



The State of New Hampshire  
**Department of Environmental Services**

**Robert R. Scott, Commissioner**



February 28, 2023

Thomas Lambert, Superintendent  
Water and Sewer Department  
Town of Troy  
16 Central Square  
Troy, NH 03465

**Re: Troy, NH - Troy Wastewater Treatment Facility (WWTF)**

**WWTF OPTIMIZATION STUDY**

Dear Mr. Lambert:

The New Hampshire Department of Environmental Services (NHDES) has reviewed the technical memorandum "*Troy, NH Lagoon Treatment Optimization Study*" (Study) dated February 16, 2023, prepared by Underwood Engineers (Underwood). This letter summarizes Study findings and NHDES permitting requirements for future sewer connections and improvements to the Town of Troy (Town) WWTF.

**BACKGROUND**

The Troy WWTF utilizes an aerated facultative lagoon system for secondary treatment (BOD, TSS and ammonia removal) and a chlorination/dechlorination system for effluent disinfection. The facility has a nominal design capacity of 265,000 gal/day, expressed annual average flow. However, the actual capacity is significantly lower since the largest of three (3) lagoons was taken out of service in 2006 and is currently inoperable. Estimated current WWTF capacity is addressed later in this letter.

The WWTF operates under a federal and state discharge permit (NPDES #NHG580001). The facility has had difficulty meeting discharge limitations for ammonia, phosphorus and copper. Accordingly, the US Environmental Protection Agency (USEPA) issued an Administrative Order (AO) to the Town on September 29, 2022. The AO requires the Town to submit a Copper and Nutrient Reduction Report (Report) to identify improvements to bring the facility into compliance. The Underwood Study was commissioned prior to issuance of the AO and provides a preliminary assessment of potential WWTF upgrade alternatives.

**WWTF STUDY FINDINGS**

***Estimated WWTF Capacity***

Based on a process evaluation of the existing lagoon system to meet effluent permit limits, the estimated capacity of the WWTF is 68,250 gal/day, expressed as an annual average flow. The capacity estimate is based on the two (2) of three (3) lagoons in service (the largest lagoon is currently inoperable). The current annual average flow to the WWTF is 65,000 gal/day, which leaves approximately 3,250 gal/day in reserve capacity.

### **Potential WWTF Improvements**

Degradation of lagoon system performance is likely due in part to significant accumulation of sludge, which reduces lagoon capacity. Additionally, existing chemical addition strategies can be optimized to increase copper and nutrient removal. The following actions may possibly bring the facility into compliance but would require pilot testing to verify performance:

- Removal of sludge from lagoons,
- Implementation of automated, flow-paced alkalinity addition for nitrification (ammonia reduction),
- Construction of new tankage with fixed-film media for nitrification (ammonia reduction), and
- Implementation of automated, flow-paced poly-aluminum chloride (PAC) and polymer addition for phosphorus and copper removal.

If the improvements listed above cannot achieve consistent permit compliance, the Town may need to construct a new mechanical activated sludge system to replace the existing lagoons. This approach has been implemented by towns throughout NH to comply with increasingly stringent permit limits that lagoon systems were not intended to meet when constructed decades ago.

### **PERMITTING REQUIREMENTS**

Design and permitting requirements for sewer connections and WWTF modifications are stated in Env-Wq 700 – *Standards of Design and Construction for Sewerage and Wastewater Treatment Facilities*, which can be accessed from the following link: [Administrative Rules | NH Department of Environmental Services](#).

### **Sewer Connection Permits**

Env-Wq 703.07 addresses permitting requirements for new sewer connections to publicly owned treatment works (POTW). In accordance with Env-Wq 703.07 (d), NHDES can only issue a state Sewer Connection Permit (SCP) if the receiving collection system and WWTF are capable of adequately processing the added hydraulic flow and organic load at the time of connection. Based on the Study capacity estimate of the WWTF, approximately 3,250 gal/day of reserve capacity is available for new connections.

Since the existing WWTF is operating above 80% capacity, all new sewer connections to the WWTF require a SCP per Env-Wq 703.07 (a)(3). SCP applications require review and approval by the Town prior to submittal to NHDES. The SCP application can be obtained from the following link: [NH Online Forms System - Sewer Connection Permit Application, Version 1.4](#).

Per Env-Wq 703.01 (c), SCP applications must include engineering plans and specifications prepared by a professional engineer (PE) licensed in NH if any of the conditions specified in Env-Wq 703.01 (b) apply:

- Proposed sewer serves more than one building;
- Proposed sewer requires a manhole at the connection;
- Proposed sewage pumping station serves more than one building;
- Proposed sewage pumping station with capacity greater than 50 gallons per minute (gpm).

**WWTF Modifications**

WWTF modifications must be approved by NHDES prior to construction, according to the provisions of Env-Wq 700:

- Env-Wq 703 – Engineering design document submittal, review and approval procedures.
- Env-Wq 704 to Env-Wq 717 – Wastewater conveyance and treatment design standards.

As mentioned previously, the USEPA AO requires the Town to submit a Report to identify improvements to bring the facility into compliance. NHDES will review the Report concurrently with USEPA. The Report should conform with provisions of Env-Wq 707 - Basis of Design Report (BODR). A BODR is required for all proposed WWTF modifications and must be approved by NHDES prior to initiation of final design efforts.

Feel free to contact me by phone at 603.271.2980, at the address on the cover page, or by e-mail at [dennis.j.greene@des.nh.gov](mailto:dennis.j.greene@des.nh.gov), if you need clarification or additional information regarding this letter.

Sincerely,



Dennis J. Greene, P.E.  
Sanitary Engineer  
Wastewater Engineering Bureau

cc: David Mercier, P.E. – Underwood Engineers  
Tracy Wood, P.E. – Administrator, NHDES Wastewater Engineering Bureau