

AGENCY OF NATURAL RESOURCES
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WASTEWATER MANAGEMENT DIVISION
103 SOUTH MAIN STREET
WATERBURY, VERMONT 05671-0405

FACT SHEET

January 2009

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

PROJECT ID NO.: BR95-0001

PERMIT NO.: 3-1232

NPDES NO.: VT0100455

NAME AND ADDRESS OF APPLICANT:

Town of Stowe
P.O. Box 730
Stowe, VT 05672-0730

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Stowe Wastewater Treatment Facility
River Road
Stowe, Vermont

RECEIVING WATER AND CLASSIFICATION: Little River: Class B with a waste management zone. Class B waters are suitable for bathing and recreation; irrigation and agricultural uses; good fish habitat; good aesthetic value; acceptable of public water supply with filtration and disinfection. A waste management zone 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.

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

The above named applicant has applied to the Vermont Department of Environmental Conservation for renewal of its permit to discharge into the designated receiving water. The facility is engaged in the treatment of domestic wastewater from the Town of Stowe. The discharge is from the Stowe Wastewater Treatment Facility outfall to the Little River.

II. Description of Discharge

This permit authorizes the discharge of 1.0 MGD of treated municipal wastewater. The treatment system is considered advanced treatment of wastewater and consists of the following processes: flow equalization and fine screening, sequencing batch reactors for secondary treatment, nitrification, biological phosphorus removal and chemical precipitation for additional phosphorus removal, an effluent filter for effluent polishing, and ultraviolet light disinfection.

A quantitative description of the discharge in terms of significant effluent parameters is presented in section IV. below.

III. Limitations and Conditions

The effluent limitations of the permit, the monitoring requirements, and any implementation schedule (if required), may be found on the following pages of the permit:

Effluent Limitations: Page 2
 Monitoring Requirements: Pages 6, 8, and 9

The complete application, draft permit, and other relevant information are available and may be inspected at the VTDEC, Wastewater Management Division, Waterbury Office. Copies will be made at a cost based on the previous Secretary of State Official Fee Schedule for Copying Public Records from 8:00 am to 4:00 pm, Monday through Friday.

IV. Permit Basis and Explanation of Effluent Limitation Derivation

History & Summary

In November 1998, the Agency issued Discharge Permit No. 3-1232 to the Town of Stowe authorizing the expansion and upgrade of its existing wastewater treatment facility from 0.25 MGD (million gallons per day) to a new facility with a treatment capacity of 1.0 MGD. In November 2002, the Town notified the Agency that construction of the expanded wastewater treatment facility was complete and, the Agency authorized expansion of the facility.

The wastewater treatment facility provides wastewater treatment capacity for both existing residential and commercial properties and for new development, in areas that lie within and outside the existing sewer service area.

On June 27, 2008, the Town submitted an application for renewal of their discharge permit. Having completed its review of the application, the Agency has made a determination to renew the discharge permit for the wastewater treatment facility's discharge. Following is a discussion of the specific factors considered in the renewal of this permit.

Receiving Water

The reach of the Little River downstream of the Stowe WWTF is a Class B water, with a waste management zone, and has been designated as a Cold Water Fish Habitat. There are no permitted direct discharges upstream or downstream of the Stowe WWTF in the Little River.

Summer 7Q10 flow is 8 cfs. Winter 7Q10 flow is 15.1 cfs. Low median monthly summer flow is 45.1 cfs.

The reach of river downstream of the Stowe WWTF is not considered impaired and is not listed on the federal Clean Water Act 303(d) list.

Effluent Limitations

Flow

This permit includes a flow limitation of 1.0 MGD, annual average, based on the design capacity of the facility. This is unchanged from the previous permit. Flow monitoring is required daily. This facility maintains a constant discharge.

Phosphorus

The Stowe WWTF provides optimal biological phosphorus removal via the sequencing batch reactor process. Additionally, a chemical precipitation clarifier process followed by an effluent polishing cloth filter is used to achieve phosphorus removal.

This draft discharge permit for the Stowe WWTF contains a phosphorus effluent concentration limit of 0.8 mg/l, monthly average, and a mass effluent limit of 621 total pounds, annual limitation.

The 0.8 mg/l, monthly average, concentration effluent limitation is based on the requirements of 10 V.S.A. 1266a.

The 621 total pound, annual mass effluent limitation is a water quality based effluent limitation which was developed from studies conducted by the Agency in the late 1980s and early 1990s. This limitation was established to prevent eutrophication in the upper reaches of the Waterbury Reservoir. After the establishment of this limitation, the Agency conducted follow-up biological assessment studies of the receiving water which indicated that the limitation was adequate to prevent eutrophication.

This mass limitation was then incorporated into the Lake Champlain Phosphorus TMDL, effective November 4, 2002. The TMDL allocated 0.282 metric tons per year or 621 pounds per year to the Stowe WWTF.

These effluent limitations are unchanged from the previous permit and the permittee must comply with the concentration limitation or mass limitation, whichever is more stringent. This permit requires weekly monitoring of effluent composite samples for total phosphorus and these requirements are unchanged from the previous permit.

The annual total pounds is defined the total of the twelve monthly totals which are calculated by multiplying the total monthly flow x the monthly average phosphorus concentration x 8.34. The annual total must be submitted with the December monthly monitoring report.

Ultimate Oxygen Demand (UOD)

The UOD discharged from a wastewater treatment facility is dependent on the quantity of flow, biochemical oxygen demand (BOD₅) and total kjeldahl nitrogen (TKN), as specified in the following equation:

$$\text{UOD (lbs/day)} = \text{Flow (MGD)} \times 8.34 \left[(\text{BOD}_5 \text{ (lbs/day)} \times 1.43) + (\text{TKN (lbs/day)} \times 4.57) \right]$$

Receiving waters are the most sensitive to oxygen depleting wastes during periods of high water temperature, therefore in Vermont the impacts of UOD on the receiving water only occur during the summer season.

Based on assimilative capacity modeling conducted on the Little River, the Agency determined the assimilative capacity of the Little River to be 400 lbs UOD/day during the summer period in the reach below the outfall of the Stowe WWTF.

During the review of the design of the upgrade and expansion of the Stowe WWTF, it was determined that the facility was designed to reliably meet a maximum daily UOD discharge of

300 lbs/day.

Consequently the draft permit contains a UOD effluent limitation of 300 lbs/day maximum day, for the period of June 1 through October 31. This limitation can be achieved by the Stowe WWTF, is within the assimilative capacity of the Little River, and is unchanged from the previous permit.

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

Biochemical Oxygen Demand (BOD₅)

The draft permit contains BOD concentration limitations of 30 mg/l monthly average and 45 mg/l weekly average, which are based on 40 CFR Part 133.102. A 50 mg/l, daily maximum, limitation has been included in the draft permit. This is a limitation which the Agency implements to supplement the federal technology based limitations to prevent a gross one-day permit effluent violation to be offset by multiple weekly and monthly sampling events which would enable the discharger to comply with the weekly average and month average permit limitations.

The mass limitations, which were established in a previous permit issued on April 25, 1996, of 168 pounds per day monthly average and 252 pounds per day weekly average have been retained.

The permittee must comply with the concentration limitation or mass limitation, whichever is more stringent.

In addition to complying with the mass and/or concentration limits, the quantity of BOD in the discharge must be limited such that the discharge meets the 300 lbs/day UOD limit during the period June 1 - October 31.

The draft permit requires weekly BOD monitoring and is unchanged from the previous permit.

Total Suspended Solids (TSS)

The draft permit contains TSS concentration limitations of 30 mg/l monthly average and 45 mg/l weekly average, which is based on 40 CFR Part 133.102. A 50 mg/l, daily maximum, limitation has been included in the draft permit. This is a limitation which the Agency implements to supplement the federal technology based limitations to prevent a gross one-day permit effluent violation to be offset by multiple weekly and monthly sampling events which would enable the discharger to comply with the weekly average and month average permit limitations.

The mass limitations, which were established in a previous permit issued on April 25, 1996, of 168 pounds per day monthly average and 252 pounds per day weekly average have been retained.

An additional narrative operation requirement has been included that requires that the facility be operated to meet the concentration limitation, mass limitation, or a TSS concentration necessary to maintain compliance with the E. coli limitation, whichever is more restrictive. This operational requirement is unchanged from the previous permit

The draft permit requires weekly TSS monitoring and is unchanged from the previous permit.

Copper

Based on an investigation of the potential for heavy metals from this discharge to impact the receiving water, the Agency determined that copper had a reasonable potential to cause an impact in the Little River. Consequently, a water quality based effluent limitation for Total Copper was established for this discharge.

The draft permit contains a Total Copper daily maximum limit of 0.47 lbs/day and a monthly average limit of 0.34 lbs/day with monthly monitoring. These limitations and the monitoring frequency are unchanged from the previous permit.

These limits were derived from the water quality criteria for copper as specified in Appendix C of the Vermont Water Quality Standards. The equations for the instream total copper criteria are as follows:

Acute criterion = $\exp(0.9422(\ln \text{hardness}) - 1.464)$

Chronic criterion = $\exp(0.8545(\ln \text{hardness}) - 1.465)$

A hardness of 50 mg/l in the Little River was used, resulting in an instream acute criterion for total copper of 9.22 ug/l, and an instream chronic criterion of 6.54 ug/l.

As specified in the Water Quality Standards, these criteria apply at 7Q10 stream flow. The 7Q10 flow of the Little River at the point of discharge of the Stowe Wastewater Treatment Facility is 8 cfs. Therefore at the design flow of 1.0 MGD, the effluent limits for copper are 56.90 ug/l (acute) and 40.33 ug/l (chronic). These limitations have been converted to mass limitations and are expressed as a daily maximum total copper limitation of 0.47 lbs/day and monthly average total copper limitation of 0.34 lbs/day.

Ammonia

The Agency has determined that this discharge has a reasonable potential to result in chronic ammonia toxicity in the Little River. Consequently ammonia effluent limitations have been included in this permit.

The ammonia limitations are based on the US EPA 1999 Update of Ambient Water Quality Criteria for Ammonia.

A summer time temperature of 26°C and a winter temperature of 5°C was assumed. A pH of 8.0 was used. The summer conditions resulted in a summer instream acute criteria of 5.62 mg/l and a summer instream chronic criterion of 1.16 mg/l. The winter conditions resulted in a winter instream acute criterion of 5.62 mg/l and a winter instream chronic criteria of 2.43 mg/l.

Adjusting for the summer time instream waste concentration of 0.162 (based on a 1.0 MGD discharge and a summer 7Q10 stream flow of 8 cfs) resulted in an acute ammonia effluent concentration of 34.66 mg/l and a chronic ammonia effluent concentration of 7.1 mg/l.

Adjusting for the winter instream waste concentration of 0.093 (based on a 1.0 MGD discharge and a winter 7Q10 stream flow of 15.1 cfs) resulted in an acute ammonia effluent limitation of 66.44 mg/l and a chronic effluent concentration of 26.2 mg/l.

The summer value is expressed in the draft permit as a monthly average (chronic) mass limitation of 59.6 lbs/day during the period of June 1 through October 31. Monitoring is required once per week. This limitation is unchanged from the previous permit.

The winter value is expressed in the draft permit as a monthly average (chronic) mass limitation of 217 lbs/day during the period of November 1 through May 3. Monitoring is required twice per month. This limitation is unchanged from the previous permit.

Since the any acute ammonia effluent limitations would greatly exceed the ammonia concentration in untreated municipal wastewater, an acute effluent limitation (maximum day) has not been included in the draft permit.

Escherichia coli bacteria

The draft permit contains an E. coli limit of 20/100 ml in order to protect the existing contact recreational uses identified in the Little River near the confluence with Gold Brook and near the Moscow Bridge. This limitation is unchanged from the previous permit.

This limitation was derived by decreasing the original E. coli permit limitation established on December 23, 1993 of 77/100ml in proportion to the increase in flow from the expanded facility (from 0.25 MGD to 1.0 MGD, a four (4) times increase in flow). By using an E. coli limitation of 20/100ml, the instream risk associated with this discharge will be kept the same as the original 0.25 MGD discharge.

E. coli monitoring is required once per week and is unchanged from the previous permit.

Settleable Solids

The Settleable Solids limitation is 1.0 ml/l, instantaneous maximum and is established in support of the narrative standard in Section 3-01.B.5 of the Vermont Water Quality Standards effective January 1, 2008. This limitation is unchanged from the previous permit. Sampling is required once per day and is unchanged from the previous permit.

Total Nitrogen

The Agency is currently in the process of proposing scientifically based nitrogen criteria for lakes and wadeable streams for review by the Vermont Water Resources Panel and the USEPA. In support of this effort the Department is including requirements in WWTF discharge permits to monitor discharges for total nitrogen. Once adopted the total nitrogen criteria will be used to determine the potential of WWTF discharges to cause or contribute to eutrophication and adversely impact the aquatic biota downstream of the discharge. Monitoring is required monthly.

Reserve Capacity

The draft permit maintains a special condition that requires the Town of Stowe to maintain sufficient reserve capacity at the wastewater treatment facility to enable the connection of wastewater flows from all existing developments within the expanded sewer service area. The Town's proposal provided significant treatment capacity (approximately 425,000 gallons per day) for existing developments in the draft sewer service area that are currently served by on-site sewage disposal.

In addition, the Town's wastewater allocation ordinance requires any failing systems within the service area to connect to the municipal sewer. The Agency believes it is appropriate to require

the Town to keep sufficient capacity available to ensure that all such systems, in the long term, can be connected to the municipal system. Though the Town did not previously intend to require all existing land-based systems to hook onto the municipal sewer, it will offer a financial incentive to encourage existing developments to hook onto the municipal sewer as soon as possible, instead of waiting for a system failure.

This condition is unchanged from the previous permit

Waste Management Zone

The previous permit established a waste management zone beginning at the outfall of the Stowe Wastewater Treatment Facility and extending downstream for 1.4 miles. The draft permit will maintain this waste management zone.

Operation, Management, and Emergency Response Plan

Per the requirements of the revisions to 10 V.S.A. Section 1278, promulgated in the 2006 legislative session, Condition I.G. was included in the draft permit. Condition I.G.1 reads:

“The permittee shall implement the Operation, Management and Emergency Response Plan for the wastewater treatment facility, sewage pump/ejector stations, and stream crossings approved by the Agency on October 6, 2008.”

In regards to the Operation, Management and Emergency Response Plan for the sewage collection system, Act 130 was promulgated by the legislature during the 2008 legislative session and modified 10 V.S.A. 1278 to require that Operation, Management and Emergency Response Plans for the sewage collection systems be submitted by July 1, 2010.

Therefore to be consistent with 10 V.S.A. 1278, Condition I.G.2 requires submission of an Operation, Management and Emergency Response Plan for the sewage collection system, by July 1, 2010.

Additional Conditions

The following conditions are in the previous permit and also have been included in the draft permit.

Condition I.A.8. requires the permittee to clean the quartz sleeves of the UV light disinfection system as necessary to maintain effective disinfection and replace the UV Light disinfection system lamps as necessary to maintain compliance with the E. coli bacteria limitation.

Condition I.A.9. requires the permittee to provide operational coverage of the facility on weekends and holidays between May 15th and September 15th of each year.

Condition I.A.10. requires the permittee to maintain an alarm system on all critical components of the disinfection system and treatment units critical to the effective operation of the disinfection system.

Condition I.A.11. requires the permittee to implement a response plan to ensure a timely and adequate response to any alarms associated with the critical components of the disinfection system and treatment units critical to the effective operation of the UV light disinfection system.

Condition I.A.12. requires that between *May 15 and September 15 of each year*, the permittee shall provide public notification of a disinfection system failure by taking the following actions at the earliest practical opportunity and in all cases within 12 hours: notify the local health officer and take any action as may be directed under the authority of the local health officer, notify the Vermont Department of Environmental Conservation, Wastewater Management Division, notify the Gold Brook Campground, and provide a notice of the possible public health hazard on two local radio stations.

Condition I.A.13 requires that the facility conform to the provisions of 10 V.S.A. 1626a, regarding awards to wastewater treatment plants with a capacity of 250,000 gallons or more per day. Specifically the plant capacity must be sufficient to receive, treat, and dispose of septage in a quantity equivalent to the ratio of 4,000 gpd of septage for each 1 MGD of facility hydraulic capacity. Therefore the facility must reserve 4,000 gpd and its equivalent BOD for septage.

Toxicity Testing

Based on the results of the Whole Effluent Toxicity (WET) tests and chemical pollutant analyses conducted on this discharge, the Agency has determined that this discharge does not have the potential to cause an instream toxic impact except for ammonia and copper (as discussed above).

However to ensure compliance with 40 CFR 122.21.j, at the time of permit renewal, a requirement (Condition I.E) to conduct WET testing has been included in the draft permit. This Condition requires a single specie acute WET test to be done in 2009, 2010, 2011, and 2012. The specie to be tested will alternate each year between fathead minnow and daphnia and the time of year the test will be conducted will alternate between winter and late summer to ensure representative sampling is done.

In addition, this Condition I.E also requires the effluent be analyzed for selected heavy metals and toxic organic pollutants once per year in 2009, 2010, and 2011 to ensure compliance with 40 CFR 122.21.j at the time of permit renewal.

VI. Procedures for Formulation of Final Determinations

The public comment period for receiving comments on this draft permit is from January 20, 2009 through February 20, 2009 during which time interested persons may submit their written views on the draft permit. All written comments will be retained by the Agency and considered in the formulation of the final determination to issue, deny or modify the draft permit. The period of comment may be extended at the discretion of the Agency.

Written comments should be sent to:

Vermont Agency of Natural Resources
 Department of Environmental Conservation
 Wastewater Management Division - Sewing Building
 103 South Main Street
 Waterbury, VT 05671-0405

Comments may also be faxed to: 802-241-2596.

Any interested person or groups of persons may request or petition for a public hearing with

respect to this draft permit. Any such request or petition for a public hearing shall be filed within the public comment period described above and shall indicate the interest of the party filing such request and the reasons why a hearing is warranted.

The Agency will hold a hearing if there is significant public interest in holding such a hearing. Any public hearing brought in response to such a request or petition will be held in the geographical area of the draft discharge or other appropriate area, at the discretion of the Agency and may, as appropriate, consider related groups of draft permits. Any person may submit oral or written statements and data concerning the draft permit at the public hearing. The Agency may establish reasonable limits on the time allowed for oral statements and may require the submission of statements in writing. All statements, comments, and data presented at the public hearing will be retained by the Agency and considered in the formulation of the final determination to issue, deny, or modify the draft permit.

[Send To Printer](#)

[Back To TerraServer](#)

[Change to 11x17 Print Size](#)

[Show Grid Lines](#)

[Change to Landscape](#)

USGS 4 km NE of Stowe, Vermont, United States 07 May 1996



0 100M

0 100yd

Image courtesy of the U.S. Geological Survey

© 2004 Microsoft Corporation. [Terms of Use](#) [Privacy Statement](#)