

AGENCY OF NATURAL RESOURCES
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATERSHED MANAGEMENT DIVISION
ONE NATIONAL LIFE DRIVE, MAIN BUILDING, 2nd FLOOR
MONTPELIER, VT 05620-3522

Permit No.: 3-1201
PIN: SJ95-0132
NPDES No.: VT0100251

Name of Applicant: Village of Orleans, Inc.
One Memorial Square
Orleans, VT 05860


Expiration Date: **March 31, 2024**

DISCHARGE PERMIT

In compliance with the provisions of the Vermont Water Pollution Control Act as amended (10 V.S.A. chapter 47), the Vermont Water Pollution Control Permit Regulations as amended (Environmental Protection Rules, Chapter 13), and the federal Clean Water Act as amended (33 U.S.C. § 1251 *et seq.*), and implementing federal regulations, the Village of Orleans, Inc. (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 Orleans Wastewater Treatment Facility (hereinafter referred to as the "WWTF") to the Barton River in accordance with the following conditions.

This permit shall become effective on **June 1, 2019**.

Emily Boedecker, Commissioner
Department of Environmental Conservation

By:  _____ Date: 5/15/19 _____

Chris Gianfagna, Wastewater Program Manager
Watershed Management Division

I. SPECIAL CONDITIONS

A. EFFLUENT LIMITS

1. During the term of this permit, the Permittee is authorized to discharge from outfall serial number S/N 001 of the Orleans WWTF to the Barton River, located at Latitude: 44.81805 and Longitude -72.20446, an effluent for which the characteristics shall not exceed the values listed below:

EFFLUENT CHARACTERISTICS	DISCHARGE LIMITATIONS								
	Annual Average	Annual Limit	Monthly Average	Weekly Average	Maximum Day	Monthly Average	Weekly Average	Maximum Day	Instantaneous Maximum
		Mass (lbs/yr)	Mass (lbs/day)			Concentration (mg/L)			
Flow ¹	0.190 MGD		Monitor Only						
Biochemical Oxygen Demand (5-day, 20° C) (BOD ₅) ²			48	72		30	45	50	
Total Suspended Solids (TSS) ²			48	72		30	45	50	
Total Phosphorus (TP) ^{2,3}		388				1.0 mg/l			
Total Nitrogen (TN) ⁴					Monitor only			Monitor only	
Total Kjeldahl Nitrogen (TKN)								Monitor only	
Nitrate/Nitrite Nitrogen (NO _x)								Monitor only	
Total Ammonia Nitrogen								Monitor only	
Settleable Solids									1.0 ml/L
<i>Escherichia coli</i>									77cfu/100mL
Total Residual Chlorine									0.1 mg/l
pH						Between 6.5-8.5 Standard Units			

¹ Monthly average flow calculated by summing daily effluent flow for each day in the given month and dividing the sum by the number of days of discharge in that month.
² The Permittee shall operate the WWTF to meet the concentration limitations or pounds limitation, whichever is more restrictive.
³ Total Phosphorus shall be reported as Total Monthly Pounds, Running Total Annual Pounds, and Percentage of Running Total Annual Pounds to Annual Permit Limitation. See Condition I.B.5
⁴ Total Nitrogen (TN) shall be reported as pounds and calculated as: *Average TN (mg/L) x Total Daily Flow (MGD) x 8.34*; where, *TN (mg/L) = TKN (mg/L) + NO_x (mg/L)*

2. The effluent shall not have concentrations or combinations of contaminants including oil, grease, scum, foam, or floating solids which would cause a violation of the Vermont Water Quality Standards.
3. The effluent shall not cause visible discoloration of the receiving waters.
4. The monthly average concentrations of Biochemical Oxygen Demand (BOD₅) and Total Suspended Solids (TSS) in the effluent shall not exceed 15 percent of the monthly average concentrations of BOD₅ and TSS in the influent into the Orleans WWTF. For the purposes of determining whether the Permittee is in compliance with this condition, samples from the effluent and the influent shall be taken with appropriate allowance for detention times.
5. 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 consistent with approved water quality management plans.
6. 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. TOTAL PHOSPHORUS

1. Wasteload Allocation for Phosphorus

This permit includes a Total Phosphorus (TP) water quality based effluent limitation of 388 lbs./yr., equal to the waste load allocation (WLA) for TP of 388 lbs./yr. approved by the U.S. Environmental Protection Agency (U.S. EPA) in the 2017 “Lake Memphremagog Phosphorus Total Maximum Daily Load” (LM TMDL). The Secretary reserves the right to reopen and amend this permit, pursuant to Condition II.B.4 of 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 Orleans WWTF and another WWTF pursuant to the requirements of TMDL and Vermont’s “Wasteload Allocation Process” Rule (Environmental Protection Rule, Chapter 17).

2. Phosphorus Optimization Plan

- a) **Within 120 days of the permit effective date**, the Permittee shall develop or update (as appropriate), and submit to the Secretary, a Phosphorus Optimization Plan (POP) to increase the WWTF’s phosphorus removal efficiency by implementing optimization techniques that achieve phosphorus reductions using primarily existing facilities and equipment. The POP shall:

- i. Be developed by a qualified professional with experience in the operation and design of WWTFs in consultation with the Orleans WWTF;
 - ii. Evaluate alternative methods of operating the Orleans 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 for failure to meet the requirements of subsection (a) of this section.
- 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; and
 - iii. The phosphorus discharge trends relative to the previous year.

The first annual report shall include data collected during 2020 and shall be attached to the December 2020 DMR form WR-43.

3. Phosphorus Elimination/Reduction Plan

- 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 LM TMDL WLA for the WWTF, based on the WWTF's 12-month running annual load calculated using the Running Total Annual Pounds Calculation (Condition I.B.4.), the Permittee shall, within 90 days of reaching or exceeding 80% of the LM 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.

- c) If the WWTF is not projected to exceed its WLA within the permit term, the Permittee shall reassess when it is projected to reach its WLA prior to permit renewal and submit that information with its next permit application.
- d) If the Orleans WWTF is projected to exceed its WLA 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 Condition I.B.3.b. The PERP shall be submitted to the Secretary to ensure the WWTF continues to comply with its WLA.
- e) 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 WLA.
- ii. An identification of the chosen alternative or alternatives to ensure the WWTF's compliance with its WLA;
- 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 WLA 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.

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.

4. Running Total Annual Pounds Calculation

Compliance with the annual TP limitation (presented in Condition I.A.1. and I.B.1.) will be evaluated each month, using the Running Total Annual Pounds Calculation. In order to calculate running annual TP loading relative to the TMDL WLA:

- a) Calculate the average of results for all TP monitoring events conducted in a month (Monthly Average TP Concentration). Units = mg/L
- b) For flow, use the average daily flow for the month as reported on the DMR. Units = MGD
- c) Calculate Total Monthly Pounds = (Monthly Average TP Concentration) × (average daily flow from DMR) × 8.34 × number of daily discharges in the month.

- d) Sum the results for the immediately preceding 12 months to derive the Running Total Annual Pounds.

5. Total Phosphorus Reporting

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

- a) Monthly Average TP Concentration, as calculated pursuant to Condition I.B.4.a.
- b) Total Monthly Pounds, meaning the total monthly pounds of TP discharged during the month, as calculated pursuant to Condition I.B.4.c.
- c) Running Total Annual Pounds, meaning the 12-month running annual TP load, as calculated pursuant to Condition I.B.4.d.
- d) Comparison (%) of Running Total Annual Pounds to Annual Permit Limitation, meaning the percentage of the Running Total Annual Pounds to the Annual TP Limitation. The comparison shall be calculated as:

$$\text{Percentage of Running Total Annual Pounds to Annual Permit Limitation, \%} = \frac{\text{Running Total Annual Pounds}}{\text{Annual TP Permit Limit}} \times 100$$

C. 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 Orleans WWTF in the Barton River downstream one mile.

D. REAPPLICATION

If the Permittee desires to continue to discharge after the expiration of this permit, the Permittee shall reapply on the application forms then in use at least 180 days before this permit expires.

Reapply for a Discharge Permit by: **September 30, 2023**

E. OPERATING FEES

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

F. TOXICITY TESTING

1. Whole Effluent Toxicity (WET) Testing.

- a) During **August or September 2021**, the Permittee shall conduct a two-species (*Pimephales promelas* and *Ceriodaphnia dubia*) modified acute/chronic WET tests (48-hour acute endpoints within a 7-day chronic test) on a composite effluent sample collected from S/N 001. Total ammonia should be measured in the highest

concentration of test solution at the beginning of the test. The results shall be submitted to the Secretary by **December 31, 2021**

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).

Based upon the results of these tests or any other toxicity tests conducted, the Secretary reserves the right to reopen and amend this permit, pursuant to Condition II.B.4 of this permit, to require additional WET testing or that Toxicity Reduction Evaluation.

G. MONITORING AND REPORTING

1. Sampling and Analysis

The sampling, preservation, handling, and analytical methods used shall conform to the test procedures published in Title 40 of the Code of Federal Regulations (C.F.R.) Part 136.

The Permittee shall use sufficiently sensitive test procedures (i.e., methods) approved under 40 C.F.R. Part 136 for the analysis of the pollutants or pollutant parameters required under this Section.

Samples shall be representative of the volume and quality of effluent discharged over the sampling and reporting period. All samples are to be taken during normal operating hours. The Permittee shall identify the effluent sampling location used for each discharge. A description of the effluent sample location is included in Condition I.G.2.

2. Effluent Monitoring

During the term of this permit, the Permittee shall monitor and record the quality and quantity of discharge(s) at outfall serial number S/N 001 of the Orleans WWTF, according to the following schedule and other provisions:

PARAMETER	MINIMUM FREQUENCY OF ANALYSIS	SAMPLE TYPE
Flow	Continuous	Daily Total, Max., Min.
Biochemical Oxygen Demand (BOD ₅)	1 × month	composite ¹
Total Suspended Solids (TSS)	1 × month	composite ¹
Total Phosphorus (TP)	1 × month	composite ¹
Total Nitrogen (TN)	1 × quarter	[calculated ²]
Total Kjeldahl Nitrogen (TKN)	1 × quarter	composite ¹
Nitrate/Nitrite Nitrogen (NO _x)	1 × quarter	composite ¹
Total Ammonia Nitrogen (TAN)	1 × month	grab
Settleable Solids	1 × day	grab ³
<i>Escherichia coli</i>	1 × month	grab ⁴
Total Residual Chlorine	1 × day	grab ⁵
pH	1 × day	grab
Temperature	1 x year	grab
Dissolved Oxygen	1 x year	grab
Oil & Grease	1 x year	grab
Total Dissolved Solids (TDS)	1 x year	composite ¹

Samples collected in compliance with the monitoring requirements specified above shall be collected on the downstream side of the v-notch weir.

¹ Composite samples for BOD₅, TSS, TP, TKN, TDS, and NO_x shall be taken during the hours 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.
² TN = TKN + NO_x
³ Settleable Solids samples shall be collected between 10:00 AM and 2:00 PM or during the period of peak flow.
⁴ The monthly *E. coli* sample shall be collected at the same time and location as a daily Total Residual Chlorine sample. Samples shall be collected between the hours of 6:00 AM and 6:00 PM.
⁵ Total Residual Chlorine shall be monitored and recorded both prior to and following dechlorination.

3. Annual Constituent Monitoring

Annually, by December 31, the Permittee shall monitor S/N 001 and submit the results, including units of measurement, as an attachment to the DMR form WR-43 for the month in which the samples were taken for the following parameters:

- Temperature
- Dissolved Oxygen
- Oil & Grease
- Total Dissolved Solids

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

Collect annual constituent monitoring samples once per year. The season in which samples are collected shall change chronologically from year to year to represent the seasonal variation of effluent constituents. The sampling seasons are as follows: winter (January 1 – March 31), spring (April 1 – June 30), summer (July 1 – September 30), and fall (October 1 – December 31). The first samples under this permit should be taken during the fall season. For easy reference regarding the season in which sampling is recommended, please refer to the “Guidance for Annual Constituent Monitoring.”

4. Influent Monitoring

During the term of this permit, the Permittee shall monitor the quality of the influent according to the following schedule and provisions:

PARAMETER	MINIMUM FREQUENCY OF ANALYSIS	SAMPLE TYPE
Biochemical Oxygen Demand (BOD ₅)	1 × month	composite ¹
Total Suspended Solids (TSS)	1 × month	composite ¹

¹ Composite samples for BOD₅ and TSS shall be taken during the hours 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 a composite.

5. Reporting

The Permittee is required to submit monthly reports of monitoring results specified in condition I.G. of this permit 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.

The Permittee shall electronically submit its DMRs via Vermont's on-line electronic reporting system unless electronic submission is waived by the Secretary. 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 link below shall be used for electronic submittals:

<https://anronline.vermont.gov/>

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

All reports shall be signed:

- a) In the case of corporations, by a principal executive officer of at least the level of vice president, or his/her duly authorized representative, if such representative is responsible for the overall operation of the facility from which the discharge described in the permit form originates and the authorization is made in writing and submitted to the Secretary;
- b) In the case of a partnership, by a general partner;
- c) In the case of a sole proprietorship, by the proprietor; or
- d) In the case of a municipal, State, or other public facility, by either a principal executive officer, ranking elected official, or other duly authorized employee.

6. Recording of Results

The Permittee shall maintain records of all information resulting from any monitoring activities required, including:

- a) The exact place, date, and time of sampling or measurement;
- b) The individual(s) who performed the sampling or measurements;
- c) The dates and times the analyses were performed;
- d) The individual(s) who performed the analyses;
- e) The analytical techniques and methods used including sample collection handling and preservation techniques;
- f) The results of such analyses;
- g) The records of monitoring activities and results, including all instrumentation and calibration and maintenance records;

- h) 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
- i) 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.

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

7. 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.

H. 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 Orleans WWTF or the operator’s delegate shall comply with the notice requirements outlined in Condition II.A.2 of this permit.

I. OPERATION, MANAGEMENT, AND EMERGENCY RESPONSE PLANS

1. The Permittee shall implement the Operation, Management, and Emergency Response Plan for the treatment facility, sewage pumping stations, and sewer line stream crossings as approved by the Secretary on April 29, 2008.
2. The Permittee submitted the Operation, Management, and Emergency Response Plan for the sewage collection system to the Secretary on July 7, 2010. Through issuance of this permit the Secretary approves the inspection schedule for the plan. The permittee shall implement the plan in accordance with that schedule.
3. The Permittee shall revise the Operation, Management, and Emergency Response Plan upon the Secretary’s request or on its own motion to reflect equipment or operational changes.

J. ENGINEERING EVALUATION/ASSET MANAGEMENT AND REPORT

By **December 31, 2022** the Permittee shall conduct an in-depth engineering inspection/evaluation of the Orleans WWTF 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 and it is conducted and prepared in accord with the following conditions:

A professional engineer with experience in the design and operation of municipal wastewater treatment facilities shall be hired to perform an in-depth inspection of the 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 inspected. Such components shall include: grit removal systems, comminutors, tank and partition integrity, biological systems, aeration systems, piping, clarifier drives and chlorination and dechlorination systems, flow metering systems, all critical and necessary valves, and sludge handling equipment (digesters and appurtenances). In the pump stations, all components critical to the proper conveyance of sewage, the prevention of sewage bypass, and the supporting appurtenances shall be inspected. This includes pumps, alarms, check valves, piping, motor controls, ventilators, dehumidifiers, and sumps pumps, if so equipped, and the station structure.

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.

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.

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.

K. EMERGENCY ACTION - ELECTRIC POWER FAILURE

The Permittee shall indicate in writing to the Secretary **within 90 days after the effective date of this permit** that in the event the primary source of electric power to the Orleans WWTF (including pump stations) fails, the Permittee shall either provide an alternative source of power for the operation of the Orleans 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 Orleans WWTF 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.

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

L. SEWER ORDINANCE

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

1. Prohibit the introduction by any person into the Permittee's sewerage system or WWTF of any pollutant which:
 - a) Is a toxic pollutant in toxic amounts as defined in standards issued from time to time under Section 307(a) of the Clean Water Act;
 - b) Creates a fire or explosion hazard in the Permittee's treatment works;
 - c) Causes corrosive structural damage to the Permittee's treatment works, including all wastes with a pH lower than 5.0;
 - d) 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
 - e) 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.
2. Require 45 days prior notification to the Permittee by any person or persons of a:
 - a) 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;
 - b) Proposed new discharge into the Permittee's treatment works of pollutants from any source which would be a new source as defined in Section 306 of the Clean Water Act if such source were discharging pollutants; or
 - c) Proposed new discharge into the Permittee's treatment works of pollutants from any source which would be subject to Section 301 of the Clean Water Act if it were discharging such pollutants.
3. 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.

4. 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 under subsection 3 above, and to sample any discharge into the Permittee's treatment works.

II. GENERAL CONDITIONS

A. MANAGEMENT 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 notice to the Secretary of such changes. Following such notice, the permit may be modified, pursuant to Condition II.B.4 of this permit, to specify and limit any pollutants not previously limited.

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

- a) Any new introduction of pollutants into the treatment works from a source which would be a new source as defined in Section 306 of the Clean Water Act if such source were discharging pollutants;
- b) 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 Section 301 of the Clean Water Act if such source were discharging pollutants; and
- c) 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.

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.

2. 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.
 - i. Public notice. For “untreated discharges” an operator of a 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 a 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:

- (1) 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.
 - (2) Except for discharges from a WWTF to a separate storm sewer system, the date and approximate time the untreated discharge began.
 - (3) 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.
 - (4) Except for discharges from a 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.
 - (5) 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.
 - (6) The person reporting the untreated discharge.
- d)** For any non-compliance not covered under Condition II.A.2.c. of this permit, an operator of a 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:
- 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.

3. 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, maintain in good working order and operate as efficiently as possible all treatment and control facilities and systems (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 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 Orleans WWTF shall be performed only by qualified personnel who are licensed as required by Secretary and the Director of the Vermont Office of Professional Regulation.

4. Quality Control

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.

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

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 $\pm 10\%$.

For purposes of demonstrating compliance with the requirements of Condition II.A.3.a) of this permit regarding adequate laboratory controls and appropriate quality assurance procedures, the Permittee shall conduct 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. Results shall be submitted to the Secretary by **December 31, annually**. The first results are due by **December 31, 2020**.

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. 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.

6. Duty to Mitigate

The Permittee shall 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.

7. Records Retention

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed, all calibration and maintenance of instrumentation records and all original 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 shall be retained for a minimum of three years, and shall be submitted to the Secretary upon request. This period shall be extended during the course of unresolved litigation regarding the discharge of pollutants or when requested by the Secretary.

8. Solids Management

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.

9. Emergency Pollution Permits

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 Section II.A.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, he 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:

- (1) 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;
- (2) the denial of an emergency pollution permit would work an extreme hardship upon the applicant;
- (3) the granting of an emergency pollution permit will result in some public benefit;
- (4) the discharge will not be unreasonably harmful to the quality of the receiving waters;
- (5) the cause or reason for the emergency is not due to willful or intended acts or omissions of the applicant.

Application shall be made to the Secretary at the following address: Agency of Natural Resources, Department of Environmental Conservation, One National Life Drive, Main Building, 2nd Floor, Montpelier VT 05620-3522.

B. RESPONSIBILITIES

1. Right of Entry

The Permittee shall allow the Secretary or authorized representative, upon the presentation of proper credentials:

- 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.

2. 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.

3. 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 this chapter.

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.

4. 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 LM 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.

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.

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.

5. 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 section 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.B.4 of this permit, in accordance with the toxic effluent standard or prohibition and the Permittee so notified.

6. 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.

7. Other Materials

Other materials ordinarily produced or used in the operation of the Orleans WWTF, 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 his/her 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.

8. 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.

9. Civil and Criminal Liability

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.A.5) and "Emergency Pollution Permits" (Condition II.A.9), nothing in this permit shall be construed to relieve the Permittee from civil or criminal penalties for noncompliance. Civil and criminal penalties for non-compliance are provided for in 10 V.S.A. Chapters 47, 201, and 211.

10. 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.

11. 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.

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. 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.

14. 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, and Section 402 of the Clean Water Act, as amended.

15. 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 Section 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.

AGENCY OF NATURAL RESOURCES
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATERSHED MANAGEMENT DIVISION
ONE NATIONAL LIFE DRIVE, MAIN BUILDING, 2ND FLOOR
MONTPELIER, VT 05620-3522

FACT SHEET FOR DRAFT PERMIT
January 2019

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

PERMIT NO: 3-1201
PIN: SJ95-0132
NPDES NO: VT0100251

NAME AND ADDRESS OF APPLICANT:

Village of Orleans, Inc.
One Memorial Square
Orleans, VT 05860

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Orleans Wastewater Treatment Facility
187 Maple Street
Orleans, Vermont

RECEIVING WATER: Barton 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 May 28, 2012. The facility's previous permit was issued on September 14, 2007. 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 as 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.

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

II. Description of Discharge

The facility is engaged in the treatment of municipal wastewater including domestic, commercial, and industrial wastewaters. There are no pretreaters permitted under the NPDES program discharging to the collection system. The facility type is a tertiary treatment plant. The design flow of the facility is 0.19 million gallons per day (MGD). The average flow to the facility over the last 5 years is about 0.06 MGD.

The WWTF maintains a continuous discharge to the Barton River.

III. Limitations and Conditions

The draft permit contains limitations for effluent flow, biochemical oxygen demand (BOD₅), total suspended solids (TSS), total phosphorus (TP), settleable solids, *Escherichia coli*, total residual chlorine, and pH. It also contains monitoring requirements for total nitrogen (TN), Total Kjeldahl Nitrogen (TKN), nitrate/nitrite (NO_x), and Total Ammonia Nitrogen (TAN). 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 25
Monitoring Requirements:	Pages 4-9 of 25

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 BOD₅, TSS and pH; 40 C.F.R. Part 133.

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

A permit must include limits for any pollutant or pollutant parameter (conventional, non-conventional, toxic, and whole effluent toxicity) that is or may be discharged at a level that causes or has "reasonable potential" to cause or contribute to an excursion above any water quality standard, including narrative water quality criteria. See 40 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 in stream pollutant concentrations. Acute aquatic life criteria are generally implemented through maximum daily limits and chronic aquatic life criteria are generally implemented through average monthly limits.

Where a state has not established a numeric water quality criterion for a specific chemical pollutant that is present in the effluent in a concentration that causes or has a reasonable potential to cause a violation of narrative water quality standards, the permitting authority must establish effluent limits in one of three ways: based on a “calculated numeric criterion for the pollutant which the permitting authority demonstrates will attain and maintain applicable narrative water quality criteria and fully protect the designated use”; on a “case-by-case basis” using CWA § 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.
- 6) All effluent limitations, monitoring requirements, and other conditions of the 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(i). 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 **Barton River**, a designated **Cold-Water Fish Habitat**. At the point of discharge, the river has a contributing drainage area of **78** square miles. The summer 7Q10 flow of the river is estimated to be 14.13 cubic feet per second (CFS) and the summer Low Median Monthly flow is estimated to be 35.25 CFS. The instream waste concentration at the summer 7Q10 flow is 0.0204 (2.0%) and the instream waste concentration at the summer Low Median Monthly flow is 0.008 (0.8%).

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

VI. Facility History and Background

The Village of Orleans operates the facility which is a tertiary treatment facility consisting of activated sludge followed by sand filtration units. Phosphorus removal is accomplished by biological removal and chemical precipitation. Chlorine disinfection is followed by dechlorination. The collection system (which consists of a main pump station; circa 1980) and the facility itself underwent several improvements prior to issuance of the 1998 permit. These included collection system improvements to reduce inflow and infiltration (I/I) and the installation of a new aeration basin, clarifier, and sand filtration unit. The facility discharges to the Barton River.

VII. Permit Basis and Explanation of Effluent Limitation Derivation

A. Flow – The draft permit maintains the annual average flow limitation of 0.19 MGD. This facility maintains a constant discharge. Continuous flow monitoring is required.

B. Conventional Pollutants

- 1. Biochemical Oxygen Demand (BOD₅)** – The effluent limitations for BOD₅ 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, BOD₅ limitation. This is the Agency standard applied to all such discharges pursuant to 13.4 c. of the Vermont Water Pollution Control Permit Regulations. The Secretary implements the limit to supplement the federal technology-based limitations. This is designed to prevent a gross one-day permit effluent violation from being offset by multiple weekly and monthly sampling events. Mass limits (48 lbs/day, monthly average and 72 lbs/day, weekly average) are calculated using the concentration limits outlined above and the permitted flow (0.019 MGD). The monthly BOD₅ monitoring requirement is unchanged from the current permit.
- 2. Total Suspended Solids (TSS)** – The effluent limitations for TSS remain unchanged from the current permit. The monthly average (30 mg/L) and weekly average (45 mg/L) reflect the minimum level of effluent quality specified for secondary treatment in 40 C.F.R. Part 133.102. In addition, the draft permit contains a 50 mg/L, maximum day, TSS limitation. This is the Agency standard applied to all such discharges pursuant to 13.4 c. of the Vermont Water

Pollution Control Permit Regulations. This is designed to prevent a gross one-day permit effluent violation from being offset by multiple weekly and monthly sampling events. Mass limits (48 lbs/day, monthly average and 72 lbs/day, weekly average) are calculated using the concentration limits outlined above and the permitted flow (0.019 MGD). The monthly TSS monitoring requirement 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 § 402(o) of the CWA. As in the current permit, monthly monitoring is required.
4. **pH** – The pH limitation remains at 6.50 - 8.50 Standard Units as specified in § 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 Memphremagog from a variety of sources has impaired the water quality of the lake. The Lake Memphremagog Phosphorus Total Maximum Daily Load (LM 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 approved phosphorus TMDLs for the Vermont Lake segment of Lake Memphremagog developed 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 “Lake Memphremagog Phosphorus Total Maximum Daily Load” (September 2017). The 2017 LM TMDL specifies allowable phosphorus loads, or waste load allocations (WLA), expressed as pounds per year (lbs/yr), for each of the four WWTFs that discharge to the Lake’s watershed.

The LM TMDL establishes new annual WLAs for all four WWTFs that discharge to the Vermont Lake segment’s watershed. These new WLAs were calculated by implementing a 33.2% reduction from current permitted loading levels. In the LM TMDL, the Secretary employed 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 LM 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 LM TMDL to the actual phosphorus discharge load from the WWTF over last 12 months:

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

To ensure facilities are operating as efficiently as possible, all reissued wastewater discharge (NPDES) permits under the LM 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, and
- (2) for facilities that currently have an existing monthly effluent concentration limits for TP in their NPDES permit, as monthly average concentration limits.

Phosphorus Limit in Draft Permit:

The current discharge permit for this Facility includes a total annual mass limit of 1.6 pounds of TP per day monthly average based on a monthly average concentration of 1.0 mg/l as established in 10 V.S.A. 1266a.

This proposed draft permit contains a phosphorous monthly average concentration limit of 1.0 mg/l, and a total annual mass limit of 388 pounds. The concentration effluent limit is based on the requirements of 10 V.S.A. § 1266a and is unchanged from the current permit. The Secretary has set the annual mass limit for phosphorus equal to the 2017 WLA for this facility. Monthly sampling for total phosphorus is required.

The LM 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.B.4. of the permit), rather than once at the end of the calendar year. The LM 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. 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. Discharges from a municipally owned aerated lagoon type secondary sewage treatment plant in the Lake Memphremagog drainage basin, permitted on or before July 1, 1991 shall not be subject to the requirements of this subsection unless the plant is modified to use a technology other than aerated lagoons." Though state law does not require a phosphorus concentration limit for the Orleans WWTF, the previous permit contained a concentration limit of 1.0 mg/L. To comply with federal anti-backsliding requirements, this concentration limit is retained in the draft permit. 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 1.0 mg/L concentration limit at design flows will not result in meeting the annual mass limit.

The Permittee must comply with both limits 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 limit 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.

Condition I.G.5 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.

Phosphorus Optimization and Elimination/Reduction Plans:

To ensure the facility is operating as efficiently as possible for purposes of phosphorus removal, Condition I.B.2 of the permit requires that within 120 days of permit issuance, 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 issuance 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 LM TMDL WLA for the WWTF, based on the WWTF's 12-month running annual load calculated using the Phosphorus Load Calculation (Condition I.B.4 of the permit) the Permittee shall, within 90 days of reaching or exceeding 80% of the LM 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 Permittee is not projected to exceed its WLA within the permit term, the WWTF shall reassess when it is projected to reach its WLA prior to permit renewal and submit that information with its next permit application. If the facility is projected to exceed its WLA during the permit term, the Permittee shall submit a Phosphorus Elimination/Reduction Plan (PERP) within 6 months to the Secretary to ensure the WWTF continues to comply with its WLA. The PERP shall be treated as an application to amend the permit, and therefore, shall be subject to all public notice, hearing, and comment provisions, in place at the time the plan is submitted, that are applicable to permit amendments. The WWTF shall revise the PERP, if required by the Secretary.

2. Total Nitrogen (TN)

To gather data on the amount of Total Nitrogen (TN) in this discharge and its potential impact on the receiving water, a quarterly "monitor only" requirement for Nitrate/Nitrite (NOx) and Total Kjeldahl Nitrogen (TKN) has been included in this permit. TN is a calculated value based on the sum of NOx and TKN, and, shall be reported as pounds, calculated as:

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

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

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

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

Total Nitrogen monitoring is required quarterly for this facility.

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

- 3. Total Ammonia Nitrogen (TAN)** – To gather data on the amount of TAN in this discharge and its potential impact on the receiving water, a monthly “monitor only” requirement has been included in the permit.
- 4. 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 § 29A-303(2) of the Vermont Water Quality Standards.
- 5. Total Residual Chlorine** – The Total Residual Chlorine limits of 0.1 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. The monitoring requirement remains daily.
- 6. 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

Section I.F 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.

- 7. Annual Monitoring** - For all facilities with a design flow of greater than 0.1 MGD, 40 C.F.R. § 122.21(j) requires the submittal of effluent monitoring data for those parameters identified in Section I.G.3 of the draft permit. Samples must be collected once annually such that by the end of the term of the permit, all quarters have been sampled at least once, and the results will be submitted by December 31 of each year. Sampling in 2019 should be completed in fall (July 1 to September 30). For subsequent sampling, the “Guidance for Annual Constituent Monitoring” document should be referred to determine the season in which samples should be taken each year.

D. Special Conditions

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

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

- 2. Laboratory Proficiency Testing** - To ensure there are adequate laboratory controls and appropriate quality assurance procedures, the Permittee shall conduct an annual laboratory proficiency test for the analysis of all pollutant parameters performed within their facility laboratory and reported as required by their NPDES permit. Proficiency Test samples must be obtained from an accredited laboratory or as part of an EPA DMR-QA study. Results shall be submitted to the Secretary by December 31, annually.
- 3. Operation, Management, and Emergency Response Plans** – As required by 10 V.S.A. § 1278, Section I.I has been included in the draft permit. This condition requires that the Permittee implement the Operation, Management, and Emergency Response Plans for the WWTF, sewage pump/ejector stations, and stream crossings as approved by the Agency on April 29, 2008; and for the collection system as approved by the Agency on July 7, 2010.
- 4. Engineering Evaluation/Asset Management and Report**– An engineering evaluation/asset management plan 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 has not been completed since plant upgrades were implemented in 1997. The evaluation can be combined with or part of an Asset Management Plan provided the plan includes an inspection of the facility and collection system that is conducted in accordance with Condition I.J. of the permit.
- 5. Electric Power Failure Plan** – To ensure the facility can continue operations even during the

event of a power failure, **within 90 days of the effective date of the permit**, the Permittee must submit to the Secretary updated documentation addressing how the discharge will be handled in the event of an electric power outage.

- 6. Electronic Reporting** - The EPA recently promulgated a final rule to modernize the Clean Water Act reporting for municipalities, industries, and other facilities by converting to an electronic data reporting system. The final rule requires the inclusion of electronic reporting requirements in NPDES permits that become effective after December 21, 2015. The rule requires that NPDES regulated entities that are required to submit discharge monitoring reports (DMRs), including majors and nonmajors, individually permitted or covered by a general permit, must do so electronically after December 2016. The Secretary has created an electronic reporting system for DMRs and has recently trained facilities in its use. As of December 2020, these NPDES facilities will also be expected to submit additional information electronically as specified in Appendix A in 40 C.F.R. Part 127.
- 7. Noncompliance Notification** - As required by 10 V.S.A. § 1295, Condition II.A.2 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 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, other than the effluent limitation for phosphorus, the development of a water quality based effluent limitations (WQBELs) will not be necessary. However, due to limited data to determine compliance with Water Quality Standards for Total Ammonia Nitrogen in the winter months, monthly monitoring of TAN is suggested.

VIII. Procedures for Formulation of Final Determinations

The public comment period for receiving comments on the draft permit was from **January 10 through February 20, 2019**. *No comments were received during the public comment period.*


ATTACHMENT A

Agency of Natural Resources
Department of Environmental Conservation

Watershed Management Division
1 National Life Drive 2 Main
802-828-1535

MEMORANDUM

To: Mary Borg, Deputy Director, Watershed Management Division

From: Amy Polaczyk, Wastewater Program (WWP) 
Rick Levey, Monitoring, Assessment and Planning Program (MAPP)

Cc: Pete LaFlamme, Director, Watershed Management Division (WSMD)

Date: November 19, 2018

Subject: MAPP Reasonable Potential Determination for the Orleans Wastewater Treatment Facility (WWTF).

MAPP has evaluated the draft permit limits for the Orleans WWTF in Orleans, Vermont pursuant to the 2012 procedure outlining WWM-WSMD roles and responsibilities. This memo provides MAPP's concurrence with the permit limits set forth by the draft permit for Orleans WWTF prepared by the WWP.

Facility:

Orleans Wastewater Treatment Facility
Permit No. 3-1201
NPDES No. VT0100251

Hydrology for Orleans WWTF used in this evaluation:

Design Flow: 0.190 MGD = 0.294 CFS
7Q10 = 14.13 CFS
LMM = 35.25 CFS
IWC-7Q10 = 0.0204 (IWC > 1%)
IWC-LMM = 0.008 (IWC < 1%)

Receiving Water:

Barton River, Orleans, VT
Outfall Location: Lat. 44.8180523 Long. -72.2044625 (NAD 83)

The Barton River downstream of the Orleans WWTF is classified as Class B and is designated a Cold-Water Fish Habitat. At the point of discharge, the river has a contributing drainage area of 78 square miles. Approximately 150 meters below the WWTF outfall the Barton River is joined by the Willoughby River (drainage area of 140 mi²), leading to increased flow (~25%) and dilution of effluent from the Orleans WWTF. Calculations in this determination were carried out without considering this additional dilution. The proposed permit waste management zone (WMZ) in the Barton River begins at the outfall of

the WWTF and extends downstream approximately 1.0 mile (Figure 1). The Barton WWTF discharges approximately 5-6 miles upstream.

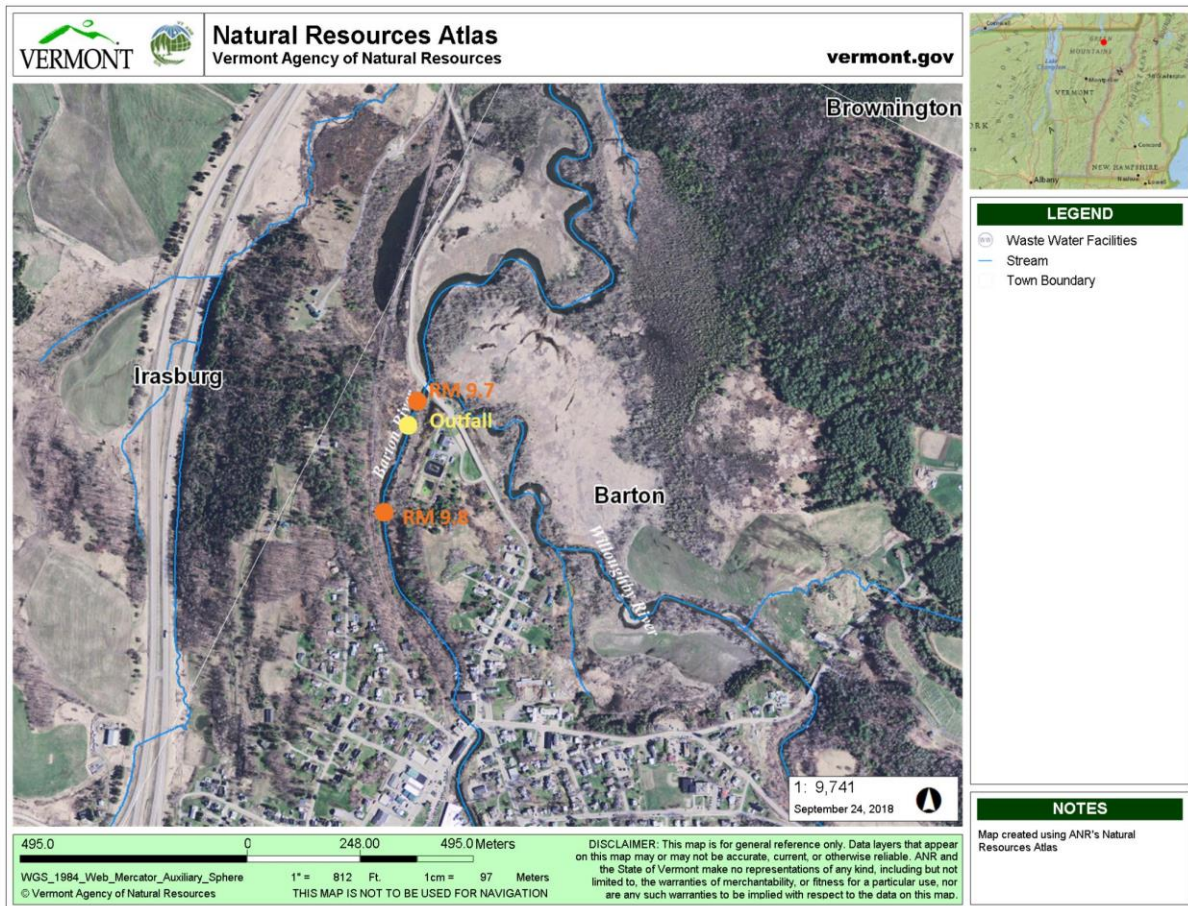


Figure 1. Barton River near the Orleans WWTF, showing up and downstream sampling locations (RM 9.8 & 9.7). Outfall location shown by a yellow dot. Figure taken from the Vermont Integrated Watershed Assessment System on the VTANR Atlas (<https://anrweb.vt.gov/DEC/IWIS/>).

General Assessment – VTDEC Assessment Database:

MAPP maintains the VTDEC assessment database, an EPA-required database which describes the conditions of Vermont’s surface waters with respect to their attainment of VWQS. For the Barton River segment to which this facility discharges, the database indicates the receiving water does fully support all designated uses. However, the Barton River below Ethan Allen Wetlands, approximately 0.75 miles upstream from the WWTF, is listed on the 2016 Stressed Waters List for aquatic life support and is in need of fish community and sediment monitoring due to the pollutant of toxics.

Ambient Chemistry Data for the Barton River above and below the Orleans WWTF:

The most recent ambient chemistry data available from VTDEC sampling is from 2009 when surface waters were sampled above and below the outfall at River Mile (RM) 9.8 and RM 9.7 respectively. The upstream site RM 9.8 was also sampled in 2004.

Water chemistry measures for the following parameters are available: alkalinity, conductivity, pH, hardness, dissolved oxygen, turbidity, total chloride, dissolved chloride, total phosphorus (TP), total

dissolved phosphorus, total nitrogen (TN), total nitrate/nitrite nitrogen, and water temperature. The most relevant parameters for this assessment are summarized in Table 1. Priority metals were analyzed above and below the WWTF in 2009. All of the priority metals were below the Vermont Water Quality Standards Acute and Chronic Criteria to Protect Aquatic Biota (Table 4).

Data representativeness was assessed by evaluating the flow conditions at which samples were collected from field sheets and from the most proximally-located USGS gauge for which data were available and in consideration of possible downstream sensitive reaches. The location of the upstream and downstream sampling locations RM 9.8 and RM 9.7 effectively bracket the WWTF outfall (Figure 1). The downstream sampling location is the most sensitive location, and the sampling results are representative of low flows based on the actual flows shown from the USGS gauge and field notes collected by DEC technical staff. Thus, the data presented below are relevant for inclusion in this analysis.

Table 1: Concentrations of surface-water chemistry above and below the Orleans Wastewater Treatment Facility (River Mile 9.8 and RM 9.7 refer to stations above and below the outfall respectively).

Date	River Mile	Water Temp (deg C)	pH	Alkalinity (mg/l)	Hardness	DO (mg/l)	Turbidity (NTU)	Total Chloride (mg/l)	Dissolved Chloride (mg/l)	Total Phosphorus (ug/l)	Total Nitrogen (mg/l)
9/17/2004	9.8	18.0	8.0	80	90	9.34	0.88	15.3		10.0	0.28
9/17/2009	9.8	12.7	8.2	116	130		1.19		23.9	9.4	0.38
	9.7	12.6	8.2	97	104		1.19		16.9	12.2	0.34

Total Phosphorus (TP) above the outfall (RM 9.8) during 2004 sampling was 10.0 µg/L and 9.4 µg/L in 2009. Below the outfall (RM 9.7) a TP concentration of 12.2 µg/L was measured in 2009. The results of the TP samples collected above and below the outfall, results indicated a very modest increase below the WWTF of 2.8 µg/L-TP, from 9.4 µg/L (above) to 12.2 µg/L-TP (below).

Total Nitrogen (TN) above the outfall (RM 9.8) was 0.28 mg/L in 2004 and 0.38 mg/L in 2009. Below the outfall (RM 9.7) the TN value was 0.34 mg/l in 2009.

Turbidity, Dissolved Oxygen, pH:

Turbidity above the outfall (RM 9.8) was measured to be 0.88 and 1.19 Nephelometric Turbidity Units (NTU) in 2004 and 2009, respectively. Turbidity below the outfall (RM 9.7) was 1.19 NTU in 2009. Dissolved oxygen and percent saturation above were 9.34 mg/L and 101 percent, respectively. Data are not available for these parameters below the outfall (RM 9.7). All pH values were within the range of VWQS, at RM 9.7 the pH was 7.6, above at RM 9.8 the pH ranged from 8.0 - 8.2.

Biological Assessments:

Biological assessments were conducted above and below the Orleans WWTF at RM 9.7 and RM 9.8 (Table 2). In 2004 an upstream assessment was carried out at the upstream (RM 9.8) site, indicating the site met water quality standards. In 2009 bioassessments were conducted above and below the WWTF, both assessments met water quality standards for Medium High Gradient Stream Type.

Table 2. Results of the Biological Monitoring for Macroinvertebrates on the Barton River, above (RM 9.8) and below (RM 9.7) the Orleans WWTF outfall.

Date	River Mile	Density	Richness	EPT Richness	PMA-O	B.I.	Oligo.	EPT/EPT + Chiro	PPCS-F	Community Assessment
9/17/2004	9.8	928	56	30	78.3	3.95	0.29	0.93	0.41	Meets WQS
9/17/2009	9.8	1364	42	19	80.5	4.08	4.11	0.80	0.63	Meets WQS
	9.7	840	39	20	78.5	4.14	0.00	0.78	0.35	Meets WQS
	Full Support	≥ 300	≥ 30	≥ 18	≥ 45	≤ 5	≤ 12	≥ 0.45	≥ 0.4	
	Indeterminate	≥ 250	≥ 28	≥ 16	≥ 40	≤ 5.15	≤ 14.5	≥ 0.43	≥ 0.35	
	Non-Support	< 250	< 28	< 16	< 40	> 5.15	> 14.5	< 0.43	< 0.35	

*Scoring Guidelines for Stream Type MHG and WQ Class B(2).

Total Phosphorus:

Instream Phosphorus Concentrations were calculated using the low monthly median flow (LMM) of 35.25 CFS at design flow of 0.294 CFS (0.19 MGD) and using the effluent phosphorus concentration of 0.45 mg/L which is the average monthly effluent concentration observed during 2012 – 2017, from facility monitoring records; effluent TP values ranged from 0.09 – 0.99 mg/L-TP (n=72). The calculated phosphorus concentration at these conditions attributable to discharge is 0.0036 mg/L-TP (3.6 µg/L-TP).

The instream TP observed below the outfall at RM 9.7 (Table 1) showed an increase of 2.8 µg/L-TP below the outfall from sampling conducted on 9/17/2009, consistent with calculations shown above.

Review of the Orleans WWTF flow records indicate that average flows for 2012- 2017 are about 1/3rd (0.06 MGD) of the design flow (0.19 MGD). Instream TP concentrations at these flow rates would be 2.9 µg/L-TP using the average effluent concentration observed, this very slight increase is in line with the 2.8 µg/L observed through the analysis of instream data in 2009.

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, MAPP typically 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 water quality standards, for streams that can be assessed using macroinvertebrate biocriteria. Under this framework, MAPP can make a positive finding of compliance with the narrative standard 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.

The total phosphorus concentrations in receiving waters are moderate, and below the 2014 nutrient criteria threshold of 15 µg/L-TP for Medium-High Gradient streams. The mass balance calculation presented above, indicated that increases in phosphorus attributable to the facility are minimal. Further, aquatic life use is shown to be fully supported, and the stream complies with VWQS for all identified response variables. Therefore, the narrative standard presented in §3-01.B.2 of the VWQS is supported (Table 3). As described below, for facilities where there are increases in phosphorus attributable to the

discharge, and biological monitoring results do consistently indicate attainment of all thresholds, MAPP recommends that monthly TP effluent monitoring be required to better assess compliance with the 2014 nutrient criteria at the next permit issuance.

Table 3. Assessment of phosphorus response variables for the Orleans WWTF conducted 9/17/2009. The relevant target values are referenced to the appropriate section of the VWQS.

Response variable (VWQS reference)	Target Value	River-mile 9.8 (Upstream)	River-mile 9.7 (Downstream)
pH (§3-01.B.9), range	<8.5 s.u.	8.2	8.2
Turbidity (§3-04.B.1), range	< 25 NTU at low mean annual flow	1.19	1.19
Dissolved Oxygen (§3-04.B.2), min	>6 mg/L and 70% saturation	-	-
Aquatic biota, based on macroinvertebrates, (§3-04-B.4), also see Table 2.	Attaining an assessment of good, or better.	Meets WQS	Meets WQS

Whole Effluent Toxicity (WET) and Priority Pollutant Testing:

40 CFR Part 122.44(d)(1) requires the Agency 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 goal of the Vermont Toxic Discharge Control Strategy is to assure that the state water quality standards and receiving water classification criteria are maintained.

The 2019 draft permit requires a modified acute/chronic WET test (48-hour acute endpoints within a 7-day chronic test) be conducted in August or September 2021. If the results of this test indicate a reasonable potential to cause an instream toxic impact, the Department may require additional WET testing, establish a WET limit, or require a Toxicity Reduction Evaluation.

Ammonia Monitoring:

Review of the Orleans WWTF effluent ammonia records from 2011 - 2015, indicate effluent ammonia concentrations ranged from 0.08 mg – 4.9 mg TAN/L. Using the highest effluent ammonia concentration of 4.9 mg/L TAN observed in April 2014, the receiving water concentration (RWC) at 7Q10 instream waste concentration (IWC) of 2.0% used for implementing the acute criteria would be 0.098 mg TAN/L (7Q10 IWC .020 X 4.9 mg TAN/L). This value is a magnitude of order below both the chronic and acute ammonia criteria, illustrating that there is not a reasonable potential for VWQS excursion. MAPP supports monthly ammonia monitoring to provide additional data for evaluation.

Sediment, Hardness, and Metals:

Instream total suspended solids were calculated using the 7Q10 of 14.13 CFS at design flow of 0.294 CFS (0.19 MGD), assuming the maximum permitted daily concentration of 50 mg/L. The calculated suspended sediment concentration at these conditions was 1 mg/l, indicating a slight increase of instream ambient suspended sediment concentrations in receiving waters.

The hardness of the Barton River below the Orleans WWTF (RM 9.7) was recorded to be 107 mg/l on 9/17/2009 (Table 4). Hardness data is utilized to determine compliance with Vermont’s aquatic biota-based metals criteria as specified in § 29A-303(7) and Appendix C of the Vermont Water Quality Standards. Vermont DEC priority metal chemistry data below the outfall (Table 4) did not detect any exceedances and were below detection for all priority metals.

Table 4. Barton River Metals Water Chemistry – above and below the Orleans WWTF outfall at RM 9.8 and RM 9.7 on 9/17/2009.

Parameter	RM 9.8	RM 9.7
Hardness	130	104
Aluminum (ug/l)	14.7	14.7
Arsenic (ug/l)	<1	<1
Cadmium (ug/l)	<1	<1
Chromium (ug/l)	<5	<5
Copper (ug/l)	<10	<10
Iron (ug/l)	256	165
Lead (ug/l)	<1	<1
Manganese (ug/l)	40.6	33.0
Nickel (ug/l)	<5	<5
Selenium (ug/l)	<5	<5
Zinc (ug/l)	<50	<50

Recommended Biological and Water Quality Monitoring:

In light of the fact that biological monitoring results consistently indicate attainment of all thresholds, and the stream complies with VWQS for all identified response variables, and that the narrative standard presented in §29A-302(2)(A) of the VWQS is supported (Table 3), MAPP does not recommend biomonitoring be included in the permit. To better assess compliance with the 2014 nutrient criteria at the next permit issuance, MAPP does support the effluent monitoring required by the permit which includes monthly effluent monitoring for TP.

Conclusion:

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 a WQBEL's will not be necessary. However, due to limited data to determine compliance with Water Quality Standards for Total Ammonia Nitrogen in the winter months, monthly monitoring of TAN is suggested.

TOTAL PHOSPHORUS REPORTING WORKSHEET
WR-43-TP



This worksheet is intended to help you calculate monthly and annual total phosphorus (TP) discharges. These discharges are required to be reported by your Direct Discharge Permit subject to the Lake Champlain Total Maximum Daily Load (TMDL). **This worksheet shall serve as guidance only and is not required to be submitted with your electronic discharge monitoring report.** All TP discharges shall be recorded on your WR-43 form and reported electronically, via ANR Online.

Total Phosphorus Calculations:

Your Wastewater Permit requires you to report TP in the following ways:

1. Monthly Average Concentration (A)
2. Total Monthly Pounds (D)
3. Running Total Annual Pounds (E)
4. Comparison of Running Total Annual Pounds to Annual Permit Limit (G)

A	Monthly Average Total Phosphorus Concentration <i>(Sum of all daily discharges (mg/l) measured during the month divided by the number of daily discharges measured during the month.)</i>	mg/l
B	Average Daily Flow for the Month <i>(Average daily flow for the month as reported on DMR.)</i>	MGD
C	Number of Daily Discharges in the Month	days
D	Total <u>Monthly</u> Pounds of Phosphorus Discharged <i>($A \times B \times C \times 8.34 = D$)</i>	lbs
E	Running Total of <u>Annual</u> Pounds of Phosphorus Discharged <i>(Sum of all monthly TP from preceding 12 months.)</i>	lbs
F	Total Phosphorus Annual Permit Limit (waste load allocation)	lbs
G	Comparison (%) of Running Total Annual Pounds to Annual Permit Limit <i>(calculated as: $E / F \times 100$)</i>	%

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

TOTAL NITROGEN MONITORING REPORT FORM
 WR-43-TN

Permittee: _____
 Permit No.: _____
 Preparer/Contact: _____
 Telephone: _____

Month: _____ Year: _____

TN shall be reported as total monthly pounds calculated as:
monthly average TN (mg/L) x total monthly flow x 8.34 where TN (mg/L) = TKN (mg/L) + NO_x (mg/L)

Table 1. Current Month Influent Monitoring Results

A	B	C	D
Date of sample	TKN (mg/L) (measured)	NO _x (mg/L) (measured)	TN (mg/L) (= B + C)
Maximum			

Table 2. Current Month Effluent Monitoring Results

A	B	C	D	E	F
Date of sample	TKN (mg/L) (measured)	NO _x (mg/L) (measured)	TN (mg/L) (= B + C)	Volume discharged on date of sample (MG) (measured)	TN (lbs) (=D × E × 8.34)
Maximum					
Average					

THIS TABLE IS TO BE SUBMITTED ONCE PER YEAR, WITH THE DECEMBER DMR FORM.

Table 3. Annual average TN (lbs/day). Calculate the annual average TN by adding the calculated TN (lbs/day) values collected during the calendar year and dividing by the number of times sampled.

A	B
Date of sample	(lbs/day)

(. . . Table 3 continued)

A	B
Date of sample	TN (lbs/day)
ANNUAL AVERAGE = TN (lbs/day)	

*add the values in column B and
divide by the count of those
values*

for assistance with this form, please visit our contact website at:
<http://dec.vermont.gov/watershed/wastewater/contacts>