facility has reasonable potential to violate VWQS.

This facility has a permitted flow of 0.045 MGD and therefore is not subject to 10 V.S.A. 1266a, which reads "No person directly discharging into the drainage basins of Lake Champlain or Lake Memphremagog shall discharge any waste that contains a phosphorus concentration in excess of 0.80 milligrams per liter on a monthly average basis. Discharges of less than 200,000 gallons per day, permitted on or before July 1, 1991, shall not be subject to the requirements of this subsection."

However, this facility is subject to the Lake Champlain Phosphorus TMDL. This TMDL establishes a Annual Waste Load Allocation of 0.311 mt/yr (685 lbs/year) for this facility. This WLA is based upon the design flow of 0.045 MGD and an assumed average TP concentration of 5.0 mg/L. It is not necessary to establish an effluent

concentration limit for TP, but the permit should require that a Phosphorus Optimization Plan be prepared. Monthly monitoring of TP is required to demonstrate compliance with the Lake Champlain Phosphorus TMDL.

### G. Chlorine:

The potential impacts of chlorine discharges from this facility to the receiving water have been assessed in relation to the numeric criteria of the 2017 VWQS. This analysis is shown below in Table 6.

Table 6. Assessment of Chlorine and *E. coli* around the Marshfield WWTF

|                             | Chlorine (mg/l) | <i>E.coli</i><br>(CFU/100 ml) | Notes   |
|-----------------------------|-----------------|-------------------------------|---|
| <b>Qs (cfs)</b>             | 9.19            |                               | <i>Estimated 7Q10 flow</i>  |
| <b>Qe (cfs)</b>             | 0.070           |                               | <i>permitted effluent discharge</i>   |
| <b>Qr = Qs + Qe (cfs)</b>   | 9.26            |                               | <i>Qs+Qe</i>  |
| <b>7Q10 IWC</b>             | 0.008           |                               | <i>Qe/(Qs+Qe)</i>   |
| <b>Cs</b>                   | 0               | 0                             | <i>upstream pollutant concentrations assumed to be 0.</i>   |
| <b>Cetsd</b>                | 1.089           | 76                            | <i>effluent pollutant concentration (maximum observed value * TSD 95th Percentile multiplier)</i> |
| <b>Cr</b>                   | 0.008           | 0.57                          | <i>resultant pollutant concentration</i>  |
| <b>VWQS Criteria (2017)</b> |                 |                               |   |
| <b>contact recreation</b>   |                 | 235                           |   |
| <b>acute</b>                | 0.019           |                               |   |
| <b>chronic</b>              | 0.011           |                               |   |
| <b>RP determined?</b>       |                 |                               |   |
| <b>contact recreation</b>   |                 | NO                            |   |
| <b>acute</b>                | NO              |                               |   |
| <b>chronic</b>              | NO              |                               |   |

### V. Summary of Reasonable Potential Determinations

The analyses conducted do not indicate that the discharge from the Marshfield WWTF have a reasonable potential to cause violations of the VWQS. However, data was not available for many pollutants of interest and therefore additional monitoring is suggested as described below.

**A. Recommended Biological and Water Quality Monitoring:*****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 5), it is not necessary to include biomonitoring in the draft permit.

**B. Recommended Effluent Monitoring:**

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

- To provide additional data for future assessments of WET reasonable potential, it is recommended the requirement of two 2-species acute WET tests be included in the draft permit, one summer (August/October 2021) and one winter (January/February 2023). It is further recommended that Total Ammonia Nitrogen and TRC be concurrently sampled with the WET tests.
- Due to a lack of nitrogen data it was not possible to assess reasonable potential for any nitrogen containing pollutants. Nitrogen containing pollutants are associated with both eutrophication and toxicity and therefore should be characterized. It is recommended that the draft permit include requirements for quarterly “monitor only” sampling for Nitrate/Nitrite (NO<sub>x</sub>) and Total Kjeldahl Nitrogen (TKN).
- In order to assess compliance with the Lake Champlain Phosphorus TMDL it is recommended that monthly sampling for Total Phosphorus be retained in the draft permit.

**C. Conclusion:**

After review of all available information, it has been determined that there is not a reasonable potential for the discharge to cause or contribute to a water quality violation, and as such, the development of WQBELs will not be necessary. Given the dilution (IWC at 7Q10 is = 0.008 (<1%)), 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.



**ATTACHMENT B.**  
**RESPONSIVENESS SUMMARY**

**RESPONSIVENESS SUMMARY**  
**NPDES Discharge Permit # 3-1195**  
**Village of Marshfield**  
**Wastewater Treatment Facility**

The above referenced permit was placed on public notice for comment from a period of December 22, 2020 through January 22, 2021. This is a renewal permit.

Comments on the draft permit were received during the public notice period from Nancy Groveman, on behalf of the Village of Marshfield. The following is a summary of the comments and the Agency's responses to those comments. A copy of any or all comments received can be obtained by contacting the Agency's Watershed Management Division at (802) 828-1115. See letter dated January 20, 2021 from the Village of Marshfield (attached).

**RESPONSE TO THE VILLAGE OF MARSHFIELD:**

**COMMENT:**

1. Condition I.E. "Operation, Management, and Emergency Response Plan (OMERP)". As stated in the Fact Sheet and in Condition I.E. of the Draft Permit, the Village submitted an OMERP for the wastewater treatment facility, pump stations, and sewer line stream crossings as required by 10 VSA 1278(b) on December 31, 2008. The Agency approved this Plan on January 5, 2009, and the Village has been implementing it. The Village acknowledges the need to revise and update this Plan and is planning to submit a revised OMERP for the wastewater treatment facility, pump stations, and sewer line stream crossings by December 31, 2022, as proposed in Condition I.E. and will implement this updated OMERP upon receiving written approval from the Agency.

With respect to the OMERP for the collection system, as referenced in the Fact Sheet and in Condition I.E. of the draft permit, the Village submitted an OMERP to the Agency for the collection system as required by 10 VSA 1278(c) on July 1, 2010. However, to date the Village has not received any review comments on this Plan from the Agency, nor has the Agency issued an approval of it. Consequently, it is not possible for the Village to revise this Plan as proposed in Condition I.E. Therefore, the Village requests that the Agency complete the review of this pending Plan, and the Village will implement it upon approval by the Agency as required by 10 VSA 1278(c).

**RESPONSE:**

Condition I.E of the Permit and Condition VIII.D.2. of the Fact Sheet have been revised as follows:

The Operation Management and Emergency Response Plan (OMERP) for the sewage collection system was submitted on July 1, 2010. Through issuance of this permit the Secretary approves

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

The Permittee shall revise the plan upon the Secretary's request or on its own motion to reflect equipment or operational changes.

**COMMENT:**

2. Condition I.F. "Phosphorus Optimization Plan".

Due to the health concerns caused by COVID 19 impacting the availability of our consultant and the ability of our staff to interact with the users of our system to identify and assess potentially high discharges of phosphorus into our collection system, the Village trustees are requesting a revision of the submittal and implementation dates for the Phosphorus Optimization Plan referenced in Condition I.F.3.

Specifically, after discussions with our consultant and staff, we are requesting that the submission deadline of the Phosphorus Optimization Plan be revised from July 1, 2021 to October 1, 2021 and the requirement commencement date to implement this Plan be changed from September 1, 2021 to December 1, 2021. These minor extensions will allow our consultant and staff additional time to properly prepare this Plan, to thoroughly assess potential high sources of phosphorus, and to educate the users of our system on how to reduce their input of phosphorus into our wastewater treatment facility.

**RESPONSE:**

The Agency approves the revised schedule and Condition I.F. of the permit has been amended accordingly.

The Village trustees have reviewed draft Discharge Permit No. 3-1195 and wish to submit the following comments:

1. Condition I.E. “Operation, Management, and Emergency Response Plan (OMERP)”

As stated in the Fact Sheet and in Condition I.E. of the Draft Permit, the Village submitted an OMERP for the wastewater treatment facility, pump stations, and sewer line stream crossings as required by 10 VSA 1278(b) on December 31, 2008. The Agency approved this Plan on January 5, 2009, and the Village has been implementing it. The Village acknowledges the need to revise and update this Plan and is planning to submit a revised OMERP for the wastewater treatment facility, pump stations, and sewer line stream crossings by December 31, 2022, as proposed in Condition I.E. and will implement this updated OMERP upon receiving written approval from the Agency.

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Total Phosphorus WR-43-TPO4-LC

|   |                   |
|---|-------------------|
| Agency of Natural Resources                       | Permittee:        |
| Department of Environmental Conservation          | NPDES Permit No.  |
| Watershed Management Division                     | Preparer/Contact: |
| One National Life Drive, Main Building, 2nd Floor | Telephone:        |
| Montpelier, VT 05620-3522                         | Email:            |
|   | Month/Year:       |

|   |                              |  |
|---|------------------------------|--|
| Total Phosphorus Waste Load Allocation from Lake Champlain Phosphorus TMDL: | metric tons/year<br>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:

Table 9. Vermont Individual WWTF Phosphorus Wasteload Allocations  
*(Facilities with allocations different from the 2002 TMDLs are shown in italics.)*

| Facility                                      | Lake Segment             | Design Flow (mgd) | Current Permit Load (mt/yr) | TMDL Wasteload Allocation (mt/yr) | Change in Permitted Load (mt/yr) |
|---|--------------------------|-------------------|-----------------------------|-----------------------------------|----------------------------------|
| Alburgh                                       | 13 Isle LaMotte          | 0.130             | 0.108                       | 0.108                             | 0.000                            |
| Barre City                                    | <i>05 Main Lake</i>      | 4.000             | 3.314                       | 1.105                             | -2.209                           |
| Benson  | 01 South Lake B          | 0.018             | 0.122                       | 0.122                             | 0.000                            |
| Brandon                                       | 04 Otter Creek           | 0.700             | 0.580                       | 0.580                             | 0.000                            |
| Burlington Electric McNeil Generating Station | 05 Main Lake             | 0.365             | 0.017                       | 0.017                             | 0.000                            |
| Burlington Main                               | <i>07 Burlington Bay</i> | 5.300             | 4.392                       | 1.464                             | -2.928                           |
| Burlington North                              | <i>05 Main Lake</i>      | 2.000             | 1.657                       | 0.552                             | -1.105                           |
| Burlington River (East)                       | <i>05 Main Lake</i>      | 1.200             | 0.994                       | 0.331                             | -0.663                           |
| Cabot   | 05 Main Lake             | 0.050             | 0.041                       | 0.041                             | 0.000                            |
| Castleton                                     | 01 South Lake B          | 0.480             | 0.397                       | 0.397                             | 0.000                            |
| Enosburg Falls                                | <i>12 Missisquoi Bay</i> | 0.450             | 0.373                       | 0.124                             | -0.249                           |
| Essex Junction                                | <i>05 Main Lake</i>      | 3.300             | 2.569                       | 0.911                             | -1.658                           |
| Fair Haven                                    | 01 South Lake B          | 0.500             | 0.414                       | 0.414                             | 0.000                            |
| Fairfax                                       | 09 Malletts Bay          | 0.078             | 0.539                       | 0.539                             | 0.000                            |
| Global Foundries (I B M Corp)                 | <i>05 Main Lake</i>      | 8.000             | 5.531                       | 2.210                             | -3.321                           |
| Hardwick                                      | 09 Malletts Bay          | 0.371             | 0.410                       | 0.410                             | 0.000                            |
| Hinesburg                                     | <i>06 Shelburne Bay</i>  | 0.250             | 0.276                       | 0.069                             | -0.207                           |

|   |                          |       |       |       |        |
|---|--------------------------|-------|-------|-------|--------|
| Jeffersonville  | 09<br>Malletts<br>Bay    | 0.077 | 0.532 | 0.532 | 0.000  |
| Johnson   | 09<br>Malletts<br>Bay    | 0.270 | 0.224 | 0.224 | 0.000  |
| Marshfield  | 05 Main<br>Lake          | 0.045 | 0.311 | 0.311 | 0.000  |
| Middlebury  | 04 Otter<br>Creek        | 2.200 | 1.823 | 1.823 | 0.000  |
| Milton  | 09<br>Malletts<br>Bay    | 1.000 | 0.829 | 0.829 | 0.000  |
| Montpelier  | 05 Main<br>Lake          | 3.970 | 3.290 | 1.097 | -2.193 |
| Morrisville   | 09<br>Malletts<br>Bay    | 0.550 | 0.352 | 0.352 | 0.000  |
| Newport Town (Newport<br>Center)                                      | 12<br>Missisqu<br>oi Bay | 0.042 | 0.006 | 0.116 | 0.110  |
| North Troy  | 12<br>Missisqu<br>oi Bay | 0.110 | 0.760 | 0.122 | -0.638 |
| Northfield  | 05 Main<br>Lake          | 1.000 | 0.829 | 0.276 | -0.553 |
| Orwell  | 02 South<br>Lake A       | 0.033 | 0.228 | 0.228 | 0.000  |
| Otter Valley Union High<br>School                                     | 04 Otter<br>Creek        | 0.025 | 0.173 | 0.173 | 0.000  |
| P B M Nutritionals Inc  | 09<br>Malletts<br>Bay    | 0.425 | 0.352 | 0.352 | 0.000  |
| Pawlet (West Pawlet)  | 01 South<br>Lake B       | 0.040 | 0.276 | 0.276 | 0.000  |
| Pittsford   | 04 Otter<br>Creek        | 0.085 | 0.483 | 0.483 | 0.000  |
| Pittsford Fish Hatchery<br>(US Dept of Interior-<br>DEisenhower NFH ) | 04 Otter<br>Creek        | 2.600 | 0.691 | 0.691 | 0.000  |
| Plainfield  | 05 Main<br>Lake          | 0.125 | 0.691 | 0.138 | -0.553 |
| Poultney  | 01 South<br>Lake B       | 0.500 | 0.414 | 0.414 | 0.000  |
| Proctor   | 04 Otter<br>Creek        | 0.325 | 0.359 | 0.359 | 0.000  |

|   |                             |        |       |       |        |
|---|-----------------------------|--------|-------|-------|--------|
| Richford  | 12<br><i>Missisquoi Bay</i> | 0.380  | 0.420 | 0.105 | -0.315 |
| Richmond  | 05 Main<br><i>Lake</i>      | 0.222  | 0.184 | 0.061 | -0.123 |
| Rutland City                                      | 04 Otter<br><i>Creek</i>    | 8.100  | 5.634 | 5.634 | 0.000  |
| Shelburne #1 (Crown Road)                         | 06<br><i>Shelburne Bay</i>  | 0.440  | 0.348 | 0.122 | -0.226 |
| Shelburne #2 (Harbor Road)                        | 06<br><i>Shelburne Bay</i>  | 0.660  | 0.497 | 0.182 | -0.315 |
| Sheldon Springs                                   | 12<br><i>Missisquoi Bay</i> | 0.054  | 0.373 | 0.373 | 0.000  |
| Shoreham  | 04 Otter<br><i>Creek</i>    | 0.035  | 0.242 | 0.242 | 0.000  |
| South Burlington Airport Parkway                  | 05 Main<br><i>Lake</i>      | 3.300  | 1.906 | 0.911 | -0.995 |
| South Burlington Bartlett Bay                     | 06<br><i>Shelburne Bay</i>  | 1.250  | 0.878 | 0.345 | -0.533 |
| St Albans Northwest Correctional                  | 11 St.<br><i>Albans Bay</i> | 0.040  | 0.028 | 0.028 | 0.000  |
| St. Albans City                                   | 11 St.<br><i>Albans Bay</i> | 4.000  | 2.762 | 1.105 | -1.657 |
| Stowe   | 05 Main<br><i>Lake</i>      | 1.000  | 0.282 | 0.276 | -0.006 |
| Swanton   | 12<br><i>Missisquoi Bay</i> | 0.900  | 0.746 | 0.249 | -0.497 |
| Troy/Jay  | 12<br><i>Missisquoi Bay</i> | 0.800  | 0.221 | 0.221 | 0.000  |
| Vergennes   | 04 Otter<br><i>Creek</i>    | 0.750  | 0.621 | 0.621 | 0.000  |
| VT Fish & Wildlife - Ed Weed Fish Culture Station | 05 Main<br><i>Lake</i>      | 11.500 | 0.914 | 0.914 | 0.000  |
| VT Fish & Wildlife - Salisbury Fish Hatchery      | 04 Otter<br><i>Creek</i>    | 1.310  | 0.181 | 0.181 | 0.000  |
| Wallingford FD 1                                  | 04 Otter<br><i>Creek</i>    | 0.120  | 0.829 | 0.829 | 0.000  |



|                                 |                          |       |        |        |         |
|---------------------------------|--------------------------|-------|--------|--------|---------|
| Waterbury                       | <i>05 Main Lake</i>      | 0.510 | 0.563  | 0.141  | -0.422  |
| West Rutland                    | <i>04 Otter Creek</i>    | 0.450 | 0.364  | 0.364  | 0.000   |
| WestRock Converting (Rock Tenn) | <i>12 Missisquoi Bay</i> | 2.500 | 1.260  | 0.691  | -0.569  |
| Williamstown                    | <i>05 Main Lake</i>      | 0.150 | 1.036  | 0.166  | -0.870  |
| Winooski                        | <i>05 Main Lake</i>      | 1.400 | 1.160  | 0.387  | -0.773  |
| Total                           |                          |       | 55.802 | 32.336 | -23.465 |

The yellow column contains the P loads for each facility in mt/year (metric ton per year).

|   |        |
|---|--------|
| Alburgh                                       | 3-1180 |
| Barre City                                    | 3-1272 |
| Benson  | 3-1166 |
| Brandon                                       | 3-1196 |
| Burlington Electric McNeil Generating Station | 3-1219 |
| Burlington Main                               | 3-1331 |
| Burlington North                              | 3-1245 |
| Burlington River                              | 3-1247 |
| Cabot   | 3-1440 |
| Castleton                                     | 3-1238 |
| Enosburg Falls                                | 3-1234 |
| Essex Junction                                | 3-1254 |
| Fair Haven                                    | 3-1307 |
| Fairfax                                       | 3-1194 |
| I B M Corp                                    | 3-1295 |
| Hardwick                                      | 3-1143 |
| Hinesburg                                     | 3-1172 |

|                                     |        |
|-------------------------------------|--------|
| Jeffersonville                      | 3-1323 |
| Johnson                             | 3-1149 |
| Marshfield                          | 3-1195 |
| Middlebury                          | 3-1210 |
| Milton                              | 3-1203 |
| Montpelier                          | 3-1207 |
| Morrisville                         | 3-1155 |
| Newport Town                        | 3-1236 |
| North Troy                          | 3-1139 |
| Northfield                          | 3-1158 |
| Orwell                              | 3-1214 |
| Otter Valley Union High School      | 3-0293 |
| P B M Nutritionals Inc              | 3-1209 |
| Pawlet                              | 3-1220 |
| Pittsford                           | 3-1189 |
| US Dept of Interior-DEisenhower NFH | 3-1188 |
| Plainfield                          | 3-0381 |
| Poultney                            | 3-1231 |
| Proctor                             | 3-1298 |

|   |        |
|---|--------|
| Richford  | 3-1147 |
| Richmond  | 3-1173 |
| Rutland   | 3-1285 |
| Shelburne 1 (Crown Rd)                            | 3-1289 |
| Shelburne 2 (Harbor Rd)                           | 3-1304 |
| Sheldon Springs                                   | 3-1108 |
| Shoreham  | 3-1459 |
| South Burlington - Airport Parkway                | 3-1278 |
| South Burlington - Bartlett Bay                   | 3-1284 |
| St Albans Northwest Correctional                  | 3-1260 |
| St Albans City                                    | 3-1279 |
| Stowe   | 3-1232 |
| Swanton   | 3-1292 |
| Troy & Jay  | 3-1311 |
| Vergennes   | 3-0368 |
| VT Fish & Wildlife - Ed Weed Fish Culture Station | 3-1312 |
| VT Fish & Wildlife - Salisbury Fish Hatchery      | 3-0361 |
| Wallingford FD 1                                  | 3-0365 |

|                             |        |
|-----------------------------|--------|
| Waterbury                   | 3-1160 |
| West Rutland                | 3-1237 |
| WestRock Converting Company | 3-1118 |
| Williamstown                | 3-1176 |
| Winooski                    | 3-1248 |