

Town of Middlebury

Evaluation of Existing Wastewater Treatment Facility

Draft Scope of Services

Introduction

The purpose of the evaluation is to assess the current condition of the physical plant and the treatment processes involved and provide recommendations for improvements for the next twenty-year planning period. The Wastewater Treatment Facility Evaluation portion of the study will assess the current condition of the wastewater treatment plant, its facilities and its ability to operate in compliance with current discharge permit requirements. The Facilities Planning Study portion will evaluate the long-term needs of the wastewater treatment plant and develop alternatives and recommendations for improvements at the plant. Estimates of the future design flows for the service area, initial assessment of the potential need for collection system improvements (pump station and force main), and an assessment of the wastewater treatment facility upgrade requirements for current and anticipated treatment requirements will be prepared under the facilities planning study.

Scope of Services

1. WASTEWATER TREATMENT FACILITY EVALUATION

A. Inventory and Review of the Following Existing Data.

1. ENGINEER will conduct an interview of the Wastewater Treatment Facility (WWTF) Staff.

This will include reviewing a questionnaire prepared by ENGINEER to be covered include but are not limited to:

- a) inventory of existing equipment
 - b) past and present operational practices
 - c) past and present operational problems
 - d) anticipated future needs
3. Recommend a sampling and monitoring program to provide additional process data not included in the monthly reports or otherwise available. Examples of areas of interest include phosphorous, nitrogen compounds, and oil and grease.
 4. The wastewater treatment budget reports will be reviewed and used to develop the cost analysis for recommendations described below.

5. Record drawings of the existing WWTF and a portion of collection system will be reviewed to assist in the evaluation of the design capabilities and will be utilized in the development of recommendations.

6. Pertinent correspondence from the State of Vermont, Department of Environmental Conservation will be reviewed to develop a working knowledge of the history of the facility.

B. Review Basis of Design

1. The Basis of the Design of existing WWTF, will be reviewed and updated to reflect the design capabilities of the existing facility based on current standards.

2. The present and design year population data will be compiled. This will be used to estimate future treatment and capacity upgrades needed. A 20 year design population will be used for the WWTF. This population projection will be used to estimate future flows for the 20 year planning period.

C. Conduct Initial Site Visit.

1. An inspection team consisting of individuals experienced in the fields of wastewater process design, mechanical, electrical and structural engineering will conduct a site visit of the wastewater treatment facility and pumping station/force main. The questionnaire and interview with the Operator mentioned above will be the starting point for the site visit.

2. The purpose of the site visits are to evaluate the condition of the existing WWTF and pumping station, and the ability to expand it or prolong its useful life.

3. Specific recommendations for the upgrade of the structures, electrical system (including a review of alternative fuels sources for the emergency generator), and mechanical equipment will be detailed and ranked according to urgency of upgrade. An opinion of cost for each recommendation will also be prepared. This will include capital cost as well as operation and maintenance cost where appropriate. An analysis will be performed to identify improvements which will result in energy conservation.

4. In conjunction with the structural, electrical and mechanical review, The ENGINEER will develop a list of operational recommendations. These recommendations may include but are not limited to

a) updating the twenty-year flow estimates (the update of the Inflow/Infiltration data discussed below will be taken into consideration):

b) SBR process modifications;

c) alternative treatment processes;

d) review of the Energy Evaluation Report with chief operator;

e) sludge treatment and handling;

f) evaluation of alternative fuel sources for emergency generator.

D. LIMITED INFLOW/INFILTRATION (I/I) STUDY

Infiltration and inflow (I/I) will be analyzed using Plant Operation Reports, rainfall and data influent flow records. This data will be used to assess the overall magnitude of I/I in accordance with recognized standards and methodologies. This will include the following:

- 1) Determination of theoretical wastewater production rate.
- 2) Determination of total yearly infiltration/inflow.
- 3) Determination of total yearly infiltration
- 4) Determination of total yearly inflow.
- 5) Determination of peak infiltration.
- 6) Determination of peak inflow.
- 7) Determination of peak infiltration /inflow.

The results of the analysis described above will be compared to the State of Vermont and EPA Standards of allowable I/I.

E. EVALUATION OF TREATMENT PROCESSES

A. A comparison of actual operating conditions to current and future design standards will be conducted for each unit process of the Wastewater Treatment Facility, including the Main Pumping Station and force main. Areas of the evaluation include but are not limited to pretreatment, primary treatment, SBR analysis, phosphorous removal, UV system replacement, and sludge handling and disposal. Other areas of concern include evaluation of the possible need for industrial wastewater discharges, flow equalization, emergency power facilities and flood protection.

B. Prepare a computer model of the existing process using BioWIN software. Compare model outputs with actual system performance. Analyze operational modifications that may improve performance.

B. Results of the initial site visit will provide valuable information for this evaluation.

C. As a result of this evaluation, specific conclusions will be made with regard to the capability of the existing plant to meet current and future design standards.

END OF WWTF FACILITY EVALUATION PHASE

DELIVERABLES: WWTF Evaluation Report

WORKSHOPS:

1. WWTF Facility Tour (WWTF Staff and others)

2. Presentation, Confirmation and Verification of WWTF Findings (Town Staff and Infrastructure Committee)

2. FACILITY PLANNING STUDY

A. The ENGINEER shall conduct evaluations and develop alternatives for improvement and upgrade requirements for the WWTF to meet the future 20-year needs of the plant. The evaluations for proposed improvements will be based on those items found in the WWTF Evaluation phase. The scope of these evaluations is anticipated to include the following:

1. refurbishment of the existing facilities,
2. optimization of the SBR process,
3. assessment of biological phosphorous removal,
4. upgrading the size or number of existing processes,
5. review of identified industrial discharges and compliance with permit requirements,
6. review of biosolids handling and processing facilities, including marketing potential of Class A biosolids product as an alternative to the present arrangement.

B. Develop recommendations for the upgrade of the WWTF processes, structures, facilities, electrical system (including a review of the alternative fuel for emergency generator), and mechanical equipment. Recommendations will be detailed and ranked according to urgency of need.

C. Prepare BioWIN model for selected alternative to verify performance expectations.

D. A summary of the projected implementation of the project will be provided to include total project costs, anticipated funding, recommended bond amount, estimated user costs and anticipated project schedule.

END OF FACILITY PLANNING PHASE:

DELIVERABLES: Draft Facilities Planning/Preliminary Engineering Report

WORKSHOPS:

1. Identification of Alternatives (Town Staff and Infrastructure Committee)
2. Presentation of Analysis of Alternatives, Selection of Recommended Plan (Town Staff and Infrastructure Committee)

3. REPORT

A. The ENGINEER shall prepare a report that summarizes the results of the Wastewater Treatment Evaluation and Facilities Planning Study. This report will include the following:

- Purpose, Background and Scope of Report.
- Population, Flow and Loading Projections for existing and 20-year planning period

- Discussion of Limited I/I investigations.
- Presentation of existing WWTF Facilities and capabilities to handle current and future flows and loadings.
- Presentation of alternatives to include costs for upgrading the treatment system, pump station and force main.
- Recommendation of alternatives most suited to the OWNER.
- A summary of the proposed project implementation to include total project costs, anticipated funding, recommended bond amount, estimated user costs and anticipated project schedule.

B. Four (4) copies of the draft report will be submitted to the OWNER and the State ANR Facilities Engineering Division and USDA Rural Development for review and comment. The comments will then be incorporated into the final report.

C. The ENGINEER will furnish ten (10) copies of the Final Report incorporating the responses to the review comments raised by the OWNER and DEC.

END OF REPORT PHASE:

DELIVERABLES Combined WWTF Evaluation and Facility Planning Report

WORKSHOPS:

1. Presentation of Draft Report (Town Staff and Infrastructure Committee)
2. Presentation of Final Report (Public, Town Staff and Infrastructure Committee)

4. PROJECT MANAGEMENT AND ADMINISTRATION (THROUGHOUT ALL PHASES)

A. The ENGINEER will attend three (3) formal meetings with the OWNER and regulatory/funding agencies (USDA and VT DEC) during the PROJECT (a 30%, 60% and 90% review of the PROJECT).

B. The ENGINEER will prepare funding applications and periodic payment requests and submittal to regulatory/funding agencies, on behalf of the OWNER, as needed.