Town of New Baltimore
Wastewater System Evaluation
Greene County, New York

Preliminary Engineering Report

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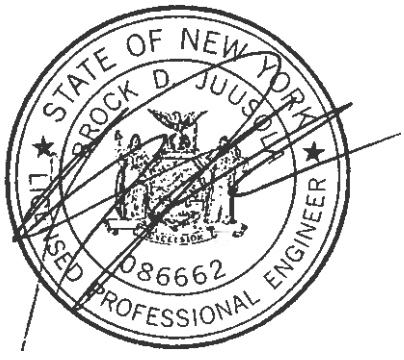

December 2012

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1.0 INTRODUCTION

1.1 Facility Overview and History

The Town of New Baltimore owns and operates a wastewater treatment plant (WWTP) located on Route 144 in the Town of New Baltimore, Greene County, New York. See Figure 1 for a site location map of the New Baltimore WWTP.

The New Baltimore WWTP and wastewater collection system were reportedly initially constructed in 1983 to provide treatment of wastewater generated within the Hamlet of New Baltimore. The original collection system consisted of 6" and 8" gravity sanitary sewer pipes, 6" forcemain and one pump station. The collection system was expanded in 2000 with the addition of approximately 1,600 linear feet of 8" gravity sewer pipes on River View Lane. With the exception of pump replacement at the pump station, the pump station has been largely unchanged since the original construction.

The Town's WWTP has undergone two upgrades since the plant was originally constructed. The facility as constructed in 1983 provided treatment as follows:

Incoming wastewater was manually screened through a coarse screen (1½" bar rack), followed by grit sump and then a comminutor which ground the incoming solids into small pieces. The wastewater was then treated biologically via an oxidation ditch, followed by a secondary clarifier for solid separation. The effluent was then discharged to the Hudson River. The facility was constructed with a gas chlorination system for disinfection, however the original SPDES permit did not require disinfection and as such the chlorination system was never used. Excess sludge (solids) from the biological system was wasted to a digester prior to being pumped to sludge drying beds for dewatering and ultimate off-site disposal.

The WWTP facility was upgraded in 2000 to provide fine screening of the influent and added flow equalization. As part of this upgrade, the coarse screen was removed, the grit sump was filled and all incoming wastewater now flows directly into a grinder/fine screen combination unit. Flow equalization was added as part of this upgrade, with the effluent from the fine screen directed to a 40,000 gallon flow equalization tank. Utilizing the storage capacity of the equalization tank, flow is pumped to the oxidation ditch at a steady rate via equalization pumps and a flow equalization control box. The 2000 upgrades included the replacement of the RAS/WAS pump and the digested sludge/ decant pump but did not fundamentally change any other part of the overall process.

In 2006, the WWTP's SPDES permit was amended to require seasonal disinfection of effluent prior to discharge to the Hudson River. The facility added a UV disinfection system in 2007 to provide for disinfection. See Exhibit A for a copy of the New Baltitmore WWTP SPDES permit.

1.2 Regulatory Standards

This Preliminary Engineering Report is prepared in conformance with *Recommended Standards for Wastewater Facilities - Great Lakes Upper Mississippi River Board of State Public Health & Environmental Manager*s, dated 2004 and commonly referred to as the Ten States Standards, and applicable NYSDEC Design Standards.

2.0 EXISTING WWTP HYDRAULIC AND SOLIDS LOADING

2.1 Solids Loadings and SPDES Permit

Table 2.1 lists the recommended design influent loading characteristics for the New Baltimore WWTP. These values follow the anticipated "medium strength" wastewater in accordance with Table 3-16 of *Metcalf & Eddy* (Metcalf & Eddy, Inc *Wastewater Engineering: Treatment, Disposal and Reuse: 3rd Edition*, revised by G. Tchobanoglous and Franklin L. Barton, McGraw-Hill, Inc., New York 1991) and generally match the influent data monitored for the years 2010 and 2011.

Table 2.1 Design Influent Loading

Parameter	Design Average Influent Concentration
BOD_5	220 mg/L (2010/2011 = 185 mg/L)
TSS	220 mg/L (2010/2011 = 202 mg/L)
NH3 (as N)	25 mg/L (not monitored, no historical data)
Organic N (as N)	15 mg/L (not monitored, no historical data)
TKN (as N)	40 mg/L (not monitored, no historical data)

Table 2.2 shows the existing New Baltimore WWTP effluent limits as required by SPDES Permit NY0109151.

Table 2.2 SPDES Permit Limits

Parameter	Limit
Flow (MMDF)	60,000 gpd (maximum monthly daily flow)
BOD_5 (30 day arithmetic mean)	30 mg/l & 85% removal
Solids, Suspended (30 day arithmetic mean)	30 mg/l & 85% removal
Solids, Settleable (daily maximum)	0.3 ml/l
pH (range)	6.0-9.0
Temperature (daily maximum)	Monitor
Coliform, Fecal (30 day geometric mean)	200 / 100 ml
Coliform, Fecal (7 day geometric mean)	400 / 100 ml
Chlorine, Total Residual (daily maximum) – only applies if sodium hypochlorite used as disinfection	2.0 mg/l

3.0 EXISTING WASTEWATER SYSTEM EVALUATION

3.1 Wastewater System

3.1.1 Evaluation Approach

An evaluation of the requirements for each existing unit process at the New Baltimore WWTP was conducted utilizing the hydraulic loadings, a detailed review of operating data for influent organic loadings and knowledge of the SPDES discharge parameters. This review establishes and rates the actual capacity of each unit process under which SPDES compliance can consistently be achieved. The following unit processes were evaluated:

1. Wastewater Collection System
2. Remote Pump Station (Mill Street Pump Station)
3. Grit Removal System
4. Fine Screening
5. Flow Equalization and Pumping
6. Biological Treatment System
7. Sanitary Disinfection
8. Sludge Handling Facilities

3.1.2 Collection System Site Considerations/Conditions

The Hamlet of New Baltimore is located on a steep hillside on the western shore of the Hudson River. The initial construction of the collection and treatment system was necessary because many of the on-site septic systems within the Hamlet were failing due to the shallow, vertical shall rock formations in the area. The shallow shale resulted in the septic tank effluent (untreated wastewater) traveling along the top of the shale and discharging to service water or residential wells. The 1983 construction eliminated this discharge.

The Mill Street Pump Station is located in Cornell Park, a Town recreational facility. The pump station has adequate space for a moderate capacity increase which only involves the replacement of equipment. Any expansion of the wetwell or building at the site must take into consideration any potential impacts on the park.

The 1983 As-Built drawings show the finished floor of the pump station at 14.5’ elevation, however the vertical datum of the drawings is not known. The 100-year flood elevation for the Mill Street Pump Station has been calculated as approximately 15.2’ in the North American Vertical Datum of 1988 (NAVD88). As part of detailed design for upgrades to the Mill Street Pump Station is recommended that the site be surveyed, and the site plans updated to the NAVD88 datum. Additionally, it is recommended that the design for any pump station upgrades take into account the 100 year flood elevation.

3.1.3 WWTP Site Considerations/Conditions

The New Baltimore WWTP site was filled with approximately 6 or 7 feet of fill prior the construction of the facility in 1983. The filling operation included the placement of a gabion retaining wall to stabilize the site, with the grade falling away significantly on three sides of the site. The fill and top of the retaining wall now sit at 13.5' in elevation based on the 1983 As-Built drawings. The 100-year flood elevation for the WWTP was calculated as approximately 15.4' in the NAVD88 datum. With the datum utilized for the 1983 As-Built plans unknown, it is recommended that as part of detailed design for upgrades to the WWTP, the site be surveyed and the site plans updated to the NAVD88 datum. Additionally, it is recommended that the design for any WWTP upgrades take into account the 100 year flood elevation. The geotechnical components of the site (depth to bedrock, etc.) are also unknown and it is recommended that soil borings be conducted as part of any detailed design.

The site is approximately 240' by 150' (0.8 acres) within the confines of the retaining wall. The site access road, process tanks, buildings and administration areas utilize much of the site and the available area for expansion is limited.

3.1.4 Hydraulic and Organic Load Capacity

The capacity of each unit process was evaluated based on Maximum Monthly Daily Flow (MMDF), Average Annual Daily Flow (ADF), and/or Peak Hydraulic Flow (PHF) and total organic loading. In accordance with current regulatory standards and good engineering practice, each unit process requires a specific hydraulic design standard. The overall plant capacity is then rated as the capacity of the unit process with the most restrictive design capacity. The SPDES permit flow limit is based on the Maximum Monthly Daily Flow. In accordance with Table 2-8 of Metcalf & Eddy, the maximum monthly daily flow is 120% larger than the annual average daily flow (ADF). The permitted flow conditions are represented in Table 3.1.

Table 3.1 WWTP Permitted Capacity

Parameter	Flow
Maximum Monthly Daily Flow (MMDF)	60,000 gpd
Average Daily Flow (ADF) – not part of permit but relates to permitted MMDF	50,000 gpd
Peak Hydraulic Flow (PHF) – not part of permit but relates to permitted MMDF	180,000 gpd

During calendar years 2010 and 2011, the New Baltimore WWTP discharged an annual average daily flow (ADF) of 31,000 gpd. The maximum monthly daily flow (MMDF) during this two year period occurred in March of 2011, with a MMDF of 62,000 gpd. The peak hydraulic flow (PHF) of 260,000 gpd occurred on August 28, 2011 during Hurricane Irene. The daily flow data suggests infiltration and inflow (I&I) exists within the system as evidenced with high flow day(s) occurring during and shortly after rainfall

events exceeding 0.5". The MMDF of 62,000 gpd in March of 2011 also indicates the presence of I&I in the system, as this occurred during a month of high snow melt and heavy rains. Table 3.2 shows the actual peak influent flows in the last two years. The Town is currently conducting a visual inspection of the collection system and it is recommended that any I&I identified as part of this inspection be remediated. While the facility currently has excess capacity in terms of the annual average daily flow (ADF), I&I reduction within the collection system must be achieved for the facility to utilize this capacity as evidenced by the March 2011 flows.

Table 3.2 Actual Influent Flow Conditions

Parameter	Flow
Maximum Monthly Daily Flow (MMDF)	62,000 gpd
Average Daily Flow (ADF)	31,000 gpd
Peak Hydraulic Flow (PHF)	260,000 gpd

3.1.5 Collection System and Remote Pump Station Evaluation

The following narrative describes and rates the capacity of the existing unit processes.

3.1.5.1 Collection System Piping

The existing New Baltimore wastewater collection system consists of 8" gravity sewers, 6" inverted siphons and a pump station. The 8" gravity sewer portion of the collection system has a PHF capacity of 720,000 gpd. The collection system also includes a 6" inverted siphon, with an estimated capacity of 330,000 gpd. The PHF of this portion of the collection system is 330,000 gpd.

As-Built drawings of the collection system are not available and therefore the elevations and the siphon length are not known. As part of a detailed design for upgrades, it is recommended that the inverted siphon portion of the collection system be surveyed and the capacity of this portion of the collection system be re-evaluated.

3.1.5.2 Mill Street Pump Station

Approximately 75% of the Town's wastewater collection system flows via gravity to the Mill Street Pump Station located within Cornell Park on Mill Street. The pump station pumps this flow through approximately 2,200 linear feet of 6" ductile iron forcemain into the gravity portion of the collection system on Route 144, where it is ultimately discharged via gravity to the WWTP. The pump station consists of a 26.3' deep by 6.5' diameter concrete wetwell. The wetwell houses two 25 horsepower Hydromatic submersible pumps, with each pump rated for 230 gpm at 112' of total dynamic head. The Hydromatic pumps, which were installed in 2004, replaced the original KSB pumps installed as part of the original system construction. The 2004 upgrade included a full replacement of the pump station control panel. The Mill Street Pump Station's existing rated capacity is 83,000 gpd on an ADF basis, 100,000 gpd on a MMDF basis and 330,000 gpd on a PHF basis.

The pump station is not equipped with a flow meter. Therefore flow through the station is not monitored or recorded and no historical flow exists. The facility staff has reported that the Hydromatic pumps experience seal failures on a biennial basis. Excess grit entering the collection system and wearing the internal components of the pump is believed to be the cause of these failures. The controls within the pump station provide local alarms and equipment shutdown in the event of equipment failure with limited ability to call off-site to notify facility staff of these events.

The station is equipped with a 75 kW emergency diesel fired generator. The generator is equipped with an automatic transfer switch which automatically starts the generator and transfers the electric load to the generator in the event of a power failure in the power grid system.

Note that the actual operating conditions of the pump station cannot be verified at this time because as-built drawings of the collection system are not available. As part of a detailed design for upgrades, it is recommended that a sufficient portion of the collection system be surveyed to allow for an accurate assessment of the system hydraulics.

3.1.6 Wastewater Treatment Plant Evaluation

3.1.6.1 Grit Removal System

The 1983 construction consisted of wastewater entering the headworks of the WWTP via a manually cleaned course bar screen. The flow then traveled though an 8" deep grit sump prior to entering an influent grinder system. The upgrades in 2000 filled in the grit sump, thereby effectively removing the grit removal capabilities of the facility.

3.1.6.2 Influent Screening

The 2000 upgrades included the installation of a channel grinder / mechanical fine screen combination unit in place of the original influent grinder. The channel grinder is a Headworks Muffin Monster 30005-18 manufactured by JWC Environmental. The 2000 upgrade plans developed by Crawford & Associates show the capacity of this unit to be 500 gpm (0.72 mgd). A manually cleaned bar rack is configured to operate in parallel to the mechanical screen in the event of a failure of the mechanical screen. Gates are provided to direct the influent flow to the appropriate channel. Screens are rated only on a peak hourly flow basis, with the existing screen currently rated for a PHF of 720,000 gpd.

Regulatory standards require a design approach velocity of between 1.25 ft/sec and 3.0 ft/sec. In the case of the New Baltimore WWTP, the system is lacking a downstream control structure which will ensure approach velocities within the prescribed range. The approach velocity under the average daily flow condition is approximately 0.67 ft/sec which can result in solids settling out of the wastewater and depositing in the influent channel. However, the limited additional maintenance associated with the low approach velocity does not warrant altering the screen to meet the regulatory standards.

3.1.6.3 Equalization Basins

The 2000 upgrades added flow equalization to the New Baltimore WWTP. The equalization tank is approximately 24' long by 22.5' wide. It has a maximum water surface depth of 9.9' resulting in a total equalization capacity of 40,000 gallons. The tank is constructed of carbon steel, and includes galvanized steel walkways and painted carbon steel handrails.

The equalization tank in the New Baltimore WWTP is only required to equalize diurnal flow patterns under a "normal" flow condition as the downstream unit processes are sized for peak flows matching the design peak flow into the equalization tank. To achieve equalization under "normal" flow conditions, the facility is required to have approximately 7,000 gallons of equalization capacity (14% of ADF). The 40,000 gallons provided far exceeds the required 14% of the ADF, with the equalization tank providing 80% storage of the existing ADF of 50,000 gpd. The equalization tank in its current configuration can be rated for an ADF of 286,000 gpd.

The equalization tank is aerated to ensure mixing and aeration of the wastewater stored within the tank. The tank is equipped with coarse bubble diffusers fed via 14 drop legs. The air flow to each drop leg is manually and individually controlled via manual ball valves. Aeration is provided via two Sutorbilt 3LP blowers (one duty and one standby), each rated for 130 scfm at 5.0 psi. The Sutorbilt blowers provide aeration for both the equalization tank and the digester tank(s) discussed further in this report. Regulatory standards require that 1.25 scfm/1,000 gallons of storage be provided, therefore the 40,000 gallon equalization tank alone requires 50 scfm.

As noted above, the equalization basin is constructed of painted carbon steel, with painted carbon steel handrail and galvanized carbon steel grating. The paint on the handrail is peeling and dilapidated, while a portion of the galvanized grating has corroded to a point where a portion of the grating is on the verge of failure.

3.1.6.4 Equalization Pumps

The New Baltimore WWTP is equipped with a duplex equalization pump station, consisting of two Goulds Model 3887BF WS05BF pumps, float controls and a control panel. Each equalization pump operates between 110 gpm at 11' Total Dynamic Head (TDH) when the equalization tank is at its low level and 160 gpm at 4' TDH when the tank is at its high level. The pumps are operated via a float system, which start and stop the pumps based on the liquid level within the equalization tank. The pumps feed a flow control box, which controls the flow rate to the oxidation ditch via a fixed 60 degree v-notch weir and with a manually set adjustable overflow weir. Equalization is achieved by lowering or raising the overflow weir, thereby increasing or decreasing the water level within the flow control box and changing the proportion of flow which is sent to the oxidation ditch versus being returned to the equalization tank.

Regulatory standards require that the facility is capable of processing the peak flow with the largest pump out of service and as such, the equalization pumps are rated based on a PHF condition. In the case of the equalization pumps, they are each rated for 135 gpm (based on equalization tank at mid level) and are capable of providing for a PHF of 194,400 gpd.

3.1.6.5 Oxidation Ditch

The New Baltimore WWTP utilizes a treatment process known as "activated sludge" for the removal of BOD and TSS (organic matter) from the wastewater. This process involves mixing influent wastewater with micro-organisms well suited to biologically degrade the organic material in an oxygen rich environment. A simplified explanation of this process involves the micro-organisms breaking down the organic matter by converting a portion of the organic matter (commonly referred to as BOD) into additional micro-organisms while also oxidizing a portion into carbon dioxide and water. The mixture of raw wastewater and micro-organisms is referred to as mixed liquor and the micro-organisms are referred to as activated sludge.

The New Baltimore WWTP utilizes an oxidation ditch to achieve the process described above. Aeration occurs within the oxidation ditch utilizing two rotor type mechanical mixers which transfer atmospheric oxygen into the mixed liquor. After biological treatment within the oxidation ditch, the mixed liquor flows to the secondary clarifier where the activated sludge is separated from the treated water via gravity settling.

The WWTP utilizes one 83,000 gallon oxidation ditch. When following regulatory standards for an extended aeration activated sludge system (oxidation ditch), the organic (BOD) loading cannot exceed 15 lbs/day/1,000 ft^3. Following this standard, the 83,000 gallon oxidation ditch is rated for 166 lbs BOD/day. With an influent BOD of 220 mg/l, the oxidation ditch is rated for an ADF flow of 90,000 gpd. PHF are not considered in the sizing of the aeration tanks.

The amount of dissolved oxygen that the mechanical mixers provide to the mixed liquor is a function of the speed of the mixer and the immersion depth of the mixer paddles. The mixers at the New Baltimore facility are designed to operate at an immersion depth ranging between 3.5" and 10.0". The immersion depth is controlled via an adjustable weir (adjustment component of the weir is currently inoperable) on the outfall of the oxidation ditch which allows the operator to control the water surface level and thereby the immersion depth of the mixer rotor. The speed of the mixers is also operator adjustable via variable frequency drives. The New Baltimore facility requires 257 lbs/day of dissolved oxygen when operating at 60,000 gpd. The aeration capacity of a WWTP is rated based on the MMDF condition and required redundancy such that the facility can provide the required aeration with the larger aerator out of service. The existing rotors at the New Baltimore WWTP can provide the required oxygen with the largest aerator out of service provided that the adjustable weir be repaired/replaced.

3.1.6.6 Secondary Clarification

The New Baltimore WWTP provides solids separation (activated sludge and treated water) utilizing one 28' long x 7' wide chain and flight secondary clarifier. The 1983 construction included a backup clarifier that operates primarily as a digester but has chain and flight collectors with the intent that this could function as a backup clarifier. However, the chain and flight system has not been operational for many years chain and this evaluation assumes that this tank is utilized as a digester only. The clarifier takes mixed liquor from the oxidation ditch and decreases the velocity to a level which allows the activated sludge to settle to the bottom. The treated water discharges via an overflow weir on the top of the tank while the settled activated sludge is returned to the oxidation ditch for mixing with new incoming organics. The activated sludge that is returned to the oxidation ditch is referred to as "return activated sludge" or RAS. As noted above, the activated sludge process converts organics in the wastewater to micro-organisms. To maintain a steady state condition of activated sludge in the system, a portion of the activated sludge settled within the secondary clarifier is wasted to the digester. This sludge is referred to as "waste activated sludge" or WAS.

Regulatory standards require that in the event that multiple secondary clarifiers are not provided, then other provisions must be available to ensure continuity of treatment. In the case of the New Baltimore facility, the "backup" clarifier is not operational as a clarifier nor is it readily available during an emergency. Additionally, regulatory standards require that secondary clarifiers following an extended aeration system have a minimum depth of 12', not exceed a surface overflow rate at the PHF of 1,000 gpd/sf while also limiting the solids loading to 35 lbs/day/sf. The clarifier configuration at the New Baltimore facility does not meet regulatory standards as the depth is only 9' and multiple clarifiers are not available to provide continuous of treatment in the event of an equipment failure. In terms of the clarifier surface area, the 196 SF clarifier is rated for a PHF of 196,000 gpd. Under the current operational mode, the peak solids loading rate is being exceeded during high flow events. The facility is capable of operating under the existing conditions while not exceeding the solids loading capacity with changes to the process control. The solids loading and process control parameters of the facility are discussed in detail later in this report.

3.1.6.7 RAS / WAS Pumps

The New Baltimore WWTP's secondary clarifier is equipped with one return activated sludge pump (a shelf spare is present). Valving on the discharge piping of the sludge pump allows for the same pump to be utilized for wasting (WAS) activated sludge to the digester. This pump is a single speed Tsurumi Model 80C21.5 pump. The controls for the RAS/WAS pump only include the ability to manually turn the pump on or off. The pump operates at 120 gpm at 20' TDH.

Regulatory standards require RAS pumps to be capable of operating at all flow rates between 50% and 150% of the design ADF, correlating to a required return rate that can be varied between 17 gpm and 52 gpm under the current facility operation. The RAS rate

is a critical component of an activated sludge system, with the solids loading to the secondary clarifiers being directly impacted by RAS rates. RAS rates which are too high impact the solids loading capacity of the clarifier. The RAS pump at the New Baltimore WWTP is oversized and has a negative impact on the treatment capabilities of the facility. The existing RAS/WAS pumps can be rated for an ADF of 260,000 gpd. However, the pumps do not have the capability of providing varying flow rates and therefore do not meet regulatory requirements regardless of actual pump size.

3.1.6.8 Sanitary Disinfection

The SPDES discharge permit for the New Baltimore WWTP requires seasonal disinfection. During the period from November 1st to April 30th of each year disinfection in not required and the effluent from the secondary clarifiers is discharged directly to the Hudson River with no additional treatment. During the period from May 1st to October 31st, the effluent is disinfected utilizing an ultraviolet (UV) disinfection system installed in 2007. The UV disinfection system works to deactivate micro-organisms by subjecting the organisms to light with a 254 nm wavelength (UV light). Light at this wavelength alters the DNA of the organisms thereby removing their ability to reproduce.

The existing UV system consists of one bank of UV lights submerged in the effluent flow. The bank has three (3) modules, with each module containing two (2) lamps. The UV system is sized for a dosage rate of 30 mJ/cm2 for a peak flow of 200,000 gpd (PHF), with a minimum UV transmittance of 65% and a maximum TSS of 30 mg/L.

Regulatory standards require that disinfection can be maintained with one bank out of service. The New Baltimore facility only has one bank and in the event of a bank failure, disinfection requirements cannot be maintained. The facility has had occurrences over the last two years were the facility effluent was not in compliance with the disinfection limits. Plant staff has indicated that this is the result of the lamps fouling. Many UV systems have in-place lamp cleaning capabilities. In the case of the New Baltimore system, the module must be removed from the channel and the lamps cleaned manually.

3.1.6.9 Solids Processing – Anticipated Production

As discussed previously, an activated sludge process generates excess sludge which must be removed from the process. Table 12-7 of *Metcalf & Eddy* provides for a typical sludge yield from a medium strength wastewater in an extended aeration activated sludge system to be 0.8 lbs/dry solids/1,000 gallons. The New Baltimore facility operating in its current ADF condition of 30,000 gpd generates approximately 24 lbs/day. Operating under the current facilities permitted ADF of 50,000 gpd, the facility will generate 40 lbs/day.

3.1.6.10 Solids Processing – Digesters

The New Baltimore WWTP removes excess sludge (excess micro-organisms generated with the biodegradation of organic matter) utilizing the RAS/WAS pumps to divert a portion of the return activated sludge to the sludge holding/digester tank. The sludge holding/digester tank was originally designed to operate as a redundant secondary

clarifier and is equipped with a chain and flight system. As noted previously, the chain and flight system is not operational and this evaluation assumes that this tank is utilized as a digester only. The upgrades completed in 2000 provided an additional digester, with a 10,000 gallon aerobic digester being installed with the equalization tank. However, this digester is not currently utilized as the upgrade did not provide provisions to pump the sludge from this digester to the sludge drying beds.

The original digester is 28' long by 7' wide with an operating range up to 9' in depth, providing 13,200 gallons of capacity. Regulatory standards require facilities of this size to have alternate sludge handling facilities in the event that multiple units are not provided. Regulatory standards further require 3.75 ft^3 of digester capacity per capita (population equivalent, P.E.) served by the facility. The design P.E. for the New Baltimore wastewater system is 500, thereby resulting in a minimum digester capacity of 14,025 gallons. Using both the original digester and the digester installed in 2000, the New Baltimore facility has a total digester capacity of 23,200 gallons. Aeration and mixing of the digesters is accomplished utilizing coarse bubble diffusers and blowers. Standards require 30 scfm/1,000 ft^3 of digester capacity. This equates to a required blower capacity of 53 scfm to the original digester and 40 scfm to the 2000 digester. The digesters share blowers with the equalization tank, with two 130 scfm blowers providing aeration for both systems. Regulatory standards recommend that the mixing/aeration capacity of the equalization tanks and mixers be maintained with the largest unit out of service. Under the current operational mode, with the 10,000 sludge tank out of service, the required blower capacity is 103 scfm and mixing/aeration is maintained with one blower out of service. With the 2000 sludge holding tank in service, the required blower capacity is 143 scfm and the existing blowers are undersized for this application. From an operational standpoint, the air flow to the equalization tank, original digester and 2000 digester are all fed on a common air header from the blower. Air control to each of the tanks is completed by manually adjusting valves on many individual drop legs to sets of diffusers in each tank. As such, balancing the system is problematic and a change in the water surface level in any tank requires that the operator re-adjust the valves into all tanks. By design, the water surface levels in the equalization and digester tanks are continuously changing, causing the air to the systems to be unbalanced.

3.1.6.11 Solids Processing – Sludge Dewatering/Disposal

As discussed previously, the activated sludge process generates excess solids in the form of waste activated sludge. To address these solids, the New Baltimore WWTP holds the solids in a digester prior to discharging the solids to a sludge drying bed for dewatering. The dewatered sludge is ultimately disposed of off-site via landfilling. The WWTP is equipped with three sludge drying beds. Each bed is 23.25' x 23.20' (539 sf) resulting a total drying bed area of 1,618 sf. Regulatory standards require a minimum drying bed area of 2.0 sf / P.E., resulting in a required minimum drying bed area of 1,000 sf. It must be noted that drying beds require dry weather conditions to be operational. Practical experience and regulatory standards limit the time which drying beds are functional to 6 months/year and require alternate sludge drying/disposal methods to be included within the facility to address the time periods which drying beds are not functional.

3.1.6.12 WWTP Discharge

The New Baltimore WWTP discharges to the Hudson River via a gravity piping system consisting of 12", 8" and 6" pipes. This outfall is rated for a PHF of approximately 1,000,000 gpd.

3.1.6.13 Supervisory Control and Data Acquisition (SCADA)

The New Baltimore WWTP has very limited automation and control capabilities. The influent grinder/fine screen unit has local controls for the unit and the equalization pumps have float controls to start and stop the pumps. All other systems in the facility are manually controlled (on/off) and the facility has no alarm callouts to alert the facility operator in the event of an equipment failure.

3.1.6.14 Plant Process Control

The New Baltimore WWTP operations for the influent grinder/screening and flow equalization are described above. Process control dictates the capacity of the biological process, and in particular the secondary clarifiers, as the mixed liquor concentrations within the oxidation ditch, the RAS rates and the influent flow rate determine the solids loading characteristics of the secondary clarifiers. From a hydraulics standpoint, the existing secondary clarifier is rated for a peak flow of 196,000 gpd. The solids loading is limited to loading of 35 lbs/day/sf. The clarifier surface area is 196 sf, therefore the solids loading is limited to 6,860 lbs/day.

Industry accepted standards (Table 10-5 of *Metcalf & Eddy*) provide the following recommended operating parameters for an extended aeration activated sludge system.

Table 3.3 Metcalf and Eddy Operating Standards

MCRT (Solids Retention Time) Days	**F/M Ratio (Food to Mass Ratio)**	**MLSS (Mixed Liquor Suspended Solids)** mg/L	**Secondary Clarifier – Peak Solids Loading Rate** (lbs/day/SF)
20-30	0.05-0.15	1,500-5,000	35

The New Baltimore WWTP is currently operating in ranges shown in Table 3.4. Operating points that exceed Metcalf and Eddy standards are shown in boldface.

Table 3.4 WWTP Existing Process Operating Points

Operating Parameter	**Operating Pt. at Existing ADF 30,000 gpd**	**Operating Pt. at Rated Max. ADF 50,000 gpd**	**Units**
ADF	30,000	50,000	gpd
BOD Loading	55	92	lbs/day
Volumetric BOD Loading (ADF)	5.0	8.3	lbs/day/1000CF
Mass in System	**1,800**	**3,100**	lbs

MLSS	**2,600**	**4,400**	mg/L
F/M Ratio	**0.03**	**0.03**	
MCRT	**80.0**	**80.0**	days
Surface Overflow Rate at PHF	1,000	1,000	gpd/SF
Peak Solids Loading Rate (with ex. RAS pump) – RAS at 120 gpm	**42**	**69**	lbs/day/SF

The process is currently operated with excess solids (activated sludge) within the system resulting in the food to mass ratio (F/M) being excessively low, the solid retention time (MCRT) being excessively high and the associated solids loading to the secondary clarifier during high flow events exceeding the solids loading capacity of the secondary clarifier. The facility carries excess solids due to staff having very limited solids disposal options. As noted in the Solid Processing – Sludge Dewatering/Disposal section, drying beds are only truly functional during dry weather which is conducive to evaporation of the water within the sludge. During periods when adequate dewatering cannot be achieved, the drying beds do not function well and become filled with undried sludge. This forces the facility staff to hold waste sludge within the digester which is also filled to capacity. Excess solids then accumulate in the oxidation ditch, resulting in conditions where the process is holding excess solids. This decreases the efficiency of treatment and the effluent quality. Excess old sludge (long MCRT) often creates poor settling within the secondary clarifiers; consequently a portion of the poorly settled sludge washes out of the clarifiers with the effluent. The high solids concentration also results in the clarifiers being overloaded during high flow events, which leads to solids washing out of the clarifiers with the effluent.

3.1.6.15 Unit Process Capacity Summary

Table 3.5 presents a summary of the capacity of the existing New Baltimore WWTP.

Table 3.5 Existing Facility Capacity Summary

Average Annual Daily Flow (ADF) *(limited by mechanical mixer capacity)*	**50,000**	**GPD**
Maximum Monthly Daily Flow (MMDF) *(limited by mechanical mixer capacity)*	**60,000**	**GPD**
Peak Instantaneous Flow	**194,400**	**GPD**
Collection System		
Capacity – ADF (gpd)	83,000 gpd	
Capacity – MMDF (gpd)	NA	
Capacity – PHF (gpd)	330,000 gpd	
Mill Street Pump Station		
Number of Pumps	2	
Capacity / Pump (gpd)	330,000 gpd	
Pump Station Capacity – ADF (gpd)	83,000 gpd	
Pump Station Capacity – ADF (gpd)	NA	

Pump Station Capacity – PHF (gpd)	330,000 gpd
Influent Screening	
Number of Units	1
Capacity / Screen – ADF (gpd)	NA
Capacity / Screen – MMDF (gpd)	NA
Capacity / Screen – PHF (gpd)	720,000 gpd
Equalization Tank	
Number of Units	1
Capacity per Unit (gallons)	40,000 gallons
Total Capacity (gallons)	40,000 gallons
EQ Tank Capacity – ADF (gpd)	286,000 gpd
EQ Tank Capacity – PHF (gpd)	NA
Number of EQ Pumps	2
Capacity / Pump (gpd)	197,400 gpd
EQ Pump Station Capacity – ADF (gpd)	50,000 gpd
EQ Pump Station Capacity – MMDF (gpd)	NA
EQ Pump Station Capacity – PHF (gpd)	*194,400 gpd*
Oxidation Ditch	
Number of Units	1
Total Aeration Volume Each (gallons)	83,000 gallons
Aeration Tank Capacity – ADF (gpf)	90,000 gpd
Number of Mechanical Mixers	2
Capacity / Mixer (O2 transferred to mixed liquor – lbs/d)	258 lbs/d
Total Capacity w/ Largest Unit Out of Service (O2 transferred to mixed liquor – lbs/d)	258 lbs/d
Aeration Mixer Capacity – ADF (gpd)	*50,000 gpd*
Aeration Mixer Capacity – MMDF (gpd)	*60,000 gpd*
Aeration Mixer Capacity – PHF (gpd)	NA
Secondary Clarifiers	
Number of Units	1
Tank Depth (ft)	9 ft
Tank Surface Area (sf)	196 sf
Capacity Related to Surface Overflow Rate – ADF (gpd/sf)	NA
Capacity Related to Surface Overflow Rate – MMDF (gpd/sf)	NA
Capacity Related to Surface Overflow Rate – PHF (gpd/sf)	196,000 gpd
Return Sludge Pumping	
Number of Units	1 (one shelf spare)
Capacity / Pump (gpm)	120 gpm
RAS Capacity – ADF (gpd)	260,000 gpd
RAS Capacity – MMDF (gpd)	NA
RAS Capacity – PHF (gpd)	NA
UV Disinfection System	
Number of Units	1

Capacity / Unit (gpd)	200,000 gpd
Disinfection Capacity – ADF (gpd)	NA
Disinfection Capacity – MMDF (gpd)	NA
Disinfection Capacity – PHF (gpd)	200,000 gpd
Digester Tanks	
Number of Units	2
Total Volume Digester #1 (original 1983 digester) (gallons)	13,200 gallons
Total Volume Digester #2 (2000 digester) (gallons)	10,000 gallons
Capacity – ADF (gpd)	50,000 gpd
Capacity – MMDF (gpd)	60,000 gpd
Capacity – PHF (gpd)	NA
Solids Handling Process	
See narrative for discussion	

4.0 WASTEWATER TREATMENT & PUMP SYSTEM UPGRADE OPTIONS

4.1 Option #1 – Change Process Control Only

4.1.1 Option #1 Change Process Control Only

As discussed in the evaluation of the existing facility, the current configuration lacks redundancy of critical processes, has insufficient operator controls/automation and has insufficient sludge handling facilities. However, even with the deficiencies noted, the facility could be made to perform more efficiently and provide a greater level of treatment solely with process control changes. This can be achieved by operating the biological system (oxidation ditch and secondary clarifier) within the following recommended ranges:

Table 4.1 Metcalf and Eddy Operating Standards

MCRT (Solids Retention Time) Days	**F/M Ratio (Food to Mass Ratio)**	**MLSS (Mixed Liquor Suspended Solids)** mg/L	**Secondary Clarifier – Peak Solids Loading Rate** (lbs/day/SF)
20-30	0.05-0.15	1,500-5,000	35

Table 4.2. WWTP Optimized Process Operating Points

Operating Parameter	**Operating Pt. at Existing ADF 30,000 gpd**	**Operating Pt. at Rated Max. ADF 50,000 gpd**	**Units**
ADF	30,000	50,000	gpd
BOD Loading	55	92	lbs/day
Volumetric BOD Loading (ADF)	5.0	8.3	lbs/day/1000CF
Mass in System	**917**	**917**	lbs
1,300	**1,300**	**1,300**	mg/L

F/M Ratio	**0.06**	**0.1**	
MCRT	**25**	**25**	days
Surface Overflow Rate at PHF	1,000	1,000	gpd/SF
Peak Solids Loading Rate (with ex. RAS pump) – RAS at 120 gpm	**21**	**20**	lbs/day/SF

To allow for the facility to operate at the points listed above, the hauling of liquid sludge will be required during periods which the drying beds are not fully functional. Under the existing average day flow of 30,000 gpd, it is anticipated that the facility will generate approximately 24 dry lbs of sludge per day. Utilizing the digester to thicken the sludge to 2% prior to hauling, the daily liquid sludge production will be 145 gpd. Current market pricing for hauling and disposal of liquid sludge is approximately $0.17/gallon. Following regulatory standards of considering drying beds as operational 6 months per year (50% of the sludge is hauled as liquid), the required liquid hauling costs to optimize the operation of the facility under the current flow is $4,500 per year. Under conditions of maximum rated ADF capacity of 50,000 gpd, the anticipated sludge production will be approximately 40 dry lbs/day. When hauling 50% of this sludge as liquid with a solids content of 2%, the cost per year at $0.17/gallon or approximately $7,400 per year. It is recommended that the operation of the facility be altered to optimize the process and to haul liquid sludge as needed. Implementing these changes will provide immediate improvements to the treatment capabilities of the facility. Note that the facility currently has excess sludge built up within the system and additional sludge hauling will be required initially to bring the sludge inventory to the levels noted.

4.1.2 Option #1 Cost Estimate

Implementation of Option #1 involves no capital costs. The additional costs associated with implementing this option relate to the cost of hauling and disposing of liquid sludge. Under the existing flow conditions, the annual increase in operating costs to the facility will be approximately $4,500/year, while the annual increase in operating costs with the facility operating at current maximum capacity is approximately $7,400/year.

4.2 Option #2 – Full Upgrade to Maximum Capacity

4.2.1 Option #2 Full Upgrade to Maximum Capacity

Option #2 addresses the deficiencies noted in the plant evaluation and optimizes the capacity of the plant by utilizing the maximum capacity of existing tanks and structures.

Based on the evaluation of the existing system, the limiting unit processes at the New Baltimore facility are the equalization pumps, the mechanical aerators on the oxidation ditch, the lack of multiple units and the depth of the secondary clarifier, the lack of redundancy for the UV system and the solids processing/handling facilities. By addressing these items, the limiting capacity of the system then becomes the Mill Street Pump Station and the inverted siphons within the collection system become the limiting factor, with a rated ADF capacity of 83,000 gpd, a rated MMDF of 100,000 gpd (permitted flow) and a rated PHF of 330,000 gpd. *(Note that the capacity of the siphons*

may be much greater than noted within this report. A survey of the siphon is required to determine the length and elevation change in the siphon. It is recommended that this be surveyed and the capacity of the siphon be re-evaluated as part of a detailed design.)

The upgrades required to increase the capacity of the facility to a MMDF of 100,000 gpd, and upgrade the facility to address the historical operational issues of the facility are as follows:

4.2.1.1 Mill Street Pump Station Upgrades

The Mill Street Pump Station has experienced excessive wear and high O&M costs relating to the pumps, likely due to abrasive grit prematurely wearing the components of the pumps. Athough an I&I investigation and remediation actions may decrease the grit introduced into the collection system, it is unlikely that removal of grit in the quantity required to eliminate the pump wear issue can be achieved. Due to the depth of the sanitary sewer entering the pump station wetwell, the option of installing a grit removal system prior to the pump station is cost prohibitive and not feasible. As a result, it is recommended that these pumps be replaced with pumps capable of processing grit laden wastewater without excessive wear to the pumps. While there are no centrifugal pumps that can operate at the relatively high head condition experienced at the Mill Street Pump Station with no wear due to grit, the most feasible option is to replace the existing pumps with screw centrifugal pumps. These pumps are designed to limit the grit wear within the impeller/volute with the screw type impeller limiting the turbulence. A screw centrifugal pump also provides enhanced grit capability as the impeller and liner are constructed of a hardened hi-chrome which increases resistance to premature wear. The existing pumps experience significantly more turbulence in the impeller/volute and are constructed of cast iron which is much more susceptible to deterioration from grit.

This option further recommends that the replacement of the pumps include full replacement of the base elbows and pump rail systems. With a rated capacity of 83,000 gpd, the capacity of the pump station is sufficient and the replacement pumps will be sized equal to the existing pumps. This allows for the existing electrical service and electrical systems within the pump station to remain without upgrades. The pump station controls were installed with the change from KSB pumps to Hydromatic pumps in 2004. While this control system could be reused with some alterations, it is recommended that the control panel also be replaced. This will allow for the upgraded control panel to be equipped with alarm callouts (auto dialer or telemetry with an upgraded WWTP SCADA system) while also removing the requirement of retrofitting the existing control panel with components required for the replacement pumps. Additionally, it recommended that the generator be replaced as this unit is approximately 30 years old and has reached the end of its useful life.

4.2.1.2 Influent Screening

The existing influent grinder/screening system was installed in 2000 and appears to be in good working order. The unit is rated for a peak flow of 720,000 gpd and no upgrades are required or recommended.

4.2.1.3 Grit Removal System

The existing facility effectively has no grit removal capacity. As noted within the pump station evaluation, the collection system has a significant quantity of grit. The existing headworks, prior to the influent channel grinder, collects some grit which the facility staff manually removes. Manual removal has limited efficiency and it is very likely that a large quantity of grit is accumulating in downstream processes such as the equalization tank and the oxidation ditch. To address this, this option recommends that a grit screw rated for a PHF of 330,000 gpd be installed downstream of the influent screening system and prior to the equalization tank. The grit screw would operate with controls that would permit grit removal without an operator presence being required. The grit would be deposited in a garbage can for landfill disposal.

4.2.1.4 Equalization Basins

As previously noted, the required flow equalization for the New Baltimore WWTP is 14% of the average daily flow. This equates to an equalization capacity for an ADF of 286,000 gpd and a MMDF of 343,000 gpd. The equalization basin has sufficient capacity for any proposed upgrade option and no additional capacity is required.

As noted in the evaluation of the existing system, the basin is constructed of painted carbon steel, with painted carbon steel handrail and galvanized carbon steel grating. The paint on the handrail is peeling and dilapidated, while a portion of the galvanized grating has corroded to a point where sections of the grating are on the verge of failure. It is recommended that the handrail and carbon steel portions of the tank be painted and the galvanized steel grating be replaced with corrosion resistant aluminum or FRP grating.

4.2.1.5 Equalization Pumps

The existing equalization pumps and adjustable overflow weir system are rated for a peak flow of 194,400 gpd. To maximize the capacity of the New Baltimore WWTP, this option recommends that the pumps be replaced with two new equalization pumps controlled via variable frequency drives and a PLC based control system to provide a PHF capacity of 330,000 gpd. This will provide an equalization system rated for an ADF of 83,000 gpd and a MMDF of 100,000 gpd.

4.2.1.6 Oxidation Ditch

The New Baltimore WWTP utilizes one 83,000 gallon oxidation ditch. Regulatory standards for an extended aeration activated sludge system limit the organic (BOD) loading for an aeration basin (oxidation ditch) to 15 lbs/day/1,000 ft^3. Following this standard, the 83,000 gallon oxidation ditch is rated for 166 lbs BOD/day. With an influent BOD of 220 mg/l, the oxidation ditch is capable of treating an ADF of 90,000 gpd, a MMDF of 108,000 gpd and a PHF of 360,000 gpd. In order to maximize the capacity of the facility while utilizing the existing oxidation ditch structure, the existing aeration rotors will be replaced with rotors capable of providing the dissolved oxygen required with the facility operating at an ADF of 83,000 gpd and a MMDF of 100,000

gpd. Each rotor will be sized to provide the required aeration so that the facility can meet treatment requirements under an MMDF condition with one of the rotors out of service. The existing mechanical aerators were installed in 1983, are 29 years old and have reached the end of their useful life.

4.2.1.7 Secondary Clarification

As discussed within the evaluation of the existing facility, the New Baltimore WWTP has one secondary clarifier rated for a peak flow hydraulic flow of 196,000 gpd. To maximize the capacity of the facility, the existing secondary clarifier will be converted to a digester (discussed further in the digester upgrade section) and two new rectangular chain and flight clarifiers, each rated for a peak flow of 165,000 gpd, will be constructed.

4.2.1.8 RAS / WAS Pumps

To provide operational control and the required RAS rates, two new RAS/WAS pumps will be installed. Each pump will be controlled via a central plant control system (SCADA), with the RAS/WAS pumps operated via variable frequency drives. Each pump will be rated for operation between 41,500 gpd and 125,000 gpd (50% and 150% of the design ADF).

4.2.1.9 Sanitary Disinfection

As noted in the evaluation of the existing facility, the existing UV disinfection system does not meet current regulatory standards for redundancy (multiple banks are required to ensure continuity of treatment during maintenance, equipment failures, etc.). Additionally, to expand the capacity of the New Baltimore facility, the disinfection system must be upgraded to provide treatment up to PHF of 330,000 gpd.

Disinfection can be achieved at the New Baltimore facility by upgrading the UV disinfection system to a dual bank system. With this upgrade, a system capable of automatic bulb cleaning would be included. Further, the upgraded system would include local UV controls which communicate all alarm and operating conditions to a new facility SCADA system.

A second option involves the removal of the UV disinfection system and the replacement of this system with a sodium hypochlorite (chlorine) disinfection system. This option involves the construction of a 3,500 gallon chlorine contact tank which is capable of providing 15 minutes of contact time at a PHF of 330,000 gpd and the construction of a sodium hypochlorite feed system.

4.2.1.10 Solids Processing – Digesters

To address the limited digester capacity currently experienced at the facility (note that the 10,000 gallon digester is not in service as discussed above), the existing secondary clarifier will be converted to a digester. Under an ADF condition of 83,000 gpd, the population equivalent would be 830 and the required digester capacity would be 23,300

gallons. Utilizing the original 1983 digester and converting the existing secondary clarifier provides for 26,400 gallons of digester capacity while also addressing the requirement for the facility to have multiple digester units.

4.2.1.11 Solids Processing – Sludge Dewatering/Disposal

With the facility operating at an ADF of 83,000 gpd, the anticipated sludge production is 66 lbs/day. Several sludge drying and disposal options are available as follows:

The first option is to utilize the existing drying beds to the extent possible and haul liquid sludge as needed. The drying beds provide 1,618 sf of drying bed space, generally matching regulatory standards for required drying bed space when operating at an ADF of 83,000 gpd. Assuming that 50% of the sludge generated will be hauled as liquid sludge with a 2% solids content, the total liquid sludge hauled per year will be 72,000 gallons. At the current market rate of sludge hauling and disposal costs of $0.17/gallon, the total sludge hauling costs with the facility operating at capacity will be $13,000/year. Solids dried within the drying bed to a solid content of 40%, would create 15 tons of dried sludge per year. Disposal costs for dried sludge are in the $110/ton range, or approximately $1,700/year. The total sludge disposal cost under this option is $14,700/year.

The second option is to install a mechanical sludge dewatering system. The smallest option for mechanical dewatering is a screw press. These types of presses have the capability of dewatering sludge of the type at the New Baltimore WWTP to a solids concentration of 18%. If all the sludge generated at the facility was processed via the sludge press, the facility would generate 67 tons per year. Disposal of this sludge at a cost of $110/ton would result in an annual sludge disposal cost of $7,400.

4.2.1.12 Supervisory Control and Data Acquisition (SCADA)

A full upgrade to the facility will include a full SCADA system. This system will monitor all equipment which operates on local controls (i.e. influent screen), with all local controlled equipment reporting operating and alarm conditions to the plant SCADA. The SCADA would be utilized to automate and control the new equalization pumps, the new RAS/WAS pumps, the new aeration equipment and the disinfection equipment. The SCADA system will be configured to record all operating conditions, generate daily reports providing process and flow numbers and output alarm conditions to the facility operator in the event of an alarm condition at the facility. The SCADA system will also provide remote access which allows for facility staff to monitor the plant while off-site.

4.2.1.13 Mechanical/Electrical/Architectural Upgrades

To provide the upgrades noted as part of this option, alterations will be required for the electrical system. It is also recommended that the generator be replaced as this unit is approximately 30 years old and has reached the end of its useful life.

4.2.2 Option #2 Cost Estimates

Under this option there are four different alternatives which would give the New Baltimore WWTP a MMDF capacity (permitted flow) of 100,000 gpd:

- **Option 2 Alternative 1**
  Upgrade to 100,000 gpd with mechanical sludge dewatering and UV disinfection
  This alternative provides a mechanical sludge dewatering system and UV disinfection system. It has a project cost estimate of approximately $2,930,000.

- **Option 2 Alternative 2**
  Upgrade to 100,000 gpd with mechanical sludge dewatering and sodium hypochlorite disinfection
  This alternative provides a mechanical sludge dewatering system and sodium hypochlorite disinfection. It has a project cost estimate of approximately $2,805,000.

- **Option 2 Alternative 3**
  Upgrade to 100,000 gpd with UV disinfection
  This alternative provides a UV disinfection system but no mechanical sludge dewatering system. It has a project cost estimate of approximately $2,424,000.

- **Option 2 Alternative 4**
  Upgrade to 100,000 gpd with sodium hypochlorite disinfection
  This alternative provides sodium hypochlorite disinfection but no mechanical sludge dewatering system. It has a project cost of approximately $2,316,000.

Detailed construction cost estimates of these alternatives are provided in Appendix B.

4.3 Option #3 – Upgrades to Ensure Reliable Treatment – No capacity increase

4.3.1 Option #3 Upgrades to Ensure Reliable Treatment, no capacity increase

This option follows the CPE recommendations prepared by New York State Rural Water Association while also addressing the unit processes which are lacking in redundancy, required sizing and control.

Based on the evaluation of the existing system, the unit processes which limit the capability of the New Baltimore facility to achieve treatment under the current permitted flow conditions include the lack of adequate grit removal, the mechanical aerators on the oxidation ditch, the lack of multiple units and the depth of the secondary clarifier, the lack of redundancy for the UV system, the solids processing/handling facilities and the controls/automatic capabilities of the facility. This option addresses each flow unit process with design flows of 50,000 gpd on an ADF basis, 60,000 gpd on a MMDF basis, and 196,000 gpd on a PHF basis.

4.3.1.1 Mill Street Pump Station Upgrades

The Mill Street Pump Station has experienced excessive wear and high O&M costs relating to the pumps, likely due to abrasive grit prematurely wearing the components of the pumps. Athough an I&I investigation and remediation actions may decrease the grit introduced into the collection system, it is unlikely that removal of grit in the quantity required to eliminate the pump wear issue can be achieved. Due to the depth of the sanitary sewer entering the pump station wetwell, the option of installing a grit removal system prior to the pump station is cost prohibitive and not feasible. As a result, it is recommended that these pumps be replaced with pumps capable of processing grit laden wastewater without excessive wear to the pumps. While there are no centrifugal pumps that can operate at the relatively high head condition experienced at the Mill Street Pump Station with no wear due to grit, the most feasible option is to replace the existing pumps with screw centrifugal pumps. These pumps are designed to limit the grit wear within the impeller/volute with the screw type impeller limiting the turbulence. A screw centrifugal pump also provides enhanced grit capability as the impeller and liner are constructed of a hardened hi-chrome which increases resistance to premature wear. The existing pumps experience significantly more turbulence in the impeller/volute and are constructed of cast iron which is much more susceptible to deterioration from grit.

This option further recommends that the replacement of the pumps include full replacement of the base elbows and pump rail systems. With a rated capacity of 83,000 gpd, the capacity of the pump station is sufficient and the replacement pumps will be sized equal to the existing pumps. This allows for the existing electrical service and electrical systems within the pump station to remain without upgrades. The pump station controls were installed with the change from KSB pumps to Hydromatic pumps in 2004. While this control system could be reused with some alterations, it is recommended that the control panel also be replaced. This will allow for the upgraded control panel to be equipped with alarm callouts (auto dialer or telemetry with an upgraded WWTP SCADA system) while also removing the requirement of retrofitting the existing control panel with components required for the replacement pumps. Additionally, it recommended that the generator be replaced as this unit is approximately 30 years old and has reached the end of its useful life.

4.3.1.2 Influent Screening

The existing influent grinder/screening system was installed in 2000 and appears to be in good working order. The unit is rated for a peak flow of 720,000 gpd and no upgrades are required or recommended.

4.3.1.3 Grit Removal System

The existing facility effectively has no grit removal capacity. As noted within the pump station evaluation, the collection system has a significant quantity of grit. The existing headworks, prior to the influent channel grinder, collects some grit which the facility staff manually removes. Manual removal has limited efficiency and it is very likely that a

large quantity of grit is accumulating in downstream processes such as the equalization tank and the oxidation ditch. To address this, this option recommends that a grit screw rated for a PHF of 196,000 gpd be installed downstream of the influent screening system and prior to the equalization tank. The grit screw would operate with controls that would permit grit removal without an operator presence being required. The grit would be deposited in a garbage can for landfill disposal.

4.3.1.4 Equalization Basins

As previously noted, the required flow equalization for the New Baltimore WWTP is 14% of the average daily flow. This equates to an equalization capacity for an ADF of 286,000 gpd and a MMDF of 343,000 gpd. The equalization basin has sufficient capacity for any proposed upgrade option and no additional capacity is required.

As noted in the evaluation of the existing system, the basin is constructed of painted carbon steel, with painted carbon steel handrail and galvanized carbon steel grating. The paint on the handrail is peeling and dilapidated, while a portion of the galvanized grating has corroded to a point where sections of the grating are on the verge of failure. It is recommended that the handrail and carbon steel portions of the tank be painted and the galvanized steel grating be replaced with corrosion resistant aluminum or FRP grating.

4.3.1.5 Equalization Pumps

The equalization pumps and adjustable overflow weir system are rated for a peak flow of 194,400 gpd. These pumps where installed as part of the 2000 upgrades and meet the capacity requirements of the faculties existing permitted flows. No upgrades are required for this system under this option.

4.3.1.6 Oxidation Ditch

The New Baltimore WWTP utilizes one 83,000 gallon oxidation ditch. Regulatory standards for an extended aeration activated sludge system limit the organic (BOD) loading for an aeration basin (oxidation ditch) to 15 lbs/day/1,000 ft^3. Following this standard, the 83,000 gallon oxidation ditch is rated for 166 lbs BOD/day. With an influent BOD of 220 mg/l, the oxidation ditch is capable of treating an ADF of 90,000 gpd, a MMDF of 108,000 gpd and a PHF of 360,000 gpd. The mechanical aerators are sized to provide the required aeration when operating under the existing permitted flows. However, the mechanical aerators were installed in 1983, are 30 years old and have reached the end of their useful life. It is recommended that they be replaced with automated aerators of the same size which can control the speed of the mixers and the water surface level within the oxidation ditch based on the dissolved oxygen levels. The existing adjustable overflow weir which controls the water surface level within the oxidation ditch is not operable and the overflow weir will be replaced as part of this upgrade.

4.3.1.7 Secondary Clarification

As discussed within the evaluation of the existing facility, the New Baltimore WWTP has one secondary clarifier rated for a peak flow hydraulic flow of 196,000 gpd. However, regulatory standards require multiple units be provided to ensure continuity of treatment during maintenance and equipment failure events. To address this, the existing secondary clarifier will be converted to a digester (discussed further in the digester upgrade section) and two new rectangular chain and flight clarifiers, each rated for a peak flow of 98,000 gpd will be constructed.

4.3.1.8 RAS / WAS Pumps

To provide operational control and the required RAS rates, two new RAS/WAS pumps will be installed. Each pump will be controlled via a central plant control system (SCADA), with the RAS/WAS pumps operated via variable frequency drives. Each pump will be rated for operation between 25,000 gpd and 75,000 gpd (50% and 150% of the design ADF).

4.3.1.9 Sanitary Disinfection

As noted in the evaluation of the existing facility, the existing UV disinfection system does not meet current regulatory standards for redundancy (multiple banks are required to ensure continuity of treatment during maintenance, equipment failures, etc.). Additionally, to expand the capacity of the New Baltimore facility, the disinfection system must be upgraded to provide the required redundancy.

Disinfection can be achieved at the New Baltimore facility by upgrading the UV disinfection system to a dual bank system. With this upgrade, a system capable of automatic bulb cleaning would be included. Further, the upgraded system would include local UV controls which communicate all alarm and operating conditions to a new facility SCADA system.

A second option involves the removal of the UV disinfection system and the replacement of this system with a sodium hypochlorite (chlorine) disinfection system. This option involves the construction of a 2,100 gallon chlorine contact tank which is capable of providing 15 minutes of contact time at a PHF of 194,400 gpd and the construction of a sodium hypochlorite feed system.

4.3.1.10 Solids Processing – Digesters

To address the limited digester capacity currently experienced at the facility (note that the 10,000 gallon digester is not in service as discussed above), the existing secondary clarifier will be converted to a digester. Under an ADF condition of 50,000 gpd, the population equivalent is 500 and the required digester capacity would be 14,024 gallons. Utilizing the original 1983 digester and converting the existing secondary clarifier

provides for 26,400 gallons of digester capacity while also addressing the requirement of the facility to have multiple digester units.

4.3.1.11 Solids Processing – Sludge Dewatering/Disposal

Under the scenario with the facility operating at an ADF of 50,000 gpd, the anticipated sludge production is 40 lbs/day. Several sludge drying and disposal options are available:

The first option is to utilize the existing drying beds to the extent possible and haul liquid sludge as needed. The drying beds provide 1,618 sf of drying bed space, meeting the regulatory standards for required drying bed space when operating at an ADF of 50,000 gpd. Assuming that 50% of the sludge generated will be hauled as liquid sludge with a 2% solids content, the total liquid sludge hauled per year will be 43,800 gallons. At the current market rate of sludge hauling and disposal costs of $0.17/gallon, the total sludge hauling costs with the facility operating at capacity will be $7,500/year. Solids dried within the drying bed to a solid content of 40% would create 9 tons of dried sludge per year. Disposal costs for dried sludge are in the $110/ton range, or approximately $990/ year. The total sludge disposal cost under this option is $8,500/year.

The second option is to install a mechanical sludge dewatering system. The smallest option for mechanical dewatering is a screw press. These types of presses have the capability of dewatered sludge of the type at the New Baltimore facility to a solids concentration of 18%. If all the sludge generated at the facility was processed via the sludge press, the facility would generate 40 tons per year. Disposal of this sludge at a cost of $110/ton would result in an annual sludge disposal cost of $4,400.

4.3.1.12 Supervisory Control and Data Acquisition (SCADA)

This option includes a full SCADA system. This system will monitor all equipment which operates on local controls (i.e. influent screen), with all local controlled equipment reporting operating and alarm conditions to the plant SCADA. The SCADA would be utilized to automate and control the new RAS/WAS pumps, the new aeration equipment and the disinfection equipment. The SCADA system will be configured to record all operating conditions, generate daily reports providing process and flow numbers and output alarm conditions to the facility operator in the event of an alarm condition at the facility. The SCADA system will also provide remote access which allows for facility staff to monitor the plant while off-site.

4.3.1.13 Mechanical/Electrical/Architectural Upgrades

To provide the upgrades noted as part of this option, alterations will be required for the electrical system. It is also recommended that the generator be replaced as this unit is approximately 30 years old and has reached the end of its useful life.

4.3.2 Option #3 Cost Estimates

Under this option there are four different alternatives which result in the facility being upgraded to meet current regulatory standards while maintaining the current capacity of 60,000 gpd (MMDF) are presented above:

- **Option 3 Alternative 1**
  Upgrades maintaining existing flow capacity (60,000 gpd) with mechanical sludge dewatering and UV disinfection
  This alternative provides a mechanical sludge dewatering system and UV disinfection system. It has a project cost estimate of approximately $2,861,000.

- **Option 3 Alternative 2**
  Upgrades maintaining existing flow capacity (60,000 gpd) with mechanical sludge dewatering and sodium hypochlorite disinfection
  This alternative provides a mechanical sludge dewatering system and sodium hypochlorite disinfection. It has a project cost estimate of $2,734,000.

- **Option 3 Alternative 3**
  Upgrades maintaining existing flow capacity (60,000 gpd) with UVdisinfection
  This alternative provides a UV disinfection system but no mechanical sludge dewatering system. It has a project cost estimate of approximately $2,358,000.

- **Option 3 Alternative 4**
  Upgrades maintaining existing flow capacity (60,000 gpd) with sodium hypochlorite disinfection
  This alternative provides sodium hypochlorite disinfection but no mechanical sludge dewatering system. It has a project cost estimate of approximately $2,249,000.

Detailed construction cost estimates for these alternatives are provided in Appendix B.

5.0 WWTP AND PUMP STATION UPGRADE RECOMMENDATIONS

Option #2 Alternative 4 is the recommended upgrade option for the New Baltimore Wastewater Facility. A conceptual site plan of this option is included as Figure 2. This option upgrades the capacity of the facility to 100,000 gpd, and provides sodium hypochloride disinfection but no mechanical sludge dewatering system. The cost differential for new equipment rated for the existing facility's permitted flow of 60,000 gpd is negligible versus new equipment which is rated for a permitted capacity of 100,000 gpd.

A cost comparison of several sludge disposal options shows that the capital cost of a mechanical dewatering system is much greater the cost of hauling liquid sludge. The construction cost of a mechanical dewatering system (including a building to house equipment, etc.) is approximately $370,000. Under existing flow conditions (30,000 gpd), the facility would generate approximately 24 tons of sludge with an 18% solids content when utilizing the sludge dewatering press only. The disposal costs at $110/ton would cost approximately $2,640 per year. The sludge disposal cost when utilizing the sludge drying beds to the extent possible and hauling liquid sludge as necessary under the existing flow conditions, results in an annual sludge disposal cost of $5,100. Under existing flow conditions the total savings realized from the mechanical dewatering system is $2,460/year. With a capital investment of $370,000, the simple payback period for the sludge press under the existing flow conditions is 150 years.

With the upgraded facility operating at maximum capacity (83,000 gpd ADF), the annual sludge disposal cost is approximately $14,000 when utilizing the sludge drying beds and hauling liquid sludge as required. The annual sludge disposal cost when utilizing the mechanical dewatering press would be $7,400 per year. With a capital investment of $370,000, the simple payback period for the sludge press with the facility operating at a permitted maximum capacity of 100,000 gpd (MMDF) flow conditions is 56 years. As such, the sludge option which includes continued use of the drying beds when possible and hauling liquid sludge as required is the recommended option.

The installation of a sodium hypochlorite disinfection system is recommended in lieu of the replacement of the UV disinfection system. The capital cost of implementing the UV system is $145,000, while the capital cost of implementing a sodium hypochlorite disinfection system is $64,000. When evaluating the operating costs of the systems, and ignoring the electrical and maintenance costs associated with the UV system, the sodium hypochlorite system is much more economical. The O&M cost of sodium hypochlorite under the existing flow of 30,000 gpd is $365 per year. The capital cost of the UV system is $81,000 more than the sodium hypochlorite system, therefore the simple payback period utilizing UV disinfection versus sodium hypochlorite is 220 years. The O&M cost of sodium hypochlorite with the facility operating at the permitted maximum capacity of 100,000 gpd (MMDF) flow conditions is $1,010 per year. The capital cost of the UV system is $81,000 more than the sodium hypochlorite system, therefore the simple payback period when utilizing UV disinfection versus sodium hypochlorite is 80 years.

6.0 PROJECT PHASING

6.1 Project Cost – Construction Completed as One Project

6.1.1 Project Cost – Design/Construction not phased and completed as one project

As noted in Section 5, the recommended upgrade option includes upgrades to the Mill Street Pump Station as well as a variety of upgrades at the WWTP facility itself. The estimated total project cost to complete the recommended upgrades as one project is $2,316,000.

6.2 Phasing/Construction Sequencing Options and Associated Project Costs

6.2.1 Phasing General Notes

At the request of the Town of New Baltimore, construction phasing options have been evaluated which will allow for the upgrades to the WWTP to be completed in phases. The presented phasing options are based on the recommended Option #2, Alternate 4 upgrade, with a sodium hypochlorite disinfection system and to ultimately have the ability to increase the rated capacity of the facility from 60,000 gpd to 100,000 gpd (note that the capacity change is included in the final phase). It must be noted that while phasing of the project is achievable, the project loses the economy of scale in terms of engineering and construction contracts, with the implementation costs increasing by approximately 9% ($2,510,000) in 2013 construction costs. The cost estimates noted within this report reflect 2013 costs and these budget numbers must be increased when considering work that will commence beyond this time. It is also noted that items such as an overall supervisory control and data acquisition (SCADA) tie all the components of the project together into one control system. Phasing of this work will require multiple, though smaller, control systems which would then need to be integrated into an overall SCADA system during the final phase of the project. For example, the Phase II work includes replacement of the mechanical mixers. In the event that the mechanical mixers were being installed at the same time as a full SCADA upgrade (SCADA scheduled as part of Phase III), the controls would be incorporated into the SCADA. With a phased project, the mechanical mixers will require a stand alone control system which will then need to be tied to the overall SCADA platform at a later date. The phased project will also require that an alarm callout panel be included with Phase I. This panel will be obsolete and replaced when the full SCADA system is implemented. While the design of each phase will consider all phases of the project, a phased approach will result in systems such as the electrical system to be upgraded with each phase of the project.

6.2.2 Mill Street Pump Station Upgrades

Upgrades to the Mill Street Pump Station as noted within sections 4.2.1.1 and 4.3.1.1 can be completed separate from the recommended upgrades to the WWTP and are not included in the evaluation of project phases at the WWTP. As noted, the recommended upgrades to the Mill Street Pump Station are identical and independent of the Town's

decision regarding capacity of the WWTP upgrades. As such, this upgrade can be completed as a stand alone project. The estimated project costs to complete the recommended upgrades are shown in Table 6.1.

Table 6.1 Mill Street Pump Station Upgrade Cost Estimate

Mill Street Pump Station	Quantity	Units	Price / Unit	Total Price
Bypassing Pumping	1	LS	$30,000.00	$30,000.00
Pumps	2	CY	$21,000.00	$42,000.00
Piping, Valves	1	LS	$9,000.00	$9,000.00
Controls	1	LS	$30,000.00	$30,000.00
Electrical (includes generator replacement)	1	LS	$52,000.00	$52,000.00
Mill Street Pump Station Construction Total				**$163,000.00**

CONSTRUCTION SUBTOTAL	$163,000.00
20% CONTINGENCY	$32,600.00
CONSTRUCTION TOTAL	**$195,600.00**

ENGINEERING AND CONSTRUCTION MANAGEMENT	**$35,208.00**

Engineering increased to 18% to account for recommended survey work of collection system

MILL STREET PUMP STATION – PROJECT TOTAL	**$230,808.00**

6.2.3 Phase I – WWTP Upgrades – New Secondary Clarifiers, Upgraded Digesters, Upgraded RAS/WAS Pump Station and Sodium Hypochlorite Disinfection

The recommended Phase I WWTP Upgrade Project includes constructing new secondary clarifiers, upgrading the RAS/WAS pump station, re-purposing the existing secondary clarifier / digester to upgraded digesters, the implementation of a sodium hypochlorite disinfection system and replacement of the overflow weir on the oxidation ditch. This phase includes stand alone control systems for each system with an alarm callout panel which provides callout alarms in the event of equipment failure within the WWTP. The construction estimate provided does not include electrical upgrades beyond what is required to operate the systems within this phase and does not include any architectural upgrades. This estimate assumes sodium hypochlorite will be utilized for disinfection. If the Town elects to utilize UV disinfection rather than sodium hypochlorite, the cost estimate listed below will be increased by approximately $100,000. The estimated project costs to complete the Phase I portion of the recommended upgrades are shown in Table 6.2.

Table 6.2 Phase I WWTP Upgrades Cost Estimate

Oxidation Ditch – Weir Replacement Only	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Overflow Weir Replacement	1	EA	$17,000.00	$17,000.00
Oxidation Ditch Total				**$17,000.00**

Secondary Clarifiers	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	220	CY	$30.00	$6,600.00
Dewatering	1	LS	$10,000.00	$10,000.00
Structural Concrete	120	CY	$1,500.00	$180,000.00
Chain and Flight Sludge Collectors (includes Controls)	2	EA	$95,000.00	$190,000.00
Electrical	1	LS	$12,000.00	$12,000.00
Secondary Clarifier Total				**$398,600.00**

RAS/WAS Pump Station Upgrades	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	40	CY	$30.00	$1,200.00
Dewatering	1	LS	$4,000.00	$4,000.00
Structural Concrete	20	CY	$1,500.00	$30,000.00
RAS/WAS Pumps	2	EA	$10,000.00	$20,000.00
EQ Piping, Valves	1	LS	$20,000.00	$20,000.00
Controls	1	LS	$20,000.00	$20,000.00
Electrical	1	LS	$10,000.00	$10,000.00
RAS/WAS Pump Station Total				**$105,200.00**

Disinfection System Upgrades - Sodium Hypochlorite	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	40	CY	$30.00	$1,200.00
Dewatering	1	LS	$4,000.00	$4,000.00
Structural Concrete	20	CY	$1,500.00	$30,000.00
Chemical Tanks	2	EA	$4,000.00	$8,000.00
Chemical Feed Pumps	2	EA	$4,000.00	$8,000.00
Chemical Feed Piping and Appurtenances	1	LS	$7,500.00	$7,500.00
Electrical	1	LS	$5,000.00	$5,000.00
Disinfection System Upgrade - Sodium Hypochlorite				**$63,700.00**

Digester Upgrades - Includes Blower Building (building likely not required)	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Cleanup/Demolition of Existing Tanks	1	LS	$10,000.00	$10,000.00
Digester Blowers	2	EA	$10,000.00	$20,000.00
Valve/Fitting	1	LS	$15,000.00	$15,000.00
Digester Air Piping	75	LF	$100.00	$7,500.00
Course Bubble Diffusers	1	LS	$20,000.00	$20,000.00
Electrical	1	LS	$25,000.00	$25,000.00
Foundation/Structural Concrete	15	CY	$1,000.00	$15,000.00
Architectural	250	FT^2	$185.00	$46,250.00
Controls	1	LS	$45,000.00	$45,000.00
Sludge Pumps	2	EA	$15,000.00	$30,000.00
Digester Upgrade Total				**$233,750.00**

Yard Piping	1	LS	$25,000.00	**$25,000.00**
Grading/Site Work/Restoration (includes driveway relocation at bottom of hill)	1	LS	$40,000.00	**$40,000.00**
SCADA System – Alarm Callout Panel Only	1	LS	$10,000.00	**10,000.00**
Generator Replacement	0	EA	$70,000.00	**$0.00**
Miscellaneous Upgrades to Existing Buildings (roof, lights, mechanical, etc.)	0	LS	$65,000.00	**$0.00**

CONSTRUCTION SUBTOTAL	$893,250.00
20% CONTINGENCY	$178,650.00
CONSTRUCTION TOTAL	**$1,071,900.00**

ENGINEERING AND CONSTRUCTION MANAGEMENT	**$160,785.00**

PHASE I - PROJECT TOTAL	**$1,232,685.00**

6.2.4 Phase II – WWTP Upgrades – Grit System and Replacement Mechanical Mixers

The recommended Phase II WWTP Upgrade Project includes the construction of a grit removal system and the replacement of the mechanical mixers. This phase includes stand alone control systems for each system, with each system connecting to an alarm callout panel (installed as part of Phase I) which provides callout alarms in the event of an equipment failure within the WWTP. The construction estimate provided does not include electrical upgrades beyond what is required to operate the systems within this phase and does not include any architectural upgrades. The estimated project costs to complete the recommended Phase II upgrades are shown in Table 6.3.

Table 6.3 Phase II WWTP Upgrades Cost Estimate

Grit Screw	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	40	CY	$30.00	$1,200.00
Dewatering	1	LS	$5,000.00	$5,000.00
Foundation/Structural Concrete	15	CY	$1,500.00	$22,500.00
Grit Screw - includes controls	1	EA	$133,000.00	$133,000.00
Site Piping	1	LS	$10,000.00	$10,000.00
Electrical	1	LS	$20,000.00	$20,000.00
Grit Screw Construction Total				**$191,700.00**

Oxidation Ditch - Rotor Replacement (replacement equipment to increase capacity or stay at same is the same)	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Horizontal Mechanical Mixers	2	EA	$68,500.00	$137,000.00
Overflow Weir Replacement	0	EA	$17,000.00	$0.00
Control Upgrades	1	LS	$35,000.00	$35,000.00
Electrical	1	LS	$15,000.00	$15,000.00
Miscellaneous Repair/ Rehabilitation of Concrete	1	LS	$15,000.00	$15,000.00
Oxidation Ditch Construction Total				**$202,000.00**

Yard Piping	1	LS	$25,000.00	**$25,000.00**
Misc. Concrete Rehabilitation Work	1	LS	$10,000.00	**$10,000.00**
SCADA System - Limited to Alarm Callout Capability	1	LS	$10,000.00	**$10,000.00**

CONSTRUCTION SUBTOTAL	$438,700.00
20% CONTINGENCY	$87,740.00
CONSTRUCTION TOTAL	**$526,440.00**

ENGINEERING AND CONSTRUCTION MANAGEMENT	**$78,966.00**

PHASE II - PROJECT TOTAL	**$605,406.00**

6.2.5 Phase III – WWTP Upgrades –Full SCADA, Generator Replacement, Miscellaneous Architectural Upgrades (roof, lights, mechanical, etc.)

The recommended Phase III WWTP Upgrade Project includes the construction of a full supervisory control and data acquisition system (SCADA), replacement of the emergency backup generator (includes required upgrades to the electrical system not required during the implementations of Phases I and II) and miscellaneous architectural upgrades such as the roof of the administratio building and upgrades to building mechanical systems. The estimated project costs to complete the recommended Phase III upgrades are shown in Table 6.4.

Table 6.4 Phase III WWTP Upgrades Cost Estimate

	Quantity	Units	Price / Unit	Total Price
SCADA System	1	LS	$75,000.00	**$75,000.00**
Generator Replacement	1	EA	$70,000.00	**$70,000.00**
Miscellaneous Upgrades to Existing Buildings (Lights, mechanical, etc.)	1	LS	$65,000.00	**$65,000.00**

CONSTRUCTION SUBTOTAL	$210,000.00
20% CONTINGENCY	$42,000.00
CONSTRUCTION TOTAL	**$252,000.00**

ENGINEERING AND CONSTRUCTION MANAGEMENT	**$37,800.00**

PHASE III - PROJECT TOTAL	**$289,800.00**

6.2.6 Phase IV – WWTP Upgrades – EQ Pump Station Upgrades to increase WWTP capacity to 100,000 gpd

The recommended Phase IV WWTP Upgrade Project consists of upgrading the EQ pump station to increase the rated capacity of the facility to 100,000 gpd. The estimated project costs to complete the recommended upgrades are as follows:

Table 6.5 Phase IV WWTP Upgrades Cost Estimate

EQ Pump Station / EQ Tank Repairs	Quantity	Units	Price / Unit	Total Price
EQ Pumps	2	EA	$9,000.00	$18,000.00
EQ Piping, Valves	1	LS	$25,000.00	$25,000.00
Painting/Grating Replacement	1	LS	$20,000.00	$20,000.00
Controls	1	LS	$20,000.00	$20,000.00
Electrical	1	LS	$15,000.00	$15,000.00
EQ Pump Station Total				**$98,000.00**
Yard Piping	1	LS	$10,000.00	**$10,000.00**

CONSTRUCTION SUBTOTAL	$108,000.00
20% CONTIGENCY	$21,600.00
CONSTRUCTION TOTAL	**$129,600.00**
ENGINEERING AND CONSTRUCTION MANAGEMENT	**$19,440.00**
PHASE IV - PROJECT TOTAL	**$149,040.00**

FIGURES

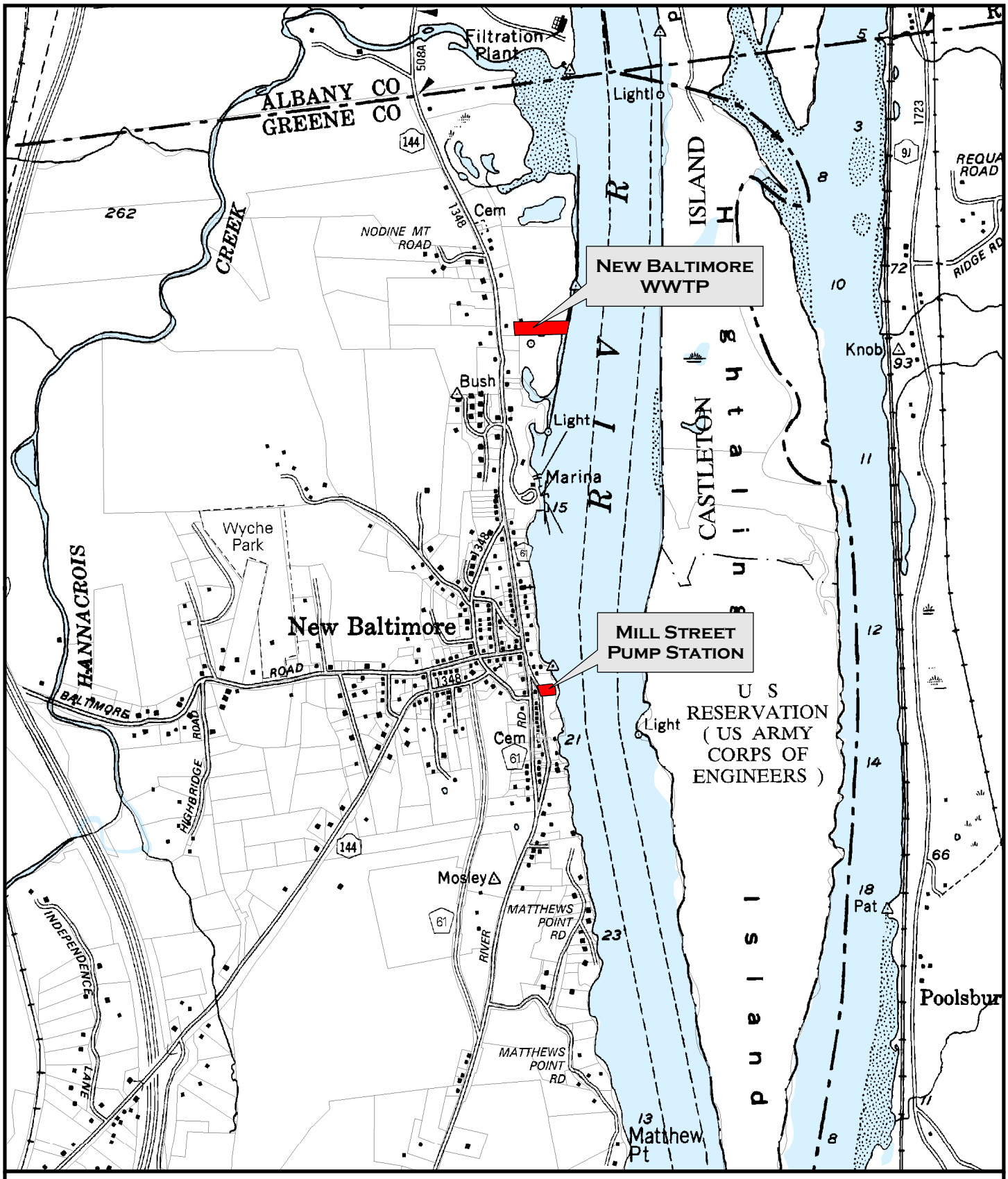


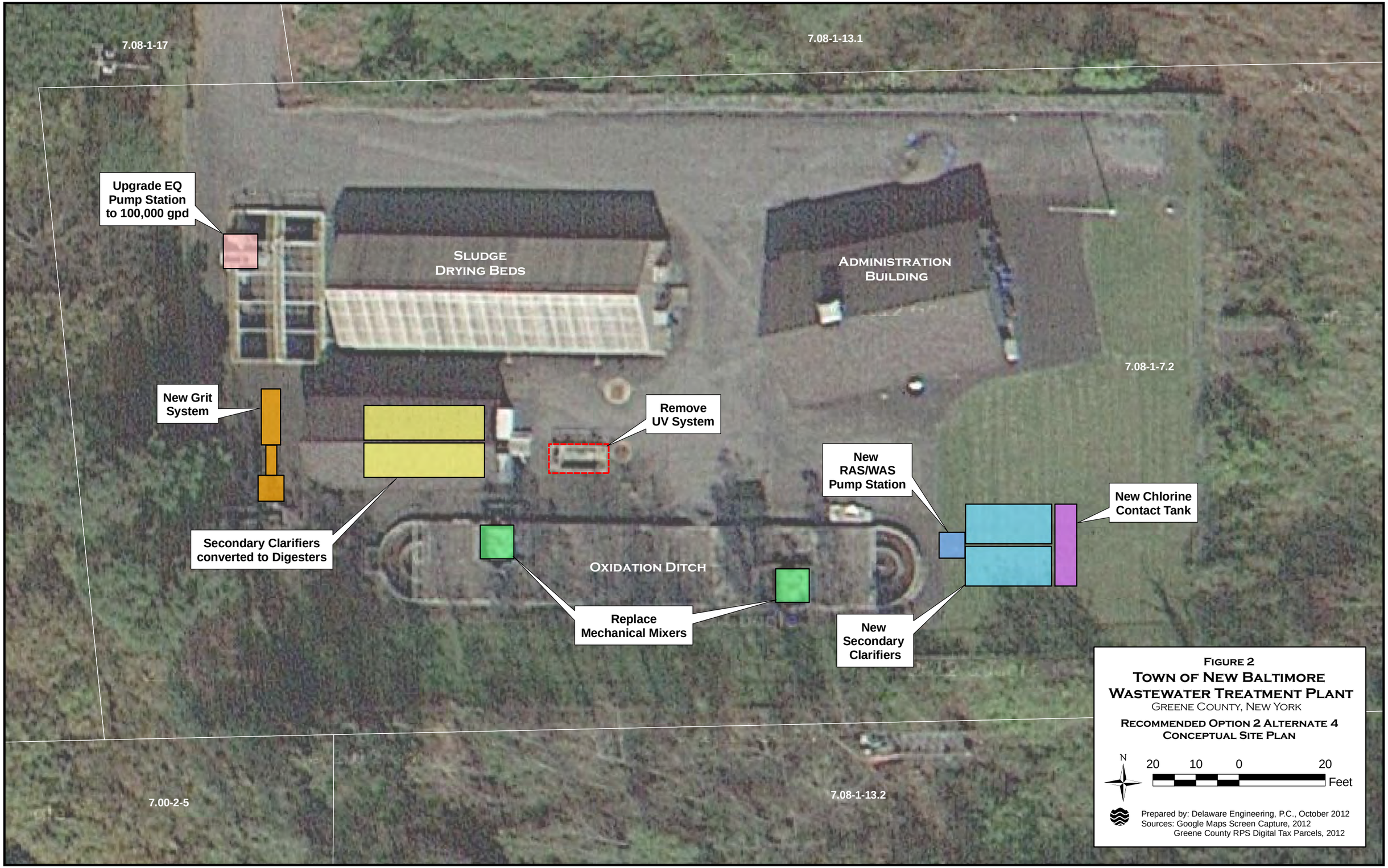
Figure 1

Location Map
Town of New Baltimore
Wastewater Treatment Plant and Pump Station
Greene County, New York

N

1,500 750 0 1,500 Feet

Prepared by: Delaware Engineering, P.C., October 2012
Source: NYS DOT 7.5' Digital Raster Quad:
Hudson South (U48), 1995


7.08-1-17
7.08-1-13.1
Upgrade EQ Pump Station to 100,000 gpd
Sludge Drying Beds
Administration Building
7.08-1-7.2
New Grit System
Remove UV System
New RAS/WAS Pump Station
New Chlorine Contact Tank
Secondary Clarifiers converted to Digesters
Oxidation Ditch
Replace Mechanical Mixers
New Secondary Clarifiers
7.00-2-5
7.08-1-13.2
Figure 2
Town of New Baltimore
Wastewater Treatment Plant
Greene County, New York
Recommended Option 2 Alternate 4
Conceptual Site Plan
N
20 10 0 20
Feet
Prepared by: Delaware Engineering, P.C., October 2012
Sources: Google Maps Screen Capture, 2012
Greene County RPS Digital Tax Parcels, 2012

APPENDICES

APPENDIX A
SPDES PERMIT

New York State Department of Environmental Conservation
Division of Environmental Permits, 4th Floor
625 Broadway, Albany, NY 12233-1750
Phone: (518) 402-9167 • **Fax:** (518) 402-9168
Website: www.dec.ny.gov

JUN - 7 2011

Joe Martens
Commissioner

COPY

Supervisor
Town of New Baltimore
3809 Co Rte 51
Hannacroix, NY 12087

FACILITY INFORMATION

NAME: New Baltimore (T) Sewer District STP
LOCATION: New Baltimore (T)
COUNTY: Greene
SPDES NO: NY 010 9151
DEC ID NO.: 4-1942-00006/00001

Dear SPDES Permittee:

Enclosed please find a validated NOTICE/RENEWAL APPLICATION/PERMIT form renewing your State Pollutant Discharge Elimination System (SPDES) permit for the referenced facility. This validated form, together with the previously issued permit (see issuance date of this permit in Part 3 of the NOTICE/RENEWAL APPLICATION/PERMIT form), and any subsequent permit modifications constitute authorization to discharge wastewater in accordance with all terms, conditions and limitations specified therein.

The instructions and other information that you received with the NOTICE/RENEWAL APPLICATION/PERMIT package fully described procedures for renewal and modification of your SPDES permit under the Environmental Benefit Permit Strategy (EBPS). As a reminder, SPDES permits are renewed at a central location in Albany in order to make the process more efficient. All other concerns with your permit such as applications for permit modifications, permit transfers to a new owner, name changes, and other questions should be directed to the Regional Permit Administrator at the following address:

William Clarke
NYSDEC-Region 4
1130 North Westcott Road
Schenectady, NY 12306-2014
(518)357-2069

If you have already filed an application for modification of your permit, it will be processed separately through our regional office. If you have questions concerning this permit renewal, please contact Lindy Sue Czubernat at (518) 402-9165.

Sincerely,

Lindy Sue Czubernat

Agency Program Aide

Enclosure

cc: RPA
RWE
BWP

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

State Pollutant Discharge Elimination System (SPDES)
NOTICE / RENEWAL APPLICATION / PERMIT

Please read ALL instructions on the back before completing this application form. Please **TYPE** or **PRINT** clearly in ink.

PART 1 - NOTICE

02/11/2011

Permittee Contact Name, Title, Address

NEW BALTIMORE (T)
SUPERVISOR
3809 COUNTY HWY 51
HANNACROIX NY 12087

Facility and SPDES Permit Information

Name: NEW BALTIMORE (T) SEWER DIST S T
Ind. Code: 4952 County: GREENE
DEC No.: 4-1942-00006/00001
SPDES No.: NY 010 9151
Expiration Date: 12/31/2011
Application Due By: 07/04/2011

Are these name(s) & address(es) correct? if not, please write corrections above.

The State Pollutant Discharge Elimination System Permit for the facility referenced above expires on the date indicated. You are required by law to file a complete renewal application **at least 180 days prior to expiration of your current permit. Note the "Application Due By" date above.**

CAUTION: This short application form and attached questionnaire are the only forms acceptable for permit renewal. Sign Part 2 below and mail only this form and the completed questionnaire using the enclosed envelope. *Effective April 1, 1994 the Department no longer assesses SPDES application fees.*

If there are changes to your discharge, or to operations affecting the discharge, then in addition to this renewal application, you must also submit a separate permit modification application to the Regional Permit Administrator for the DEC region in which the facility is located, as required by your current permit. See the reverse side of this page for instructions on filing a modification request.

PART 2 - RENEWAL APPLICATION

CERTIFICATION: I hereby affirm that under penalty of perjury that the information provided on this form and all attachments submitted herewith is true to the best of my knowledge and belief. False statements made herein are punishable as a Class A misdemeanor pursuant to section 210.45 of the Penal Law.

Susan O'Rork — Supervisor

Name of person signing application (see instructions on back) — Title

Susan O'Rork — 2/28/2011

Signature — Date

PART 3 - PERMIT (Below this line - Official Use Only)

Effective Date: 1/1/12 Expiration Date: 12/31/16

Stuart Fox

Permit Administrator

Address: NYSDEC - Division of Environmental Permits
Bureau of Environmental Analysis
625 Broadway, Albany, NY 12233-1750

Stuart M. Fox — JUN - 7 2011

Signature — Date

This permit together with the previous valid permit for this facility issued 1/1/07 and subsequent modifications constitute authorization to discharge wastewater in accordance with all terms, conditions and limitations specified in the previously issued valid permit, modifications thereof or issued as part of this permit, including any special or general conditions attached hereto. Nothing in this permit shall be deemed to waive the Department's authority to initiate a modification of this permit on the grounds specified in 6NYCRR §621.14, 6NYCRR §754.4 or 6NYCRR §757.1 existing at the time this permit is issued or which arise thereafter.

~~Attachments: General Conditions dated ___/___~~

Please enter the numbers from your current permit:

DEC Number: 4 - 1942 - 00006/0004 - __

SPDES Number: NY 0590010 9151

SPDES RENEWAL APPLICATION
QUESTIONNAIRE

THIS PAGE MUST BE COMPLETED AND RETURNED WITH YOUR COMPLETED APPLICATION

Please **TYPE** or **PRINT** neatly using adequate pressure to make ALL copies legible. Keep a copy for your records.

1. Has the SPDES permit for your facility been modified in the past 5 years ☐ YES ☒ NO

2. Dischargers who use, manufacture, store, handle or discharge toxic or hazardous pollutants are subject to Industrial Best Management Practices (BMP) plan requirements for toxic or hazardous substances. A BMP plan prevents or minimizes the potential for release of pollutants to receiving waters from such ancillary industrial activities, including material storage areas; plant site runoff; in-plant transfer; process and material storage areas; loading and unloading operations, and sludge and waste disposal areas.

   Does your facility conduct ancillary activities as described above, which are not covered by BMP requirements in your current permit? ☐ YES ☒ NO

Please indicate which of the following best describes the situation at your facility:

☒ None of the concerns on the "Self Evaluation List" seem to apply to my facility at this time and I will not be applying for a modification of the SPDES permit in the foreseeable future.

☐ Yes, some of the items on the "Self Evaluation List" have led me to believe that the permit for this facility needs to be modified. I already have a complete modification application pending with the Department.

☐ Yes, some of the items on the "Self Evaluation List" have led me to believe that the SPDES permit for this facility may need to be Modified. I have requested the appropriate forms by phone OR I have completed and attached the "Request For SPDES Application Forms" (included in this renewal package) to allow me to submit a permittee-initiated Modification application. See The "Request For SPDES Application Forms" page for a toll free 800 number.

☐ The items on the "Self Evaluation List" have left me unable to conclude whether my permit needs to be modified at this time. I am reporting the following general concerns about my permit:

_____

_____

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DISTRIBUTION: Regional Water Engineer
Regional Permit Administrator
Central Office (BWP)

New York State Department of Environmental Conservation
Division of Water
Bureau of Water Permits, 4th Floor
625 Broadway, Albany, New York 12233-3505
Phone: (518) 402-8111 • **FAX:** (518) 402-9029
Website: www.dec.state.ny.us

Denise M. Sheehan
Commissioner

June 28, 2006

Town of New Baltimore
3809 County Hwy 51
Hannacroix, NY 12087

Attn: Supervisor

Re: 2009 Hudson River Swimmable Goal
Disinfection of Sewage Treatment Plant Effluent
SPDES Permit No. NY0109151

Dear Permittee:

Our records indicate that you are authorized by State Pollutant Discharge Elimination System (SPDES) permit to discharge treated sewage, either directly to the Hudson River or indirectly via a tributary stream, and that your permit does not require you to disinfect your discharge. We are sending you this letter to inform you of an upcoming modification to your permit.

In 2004 the Governor made a commitment to ensure that Hudson River water quality will be suitable for swimming by 2009. This commitment is further detailed in the *Hudson River Estuary Action Plan, 2005 - 2009* as Goal 10, see www.dec.state.ny.us/website/hudson/hreagenda05.pdf. In order to achieve this goal, it is necessary to require that certain dischargers institute disinfection treatment to reduce pathogen levels and comply with water quality standards. Because of the location of your discharge, the New York State Departments of Environmental Conservation (DEC) and Health (DOH) have determined that your permit must be modified to require seasonal effluent disinfection in support of the goal, beginning in 2009.

Although this permit modification is not yet in effect, it is recommended that you begin planning now in order to ensure that the necessary disinfection treatment facilities can be funded, designed, and installed in time to meet the 2009 date. Please note that the design of new disinfection facilities must be submitted under the seal of a professional engineer licensed to practice in New York State and that this design must be approved by DEC prior to construction.

Upgrades to municipal wastewater treatment plants to provide disinfection may be eligible for financial assistance. During 2006, two million dollars in State assistance payments were awarded to fund up to 85% of disinfection capital costs - four plants were approved to receive maximum funding and three plants were approved to receive partial funding. It is hoped that additional funding may be available in the future. If so, you will be contacted. Please note that disinfection funds will not be awarded to successful applicants until appropriate disinfection requirements are incorporated into an issued SPDES permit. To explore funding opportunities through the Clean Water State Revolving Fund contact the New York State Environmental Facilities Corporation at 518-402-7438.

We intend to initiate the SPDES permit modification process later this summer. At that time a draft permit will be mailed to you together with the information needed to complete the public notification process. There will be a 30 day public notification period during which you and the public may

EXAMPLE PERMIT LANGUAGE - THIS IS NOT A PERM

PERMIT LIMITS, LEVELS AND MONITORING

OUTFALL No.	LIMITATIONS & MONITORING APPLY:	EFFECTIVE	EXPIRING
001	Seasonal from May 1 to October 31 each year	May 1, 2009	Expiration Date of Perm

PARAMETER	EFFLUENT LIMIT			EFFLUENT MONITORING REQUIREMENTS	
	Type	Limit	Units	Sample Frequency	Sample Type
Coliform, Fecal	30 day geometric mean 7 day geometric mean	200 400	Number/100 ml	see table below and footnote *	Grab
Chlorine, Total Residual	Monthly Average Daily Maximum	Monitor 2.0	mg/L	see table below and footnote *	Grab

Required sample frequencies shall be based on the treatment system design flow, permit application, or actual flow, whichever is greater:

Plant Size (gallons per day)	**<10,000**	**10,000 - <500,000**	**500,000 - <1 MGD**	**1 MGD or more**
Chlorine, Total Residual	Daily	Daily	Daily	3/day
Coliform, Fecal	2/year**	Monthly	One/2 weeks	2/week

Footnote * - If ultraviolet light disinfection (UV) is practiced instead of chemical disinfection then no total residual chlorine monitoring required.

Footnote ** - The minimum required sample frequency shall be once per month during the months of May and August.

Special Condition A - No disinfection or related monitoring is required until May 1, 2009. However, if chemical disinfection treatment initiated prior to that date then limits and monitoring for chemical residual(s) will be in effect to ensure protection of aquatic life.

Special Condition B - This permit page is only applicable to discharges disinfected using either ultraviolet light or chlorine. If anoth disinfection technology will be utilized or if chemical dechlorination will be practiced, then the permit may require further modification.

SCHEDULE OF COMPLIANCE - The permittee shall comply with the following schedule:

(1) By August 1, 2007 submit an approvable engineering report, plans, specifications, and construction schedule for the implementation o effluent disinfection.

(2) Commence construction of the effluent disinfection treatment facilities in accordance with the Department approved schedule.

(3) By May 1, 2009 complete construction and commence operation of disinfection treatment facilities and comply with final effluen limitations and monitoring requirements.

The permittee shall submit copies of any document required by the above schedule of compliance to the NYSDEC Regional Water Engineer at the location listed under the section of this permit entitled RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS and to the Bureau of Water Permits, 625 Broadway, Albany, N.Y. 12233-3505.

The permittee shall submit a written notice of non-compliance with each of the above schedule dates no later than 14 days following each elapsed date to the locations listed under the section of this permit entitled RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS. Each notice of non-compliance shall include the following information: A short description of the non-compliance; A description of any actions taken or proposed by the permittee to comply with the elapsed schedule requirements without further delay and to limit environmental impact associated with the non-compliance; A description or any factors which tend to explain or mitigate the non-compliance; and An estimate of the date the permittee will comply with the elapsed schedule requirement and an assessment of the probability that the permittee will meet the next scheduled requirement on time.

DOW / P. Freehafer

New York State Department of Environmental Conservation
Division of Environmental Permits, Region 4
1150 North Westcott Road, Schenectady, New York 12306-2014
Phone: (518) 357-2069 • **FAX:** (518) 357-2460
Website: www.dec.state.ny.us

John P. Cah
Commissione

December 1, 1999

Edward Berber, Supervisot
Town of New Baltimore
Town Hall, RD 1, Box 43-1
Hannacroix, NY 12087

RE: DEC #4-1942-00006/00001
SPDES #NY-0109151
New Baltimore Sewage Treatment Plant
New Baltimore (T), Greene County

Dear Mr. Rundberg:

This is to inform you that pursuant to Environmental Conservation Law ("ECL"), Article 17, Title 8 (McKinney's) and 6NYCRR, Part 757, the New York State Department of Environmental Conservation (NYSDEC) has made a determination to modify the above-referenced State Pollutant Discharge Elimination System (SPDES) permit.

The modification is to correct the frequency of DMR submissions from semi-annually to monthly. The permit has been issued on updated permit forms, which now include Discharge Notification Act requirements.

This modification is effective on the date shown on the revised pages. If you object to any part of this change, you may contact me in writing within 30 days of the date of this letter to request a hearing. Your letter must contain specific evidence to support your contention(s).

Sincerely,

Nancy Adams

Nancy Adams
Environmental Analyst
Division of Environmental Permits
Region 4

newbalt-stp
CC: R4 DOW, P. Freehafer
BWFD
DOH
ECO
Ken Rundberg, New Baltimore STP, PO Box 472, New Baltimore, NY 12124
file

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

State Pollutant Discharge Elimination System (SPDES)
DISCHARGE PERMIT
Special Conditions (Part 1)

First3.99

Industrial Code:	4952	SPDES Number:	NY- 0109151
Discharge Class (CL):	07	DEC Number:	4-1942-00006/00001
Toxic Class (TX):	N	Effective Date (EDP):	01/01/97
Major Drainage Basin:	13	Expiration Date (ExPD):	01/01/02
Sub Drainage Basin:	01	Modification Dates:	11/99
Water Index Number:	Hudson River	Attachment(s):	General Conditions (Part II) Date: 11/90
Compact Area:			

This SPDES permit is issued in compliance with Title 8 of Article 17 of the Environmental Conservation Law of New York State and in compliance with the Clean Water Act, as amended, (33 U.S.C. §1251 et.seq.)(hereinafter referred to as "the Act").

PERMITTEE NAME AND ADDRESS

Name: Town of New Baltimore Attention: Supervisor
Street: R.D. 1 Box 43-1, County Route 51
City: Hannacroix State: NY Zip Code: 12087
is authorized to discharge from the facility described below:

FACILITY NAME AND ADDRESS

Name: New Baltimore (T) Sewer District Sewage Treatment Plant
Location (C,T,V): Town of New Baltimore County: Greene
Facility Address: State Route 144
City: New Baltimore State: NY Zip Code: 12124
NYTM -E: NYTM - N:
From Outfall No.: 001 at Latitude: 42 ° 27 ′ 20 ″ & Longitude: 73 ° 47 ′ 10 ″
into receiving waters known as: Hudson River Class: C
and; (list other Outfalls, Receiving Waters & Water Classifications)

in accordance with the effluent limitations, monitoring requirements and other conditions set forth in Special Conditions (Part I) and General Conditions (Part II) of this permit.

DISCHARGE MONITORING REPORT (DMR) MAILING ADDRESS

Mailing Name: New Baltimore (T) SD STP
Street: P.O. Box 472
City: New Baltimore State: NY Zip Code: 12124
Responsible Official or Agent: Ken Rundberg, Operator Phone: (518) 756-9497

This permit and the authorization to discharge shall expire on midnight of the expiration date shown above and the permittee shall not discharge after the expiration date unless this permit has been renewed, or extended pursuant to law. To be authorized to discharge beyond the expiration date, the permittee shall apply for permit renewal not less than 180 days prior to the expiration date shown above.

DISTRIBUTION:
Bureau of Water Permits, D. Lis/P. Freehafer
BWFD
DOH
ECO
Ken Rundberg, STP Operator
File

(DEPUTY)
Permit Administrator: John H. Feltman
Address: 1150 North Westcott Rd., Schenectady, NY 1
Signature: [signature] Date: 12/1/99

Effective Date of Modification: 11/99

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DISCHARGE NOTIFICATION REQUIREMENTS

(a) Except as provided in (c), (f) and (g) of these Discharge Notification Act requirements, the permittee shall install and maintain identification signs at all outfalls to surface waters listed in this permit. Such signs shall be installed within 90 days of the Effective Date of this Modification.

(b) Subsequent modifications to or renewal of this permit does not reset or revise the deadline set forth in (a) above, unless a new deadline is set explicitly by such permit modification or renewal.

(c) The Discharge Notification Requirements described herein do not apply to outfalls from which the discharge is composed exclusively of storm water, or discharges to ground water.

(d) The sign(s) shall be conspicuous, legible and in as close proximity to the point of discharge as is reasonably possible while ensuring the maximum visibility from the surface water and shore. The signs shall be installed in such a manner to pose minimal hazard to navigation, bathing or other water related activities. If the public has access to the water from the land in the vicinity of the outfall, an identical sign shall be posted to be visible from the direction approaching the surface water.

The signs shall have **minimum** dimensions of eighteen inches by twenty four inches (18" x 24") and shall have white letters on a green background and contain the following information:

N.Y.S. PERMITTED DISCHARGE POINT

SPDES PERMIT No.: NY_____

OUTFALL No. :____

For information about this permitted discharge contact:

Permittee Name: _____

Permittee Contact: _____

Permittee Phone: ( ) - ### - ####

OR:

NYSDEC Division of Water Regional Office Address :

NYSDEC Division of Water Regional Phone: ( ) - ### -####

(e) For each discharge required to have a sign in accordance with a), the permittee shall, concurrent with the installation of the sign, provide a repository of copies of the Discharge Monitoring Reports (DMRs), as required by the **RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS** page of this permit. This repository shall be open to the public, at a minimum, during normal daytime business hours. The repository may be at the business office repository of the permittee or at an off-premises location of its choice (such location shall be the village, town, city or county clerk's office, the local library or other location as approved by the Department). In accordance with the **RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS** page of your permit, each DMR shall be maintained on record for a period of three years.

(continued)

(f) If, upon November 1, 1997, the permittee has installed signs that include the information required by 17-0815-a(2)(a) of the ECL, but do not meet the specifications listed above, the permittee may continue to use the existing signs for a period of up to five years, after which the signs shall comply with the specifications listed above.

(g) All requirements of the Discharge Notification Act, including public repository requirements, are waived for any outfall meeting any of the following circumstances, provided Department notification is made in accordance with (h):

(i) such sign would be inconsistent with any other state or federal statute;

(ii) the Discharge Notification Requirements contained herein would require that such sign could only be located in an area that is damaged by ice or flooding due to a one-year storm or storms of less severity;

(iii) instances in which the outfall to the receiving water is located on private or government property which is restricted to the public through fencing, patrolling, or other control mechanisms. Property which is posted only, without additional control mechanisms, does not qualify for this provision;

(iv) instances where the outfall pipe or channel discharges to another outfall pipe or channel, before discharge to a receiving water; or

(v) instances in which the discharge from the outfall is located in the receiving water, two-hundred or more feet from the shoreline of the receiving water.

(h) If the permittee believes that any outfall which discharges wastewater from the permitted facility meets any of the waiver criteria listed in (g) above, notification (form enclosed) must be made to the Department's Bureau of Water Permits, Central Office, of such fact, and, provided there is no objection by the Department, a sign and DMR repository for the involved outfall(s) are not required. This notification must include the facility's name, address, telephone number, contact, permit number, outfall number(s), and reason why such outfall(s) is waived from the requirements of discharge notification. The Department may evaluate the applicability of a waiver at any time, and take appropriate measures to assure that the ECL and associated regulations are complied with.

(i) The permittee shall periodically inspect the outfall identification signs in order to ensure that they are maintained, are still visible and contain information that is current and factually correct.

FINAL **PERMIT LIMITS, LEVELS AND MONITORING - MUNICIPAL**

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OUTFALL NUMBER	LIMITATIONS APPLY:	RECEIVING WATER	EFFECTIVE	EXPIRING
001	[✔] All Year [ ] Seasonal from _____ to _____	Hudson River	01/01/97	01/01/02

PARAMETER	ENFORCEABLE EFFLUENT LIMITATIONS					MONITORING REQUIREMENTS				Foot Notes
	Type	Limitation	Units	Limitation	Units	Sample Frequency	Sample Type	Location Influent	Location Effluent	
Flow	30 day arithmetic mean	0.06	MGD .06			Continuous	Recorder		x	
BOD_5	30 day arithmetic mean	30	mg/l 30	15	lbs/day	1/month	6 hour composite	x	x	(1)
BOD_5	7 day arithmetic mean	45	mg/l 45	23	lbs/day					
Solids, Suspended	30 day arithmetic mean	30	mg/l 30	15	lbs/day	1/month	6 hour composite	x	x	(1)
Solids, Suspended	7 day arithmetic mean	45	mg/l 45	23	lbs/day					
Solids, Settleable	Daily Maximum	.03	ml/l .3			1/day	grab	x	x	
pH	Range	6.0-9.0	SU 6-9			1/day	grab	x	x	
Temperature	Monitor		Deg C			1/day	grab	x	x	

FOOTNOTES: (1) and effluent shall not exceed 15 % and 15 % of influent values for BOD_5 & TSS respectively.

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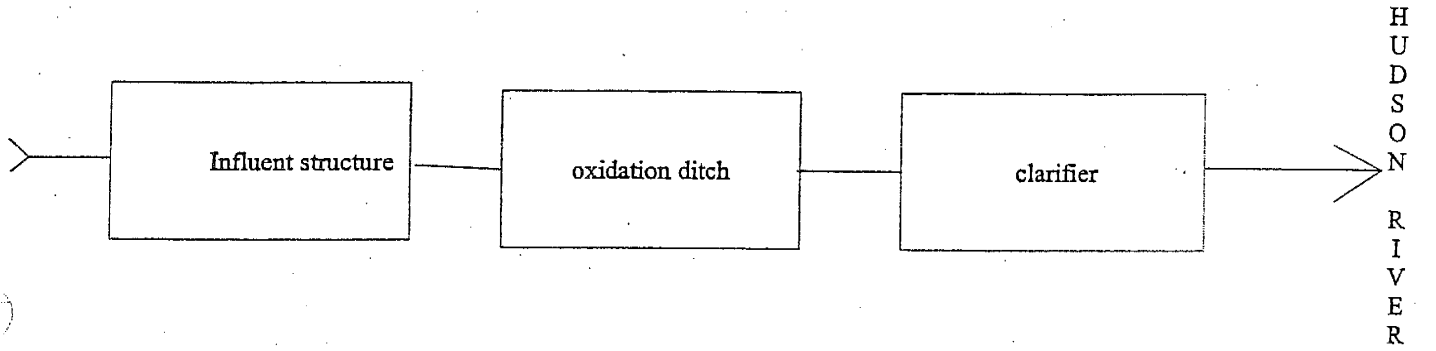
MONITORING LOCATIONS

The permittee shall take samples and measurements, to comply with the monitoring requirements specified in this permit, at the location(s) specified below:



A. Influent sample shall be taken at influent structure downstream of bar rack.

B. Effluent samle shall be taken from a point downstream of clarifier outlet.

RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS

a) The permittee shall also refer to the General Conditions (Part II) of this permit for additional information concerning monitoring and reporting requirements and conditions.

b) The monitoring information required by this permit shall be summarized, signed and retained for a period of three years from the date of the sampling for subsequent inspection by the Department or its designated agent. **Also, monitoring information required by this permit shall be summarized and reported by submitting;**

☑ (if box is checked) completed and signed Discharge Monitoring Report (DMR) forms for each 1 month reporting period to the locations specified below. Blank forms are available at the Department's Albany office listed below. The first reporting period begins on the effective date of this permit and the reports will be due no later than the 28th day of the month following the end of each reporting period.

☐ (if box is checked) an annual report to the Regional Water Engineer at the address specified below. The annual report is due by February 1 and must summarize information for January to December of the previous year in a format acceptable to the Department.

☑ (if box is checked) a monthly "Wastewater Facility Operation Report..." (form 92-15-7) to the
☑ Regional Water Engineer and/or ☐ County Health Department or Environmental Control Agency specified below.

Send the **original** (top sheet) of each DMR page to:

Department of Environmental Conservation
Division of Water
Bureau of Watershed Compliance Programs
50 Wolf Road
Albany, New York 12233-3506

Phone: (518) 457-8954

Send the **first copy** (second sheet) of each DMR page to:

Department of Environmental Conservation
Regional Water Engineer
Region 4
1150 North Westcott Road
Schenectady, NY 12306

Phone: (518) 357-2045

Send an **additional copy** of each DMR page to:

c) Noncompliance with the provisions of this permit shall be reported to the Department as prescribed in the attached General Conditions (Part II)

d) Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit.

e) If the permittee monitors any pollutant more frequently than required by the permit, using test procedures approved under 40 CFR Part 136 or as specified in this permit, the results of this monitoring shall be included in the calculations and recording of the data on the Discharge Monitoring Reports.

f) Calculation for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified in this permit.

g) Unless otherwise specified, all information recorded on the Discharge Monitoring Report shall be based upon measurements and sampling carried out during the most recently completed reporting period.

h) Any laboratory test or sample analysis required by this permit for which the State Commissioner of Health issues certificates of approval pursuant to section five hundred two of the Public Health Law shall be conducted by a laboratory which has been issued a certificate of approval. Inquiries regarding laboratory certification should be sent to the Environmental Laboratory Accreditation Program, New York State Health Department Center for Laboratories and Research, Division of Environmental Sciences, The Nelson A. Rockerfeller Empire State Plaza, Albany, New York 12201.

APPENDIX B
COST ESTIMATES

Option #2 - Alternate #1 - Construction Cost Estimate

Town of New Baltimore WWTP Improvements

Upgrade to 100,000 GPD - Mechanical Dewatering and UV Disinfection

Mill Street Pump Station	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Bypassing Pumping	1	LS	$30,000.00	$30,000.00
Pumps	2	CY	$21,000.00	$42,000.00
Piping, Valves	1	LS	$9,000.00	$9,000.00
Controls	1	LS	$30,000.00	$30,000.00
Electrical (includes generator replacement)	1	LS	$52,000.00	$52,000.00
Mill Street Pump Station Construction Total				**$163,000.00**

Grit Screw	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	40	CY	$30.00	$1,200.00
Dewatering	1	LS	$5,000.00	$5,000.00
Foundation/Structural Concrete	15	CY	$1,500.00	$22,500.00
Grit Screw	1	EA	$133,000.00	$133,000.00
Site Piping	1	LS	$10,000.00	$10,000.00
Electrical	1	LS	$15,000.00	$15,000.00
Grit Screw Construction Total				**$186,700.00**

EQ Pump Station / EQ Tank Repairs	**Quantity**	**Units**	**Price / Unit**	**Total Price**
EQ Pumps	2	EA	$9,000.00	$18,000.00
EQ Piping, Valves	1	LS	$25,000.00	$25,000.00
Painting/Grating Replacement	1	LS	$20,000.00	$20,000.00
Electrical	1	LS	$5,000.00	$5,000.00
EQ Pump Station Total				**$68,000.00**

Oxidation Ditch - Rotor Replacement (replacement equipment to increase	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Horizontal Mechanical Mixers	2	EA	$68,500.00	$137,000.00
Overflow Weir Replacement	1	EA	$17,000.00	$17,000.00
Control Upgrades	1	LS	$35,000.00	$35,000.00
Electrical	1	LS	$15,000.00	$15,000.00
Miscellous Repair/Rehabiliation of Concrete	1	LS	$15,000.00	$15,000.00
Oxidation Ditch Construction Total				**$219,000.00**

Secondary Clarifiers	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	220	CY	$30.00	$6,600.00
Dewatering	1	LS	$10,000.00	$10,000.00
Structural Concrete	120	CY	$1,500.00	$180,000.00
Chain and Flight Sludge Collectors (includes Controls)	2	EA	$95,000.00	$190,000.00
Electrical	1	LS	$12,000.00	$12,000.00
Secondary Clarifier Total				**$398,600.00**

RAS/WAS Pump Station Upgrades	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	40	CY	$30.00	$1,200.00
Dewatering	1	LS	$4,000.00	$4,000.00
Structural Concrete	20	CY	$1,500.00	$30,000.00
RAS/WAS Pumps	2	EA	$10,000.00	$20,000.00
EQ Piping, Valves	1	LS	$20,000.00	$20,000.00
Controls - Included in SCADA	0	LS	$20,000.00	$0.00
Electrical	1	LS	$10,000.00	$10,000.00
RAS/WAS Pump Station Total				**$85,200.00**

Disinfection System Upgrades - Sodium Hypochlorite	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	0	CY	$30.00	$0.00
Dewatering	0	LS	$4,000.00	$0.00
Structural Concrete	0	CY	$1,500.00	$0.00
Chemical Tanks	0	EA	$4,000.00	$0.00
Chemical Feed Pumps	0	EA	$4,000.00	$0.00
Chemical Feed Piping and Appurtenances	0	LS	$7,500.00	$0.00
Electrical	0	LS	$5,000.00	$0.00
Disinfection System Upgrade - Sodium Hypochlorite				**$0.00**

Disinfection System Upgrades - UV Disinfection	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	40	CY	$30.00	$1,200.00
Dewatering	1	LS	$4,000.00	$4,000.00
Structural Concrete	20	CY	$1,500.00	$30,000.00
UV Disinfection Equipment	1	LS	$105,000.00	$105,000.00
Electrical	1	LS	$12,000.00	$12,000.00
Disinfection System Upgrade - UV Disinfection				**$152,200.00**

Digester Upgrades - Includes Blower Building (building likely not required)	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Cleanup/Demolition of Existing Tanks	1	LS	$10,000.00	$10,000.00
Digestor Blowers	2	EA	$10,000.00	$20,000.00
Valve/Fitting	1	LS	$15,000.00	$15,000.00
Digester Air Piping	75	LF	$100.00	$7,500.00
Course Bubble Diffusers	1	LS	$20,000.00	$20,000.00
Electrical	1	LS	$25,000.00	$25,000.00
Foundation/Structural Concrete	15	CY	$1,000.00	$15,000.00
Architectural	250	FT^2	$185.00	$46,250.00
Digester Upgrade Total				**$158,750.00**

Solids Handling Upgrades - Includes Solids Building Construction	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Foundation/Structural Concrete	50	CY	$1,200.00	$60,000.00
Architectural	350	FT^2	$185.00	$64,750.00
Process Piping	1	LS	$20,000.00	$20,000.00
Sludge Pumps	1	EA	$15,000.00	$15,000.00
Sludge Press	1	EA	$145,000.00	$145,000.00
Building HVAC System	1	LS	$25,000.00	$25,000.00
Electrical	1	LS	$40,000.00	$40,000.00
Solids Handling Upgrades Total				**$369,750.00**

Yard Piping	1	LS	$30,000.00	**$30,000.00**
Grading/Site Work/Restoration	1	LS	$40,000.00	**$40,000.00**
Misc. Concrete Rehabilition Work	1	LS	$15,000.00	**$15,000.00**
SCADA System	1	LS	$100,000.00	**$100,000.00**
Generator Replacement	1	EA	$70,000.00	**$70,000.00**
Miscellanous Upgrades to Existing Buildings (Lights, mechanical, ect.)	1	LS	$65,000.00	**$65,000.00**

CONSTRUCTION SUBTOTAL	$2,121,200.00
20% CONTIGENCY	$424,240.00
CONSTRUCTION TOTAL	**$2,545,440.00**

ENGINEERING AND CONSTRUCTION MANAGEMENT	**$381,816.00**

PROJECT TOTAL	**$2,927,256.00**

Option #2 - Alternate #2 - Construction Cost Estimate

Town of New Baltimore WWTP Improvements

Upgrade to 100,000 GPD - Mechanical Dewatering and Sodium Hypochlorite Disinfection

Mill Street Pump Station	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Bypassing Pumping	1	LS	$30,000.00	$30,000.00
Pumps	2	CY	$21,000.00	$42,000.00
Piping, Valves	1	LS	$9,000.00	$9,000.00
Controls	1	LS	$30,000.00	$30,000.00
Electrical (includes generator replacement)	1	LS	$52,000.00	$52,000.00
Mill Street Pump Station Construction Total				**$163,000.00**

Grit Screw	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	40	CY	$30.00	$1,200.00
Dewatering	1	LS	$5,000.00	$5,000.00
Foundation/Structural Concrete	15	CY	$1,500.00	$22,500.00
Grit Screw (includes controls)	1	EA	$133,000.00	$133,000.00
Site Piping	1	LS	$10,000.00	$10,000.00
Electrical	1	LS	$15,000.00	$15,000.00
Grit Screw Construction Total				**$186,700.00**

EQ Pump Station / EQ Tank Repairs	**Quantity**	**Units**	**Price / Unit**	**Total Price**
EQ Pumps	2	EA	$9,000.00	$18,000.00
EQ Piping, Valves	1	LS	$25,000.00	$25,000.00
Painting/Grating Replacement	1	LS	$20,000.00	$20,000.00
Electrical	1	LS	$5,000.00	$5,000.00
EQ Pump Station Total				**$68,000.00**

Oxidation Ditch - Rotor Replacement (replacement equipment to increase capacity or stay at same capacity is the same)	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Horizontal Mechanical Mixers (includes controls)	2	EA	$68,500.00	$137,000.00
Overflow Weir Replacement	1	EA	$17,000.00	$17,000.00
Control Upgrades	1	LS	$35,000.00	$35,000.00
Electrical	1	LS	$15,000.00	$15,000.00
Miscellous Repair/Rehabiliation of Concrete	1	LS	$15,000.00	$15,000.00
Oxidation Ditch Construction Total				**$219,000.00**

Secondary Clarifiers	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	220	CY	$30.00	$6,600.00
Dewatering	1	LS	$10,000.00	$10,000.00
Structural Concrete	120	CY	$1,500.00	$180,000.00
Chain and Flight Sludge Collectors (includes Controls)	2	EA	$95,000.00	$190,000.00
Electrical	1	LS	$12,000.00	$12,000.00
Secondary Clarifier Total				**$398,600.00**

RAS/WAS Pump Station Upgrades	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	40	CY	$30.00	$1,200.00
Dewatering	1	LS	$4,000.00	$4,000.00
Structural Concrete	20	CY	$1,500.00	$30,000.00
RAS/WAS Pumps	2	EA	$10,000.00	$20,000.00
EQ Piping, Valves	1	LS	$20,000.00	$20,000.00
Controls - Included in SCADA	0	LS	$20,000.00	$0.00
Electrical	1	LS	$10,000.00	$10,000.00
RAS/WAS Pump Station Total				**$85,200.00**

Disinfection System Upgrades - Sodium Hypochlorite	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	40	CY	$30.00	$1,200.00
Dewatering	1	LS	$4,000.00	$4,000.00
Structural Concrete	20	CY	$1,500.00	$30,000.00
Chemical Tanks	2	EA	$4,000.00	$8,000.00
Chemical Feed Pumps	2	EA	$4,000.00	$8,000.00
Chemical Feed Piping and Appurtenances	1	LS	$7,500.00	$7,500.00
Electrical	1	LS	$5,000.00	$5,000.00
Disinfection System Upgrade - Sodium Hypochlorite				**$63,700.00**

Disinfection System Upgrades - UV Disinfection	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	0	CY	$30.00	$0.00
Dewatering	0	LS	$4,000.00	$0.00
Structural Concrete	0	CY	$1,500.00	$0.00
UV Disinfection Equipment	0	LS	$105,000.00	$0.00
Electrical	0	LS	$12,000.00	$0.00
Disinfection System Upgrade - UV Disinfection				**$0.00**

Digester Upgrades - Includes Blower Building (building likely not required but budgeted)	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Cleanup/Demolition of Existing Tanks	1	LS	$10,000.00	$10,000.00
Digestor Blowers	2	EA	$10,000.00	$20,000.00
Valve/Fitting	1	LS	$15,000.00	$15,000.00
Digester Air Piping	75	LF	$100.00	$7,500.00
Course Bubble Diffusers	1	LS	$20,000.00	$20,000.00
Electrical	1	LS	$25,000.00	$25,000.00
Foundation/Structural Concrete	15	CY	$1,000.00	$15,000.00
Architectural	250	FT^2	$185.00	$46,250.00
Digester Upgrade Total				**$158,750.00**

Solids Handling Upgrades - Includes Solids Building Construction	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Foundation/Structural Concrete	50	CY	$1,200.00	$60,000.00
Architectural	350	FT^2	$185.00	$64,750.00
Process Piping	1	LS	$20,000.00	$20,000.00
Sludge Pumps	1	EA	$15,000.00	$15,000.00
Sludge Press	1	EA	$145,000.00	$145,000.00
Building HVAC System	1	LS	$25,000.00	$25,000.00
Electrical	1	LS	$40,000.00	$40,000.00
Solids Handling Upgrades Total				**$369,750.00**

Yard Piping	1	LS	$30,000.00	**$30,000.00**
Grading/Site Work/Restoration	1	LS	$40,000.00	**$40,000.00**
Misc. Concrete Rehabilition Work	1	LS	$15,000.00	**$15,000.00**
SCADA System	1	LS	$100,000.00	**$100,000.00**
Generator Replacement	1	EA	$70,000.00	**$70,000.00**
Miscellanous Upgrades to Existing Buildings (roof,lights, mechanical, ect.)	1	LS	$65,000.00	**$65,000.00**

CONSTRUCTION SUBTOTAL	$2,032,700.00
20% CONTIGENCY	$406,540.00
CONSTRUCTION TOTAL	**$2,439,240.00**

ENGINEERING AND CONSTRUCTION MANAGEMENT	**$365,886.00**

PROJECT TOTAL	**$2,805,126.00**

Option #2 - Alternate #3 - Construction Cost Estimate

Town of New Baltimore WWTP Improvements

Upgrade to 100,000 GPD - UV Disinfection and No Mechanical Dewatering

Mill Street Pump Station	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Bypassing Pumping	1	LS	$30,000.00	$30,000.00
Pumps	2	CY	$21,000.00	$42,000.00
Piping, Valves	1	LS	$9,000.00	$9,000.00
Controls	1	LS	$30,000.00	$30,000.00
Electrical (includes generator replacement)	1	LS	$52,000.00	$52,000.00
Mill Street Pump Station Construction Total				**$163,000.00**

Grit Screw	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	40	CY	$30.00	$1,200.00
Dewatering	1	LS	$5,000.00	$5,000.00
Foundation/Structural Concrete	15	CY	$1,500.00	$22,500.00
Grit Screw	1	EA	$133,000.00	$133,000.00
Site Piping	1	LS	$10,000.00	$10,000.00
Electrical	1	LS	$15,000.00	$15,000.00
Grit Screw Construction Total				**$186,700.00**

EQ Pump Station / EQ Tank Repairs	**Quantity**	**Units**	**Price / Unit**	**Total Price**
EQ Pumps	2	EA	$9,000.00	$18,000.00
EQ Piping, Valves	1	LS	$25,000.00	$25,000.00
Painting/Grating Replacement	1	LS	$20,000.00	$20,000.00
Electrical	1	LS	$5,000.00	$5,000.00
EQ Pump Station Total				**$68,000.00**

Oxidation Ditch - Rotor Replacement (replacement equipment to increase	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Horizontal Mechanical Mixers	2	EA	$68,500.00	$137,000.00
Overflow Weir Replacement	1	EA	$17,000.00	$17,000.00
Control Upgrades	1	LS	$35,000.00	$35,000.00
Electrical	1	LS	$15,000.00	$15,000.00
Miscellous Repair/Rehabiliation of Concrete	1	LS	$15,000.00	$15,000.00
Oxidation Ditch Construction Total				**$219,000.00**

Secondary Clarifiers	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	220	CY	$30.00	$6,600.00
Dewatering	1	LS	$10,000.00	$10,000.00
Structural Concrete	120	CY	$1,500.00	$180,000.00
Chain and Flight Sludge Collectors (includes Controls)	2	EA	$95,000.00	$190,000.00
Electrical	1	LS	$12,000.00	$12,000.00
Secondary Clarifier Total				**$398,600.00**

RAS/WAS Pump Station Upgrades	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	40	CY	$30.00	$1,200.00
Dewatering	1	LS	$4,000.00	$4,000.00
Structural Concrete	20	CY	$1,500.00	$30,000.00
RAS/WAS Pumps	2	EA	$10,000.00	$20,000.00
EQ Piping, Valves	1	LS	$20,000.00	$20,000.00
Controls - Included in SCADA	0	LS	$20,000.00	$0.00
Electrical	1	LS	$10,000.00	$10,000.00
RAS/WAS Pump Station Total				**$85,200.00**

Disinfection System Upgrades - Sodium Hypochlorite	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	0	CY	$30.00	$0.00
Dewatering	0	LS	$4,000.00	$0.00
Structural Concrete	0	CY	$1,500.00	$0.00
Chemical Tanks	0	EA	$4,000.00	$0.00
Chemical Feed Pumps	0	EA	$4,000.00	$0.00
Chemical Feed Piping and Appurtenances	0	LS	$7,500.00	$0.00
Electrical	0	LS	$5,000.00	$0.00
Disinfection System Upgrade - Sodium Hypochlorite				**$0.00**

Disinfection System Upgrades - UV Disinfection	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	40	CY	$30.00	$1,200.00
Dewatering	1	LS	$4,000.00	$4,000.00
Structural Concrete	20	CY	$1,500.00	$30,000.00
UV Disinfection Equipment	1	LS	$105,000.00	$105,000.00
Electrical	1	LS	$12,000.00	$12,000.00
Disinfection System Upgrade - UV Disinfection				**$152,200.00**

Digester Upgrades - Includes Blower Building (building likely not	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Cleanup/Demolition of Existing Tanks	1	LS	$10,000.00	$10,000.00
Digestor Blowers	2	EA	$10,000.00	$20,000.00
Valve/Fitting	1	LS	$15,000.00	$15,000.00
Digester Air Piping	75	LF	$100.00	$7,500.00
Course Bubble Diffusers	1	LS	$20,000.00	$20,000.00
Electrical	1	LS	$25,000.00	$25,000.00
Foundation/Structural Concrete	15	CY	$1,000.00	$15,000.00
Architectural	250	FT^2	$185.00	$46,250.00
Digester Upgrade Total				**$158,750.00**

Solids Handling Upgrades - Includes Solids Building Construction	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Foundation/Structural Concrete	0	CY	$1,200.00	$0.00
Architectural	0	FT^2	$170.00	$0.00
Process Piping	0	LS	$20,000.00	$0.00
Sludge Pumps	1	EA	$15,000.00	$15,000.00
Sludge Press	0	EA	$145,000.00	$0.00
Building HVAC System	0	LS	$25,000.00	$0.00
Electrical	0	LS	$40,000.00	$0.00
Solids Handling Upgrades Total				**$15,000.00**

Yard Piping	1	LS	$20,000.00	**$20,000.00**
Grading/Site Work/Restoration	1	LS	$40,000.00	**$40,000.00**
Misc. Concrete Rehabilition Work	1	LS	$15,000.00	**$15,000.00**
SCADA System	1	LS	$100,000.00	**$100,000.00**
Generator Replacement	1	EA	$70,000.00	**$70,000.00**
Miscellanous Upgrades to Existing Buildings (roof, lights, mechanical, ect.)	1	LS	$65,000.00	**$65,000.00**

CONSTRUCTION SUBTOTAL	$1,756,450.00
20% CONTIGENCY	$351,290.00
CONSTRUCTION TOTAL	**$2,107,740.00**

ENGINEERING AND CONSTRUCTION MANAGEMENT	**$316,161.00**

PROJECT TOTAL	**$2,423,901.00**

Option #2 - Alternate #4 - Construction Cost Estimate

Town of New Baltimore WWTP Improvements

Upgrade to 100,000 GPD - Sodium Hypochlorite and No Mechanical Dewatering

Mill Street Pump Station	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Bypassing Pumping	1	LS	$30,000.00	$30,000.00
Pumps	2	CY	$21,000.00	$42,000.00
Piping, Valves	1	LS	$9,000.00	$9,000.00
Controls	1	LS	$30,000.00	$30,000.00
Electrical (includes generator replacement)	1	LS	$52,000.00	$52,000.00
Mill Street Pump Station Construction Total				**$163,000.00**

Grit Screw	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	40	CY	$30.00	$1,200.00
Dewatering	1	LS	$5,000.00	$5,000.00
Foundation/Structural Concrete	15	CY	$1,500.00	$22,500.00
Grit Screw	1	EA	$133,000.00	$133,000.00
Site Piping	1	LS	$10,000.00	$10,000.00
Electrical	1	LS	$15,000.00	$15,000.00
Grit Screw Construction Total				**$186,700.00**

EQ Pump Station / EQ Tank Repairs	**Quantity**	**Units**	**Price / Unit**	**Total Price**
EQ Pumps	2	EA	$9,000.00	$18,000.00
EQ Piping, Valves	1	LS	$25,000.00	$25,000.00
Painting/Grating Replacement	1	LS	$20,000.00	$20,000.00
Electrical	1	LS	$5,000.00	$5,000.00
EQ Pump Station Total				**$68,000.00**

Oxidation Ditch - Rotor Replacement (replacement equipment to	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Horizontal Mechanical Mixers	2	EA	$68,500.00	$137,000.00
Overflow Weir Replacement	1	EA	$17,000.00	$17,000.00
Control Upgrades	1	LS	$35,000.00	$35,000.00
Electrical	1	LS	$15,000.00	$15,000.00
Miscellous Repair/Rehabiliation of Concrete	1	LS	$15,000.00	$15,000.00
Oxidation Ditch Construction Total				**$219,000.00**

Secondary Clarifiers	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	220	CY	$30.00	$6,600.00
Dewatering	1	LS	$10,000.00	$10,000.00
Structural Concrete	120	CY	$1,500.00	$180,000.00
Chain and Flight Sludge Collectors (includes Controls)	2	EA	$95,000.00	$190,000.00
Electrical	1	LS	$12,000.00	$12,000.00
Secondary Clarifier Total				**$398,600.00**

RAS/WAS Pump Station Upgrades	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	40	CY	$30.00	$1,200.00
Dewatering	1	LS	$4,000.00	$4,000.00
Structural Concrete	20	CY	$1,500.00	$30,000.00
RAS/WAS Pumps	2	EA	$10,000.00	$20,000.00
EQ Piping, Valves	1	LS	$20,000.00	$20,000.00
Controls - Included in SCADA	0	LS	$20,000.00	$0.00
Electrical	1	LS	$10,000.00	$10,000.00
RAS/WAS Pump Station Total				**$85,200.00**

Disinfection System Upgrades - Sodium Hypochlorite	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	40	CY	$30.00	$1,200.00
Dewatering	1	LS	$4,000.00	$4,000.00
Structural Concrete	20	CY	$1,500.00	$30,000.00
Chemical Tanks	2	EA	$4,000.00	$8,000.00
Chemical Feed Pumps	2	EA	$4,000.00	$8,000.00
Chemical Feed Piping and Appurtenances	1	LS	$7,500.00	$7,500.00
Electrical	1	LS	$5,000.00	$5,000.00
Disinfection System Upgrade - Sodium Hypochlorite				**$63,700.00**

Disinfection System Upgrades - UV Disinfection	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	0	CY	$30.00	$0.00
Dewatering	0	LS	$4,000.00	$0.00
Structural Concrete	0	CY	$1,500.00	$0.00
UV Disinfection Equipment	0	LS	$105,000.00	$0.00
Electrical	0	LS	$12,000.00	$0.00
Disinfection System Upgrade - UV Disinfection				**$0.00**

Digester Upgrades - Includes Blower Building (building likely not	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Cleanup/Demolition of Existing Tanks	1	LS	$10,000.00	$10,000.00
Digestor Blowers	2	EA	$10,000.00	$20,000.00
Valve/Fitting	1	LS	$15,000.00	$15,000.00
Digester Air Piping	75	LF	$100.00	$7,500.00
Course Bubble Diffusers	1	LS	$20,000.00	$20,000.00
Electrical	1	LS	$25,000.00	$25,000.00
Foundation/Structural Concrete	15	CY	$1,000.00	$15,000.00
Architectural	250	FT^2	$185.00	$46,250.00
Digester Upgrade Total				**$158,750.00**

Solids Handling Upgrades - Includes Solids Building Construction	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Foundation/Structural Concrete	0	CY	$1,200.00	$0.00
Architectural	0	FT^2	$185.00	$0.00
Process Piping	0	LS	$20,000.00	$0.00
Sludge Pumps	1	EA	$15,000.00	$15,000.00
Sludge Press	0	EA	$145,000.00	$0.00
Building HVAC System	0	LS	$25,000.00	$0.00
Electrical	0	LS	$40,000.00	$0.00
Solids Handling Upgrades Total				**$15,000.00**

Yard Piping	1	LS	$30,000.00	**$30,000.00**
Grading/Site Work/Restoration	1	LS	$40,000.00	**$40,000.00**
Misc. Concrete Rehabilition Work	1	LS	$15,000.00	**$15,000.00**
SCADA System	1	LS	$100,000.00	**$100,000.00**
Generator Replacement	1	EA	$70,000.00	**$70,000.00**
Miscellanous Upgrades to Existing Buildings (roof, lights, mechanical, ect.)	1	LS	$65,000.00	**$65,000.00**

CONSTRUCTION SUBTOTAL	$1,677,950.00
20% CONTIGENCY	$335,590.00
CONSTRUCTION TOTAL	**$2,013,540.00**

ENGINEERING AND CONSTRUCTION MANAGEMENT	**$302,031.00**

PROJECT TOTAL	**$2,315,571.00**

Option #3 - Alternate #1 - Construction Cost Estimate

Town of New Baltimore WWTP Improvements

Upgrade Maintaining Existing Capacity - Mechanical Dewatering and UV Disinfection

Mill Street Pump Station	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Bypassing Pumping	1	LS	$30,000.00	$30,000.00
Pumps	2	CY	$21,000.00	$42,000.00
Piping, Valves	1	LS	$9,000.00	$9,000.00
Controls	1	LS	$30,000.00	$30,000.00
Electrical (includes generator replacement)	1	LS	$52,000.00	$52,000.00
Mill Street Pump Station Construction Total				**$163,000.00**

Grit Screw	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	40	CY	$30.00	$1,200.00
Dewatering	1	LS	$5,000.00	$5,000.00
Foundation/Structural Concrete	15	CY	$1,500.00	$22,500.00
Grit Screw	1	EA	$133,000.00	$133,000.00
Site Piping	1	LS	$10,000.00	$10,000.00
Electrical	1	LS	$15,000.00	$15,000.00
Grit Screw Construction Total				**$186,700.00**

EQ Pump Station / EQ Tank Repairs	**Quantity**	**Units**	**Price / Unit**	**Total Price**
EQ Pumps	0	EA	$9,000.00	$0.00
EQ Piping, Valves	0	LS	$25,000.00	$0.00
Painting/Grating Replacement	1	LS	$20,000.00	$20,000.00
Electrical	0	LS	$5,000.00	$0.00
EQ Pump Station Total				**$20,000.00**

Oxidation Ditch - Rotor Replacement (replacement equipment to increase	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Horizontal Mechanical Mixers	2	EA	$68,500.00	$137,000.00
Overflow Weir Replacement	1	EA	$17,000.00	$17,000.00
Control Upgrades	1	LS	$35,000.00	$35,000.00
Electrical	1	LS	$15,000.00	$15,000.00
Miscellous Repair/Rehabiliation of Concrete	1	LS	$15,000.00	$15,000.00
Oxidation Ditch Construction Total				**$219,000.00**

Secondary Clarifiers	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	220	CY	$30.00	$6,600.00
Dewatering	1	LS	$10,000.00	$10,000.00
Structural Concrete	120	CY	$1,500.00	$180,000.00
Chain and Flight Sludge Collectors (includes Controls)	2	EA	$95,000.00	$190,000.00
Electrical	1	LS	$12,000.00	$12,000.00
Secondary Clarifier Total				**$398,600.00**

RAS/WAS Pump Station Upgrades	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	40	CY	$30.00	$1,200.00
Dewatering	1	LS	$4,000.00	$4,000.00
Structural Concrete	20	CY	$1,500.00	$30,000.00
RAS/WAS Pumps	2	EA	$10,000.00	$20,000.00
EQ Piping, Valves	1	LS	$20,000.00	$20,000.00
Controls - Included in SCADA	0	LS	$20,000.00	$0.00
Electrical	1	LS	$10,000.00	$10,000.00
RAS/WAS Pump Station Total				**$85,200.00**

Disinfection System Upgrades - Sodium Hypochlorite	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	0	CY	$30.00	$0.00
Dewatering	0	LS	$4,000.00	$0.00
Structural Concrete	0	CY	$1,500.00	$0.00
Chemical Tanks	0	EA	$4,000.00	$0.00
Chemical Feed Pumps	0	EA	$4,000.00	$0.00
Chemical Feed Piping and Appurtenances	0	LS	$7,500.00	$0.00
Electrical	0	LS	$5,000.00	$0.00
Disinfection System Upgrade - Sodium Hypochlorite				**$0.00**

Disinfection System Upgrades - UV Disinfection	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	40	CY	$30.00	$1,200.00
Dewatering	1	LS	$4,000.00	$4,000.00
Structural Concrete	20	CY	$1,500.00	$30,000.00
UV Disinfection Equipment	1	LS	$105,000.00	$105,000.00
Electrical	1	LS	$12,000.00	$12,000.00
Disinfection System Upgrade - UV Disinfection				**$152,200.00**

Digester Upgrades - Includes Blower Building (building likely not required)	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Cleanup/Demolition of Existing Tanks	1	LS	$10,000.00	$10,000.00
Digestor Blowers	2	EA	$10,000.00	$20,000.00
Valve/Fitting	1	LS	$15,000.00	$15,000.00
Digester Air Piping	75	LF	$100.00	$7,500.00
Course Bubble Diffusers	1	LS	$20,000.00	$20,000.00
Electrical	1	LS	$25,000.00	$25,000.00
Foundation/Structural Concrete	15	CY	$1,000.00	$15,000.00
Architectural	250	FT^2	$185.00	$46,250.00
Digester Upgrade Total				**$158,750.00**

Solids Handling Upgrades - Includes Solids Building Construction	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Foundation/Structural Concrete	50	CY	$1,200.00	$60,000.00
Architectural	350	FT^2	$185.00	$64,750.00
Process Piping	1	LS	$20,000.00	$20,000.00
Sludge Pumps	1	EA	$15,000.00	$15,000.00
Sludge Press	1	EA	$145,000.00	$145,000.00
Building HVAC System	1	LS	$25,000.00	$25,000.00
Electrical	1	LS	$40,000.00	$40,000.00
Solids Handling Upgrades Total				**$369,750.00**

Yard Piping	1	LS	$30,000.00	**$30,000.00**
Grading/Site Work/Restoration	1	LS	$40,000.00	**$40,000.00**
Misc. Concrete Rehabilition Work	1	LS	$15,000.00	**$15,000.00**
SCADA System	1	LS	$100,000.00	**$100,000.00**
Generator Replacement	1	EA	$70,000.00	**$70,000.00**
Miscellanous Upgrades to Existing Buildings (Lights, mechanical, ect.)	1	LS	$65,000.00	**$65,000.00**

CONSTRUCTION SUBTOTAL	$2,073,200.00
20% CONTIGENCY	$414,640.00
CONSTRUCTION TOTAL	**$2,487,840.00**

ENGINEERING AND CONSTRUCTION MANAGEMENT	**$373,176.00**

PROJECT TOTAL	**$2,861,016.00**

Option #3 - Alternate #2 - Construction Cost Estimate

Town of New Baltimore WWTP Improvements

Upgrade Maintaining Existing Capacity - Mechanical Dewatering and Sodium Hypochlorite Disinfection

Mill Street Pump Station	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Bypassing Pumping	1	LS	$30,000.00	$30,000.00
Pumps	2	CY	$21,000.00	$42,000.00
Piping, Valves	1	LS	$9,000.00	$9,000.00
Controls	1	LS	$30,000.00	$30,000.00
Electrical (includes generator replacement)	1	LS	$52,000.00	$52,000.00
Mill Street Pump Station Construction Total				**$163,000.00**

Grit Screw	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	40	CY	$30.00	$1,200.00
Dewatering	1	LS	$5,000.00	$5,000.00
Foundation/Structural Concrete	15	CY	$1,500.00	$22,500.00
Grit Screw	1	EA	$133,000.00	$133,000.00
Site Piping	1	LS	$10,000.00	$10,000.00
Electrical	1	LS	$15,000.00	$15,000.00
Grit Screw Construction Total				**$186,700.00**

EQ Pump Station / EQ Tank Repairs	**Quantity**	**Units**	**Price / Unit**	**Total Price**
EQ Pumps	0	EA	$9,000.00	$0.00
EQ Piping, Valves	0	LS	$25,000.00	$0.00
Painting/Grating Replacement	1	LS	$20,000.00	$20,000.00
Electrical	0	LS	$5,000.00	$0.00
EQ Pump Station Total				**$20,000.00**

Oxidation Ditch - Rotor Replacement (replacement equipment to increase	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Horizontal Mechanical Mixers	2	EA	$68,500.00	$137,000.00
Overflow Weir Replacement	1	EA	$17,000.00	$17,000.00
Control Upgrades	1	LS	$35,000.00	$35,000.00
Electrical	1	LS	$15,000.00	$15,000.00
Miscellous Repair/Rehabiliation of Concrete	1	LS	$15,000.00	$15,000.00
Oxidation Ditch Construction Total				**$219,000.00**

Secondary Clarifiers	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	220	CY	$30.00	$6,600.00
Dewatering	1	LS	$10,000.00	$10,000.00
Structural Concrete	120	CY	$1,500.00	$180,000.00
Chain and Flight Sludge Collectors (includes Controls)	2	EA	$95,000.00	$190,000.00
Electrical	1	LS	$12,000.00	$12,000.00
Secondary Clarifier Total				**$398,600.00**

RAS/WAS Pump Station Upgrades	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	40	CY	$30.00	$1,200.00
Dewatering	1	LS	$4,000.00	$4,000.00
Structural Concrete	20	CY	$1,500.00	$30,000.00
RAS/WAS Pumps	2	EA	$10,000.00	$20,000.00
EQ Piping, Valves	1	LS	$20,000.00	$20,000.00
Controls - Included in SCADA	0	LS	$20,000.00	$0.00
Electrical	1	LS	$10,000.00	$10,000.00
RAS/WAS Pump Station Total				**$85,200.00**

Disinfection System Upgrades - Sodium Hypochlorite	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	40	CY	$30.00	$1,200.00
Dewatering	1	LS	$4,000.00	$4,000.00
Structural Concrete	20	CY	$1,500.00	$30,000.00
Chemical Tanks	2	EA	$4,000.00	$8,000.00
Chemical Feed Pumps	1	EA	$4,000.00	$4,000.00
Chemical Feed Piping and Appurtenances	1	LS	$7,500.00	$7,500.00
Electrical	1	LS	$5,000.00	$5,000.00
Disinfection System Upgrade - Sodium Hypochlorite				**$59,700.00**

Disinfection System Upgrades - UV Disinfection	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	0	CY	$30.00	$0.00
Dewatering	0	LS	$4,000.00	$0.00
Structural Concrete	0	CY	$1,500.00	$0.00
UV Disinfection Equipment	0	LS	$105,000.00	$0.00
Electrical	0	LS	$12,000.00	$0.00
Disinfection System Upgrade - UV Disinfection				**$0.00**

Digester Upgrades - Includes Blower Building (building likely not required)	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Cleanup/Demolition of Existing Tanks	1	LS	$10,000.00	$10,000.00
Digestor Blowers	2	EA	$10,000.00	$20,000.00
Valve/Fitting	1	LS	$15,000.00	$15,000.00
Digester Air Piping	75	LF	$100.00	$7,500.00
Course Bubble Diffusers	1	LS	$20,000.00	$20,000.00
Electrical	1	LS	$25,000.00	$25,000.00
Foundation/Structural Concrete	15	CY	$1,000.00	$15,000.00
Architectural	250	FT^2	$185.00	$46,250.00
Digester Upgrade Total				**$158,750.00**

Solids Handling Upgrades - Includes Solids Building Construction	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Foundation/Structural Concrete	50	CY	$1,200.00	$60,000.00
Architectural	350	FT^2	$185.00	$64,750.00
Process Piping	1	LS	$20,000.00	$20,000.00
Sludge Pumps	1	EA	$15,000.00	$15,000.00
Sludge Press	1	EA	$145,000.00	$145,000.00
Building HVAC System	1	LS	$25,000.00	$25,000.00
Electrical	1	LS	$40,000.00	$40,000.00
Solids Handling Upgrades Total				**$369,750.00**

Yard Piping	1	LS	$30,000.00	**$30,000.00**
Grading/Site Work/Restoration	1	LS	$40,000.00	**$40,000.00**
Misc. Concrete Rehabilition Work	1	LS	$15,000.00	**$15,000.00**
SCADA System	1	LS	$100,000.00	**$100,000.00**
Generator Replacement	1	EA	$70,000.00	**$70,000.00**
Miscellanous Upgrades to Existing Buildings (Lights, mechanical, ect.)	1	LS	$65,000.00	**$65,000.00**

CONSTRUCTION SUBTOTAL	$1,980,700.00
20% CONTIGENCY	$396,140.00
CONSTRUCTION TOTAL	**$2,376,840.00**

ENGINEERING AND CONSTRUCTION MANAGEMENT	**$356,526.00**

PROJECT TOTAL	**$2,733,366.00**

Option #3 - Alternate #3 - Construction Cost Estimate

Town of New Baltimore WWTP Improvements

Construction Cost Estimate

Upgrade Maintaining Existing Capacity - UV Disinfectionn and No Mechanical Dewatering

Mill Street Pump Station	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Bypassing Pumping	1	LS	$30,000.00	$30,000.00
Pumps	2	CY	$21,000.00	$42,000.00
Piping, Valves	1	LS	$9,000.00	$9,000.00
Controls	1	LS	$30,000.00	$30,000.00
Electrical (includes generator replacement)	1	LS	$52,000.00	$52,000.00
Mill Street Pump Station Construction Total				**$163,000.00**

Grit Screw	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	40	CY	$30.00	$1,200.00
Dewatering	1	LS	$5,000.00	$5,000.00
Foundation/Structural Concrete	15	CY	$1,500.00	$22,500.00
Grit Screw	1	EA	$133,000.00	$133,000.00
Site Piping	1	LS	$10,000.00	$10,000.00
Electrical	1	LS	$15,000.00	$15,000.00
Grit Screw Construction Total				**$186,700.00**

EQ Pump Station / EQ Tank Repairs	**Quantity**	**Units**	**Price / Unit**	**Total Price**
EQ Pumps	0	EA	$9,000.00	$0.00
EQ Piping, Valves	0	LS	$25,000.00	$0.00
Painting/Grating Replacement	1	LS	$20,000.00	$20,000.00
Electrical	0	LS	$5,000.00	$0.00
EQ Pump Station Total				**$20,000.00**

Oxidation Ditch - Rotor Replacement (replacement equipment to increase	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Horizontal Mechanical Mixers	2	EA	$68,500.00	$137,000.00
Overflow Weir Replacement	1	EA	$17,000.00	$17,000.00
Control Upgrades	1	LS	$35,000.00	$35,000.00
Electrical	1	LS	$15,000.00	$15,000.00
Miscellous Repair/Rehabiliation of Concrete	1	LS	$15,000.00	$15,000.00
Oxidation Ditch Construction Total				**$219,000.00**

Secondary Clarifiers	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	220	CY	$30.00	$6,600.00
Dewatering	1	LS	$10,000.00	$10,000.00
Structural Concrete	120	CY	$1,500.00	$180,000.00
Chain and Flight Sludge Collectors (includes Controls)	2	EA	$95,000.00	$190,000.00
Electrical	1	LS	$12,000.00	$12,000.00
Secondary Clarifier Total				**$398,600.00**

RAS/WAS Pump Station Upgrades	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	40	CY	$30.00	$1,200.00
Dewatering	1	LS	$4,000.00	$4,000.00
Structural Concrete	20	CY	$1,500.00	$30,000.00
RAS/WAS Pumps	2	EA	$10,000.00	$20,000.00
EQ Piping, Valves	1	LS	$20,000.00	$20,000.00
Controls - Included in SCADA	0	LS	$20,000.00	$0.00
Electrical	1	LS	$10,000.00	$10,000.00
RAS/WAS Pump Station Total				**$85,200.00**

Disinfection System Upgrades - Sodium Hypochlorite	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	0	CY	$30.00	$0.00
Dewatering	0	LS	$4,000.00	$0.00
Structural Concrete	0	CY	$1,500.00	$0.00
Chemical Tanks	0	EA	$4,000.00	$0.00
Chemical Feed Pumps	0	EA	$4,000.00	$0.00
Chemical Feed Piping and Appurtenances	0	LS	$7,500.00	$0.00
Electrical	0	LS	$5,000.00	$0.00
Disinfection System Upgrade - Sodium Hypochlorite				**$0.00**

Disinfection System Upgrades - UV Disinfection	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Excavation	40	CY	$30.00	$1,200.00
Dewatering	1	LS	$4,000.00	$4,000.00
Structural Concrete	20	CY	$1,500.00	$30,000.00
UV Disinfection Equipment	1	LS	$105,000.00	$105,000.00
Electrical	1	LS	$12,000.00	$12,000.00
Disinfection System Upgrade - UV Disinfection				**$152,200.00**

Digester Upgrades - Includes Blower Building (building likely not	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Cleanup/Demolition of Existing Tanks	1	LS	$10,000.00	$10,000.00
Digestor Blowers	2	EA	$10,000.00	$20,000.00
Valve/Fitting	1	LS	$15,000.00	$15,000.00
Digester Air Piping	75	LF	$100.00	$7,500.00
Course Bubble Diffusers	1	LS	$20,000.00	$20,000.00
Electrical	1	LS	$25,000.00	$25,000.00
Foundation/Structural Concrete	15	CY	$1,000.00	$15,000.00
Architectural	250	FT^2	$185.00	$46,250.00
Digester Upgrade Total				**$158,750.00**

Solids Handling Upgrades - Includes Solids Building Construction	**Quantity**	**Units**	**Price / Unit**	**Total Price**
Foundation/Structural Concrete	0	CY	$1,200.00	$0.00
Architectural	0	FT^2	$170.00	$0.00
Process Piping	0	LS	$20,000.00	$0.00
Sludge Pumps	1	EA	$15,000.00	$15,000.00
Sludge Press	0	EA	$145,000.00	$0.00
Building HVAC System	0	LS	$25,000.00	$0.00
Electrical	0	LS	$40,000.00	$0.00
Solids Handling Upgrades Total				**$15,000.00**

Yard Piping	1	LS	$20,000.00	**$20,000.00**
Grading/Site Work/Restoration	1	LS	$40,000.00	**$40,000.00**
Misc. Concrete Rehabilition Work	1	LS	$15,000.00	**$15,000.00**
SCADA System	1	LS	$100,000.00	**$100,000.00**
Generator Replacement	1	EA	$70,000.00	**$70,000.00**
Miscellanous Upgrades to Existing Buildings (roof, lights, mechanical, ect.)	1	LS	$65,000.00	**$65,000.00**

CONSTRUCTION SUBTOTAL	$1,708,450.00
20% CONTIGENCY	$341,690.00
CONSTRUCTION TOTAL	**$2,050,140.00**

ENGINEERING AND CONSTRUCTION MANAGEMENT	**$307,521.00**

PROJECT TOTAL	**$2,357,661.00**

Option #3 - Alternate #4 - Construction Cost Estimate

Town of New Baltimore WWTP Improvements

Construction Cost Estimate

Upgrade Maintaining Existing Capacity - Sodium Hypochlorite Disinfection and No Mechanical Dewatering

Mill Street Pump Station	Quantity	Units	Price / Unit	Total Price
Bypassing Pumping	1	LS	$30,000.00	$30,000.00
Pumps	2	CY	$21,000.00	$42,000.00
Piping, Valves	1	LS	$9,000.00	$9,000.00
Controls	1	LS	$30,000.00	$30,000.00
Electrical (includes generator replacement)	1	LS	$52,000.00	$52,000.00
Mill Street Pump Station Construction Total				**$163,000.00**

Grit Screw	Quantity	Units	Price / Unit	Total Price
Excavation	40	CY	$30.00	$1,200.00
Dewatering	1	LS	$5,000.00	$5,000.00
Foundation/Structural Concrete	15	CY	$1,500.00	$22,500.00
Grit Screw	1	EA	$133,000.00	$133,000.00
Site Piping	1	LS	$10,000.00	$10,000.00
Electrical	1	LS	$15,000.00	$15,000.00
Grit Screw Construction Total				**$186,700.00**

EQ Pump Station / EQ Tank Repairs	Quantity	Units	Price / Unit	Total Price
EQ Pumps	0	EA	$9,000.00	$0.00
EQ Piping, Valves	0	LS	$25,000.00	$0.00
Painting/Grating Replacement	1	LS	$20,000.00	$20,000.00
Electrical	0	LS	$5,000.00	$0.00
EQ Pump Station Total				**$20,000.00**

Oxidation Ditch - Rotor Replacement (replacement equipment to increase	Quantity	Units	Price / Unit	Total Price
Horizontal Mechanical Mixers	2	EA	$68,500.00	$137,000.00
Overflow Weir Replacement	1	EA	$17,000.00	$17,000.00
Control Upgrades	1	LS	$35,000.00	$35,000.00
Electrical	1	LS	$15,000.00	$15,000.00
Miscellous Repair/Rehabiliation of Concrete	1	LS	$15,000.00	$15,000.00
Oxidation Ditch Construction Total				**$219,000.00**

Secondary Clarifiers	Quantity	Units	Price / Unit	Total Price
Excavation	220	CY	$30.00	$6,600.00
Dewatering	1	LS	$10,000.00	$10,000.00
Structural Concrete	120	CY	$1,500.00	$180,000.00
Chain and Flight Sludge Collectors (includes Controls)	2	EA	$95,000.00	$190,000.00
Electrical	1	LS	$12,000.00	$12,000.00
Secondary Clarifier Total				**$398,600.00**

RAS/WAS Pump Station Upgrades	Quantity	Units	Price / Unit	Total Price
Excavation	40	CY	$30.00	$1,200.00
Dewatering	1	LS	$4,000.00	$4,000.00
Structural Concrete	20	CY	$1,500.00	$30,000.00
RAS/WAS Pumps	2	EA	$10,000.00	$20,000.00
EQ Piping, Valves	1	LS	$20,000.00	$20,000.00
Controls - Included in SCADA	0	LS	$20,000.00	$0.00
Electrical	1	LS	$10,000.00	$10,000.00
RAS/WAS Pump Station Total				**$85,200.00**

Disinfection System Upgrades - Sodium Hypochlorite	Quantity	Units	Price / Unit	Total Price
Excavation	40	CY	$30.00	$1,200.00
Dewatering	1	LS	$4,000.00	$4,000.00
Structural Concrete	20	CY	$1,500.00	$30,000.00
Chemical Tanks	2	EA	$4,000.00	$8,000.00
Chemical Feed Pumps	2	EA	$4,000.00	$8,000.00
Chemical Feed Piping and Appurtenances	1	LS	$7,500.00	$7,500.00
Electrical	1	LS	$5,000.00	$5,000.00
Disinfection System Upgrade - Sodium Hypochlorite				**$63,700.00**

Disinfection System Upgrades - UV Disinfection	Quantity	Units	Price / Unit	Total Price
Excavation	0	CY	$30.00	$0.00
Dewatering	0	LS	$4,000.00	$0.00
Structural Concrete	0	CY	$1,500.00	$0.00
UV Disinfection Equipment	0	LS	$105,000.00	$0.00
Electrical	0	LS	$12,000.00	$0.00
	0			
Disinfection System Upgrade - UV Disinfection				**$0.00**

Digester Upgrades - Includes Blower Building (building likely not required)	Quantity	Units	Price / Unit	Total Price
Cleanup/Demolition of Existing Tanks	1	LS	$10,000.00	$10,000.00
Digestor Blowers	2	EA	$10,000.00	$20,000.00
Valve/Fitting	1	LS	$15,000.00	$15,000.00
Digester Air Piping	75	LF	$100.00	$7,500.00
Course Bubble Diffusers	1	LS	$20,000.00	$20,000.00
Electrical	1	LS	$25,000.00	$25,000.00
Foundation/Structural Concrete	15	CY	$1,000.00	$15,000.00
Architectural	250	FT^2	$185.00	$46,250.00
Digester Upgrade Total				**$158,750.00**

Solids Handling Upgrades - Includes Solids Building Construction	Quantity	Units	Price / Unit	Total Price
Foundation/Structural Concrete	0	CY	$1,200.00	$0.00
Architectural	0	FT^2	$185.00	$0.00
Process Piping	0	LS	$20,000.00	$0.00
Sludge Pumps	1	EA	$15,000.00	$15,000.00
Sludge Press	0	EA	$145,000.00	$0.00
Building HVAC System	0	LS	$25,000.00	$0.00
Electrical	0	LS	$40,000.00	$0.00
Solids Handling Upgrades Total				**$15,000.00**

Yard Piping	1	LS	$30,000.00	**$30,000.00**
Grading/Site Work/Restoration	1	LS	$40,000.00	**$40,000.00**
Misc. Concrete Rehabilition Work	1	LS	$15,000.00	**$15,000.00**
SCADA System	1	LS	$100,000.00	**$100,000.00**
Generator Replacement	1	EA	$70,000.00	**$70,000.00**
Miscellanous Upgrades to Existing Buildings (Lights, mechanical, ect.)	1	LS	$65,000.00	**$65,000.00**

CONSTRUCTION SUBTOTAL	$1,629,950.00
20% CONTIGENCY	$325,990.00
CONSTRUCTION TOTAL	**$1,955,940.00**

ENGINEERING AND CONSTRUCTION MANAGEMENT	**$293,391.00**

PROJECT TOTAL	**$2,249,331.00**