RIVERVIEW LANDING WASTEWATER TREATMENT PLANT STUDY REPORT

for the

TOWN OF CLIFTON PARK

One Town Hall Plaza
Clifton Park, New York 12065

Clifton Park Town Board

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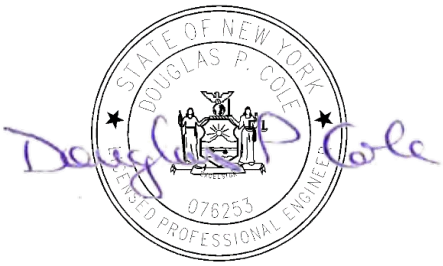

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EXECUTIVE SUMMARY

A low-pressure sewer system utilizing residential grinder pumps for conveyance and an intermittent sand filter for treatment was constructed in 1985 along Riverview Road to provide sanitary sewer service to nearby residents. The system was originally operated by RLD, Inc., but was abandoned to the Town of Clifton Park in 1999. The Town of Clifton Park Riverview Landing Sewer District No. 1 was then formed in 1999 to provide wastewater treatment services to the River Landing area of Clifton Park, which included 43 lots on Riverview Road and Maria Court. Issues were discovered with the treatment plant in 2002 that led to rebuilding of both filter units, replacement of a dosing siphon and improvements to the chlorine contact chamber in 2003. In 2017, filter bed #2 at the plant was removed from service due to excessive groundwater infiltration, necessitating the need for corrective measures. This report evaluates and compares several alternative solutions for handling the sanitary sewer flows of the Riverview Landing Sewer District.

SECTION 1 – PROJECT BACKGROUND AND HISTORY

The Town of Clifton Park has retained the services of PRIME AE Group of NY (PRIME AE) to perform a study that evaluates the feasibility of different corrective alternatives for handling the sanitary sewer flows from the Riverview Landing Sewer District. PRIME AE (fka JME) prepared the Map, Plan and Report for the Town to establish the Riverview Landing Sewer District No. 1 and assisted in the transfer of the SPDES permit (Exhibit 1) in 1999 (Town resolution #92 of 1999) after the prior owner, RLD Inc. had abandoned the system. PRIME AE also prepared the plans and specifications and provided construction phase engineering and inspection services for the rebuilding of the filter beds in 2002/2003. Tholin Excavating completed the work for approximately $105,000. Condor Constructors LLC completed the chlorine tank access improvements that PRIME AE designed later that same year. PRIME AE has provided wastewater treatment plant operation services and engineering technical assistance at this plant since 2004.

As part of our plant operation responsibilities, PRIME AE had advised the Town that there was an issue with high flows at the plant. The Town and PRIME AE performed an initial investigation and it was noticed that excessive flow was coming from filter bed #2 in the underdrain header inspection manhole when flow to that bed had been shut off. The bed was removed from service and a test pit was dug in the middle of the filter bed on May 16, 2017. The results of this test pit showed that the groundwater table had risen to a level in the sand filter above the underdrain piping compromising its treatment capability, so the filter bed was kept isolated. In a letter dated July 20, 2017, PRIME AE recommended that several corrective options be evaluated including investigation into why the groundwater table had risen, consideration of reconstructing the filter bed with a liner to keep out groundwater, and evaluation of sending the wastewater from this sewer district to a nearby sewer district.

The Riverview Landing Sewer District (RLSD) collection system is comprised of approximately 10,690 LF of 1.5-inch through 3-inch HDPE low pressure sewer mains and 36 residential grinder pump units. The 3-inch low pressure sewer main empties into a manhole near the WWTP, where gravity flow takes over to the plant. The current Riverview Landing Sewer District Wastewater Treatment Plant consists of an 8-inch gravity sewer that feeds into a series of two septic tanks (one 8,000 gallon and one 7,000 gallon), an alternating dosing siphon tank, two buried 6,600 square foot sand filter beds, an underdrain header and a chlorine disinfection tank.

The effluent from this plant is discharged through a 6-inch PVC pipe into an unnamed tributary of the Mohawk River. A site plan of this facility is located in Exhibit 2A and the Collection System layout in Exhibit 2B.

PRIME AE has collected monthly flow data since taking over operation of the plant in 2004. This measurement is performed by measuring the flow that fills a graduated bucket in one minute and then scaling this value up to a daily value. Since the start of 2015, the values observed have fluctuated between a minimum of 3,600 gallons per day (gpd), observed nine times, and a maximum of 7,290 gpd observed in April 2017. The average over this span was 5,830 gpd. To more accurately measure the flows going into the plant, PRIME AE began this study by inserting a portable flow meter into the plant's effluent sewer main and measuring the average and maximum daily flows. The average daily flow was 7,000 gallons per day (gpd) and the maximum daily flow was 15,000 gpd. A factor of four was used to calculate the peak hourly flow to the plant from the average daily flow. Thus, the estimated peak hourly flow at the Riverview Landing WWTP is 19.5 gpm. These flows were used to estimate the sizing and pricing of each design alternative. A summary of this information is provided in Exhibit 3.

PRIME AE performed a site survey on September 27, 2018 to investigate possible reasons for the rise of the groundwater table. It was found that both the drainage swale on the west side of the plant and the Riverview Landing roadside ditch have positive drainage. However, the presence of standing water in the swale, particularly near the wetland northwest of the plant, indicates that the water table is high in this area. This high groundwater condition appears to be the cause of the groundwater intrusion into the existing sand filter bed and will need to be accounted for as part of each of the alternatives discussed below, particularly rehabilitation of the current WWTP.

SECTION 2 – APPROACH AND METHODOLOGY

PRIME AE identified several different options for this study, each with several individual alternatives. These included wastewater treatment options, conventional pumping station options, and low-pressure sewer options. There are several wastewater facilities near the RLSD with the potential to treat or convey additional flow from RLSD. These include the privately owned Mohawk River Country Club Wastewater Treatment Plant (MRCC WWTP), which is located about 0.7 miles north of the RLSD WWTP on Riverview Road, the Town owned pump station across the street from the Edison Club, which is located about 1.3 miles north on Riverview Road and connects to the Rivercrest Sewer District, and the privately owned Windhover Farms forcemain, which will begin on a new street off of Grooms road to be named Penfield Drive, which is located approximately 1.7 miles from the RLSD WWTP. A map of the existing RLSD and surrounding study areas is provided in Exhibit 4A.

PRIME AE performed the following tasks for each alternative:

1. Analyzed the feasibility of the design alternative as a means of treating or transmitting the influent from RLSD, factoring in current regulations and site conditions.
2. Developed a scope of work for construction of the alternative.
3. Prepared a cost estimate for the initial construction costs.

4. Analyzed the design of each alternative to determine yearly operation and maintenance costs and future capital improvement costs that are likely to be incurred by RLSD residents. A 30-year service life and loan payoff period were assumed for this analysis.
5. Performed a 30-Year Cost (present worth) analysis of the alternative to evaluate the anticipated present and future costs to construct and maintain the facility over its entire service life. The analysis was performed to allow comparison between the value of spending funds at the time of initial construction and the future costs of operating, maintaining, repairing and replacing each alternative. To determine the present value of each alternative's overall costs, future costs were determined by inflating the current costs to reflect increased costs at the time of the construction or expense and then these future costs were discounted back to the date of initial construction. PRIME AE used 2020 as the date of initial construction for this analysis.
6. Determined the annual cost to a typical property owner (mode) in the RLSD based upon the use of a 5%, 30-year loan to fund the entire cost of the alternative (no grants). These calculations were performed on the assumption that there will be 38 Equivalent Dwelling Units (EDUs) that use RLSD, which includes 36 currently used units and a half unit for each of the four vacant lots in the district (as shown on the Saratoga County tax map website). A listing of the lots in RLSD is provided in Exhibit 5.

SECTION 3 – ALTERNATIVES ANALYSIS

Alternative #1 – Wastewater Treatment Plants

The first set of alternatives for handling the wastewater from the RLSD is to maintain a wastewater treatment plant within the district. This set of alternatives includes both rehabilitation and continued use of the current sand filter bed WWTP (Alternative #1A) and replacement of the plant with a packaged treatment plant (Alternatives #1B and #1C).

Currently, the plant operates under SPDES Permit NY0131768, which authorizes the facility to discharge treated water into an unnamed tributary of the Mohawk River in accordance with the provisions and conditions written in the permit. These conditions include plant effluent limits for BOD (30 mg/l, monthly average), suspended solids (30 mg/l, monthly average), settleable solids (0.1 ml/l, daily maximum), pH (6.5-8.5), nitrogen (NH_3) (14 mg/l, June-October, and 21 mg/l, November-May), fecal coliform (200 units/100 ml), and residual chlorine (2 mg/l, daily maximum). As previously mentioned, the SPDES permit is contained in Exhibit 1.

The operator of the plant tests pH, settleable solids, and residual chlorine once each month and samples the other parameters biannually. Since PRIME AE began operating the plant and collecting data in 2004, the average influent TSS at the RLSD WWTP has been 1427 mg/l and the average influent BOD has been 903 mg/l. The existing plant sample data can be found in Exhibit 3. The type of wastewater treatment plant that is selected will need to take wastewater with these influent values and produce effluent with values at or below the values listed in the SPDES permit referenced above.

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Alternative #1A – Rehabilitation of the Current Intermittent Sand Filter Bed WWTP

To counteract the problem of excessive infiltration due to groundwater at the site, the level of the site should be raised with additional fill (3 feet of fill over the whole site used for this study) and a liner should be installed under the filter beds to prevent future groundwater infiltration. According to The New York State Department of Environmental Conservation (NYSDEC) Design Standards for Intermediate Sized Wastewater Treatment Plants, liners for sand filters should be 30 mil in thickness (0.03 inches) and be surrounded by at least 3 inches of sand to protect the liner. The total surface area of each of these beds would be 6,600 square feet, for a total of 13,200 square feet.

Rehabilitation of the sand filter bed system would also include replacement, removal, and disposal of filter media, replacement of distribution and underdrain piping, septic tank baffles, and the distribution chambers, and rehabilitation of the dosing chamber and chlorine tank.

Currently, the filter beds are each 6,600 square feet. The NYSDEC Design Standards for Intermediate Sized Wastewater Treatment Plants require that buried filter beds in continuous operation have an average flow loading of no greater than 1 gpd/square foot. Each sand filter bed should be designed such that it can handle the average flow by itself, so that the system remains operational if one bed fails or needs to be inspected. Therefore, each bed will need an additional 400 square feet to accommodate the 7,000 gpd average flows.

A site plan for Alternative #1A is included in Exhibit 4A. There would be no change to the low-pressure sanitary sewer system as part of this alternative.

The preliminary project cost estimate for the rehabilitation of the sand filter bed system, which includes a 10% contingency added to the initial cost and a 20% engineering, legal, and administrative fee, is approximately $1,070,249 (2020 costs). The comprehensive cost estimate for rehabilitation of the sand filter beds is in Exhibit 6.

As with the other alternatives, RLSD residents will continue to pay debt service and interest for the current WWTP until the loan is paid off. The final payoff will occur in 2023. Annual Operation and Maintenance costs that RLSD residents will incur over the service life of the filter bed WWTP are labor (operator), maintenance (sludge disposal, chlorine tablets, mowing, plowing, and other miscellaneous items), engineering, and equipment. There are no electrical costs associated with this alternative.

Future capital improvements for the filter bed WWTP will be limited to future rehabilitation of the beds. The beds were last rehabilitated in 2002. Therefore, over the course of 30 years, the filter media in the beds will likely need to be replaced at least once.

The initial construction, operations and maintenance, capital improvement, and debt reduction costs are summarized in the 30-Year Cost (present worth) analysis for this alternative in Exhibit 7. The 30-Year cost analysis factors in all the costs over the 30-year intended usage period of the facility and uses yearly cost increase rates to represent the costs in terms of 2022 dollars. The total 30-year cost of this alternative was determined to be $2,109,000.

The annual cost to a typical property owner in the RLSD for rehabilitation of the current WWTP, debt payments for the current WWTP, and operation and maintenance of the plant is projected to be $2,869 in 2022. Using an annual 2.5 percent increase in prices (the current yearly labor rate increase according to Bureau of Labor Statistics), 2.0 percent yearly increase for power (Energy Information Administration), and a 2.7 percent increase in labor (Bureau of Labor Statistics) results in an annual cost of $2,643 in 2024, the first year after the final debt payment for the existing WWTP is made (the bond matures in February, 2023). The calculation of the annual cost per property is in Exhibit 8. 38 EDUs are assumed for debt reduction and 36 are assumed for operations and maintenance costs. The costs shown are for the property owners of occupied lots, which are higher than the costs to the vacant lot owners that do not use the system.

Alternative #1B – Orenco Advantex Packaged Treatment Plant

Replacement of the intermittent sand filter beds with an Orenco Advantex treatment system would include demolition and decommissioning of the existing WWTP and connection of the new treatment plant to the existing utilities on Riverview Road operated by National Grid. The demolition and decommission work includes proper disposal of the filter media, demolition and disposal of the distribution and dosing chambers and chlorine tank, and backfill of the filter bed areas. All influent and effluent pipes to and from these locations would be cut, capped, and sealed or removed completely. The septic tanks will be kept on site and used as a preliminary means of treatment before the wastewater enters the packaged treatment plant. This alternative would not necessitate land acquisition because the plant would be installed on the same lot as the current sand filter bed treatment plant. A connection of 8-inch PVC pipe would be made from the current influent manhole to the influent end of the packaged treatment plant and from the effluent end of the Orenco plant to the chlorine disinfection tanks on site. A general site plan of the packaged treatment plant is in Exhibit 4B. There would be no change to the low-pressure sanitary sewer system as part of this alternative.

Orenco Advantex packaged treatment plants utilize recirculating packed-bed filters that are made from textile fabric to treat wastewater. In addition, they come equipped with fiberglass tanks, pumping systems, and ventilation for storage and movement of the wastewater.

In order to estimate the sizing, requirements, and costs of the Orenco Advantex packaged plant, the vendor, J. Andrew Lange, Inc., needed data regarding the quality of the influent wastewater in terms of Biological Oxygen Demand (BOD) and Total Suspended Solids (TSS) concentrations, as well as the average daily, maximum daily, and peak hourly flows discussed in Section 1 above. PRIME AE provided them with the tables of permitted and observed values found in Exhibit 3.

The Orenco Advantex system will use 26.02 kW-hours of power/day which, at a price of $.18/kW/hr of power, will cost the residents of the RLSD $1,710/year (2020 dollars).

The initial construction cost of an Orenco Advantex system is estimated to be $1,711,780 (2020 dollars). A comprehensive cost estimate for construction of the plant is in Exhibit 6.

Annual Operation and Maintenance costs that RLSD residents will incur over the service life of the Orenco Advantex WWTP are labor (operator), maintenance (sludge tank pump-outs, preventative and unscheduled maintenance, cellular data, and lab testing), legal, insurance, engineering, and permit fees, and electrical (including SCADA).

Future capital improvements for the Orenco Advantex WWTP will include replacement and repair of tank equipment, textiles, pumps, floats, and contactors.

The initial construction, operations and maintenance, capital improvement, and debt reduction costs are summarized in the 30-Year cost (present worth) analysis for this alternative in Exhibit 7. The total 30-year cost of this alternative was determined to be $2,817,000 (2022 dollars).

The annual cost to a typical property owner for construction of the new wastewater treatment plant, debt reduction for the existing filter beds, and operations, maintenance, and electricity is projected to be $4,152 in 2022 (including 2002 loan fees) and will decrease to $3,932 in 2024. The calculation of the annual costs to property owners in the RLSD is in Exhibit 8.

Alternative #1C – Extended Aeration Packaged Treatment Plant

Replacement of the sand filter bed with an extended aeration treatment plant would include demolition and decommissioning of the existing WWTP, backfill of the filter bed pits, and connection of the new treatment plant to the existing utilities on Riverview Road operated by National Grid. The demolition and decommission work includes proper disposal of the filter media and demolition and disposal of the septic tanks, distribution and dosing chambers and chlorine tank. All influent and effluent pipes to and from these locations would be cut, capped, and sealed or removed completely. This alternative would not necessitate land acquisition because the plant would be installed on the same lot as the current sand filter bed treatment plant. A connection of 8” PVC pipe would be made from the current influent manhole to the influent end of the packaged treatment plant and from the effluent end of the Extended Aeration system to the chlorine contact tanks on site. A general site plan of the RLSD with the packaged treatment plant is in Exhibit 4C. There would be no change to the low-pressure sanitary sewer system as part of this alternative.

Extended Aeration packaged plants utilize activated sludge to treat the influent wastewater and clump together into flocs that settle out in the clarifier, prior to discharging treated water.

The vendor of the Extended Aeration packaged plants, Fluence Corporation, used the data discussed in Alternative #1B (Exhibit 3) to estimate the sizing, requirements, and costs of installing an extended aeration packaged plant on the site of the current wastewater treatment plant.

The Extended Aeration system will use 26.5 kW-hours of power/day which, at a price of $.18/kW/hr of power, will cost the residents of the RLSD $1,742/year (2022 dollars).

The initial construction cost of an Extended Aeration system is estimated to be $1,443,420 (2020 dollars). A comprehensive cost estimate for construction of the plant is in Exhibit 6.

Annual Operation and Maintenance costs that RLSD residents will incur over the service life of the extended aeration WWTP are labor (operator), maintenance (sludge disposal, chlorine tablets, testing, and miscellaneous), legal, insurance, engineering, and permit fees, and electrical (including SCADA).

Future capital improvements for the extended aeration WWTP will be limited to future replacement of the pumps, blowers, and controls in the WWTP.

The initial construction, operations and maintenance, capital improvement, and debt reduction costs are summarized in the present worth analysis for this alternative in Exhibit 7. The present worth of this alternative was determined to be $3,097,100 (2022 dollars).

The annual cost to a typical property owner for construction of the new wastewater treatment plant, debt reduction for the existing filter beds, and operations, maintenance, and electricity is projected to be $4,204 in 2022 and decrease to $4,010 in 2024. The calculation of the annual costs to property owners in the RLSD is in Exhibit 8.

Alternative #2 – Abandoning the Sand Filter Beds and Sending Flow to a Neighboring System Using a Pump Station

This set of alternatives would involve construction of a duplex pumping station on the current Riverview Landing WWTP lot and installation of a forcemain to convey the flows to the neighboring system. As discussed above, there are three locations that the Riverview Landing sewage could potentially be pumped to: the Edison Club Pump Station, the Windhover Farms subdivision and the Mohawk River Country Club Wastewater Treatment Plant.

Alternative #2A – Constructing a Pump Station to Send Flow to the Edison Club Pump Station

Construction of a duplex pumping station would begin with demolition of the current facility, disposal of its filter media, tanks, and internal piping, and backfill of the filter bed pits. Construction of the pump station would include constructing a building to house the components of the station as well as installation of pumps, suction and discharge valves, a wet well, electrical conduits, and other components inside the station. The construction of the station would also necessitate the installation of a new fence with controlled access system, a bypass pumping connection on the forcemain, and an emergency generator with automatic transfer switch. The pump station would connect to the existing gravity sewer manhole on-site via 8-inch PVC. A site map of this alternative is in Exhibit 4D.

This alternative also includes demolition of the current WWTP and construction of a 7,400-foot long HDPE forcemain from RLSD to the Edison Club Pump Station. The wastewater that goes to the Edison Club pump station is pumped to a manhole near the intersection of Riverview Road and Route 146. From there it is conveyed by a gravity sewer to the Town of Glenville, which sends its wastewater to the City of Schenectady for treatment.

The peak hour flow value of the RLSD is estimated at 66 gallons per minute (gpm), based upon the E-One grinder pump installation guidance manual. To ensure each pump in the pump station is capable of pumping at this rate, each is proposed to operate at 70 gpm.

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The sizing of the wetwell of the pump station for storage of wastewater, is based upon the need for a 30-minute storage capacity in the wetwell, and a distance of 4.5 feet between the invert of the inlet pipe and the depth at which both pumps would shut off. Therefore, the average daily flow from RLSD was multiplied by 30 to determine the minimum volume of the wetwell. This volume is 20 cubic feet, or 150 gallons. Dividing this volume by a 4.5-foot depth yields a minimum whole number wetwell diameter of 4 feet.

According to the Ten States Standards for Wastewater Facilities, a minimum water flow velocity of 2 feet per second shall be maintained within the forcemain from a pumping station. In addition, a forcemain should be designed to minimize the head losses that a pumping station has to overcome. Larger diameter forcemains incur lower head losses. Therefore, the forcemain was sized as the largest diameter pipe that had a flow rate greater than 2 feet per second. With a design flow rate of 70 gpm and a forcemain length of 1.3 miles from the Riverview Landing pumping station to the pumping station adjacent to the Edison Club, a 3-inch diameter pipe is the selected size. A 3-inch diameter HDPE pipe with 45 gpm of flow incurs a friction loss of 6.17 feet/1,000 feet of run. Over 1.3 miles, the friction loss will total approximately 114 feet. In addition, because the pumps would be located approximately 10 feet below grade (elevation 317 feet) and the highest point on the 1.3-mile stretch is 9 feet higher than the elevation at the pumping station (336 feet), a total static (elevation) head of 19 feet will also need to be overcome by the pumps. Adding the head losses from the pump station to the approximately 114 feet of friction head results in a total dynamic head of 133 feet. The calculations for the design of the pump station and forcemain are in Exhibit 9.

A duplex grinder pump pump station with pumps that operate at 70 gpm and 115 feet of head and a 4-foot diameter wetwell costs approximately $110,000 to install. Three-inch directional-drilled forcemain costs $40/linear foot in soil and $115/linear foot in rock. According to the NRCS Web Soil Survey, the segment of Riverview Road in which the forcemain will be constructed has rock within the first 5 feet below grade for approximately half the length. Thus, the total forcemain cost of $573,500.

The preliminary project cost of constructing a pump station and force main from the RLSD to the Edison Club pump station is $1,527,770 (2020 dollars). A comprehensive review of these costs is in Exhibit 6.

Annual Operation and Maintenance costs that RLSD residents will incur over the service life of the pump station are electrical, maintenance, SCADA, and forcemain cleaning. RLSD residents will also be charged by the Town of Glenville and the City of Schenectady for using their sewer systems.

Future capital improvements of the pump station will include replacement of the forcemain air release and cleanout valves and replacement of the pumps and controls inside the pump station.

The initial construction, operations & maintenance, capital improvement, and debt reduction costs are summarized in the 30-year cost (present worth) analysis for this alternative in Exhibit 7. The total 30-year cost of this alternative was determined to be $2,649,200.

The annual cost to a typical property owner for construction of the new pump station, servicing the debt for the existing filter beds, operations, maintenance, electricity, and neighboring sewer costs is projected to be $3,877 in 2022 and decrease to $3,621 in 2024. The calculation of the annual costs to property owners in the RLSD is in Exhibit 8.

Alternative #2B – Constructing a Pump Station to Send Flow to the Windhover Farms Subdivision Forcemain

Construction of a duplex pumping station to send wastewater to Windhover Farms would include most of the same work as construction of a pumping station to the Edison Club pump station. However, there are several key differences. Instead of locating the pump station at the site of the existing WWTP, the pump station would be located at the corner of Riverview Road and Droms Road. The grinder pumps will be redirected to pump to this location. As a result of this change in direction, some of the piping on Riverview Road near the existing WWTP will need to be replaced with smaller piping to accommodate the lower flows going through (the combined flow through the main piping will increase towards the east, where the pump station will be). The right-of-ways near this intersection are small, so the Town of Clifton Park would need to acquire a small amount of land from one of the property owners near the intersection. The amount of land required for the pump station is small, only about 1,500 square feet. The estimated cost of purchasing this land is $20,000. The forcemain from the pump station would run north on Droms Road to the corner of Grooms Road and then west along Grooms Road to the southern edge of the proposed Windhover Farms subdivision. This option would then require Clifton Park to replace the 900 feet of 2-inch forcemain on the proposed Penfield Drive with 3-inch forcemain and tie into the existing 3-inch forcemain on Holbrook Drive. This proposed forcemain to Windhover Farms would be 5,500 feet long. Adding in the replacement 900 feet gives a total run to Holbrook Drive of 6,400 feet. The design flow rate of 70 gpm, the wetwell diameter of 4 feet, and the forcemain diameter of 3 inches determined in the analysis for Alternative #2A remain the same for Alternative #2B. However, the total dynamic head for the pumps to overcome would be greater due to the increased length of the forcemain and the higher elevation change. The pumps will be at an elevation of 301 feet, and the high point between the Riverview Landing pump station and the proposed Windhover Farms subdivision is 348 feet, resulting in a static head of 47 feet. The friction head loss for this run of pipe will be approximately 98 feet. Adding in the head losses within the pump station, the total dynamic head will be 145 feet from the pump station to Holbrook Drive.

The pump station will also need to overcome the head in the existing forcemain on Holbrook Drive to the existing Saratoga County Sewer System pump station at Settler's Hill. The length of pipe for this second section will be 3,400 feet, the length of the forcemain to the Settler's Hill pump station. Windhover Farms will have approximately 25 houses, each with its own grinder pump. According to the E-One grinder pump design guidance document, about five pumps will run in a 25-pump system. This equates to a maximum flow of 55 gpm. Thus, the head over this last 3,400 feet of pipe will be equal to the static head of the forcemain, 8 feet, and the frictional head, which is the friction losses that the combined flows of Windhover Farms and Riverview Landing will experience (125 gpm). The total head from this second section will be 161 feet and the total head from the whole system for the grinder pumps to overcome will be 306 feet. Providing some additional head capacity for losses within the pump station gives a total head of 310 feet to overcome.

In researching duplex grinder pump stations, it was determined that grinder pumps which can overcome this amount of head are not sold by typical manufacturers in the area (E-One, Goulds, Myers, Flygt, and Zoeller). Therefore, Alternative #2B necessitates two pump stations on the route to the Saratoga County Sewer System. To avoid the need for two land acquisitions for this option, the pump station should be positioned near the intersection of Grooms Road and Penfield Drive. This is shown on the map for Alternative #2B in Exhibit #4E.

In addition, the pumps at the downstream pump station at Settler's Hill will need to be upgraded as well due to the additional flow from Riverview Landing. Replacing the pumps at Settler's Hill will cost $80,000.

The preliminary project cost of constructing a pump station and force main from the RLSD to the Windhover Farms subdivision is $1,458,470. A comprehensive review of these costs is in Exhibit 6.

Annual Operation and Maintenance costs that RLSD residents will incur over the service life of the pump station are electrical, maintenance, SCADA, and forcemain cleaning. The residents of RLSD would also incur the sewer charges of the Saratoga County Sewer District, estimated at $250/typical property (2020) in this study.

Future capital improvements of the pump station will include replacement of the forcemain air release and cleanout valves and replacement of the pumps and controls inside the pump station.

The initial construction, operations and maintenance, capital improvement, and debt reduction costs are summarized in the 30-Year cost (present worth) analysis for this alternative in Exhibit 7. The total 30-year cost of this alternative is $2,339,800.

The annual cost to a typical property owner for construction of the new pump station, and operations, maintenance, electricity, and neighboring sewer costs is projected to be $3, in 2022 and decrease to $3,281 in 2024. The calculation of the annual costs to property owners in the RLSD is in Exhibit 8.

Alternative #2C – Constructing a Pump Station to Send Flow to the Mohawk River Country Club Wastewater Treatment Plant

Construction of a duplex pumping station to the MRCC WWTP would involve most of the same work as construction of a pumping station to the first two sites. The key differences would be the HDPE forcemain length, which would be 4,100 feet and the need for rehabilitation work at the MRCC WWTP. As for Alternative #2A, the pump station will be constructed at the site of the existing WWTP. A map of this alternative is in Exhibit 4F.

The design flow rate of 70 gpm, the wetwell diameter of 4 feet, and the forcemain diameter of 3 inches determined in the analysis for Alternative #2A remain the same for Alternative #2C. As with Alternative #2B, the total dynamic head for the pumps to overcome would be different for this alternative. For Alternative #2C this is due to the decreased length of the forcemain and the lower elevation change. While the pumps will still be at an elevation of 317 feet, the high point between the Riverview Landing pump station and the MRCC WWTP is only 328 feet, resulting in a static head of 11 feet. The friction head

loss for this run of pipe will be approximately 65 feet. Adding in the head losses within the pump station, the total dynamic head will be 80 feet.

The forcemain to the MRCC WWTP will follow the same line as the forcemain to the Edison Club pump station, but will end 3,300 feet shorter. Thus, as with the forcemain to the Edison Club, about half of the forcemain will need to be directional drilled in rock. The price of forcemain to the MRCC WWTP is estimated to be $317,750.

The MRCC WWTP has a design capacity of 20,000 gpd. However, currently only an average of 2,500 gpd flows into the facility. Therefore, the facility has enough capacity to accept the maximum day flows of both Mohawk River Country Club (assumed to be double the average flow) and Riverview Landing (15,000 gpd). However, the facility would need to meet the Ten States' Recommended Standards for Wastewater Facilities. These standards state that "properly located and arranged bypass structures and piping shall be provided so that each unit of the plant can be removed from service independently. The bypass design shall facilitate plant operation during unit maintenance…" The MRCC WWTP has no redundant units for treatment. Therefore, while the facility can handle the maximum day flows, it does not have the necessary redundancy to operate while one unit is out of service.

The estimated cost for the redundant unit is larger than the estimated cost for each individual unit of Alternative #1C because this unit will need to accommodate a larger amount of flow.

The initial cost of constructing a pump station and force main from the RLSD to the MRCC WWTP is $1,379,740. A comprehensive review of these costs is in Exhibit 6.

Annual Operation and Maintenance costs that RLSD residents will incur over the service life of the pump station are electrical, maintenance, SCADA, and forcemain cleaning. For this option, the residents will also incur charges for operations and maintenance of the MRCC WWTP.

Future capital improvements of the pump station will include replacement of the forcemain air release and cleanout valves and replacement of the pumps and controls inside the pump station. The MRCC WWTP is an extended aeration facility. Thus, the future capital improvements of the system will be replacement of pumps, blowers, and controls as for Alternative #1C.

The initial construction, operations and maintenance, capital improvement, and debt reduction costs are summarized in the 30-year cost (present worth) analysis for this alternative in Exhibit 6. The total 30-year cost of this alternative is $2,889,500.

The annual cost to a typical property owner for construction of the new pump station, debt reduction for the existing filter beds, and operations, maintenance, and electricity is projected to be $3,864 in 2022 and decrease to $3,656 in 2024. The calculation of the annual costs to property owners in the RLSD is in Exhibit 8.

Alternative #3 – Abandoning the Sand Filter Beds and Sending Flow to a Neighboring System Using a Low-Pressure Sewer System

This set of alternatives would involve upgrading the residential grinder pumps and low-pressure sewer network and constructing a forcemain to the neighboring system. For the purpose of this study, it is assumed that all the Riverview Landing residential grinder pump cores need to be replaced. A survey can be performed later to determine how many are the newest version E-one pump cores (which perform at higher heads than the older versions) if one of these options is chosen. As discussed above, there are three locations that the Riverview Landing sewage could potentially be pumped to: the Mohawk River Country Club Wastewater Treatment Plant, the Edison Club pump station, and the Windhover Farms subdivision.

Alternative #3A – Using the Household Grinder Pumps to Send Wastewater to the Edison Club Pump Station

Use of the residential E-1 grinder pumps to send wastewater to the pump station near the Edison Club would require the construction of an approximately 7,400-foot stretch of HDPE forcemain from the site of the current wastewater treatment plant to the pump station as well as changing the sizes of the pipes at multiple sections of the current system to lower head losses. A map of this alternative is in Exhibit 4G.

In order to determine if the use of the residential grinder pumps to pump sewage to other sewer systems is a viable option, the total head exerted on the pumps needed to be calculated and compared to the maximum operating heads of the pumps. If the total head is higher than the maximum operating head of the pumps, the pumps will not function. The current E-1 grinder pumps operate at a maximum head of 85 feet. Replacing the pumps with newer models increases the maximum operating head to 180 feet. Therefore, the total head of the system needs to be below 180 feet for the grinder pump system option to work.

The total head for the proposed system from Riverview Landing to the pump station near the Edison Club was calculated by obtaining the sum of the losses that the pump(s) farthest from the Edison Club, in this case the pumps on Lot 275.-1-101 (708 Riverview Road), would have to overcome to pump wastewater to the pump station next to the Edison Club. This sum of losses includes the losses (both static and frictional) from all the pipes that the effluent from this residence goes through to get to the pump station. A table showing the head losses in each section of pipe within the RLSD and the proposed force main to the Edison Club is shown in Exhibit 10. The table shows the losses in all 19 segments of pipe in the RLSD and the proposed forcemain to the pump station (segment 20A); however, the wastewater from Lot 275.-1-101 doesn't flow through all 19 segments. It only flows through the private segment extending from the house to the road and the public segments that take wastewater to the current wastewater treatment plant. These segments are numbers 1, 2, 4, 6, 7, 8, 14, 16, 17, and 19. The proposed grinder pump forcemain extension to the pump station located in Exhibit 4H shows the segment numbers of each pipe. Adding the total losses in each segment (row 15) for the current piping configuration gives a total head of 192.00 feet. Increasing the size of some of the pipe segments to reduce head losses (while still maintaining a required minimum velocity of 2 feet per second), reduces the total head to 178.07 feet. Therefore, because the newer model pumps operate at heads at or below 180 feet, sending wastewater to the pump station is a viable option if the current residential E-1 grinder pumps are replaced with newer ones.

The initial construction cost for Alternative #3A is estimated at $1,551,300. A comprehensive review of these costs is in Exhibit 6.

Annual Operation and Maintenance costs that RLSD residents will incur over the service life of the low-pressure sewer system are pump and sewer maintenance and electricity. The residents will also pay sewer charges for the Town of Glenville and the City of Schenectady like Alternative #2A.

Future capital improvements of the low-pressure sewer system will include replacement of the forcemain air release and cleanout valves and maintenance of the residential grinder pumps. This report assumes that the Town of Clifton Park will not be responsible for replacing the newest model grinder pumps after initial construction of the new system is complete. However, replacement of the grinder pumps is included in the present worth analysis to more accurately show the costs that each homeowner will be responsible for.

The initial construction, operations and maintenance, capital improvement, and debt reduction costs are summarized in the 30-year cost (present worth) analysis for this alternative in Exhibit 6. The present worth of this alternative is $2,363,600.

The annual cost to a typical property owner for construction of the low-pressure sewer system, electricity, debt reduction for the current filter beds, and neighboring sewer fees is projected to be $3,615 in 2022 and then decrease to $3,354 in 2024. The calculation of the annual costs to property owners in the RLSD is in Exhibit 8.

Alternative #3B – Using the Household Grinder Pumps to Send Flow to the Windhover Farms Subdivision Forcemain

Use of the residential E-1 grinder pumps to send wastewater to the Windhover Farms subdivision would include much of the same work as Alternative #3A, except for the direction of flow and location of the forcemain, which will be the same as in Alternative #2B. A map of this alternative is found in Exhibit 4I.

The total head in the system will be the head from the house farthest from the newly installed forcemain plus the head in the forcemain to Windhover Farms plus the head the system would encounter in the Windhover Farms forcemain. From Exhibit 10, page 2, this total head is the sum of pipe segments 1, 3, 4, 5, 7, 13, 14, 15, 17, 18, 21, 22, & 23. The total losses for Alternative #3B are 287.47 feet before head-reducing pipe replacements and 275.47 feet after replacing the pipes. Increasing the forcemain pipe size from 3 inches to 3.5 inches, the largest pipe with greater than 2 ft/s of flow, reduces these values to 230.37 ft and 218.38 ft, respectively. Therefore, because the maximum total dynamic head the system can overcome is 180 feet, sending wastewater to Windhover Farms via low pressure sewer is not a viable option.

For reference, the initial construction cost for Alternative #3B is estimated to be $1,118,300. A comprehensive review of these costs is in Exhibit 6.

Annual Operation and Maintenance costs that RLSD residents would incur over the service life of the low-pressure sewer system are pump and sewer maintenance and electricity. The residents would also pay Windhover Farms sewer charges like Alternative #2B.

Future capital improvements of the low-pressure sewer system would include replacement of the forcemain air release and cleanout valves and replacement/maintenance of the residential grinder pumps as in Alternative #3A.

The initial construction, operations & maintenance, capital improvement, and debt reduction costs are summarized in the 30-year cost (present worth) analysis for this alternative in Exhibit 7. The total 30-year cost of this alternative is $1,671,000.

The annual cost to a typical property owner for construction of this low-pressure sewer system, electricity, debt reduction for the current filter beds, and neighboring sewer fees is projected to be $2,632 in 2022 and then decrease to $2,378 in 2024. The calculation of the annual costs to property owners in the RLSD is in Exhibit 8.

Alternative #3C – Using the Household Grinder Pumps to Send Flow to the Mohawk River Country Club Wastewater Treatment Plant

Use of the residential E-1 grinder pumps to send wastewater to the MRCC WWTP would involve most of the same work as using grinder pumps to send flow to the first two systems. The key differences would be the HDPE forcemain length, which would be 4,100 feet, and the need for rehabilitation work at the MRCC WWTP. A map of this alternative is in Exhibit 2.

The total head in the current piping system will be the same as Alternatives #3A and #3B. This total head plus the head in the proposed 4,100-foot forcemain gives the total for the proposed system to the MRCC WWTP. From Exhibit 8, this total head is the sum of pipe segments 1, 2, 4, 6, 7, 8, 14, 16, 17, 19, and 20B. The total losses for Alternative #3C are 155.59 feet before head-reducing pipe replacements and 141.65 feet after replacing the pipes. Therefore, sending wastewater to the MRCC WWTP is a viable option if the current residential E-1 grinder pumps are replaced with newer models. Furthermore, because the head losses for the current piping network would be below 180 feet, none of the current piping would need to be replaced. Not replacing any pipes to decrease head losses would result in a savings of $461,740 for 2,570 feet of pipe and associated excavation and backfill, bedding, valves, and restoration.

The initial construction cost for Alternative #3C is estimated at $1,251,960. A comprehensive review of these costs is in Exhibit 6.

Annual Operation and Maintenance costs that RLSD residents would incur over the service life of the low-pressure sewer system are pump and sewer maintenance and electricity. The residents would also pay for operations and maintenance of the MRCC WWTP as in Alternative #2C.

Future capital improvements of the low-pressure sewer system would include replacement of the forcemain air release and cleanout valves and replacement/maintenance of the residential grinder pumps as in the first two low pressure sewer alternatives.

The initial construction, operations and maintenance, capital improvement, and debt reduction costs are summarized in the 30-year cost (present worth) analysis for this alternative in Exhibit 7. The total 30-year cost of this alternative is $2,424,200.

The annual cost to a typical property owner for construction of this low-pressure sewer system, electricity, debt reduction, and operations and maintenance of the MRCC WWTP is projected to be $3,474 in 2022 and decrease to $3,265 in 2024. The calculation of the annual costs to property owners in the RLSD is in Exhibit 8.

SECTION 4 – SUMMARY AND COMPARISON OF ALTERNATIVES

The alternatives to address the current issues at the Riverview Landing WWTP would include the alternatives discussed in Section 3 above: rehabilitation of the existing WWTP, replacement of the existing WWTP with a packaged treatment system on the same lot, or sending flow to one of the neighboring sewer collection systems. Cost estimates for these alternatives are shown in Exhibit 6. The 30-year cost (present worth) of each alternative is provided in Exhibit 7. Costs to the typical property for each alternative is shown in Exhibit 8. These values are summarized in Table 1 below for ease of comparison.

Each average annual cost calculation adopts 38 EDUs for debt reduction and 36 EDUs for operations and maintenance costs based on existing Town records. The full EDU listing is found in Exhibit 5.

KB Group of NY, Inc. dba PRIME AE Group of NY

TOWN OF CLIFTON PARK
RIVERVIEW LANDING WWTP STUDY

TABLE #1

ALTERNATIVE	2020 Capital Costs	2022 30-Year Cost (Present Worth)	2022 Annual Cost / Property (Including Prior Debt)	2024 Annual Cost / Property (After Prior Debt Paid)
Alternative #1A Rehabilitation	$1,071,000	$2,109,000	$2,869	$2,643
Alternative #1B Orenco Plant	$1,711,800	$2,817,000	$4,152	$3,932
Alternative #1C Extended Aeration	$1,443,500	$3,097,100	$4,204	$4,010
Alternative #2A Pump Station to Edison Club PS	$1,527,800	$2,649,200	$3,877	$3,621
Alternative #2B Pump Station to Windhover Farms	$1,458,500	$2,339,800	$3,535	$3,281
Alternative #2C Pump Station to MRCC WWTP	$1,379,800	$2,889,500	$3,957	$3,749
Alternative #3A Grinder Pumps to Edison Club PS	$1,551,300	$2,363,600	$3,615	$3,354
~~Alternative #3B Grinder Pumps to Windhover Farms~~	~~$1,118,300~~	NOT FEASIBLE ~~$1,671,000~~	~~$2,632~~	~~$2,378~~
Alternative #3C Grinder Pumps to MRCC WWTP	$1,252,000	$2,424,200	$3,474	$3,265

TOWN OF CLIFTON PARK
RIVERVIEW LANDING WWTP STUDY

TABLE #2

Alternative	Pros	Cons
1A. Rehabilitation of Existing WWTP	Least expensive treatment plant option Minimizes the need for additional infrastructure No easements required	Permits and O&M required High groundwater Plant requires expansion to meet current standards. Ongoing liability of treatment system
1B. Orenco Advantex Packaged WWTP	No easements required Newer technology than sand filter	High project cost Requires construction of building on site and electric utilities Permits required Higher O&M cost than 1A Ongoing liability of treatment system
1C. Extended Aeration Packaged WWTP	No easements required Newer technology than sand filter Proven treatment system with predictable effluent results	High project cost Requires construction of building on site and electric utilities Permits required Higher O&M cost than 1A & 1B Ongoing liability of treatment system
2A. Pump Station (PS) to Edison Club P.S.	Eliminates WWTP operation Can sell most of existing WWTP property No easements required	High sewer user fees (Glenville & Schenectady) Long length of forcemain Edison Club Pump station may need upgrades
2B. P.S. to Windhover Farms LPSS	Eliminates WWTP operation Can sell existing WWTP property Lower sewer user fees (CPSD & SCSD)	2 pump stations required due to flow and head conditions. Must acquire property or easements to build pump stations in optimum locations
2C. P.S. to MRCC WWTP	Can sell most of existing WWTP property No sewer user fees from another system. Shortest length of forcemain No easements required	Town must take over operation of existing WWTP and perform upgrades Ongoing liability of treatment system

TABLE #2

Alternative	Pros	Cons
3A. Low Pressure Sewer System (LPSS) to Edison Club P.S.	Town does not operate a WWTP Can sell existing WWTP property No easements required	High sewer user fees (Glenville & Schenectady) Long length of forcemain EC Pump Station may need upgrades
~~3B. LPSS to Windhover Farms LPSS~~ NOT FEASIBLE	~~Town does not operate a WWTP No easements required Can sell existing WWTP property Lower sewer user fees~~	~~Not feasible (pumps cannot overcome the total head) Longest length of forcemain~~
3C. LPSS to MRCC WWTP	Can sell existing WWTP property No sewer user fees from another system. Shortest length of forcemain No easements required	Town must take over operation of existing WWTP and perform upgrades Ongoing liability of treatment system

SECTION 5 – RECOMMENDED ALTERNATIVE

Alternative 2B, construction of two (2) pump stations and installation of forcemain piping to convey the wastewater from the Riverview Landing Sewer District to the Windhover Farms low pressure sewer system and then ultimately to the Saratoga County Sewer District No. 1 for treatment is the recommended alternative, even though it is not the least expensive alternative. While this option is only the fifth lowest of the nine alternatives in terms of initial capital cost (estimated at $1,458,500), it is the second most economical alternative over a 30-year planning period with an estimated 30-year present worth cost of $2,339,800. Furthermore, Alternative 2B is initially only the third most cost effective option on the basis of annual costs to property owners, with higher costs than rehabilitating the existing WWTP (Alternative 1A) and using grinder pumps to pump wastewater to the MRCC WWTP (Alternative 3C). However, due to 2B's low O&M costs and correspondingly low O&M cost increases, this option will have lower annual costs than the grinder pumps to MRCC option for the majority of the estimated 30-year service life. This option is preferred as it eliminates the only treatment plant that the Town operates and replaces it with two pump stations and forcemain piping. The Town Sewer District staff are trained to perform the operation and maintenance on these types of facilities already.

The most economical alternative based on initial construction costs and for 30 years of operation is to rehabilitate the existing WWTP (Alternate 1A). The initial capital cost is estimated at $1,071,000, and a detailed breakdown of the costs can be found in Exhibit 6. This option, however, does not allow the Town to do away with the liability of operating a treatment plant and this is the only plant that the Town currently operates. The existing plant is too small based on current NYSDEC design standards and would

have to be expanded, which is accounted for in the cost estimates. If treatment standards change in the future, there is not much space remaining at this site for an expansion or additional treatment units.

The second most economical alternative, at least initially, is to extend the low-pressure sewer system to the Mohawk River Country Club WWTP (Alternative 3C) at a cost of $1,252,000. When the 30-year cost of this alternative is taken into account, it moves into fourth place due to the high annual operations and maintenance costs associated with an extended aeration wastewater treatment plant. The existing plant is situated in a precarious location adjacent to Riverview Road on the Mohawk River side, with barely enough room for the necessary expansion to accommodate the Riverview Landing flows. Future expansion at this location will be almost impossible. This option would also require the Town to reach an agreement with the current plant owner to take over ownership and operations. This report assumes that there would be no cost to the Town for this, as most private sewer facility owners are pleased to be relieved of this liability.

EXHIBIT 1
SPDES PERMIT

New York State Department of Environmental Conservation
Division of Environmental Permits, Region 5
232 Golf Course Road, Warrensburg, New York 12885
Phone: (518) 623-1281 · **FAX:** (518) 623-3603
Website: www.dec.ny.gov

Joe Martens
Commissioner

December 13, 2013

Michael O'Brien
Collection Systems Manager
Town of Clifton Park
One Town Hall Plaza
Clifton Park, NY 12065

RE: Riverview Landing Wastewater Treatment Plant
Town of Clifton Park, Saratoga County
DEC Permit #5-4124-00051/00003 SPDES #NY-0131768

Dear Mr. O'Brien:

Enclosed is the final State Pollutant Discharge Elimination System (SPDES) permit modification and renewal for the above facility. This permit has been modified and renewed under the Environmental Benefit Permit Strategy. No comments were received on the draft permit modification.

If you have questions regarding the terms and conditions of the permit, please contact Robert Streeter of our Division of Water at 623-1221. Thank you.

Sincerely,

Marc S. Migliore
Regional Permit Administrator

Enclosure

c: Robert Streeter, Division of Water
Michael Shaw, NYS DOH - Glens Falls

ec: William Lupo, Regional Water Engineer
Cheri Jamison, Bureau of Water Permits: Permit Coordinator - Albany
Michelle Josilo, EPA - Region 2
Douglas Cole, PE - McDonald Engineering, PC

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

State Pollutant Discharge Elimination System (SPDES)
DISCHARGE PERMIT

Industrial Code:	8999	SPDES Number:	NY0131768
Discharge Class (CL):	07	DEC Number:	5-4124-00051/00003
Toxic Class (TX):	N	Effective Date (EDP):	January 1, 2014
Major Drainage Basin:	12	Expiration Date (ExDP):	December 31, 2018
Sub Drainage Basin:	01	Modification Dates: (EDPM)	
Water Index Number:	240-19		
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 Clifton Park	Attention:	Michael O'Brien, SD#1 Facilities Supervisor		
Street:	1 Town Hall Plaza				
City:	Clifton Park	State:	New York	Zip Code:	12065

is authorized to discharge from the facility described below:

FACILITY NAME AND ADDRESS											
Name:	Riverview Landing STP										
Location (C,T,V):	Clifton Park (T)						County:	Saratoga			
Facility Address:	Riverview Road										
City:	Clifton Park				State:	NY	Zip Code:	12065			
From Outfall No.:	001	at Latitude:	42 °	50 '	45 "	& Longitude:	73 °	52 '	31 "		
into receiving waters known as:	Unnamed trib to Mohawk River						Class:	C			

and (list other Outfalls, Receiving Waters & Water Classifications)

in accordance with: effluent limitations; monitoring and reporting requirements; other provisions and conditions set forth in this permit; and 6 NYCRR Part 750-1and 750-2.

DISCHARGE MONITORING REPORT (DMR) MAILING ADDRESS					
Mailing Name:	McDonald Engineering, P.C.				
Street:	7 South Church Street				
City:	Schenectady	State:	New York	Zip Code:	12305
Responsible Official or Agent:	John M. McDonald, President			Phone:	518-382-1774

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:

CO BWP - Permit Coordinator
RWE
RPA
Region2_NPDES@epa.gov (surface water only & no Class 02 or 04)
NYSEFC (Class 05 & 07 only)

Permit Administrator:	Marc S. Migliore
Address:	NYS DEC, 232 Golf Course Road Warrensburg, NY 12885
Signature:	Date: 12/13/2013

PERMIT LIMITS, LEVELS AND MONITORING DEFINITIONS

OUTFALL	WASTEWATER TYPE	RECEIVING WATER	EFFECTIVE	EXPIRING
	This cell describes the type of wastewater authorized for discharge. Examples include process or sanitary wastewater, storm water, non-contact cooling water.	This cell lists classified waters of the state to which the listed outfall discharges.	The date this page starts in effect. (e.g. EDP or EDPM)	The date this page is no longer in effect. (e.g. ExDP)

PARAMETER	MINIMUM	MAXIMUM	UNITS	SAMPLE FREQ.	SAMPLE TYPE
e.g. pH, TRC, Temperature, D.O.	The minimum level that must be maintained at all instants in time.	The maximum level that may not be exceeded at any instant in time.	SU, °F, mg/l, etc.	See below	See below

PARAMETER	EFFLUENT LIMIT or CALCULATED LEVEL	COMPLIANCE LEVEL/ ML	ACTION LEVEL	UNITS	SAMPLE FREQUENCY	SAMPLE TYPE
	Limit types are defined below in Note 1. The effluent limit is developed based on the more stringent of technology-based limits, required under the Clean Water Act, or New York State water quality standards. The limit has been derived based on existing assumptions and rules. These assumptions include receiving water hardness, pH and temperature; rates of this and other discharges to the receiving stream; etc. If assumptions or rules change the limit may, after due process and modification of this permit, change.	For the purposes of compliance assessment, the permittee shall use the approved EPA analytical method with the lowest possible detection limit as promulgated under 40CFR Part 136 for the determination of the concentrations of parameters present in the sample unless otherwise specified. If a sample result is below the detection limit of the most sensitive method, compliance with the permit limit for that parameter was achieved. Monitoring results that are lower than this level must be reported, but shall not be used to determine compliance with the calculated limit. This PQL can be neither lowered nor raised without a modification of this permit.	Action Levels are monitoring requirements, as defined below in Note 2, which trigger additional monitoring and permit review when exceeded.	This can include units of flow, pH, mass, temperature, or concentration . Examples include µg/l, lbs/d, etc.	Examples include Daily, 3/week, weekly, 2/month, monthly, quarterly, 2/yr and yearly. All monitoring periods (quarterly, semiannual, annual, etc) are based upon the calendar year unless otherwise specified in this Permit.	Examples include grab, 24 hour composite and 3 grab samples collected over a 6 hour period.

Notes:

1. EFFLUENT LIMIT TYPES:
   a. DAILY DISCHARGE: The discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for the purposes of sampling. For pollutants expressed in units of mass, the 'daily discharge' is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the 'daily discharge' is calculated as the average measurement of the pollutant over the day.
   b. DAILY MAX.: The highest allowable daily discharge. DAILY MIN.: The lowest allowable daily discharge.
   c. MONTHLY AVG: The highest allowable average of daily discharges over a calendar month, calculated as the sum of each of the daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.
   d. 7 DAY ARITHMETIC MEAN (7 day average): The highest allowable average of daily discharges over a calendar week.
   e. 30 DAY GEOMETRIC MEAN: The highest allowable geometric mean of daily discharges over a calendar month, calculated as the antilog of: the sum of the log of each of the daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.
   f. 7 DAY GEOMETRIC MEAN: The highest allowable geometric mean of daily discharges over a calendar week.
   g. RANGE: The minimum and maximum instantaneous measurements for the reporting period must remain between the two values shown.

2. ACTION LEVELS: Routine Action Level monitoring results, if not provided for on the Discharge Monitoring Report (DMR) form, shall be appended to the DMR for the period during which the sampling was conducted. If the additional monitoring requirement is triggered as noted below, the permittee shall undertake a short-term, high-intensity monitoring program for the parameter(s). Samples identical to those required for routine monitoring purposes shall be taken on each of at least three consecutive operating and discharging days and analyzed. Results shall be expressed in terms of both concentration and mass, and shall be submitted no later than the end of the third month following the month when the additional monitoring requirement was triggered. Results may be appended to the DMR or transmitted under separate cover to the same address. If levels higher than the Action Levels are confirmed, the permit may be reopened by the Department for consideration of revised Action Levels or effluent limits. The permittee is not authorized to discharge any of the listed parameters at levels which may cause or contribute to a violation of water quality standards.

PERMIT LIMITS, LEVELS AND MONITORING

OUTFALL	LIMITATIONS APPLY:	RECEIVING WATER	EFFECTIVE	EXPIRING
001	All Year	Unnamed trib to Mohawk River	January 1, 2014	December 31, 2018

PARAMETER	EFFLUENT LIMIT					MONITORING REQUIREMENTS				FN
								Location		
	Type	Limit	Units	Limit	Units	Sample Frequency	Sample Type	Inf.	Eff.	
Flow	Monthly Average	0.008	mgd			1/month	Estimate		X	
Flow	Daily Maximum	0.0147	mgd			1/month	Estimate		X	
BOD_5	Monthly Average	30	mg/l	3.7	lbs/d	2/year	Grab	X	X	(1)
BOD_5	7-Day Average	45	mg/l	5.5	lbs/d	2/year	Grab		X	
Solids, Suspended	Monthly Average	30	mg/l	3.7	lbs/d	2/year	Grab	X	X	(1)
Solids, Suspended	7-Day Average	45	mg/l	5.5	lbs/d	2/year	Grab		X	
Solids, Settleable	Daily Maximum	0.1	ml/l			1/month	Grab		X	
pH	Range	6.5-8.5	SU			1/month	Grab		X	
Nitrogen, Ammonia (as NH_3) June 1- October 31	Monthly Average	14	mg/l			2/year	Grab		X	
Nitrogen, Ammonia (as NH_3) November 1- May 31	Monthly Average	21	mg/l			2/year	Grab		X	
Effluent Disinfection required		[X] All Year		[ ] Seasonal from _____ to _____						
Coliform, Fecal	30-Day Geometric Mean	200	No./ 100 ml				Grab		X	
Coliform, Fecal	7 Day Geometric Mean	400	No./ 100 ml				Grab		X	
Chlorine, Total Residual	Daily Maximum	2.0	mg/l				Grab		X	

FOOTNOTES:

(1) and effluent shall not exceed __15__ % and __15__ % of influent concentration values for BOD_5 & TSS respectively.

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:

Influent sample to be collected at last manhole before septic tank (MH1).

Effluent sample to be collected at Outfall.

DISCHARGE NOTIFICATION REQUIREMENTS

(a) Except as provided in (c) 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 before initiation of any discharge.

(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 five years

(f) The permittee shall periodically inspect the outfall identification sign(s) in order to ensure they are maintained, are still visible, and contain information that is current and factually correct. Signs that are damaged or incorrect shall be replaced within 3 months of inspection.

DISCHARGE NOTIFICATION REQUIREMENTS (continued)

(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) below:

(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.

GENERAL REQUIREMENTS

A. The regulations in 6 NYCRR Part 750 are hereby incorporated by reference and the conditions are enforceable requirements under this permit. The permittee shall comply with all requirements set forth in this permit and with all the applicable requirements of 6 NYCRR Part 750 incorporated into this permit by reference, including but not limited to the regulations in paragraphs B through G as follows:.

B. General Conditions

1.	Duty to comply	6NYCRR Part 750-2.1(e) & 2.4
2.	Duty to reapply	6NYCRR Part 750-1.16(a)
3.	Need to halt or reduce activity not a defense	6NYCRR Part 750-2.1(g)
4.	Duty to mitigate	6NYCRR Part 750-2.7(f)
5.	Permit actions	6NYCRR Part 750-1.1(c), 1.18, 1.20 & 2.1(h)
6.	Property rights	6NYCRR Part 750-2.2(b)
7.	Duty to provide information	6NYCRR Part 750-2.1(i)
8.	Inspection and entry	6NYCRR Part 750-2.1(a) & 2.3

C. Operation and Maintenance

1.	Proper Operation & Maintenance	6NYCRR Part 750-2.8
2.	Bypass	6NYCRR Part 750-1.2(a)(17), 2.8(b) & 2.7
3.	Upset	6NYCRR Part 750-1.2(a)(94) & 2.8(c)

D. Monitoring and Records

1.	Monitoring and records	6NYCRR Part 750-2.5(a)(2), 2.5(c)(1), 2.5(c)(2), 2.5(d) & 2.5(a)(6)
2.	Signatory requirements	6NYCRR Part 750-1.8 & 2.5(b)

E. Reporting Requirements

1.	Reporting requirements	6NYCRR Part 750-2.5, 2.6, 2.7 & 1.17
2.	Anticipated noncompliance	6NYCRR Part 750-2.7(a)
3.	Transfers	6NYCRR Part 750-1.17
4.	Monitoring reports	6NYCRR Part 750-2.5(e)
5.	Compliance schedules	6NYCRR Part 750-1.14(d)
6.	24-hour reporting	6NYCRR Part 750-2.7(c) & (d)
7.	Other noncompliance	6NYCRR Part 750-2.7(e)
8.	Other information	6NYCRR Part 750-2.1(f)
9.	Additional conditions applicable to a POTW	6NYCRR Part 750-2.9
10.	Special reporting requirements for discharges that are not POTWs	6NYCRR Part 750-2.6

F. Planned Changes

1. The permittee shall give notice to the Department as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

   a. The alteration or addition to the permitted facility may meet of the criteria for determining whether facility is a new source in 40 CFR §122.29(b); or
   b. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, or to notification requirements under 40 CFR §122.42(a)(1); or
   c. The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such

alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan.

In addition to the Department, the permittee shall submit a copy of this notice to the United States Environmental Protection Agency at the following address: U.S. EPA Region 2, Clean Water Regulatory Branch, 290 Broadway, 24th Floor, New York, NY 10007-1866.

GENERAL REQUIREMENTS continued

G. Notification Requirement for POTWs

1. All POTWs shall provide adequate notice to the Department and the USEPA of the following:
   a. Any new introduction of pollutants into the POTW from an indirect discharger which would be subject to section 301 or 306 of CWA if it were directly discharging those pollutants; or
   b. Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.
   c. For the purposes of this paragraph, adequate notice shall include information on:
      i. the quality and quantity of effluent introduced into the POTW, and
      ii. any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

POTWs shall submit a copy of this notice to the United States Environmental Protection Agency, at the following address:
U.S. EPA Region 2, Clean Water Regulatory Branch, 290 Broadway, 24th Floor, New York, NY 10007-1866.

RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS

A. The monitoring information required by this permit shall be summarized, signed and retained for a period of at least five 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;**

[x] (if box is checked) completed and signed Discharge Monitoring Report (DMR) forms for each 6 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 each year and must summarize information for January to December of the previous year in a format acceptable to the Department.

[x] (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 Water Compliance
625 Broadway, Albany, New York 12233-3506
Phone: (518) 402-8177

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

Send the **first copy** (second sheet) of each DMR page to:
Department of Environmental Conservation
Regional Water Engineer, Region 5
232 Golf Course Road
Warrensburg, NY 12885
Phone (518) 623-1200

B. Monitoring and analysis shall be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit.

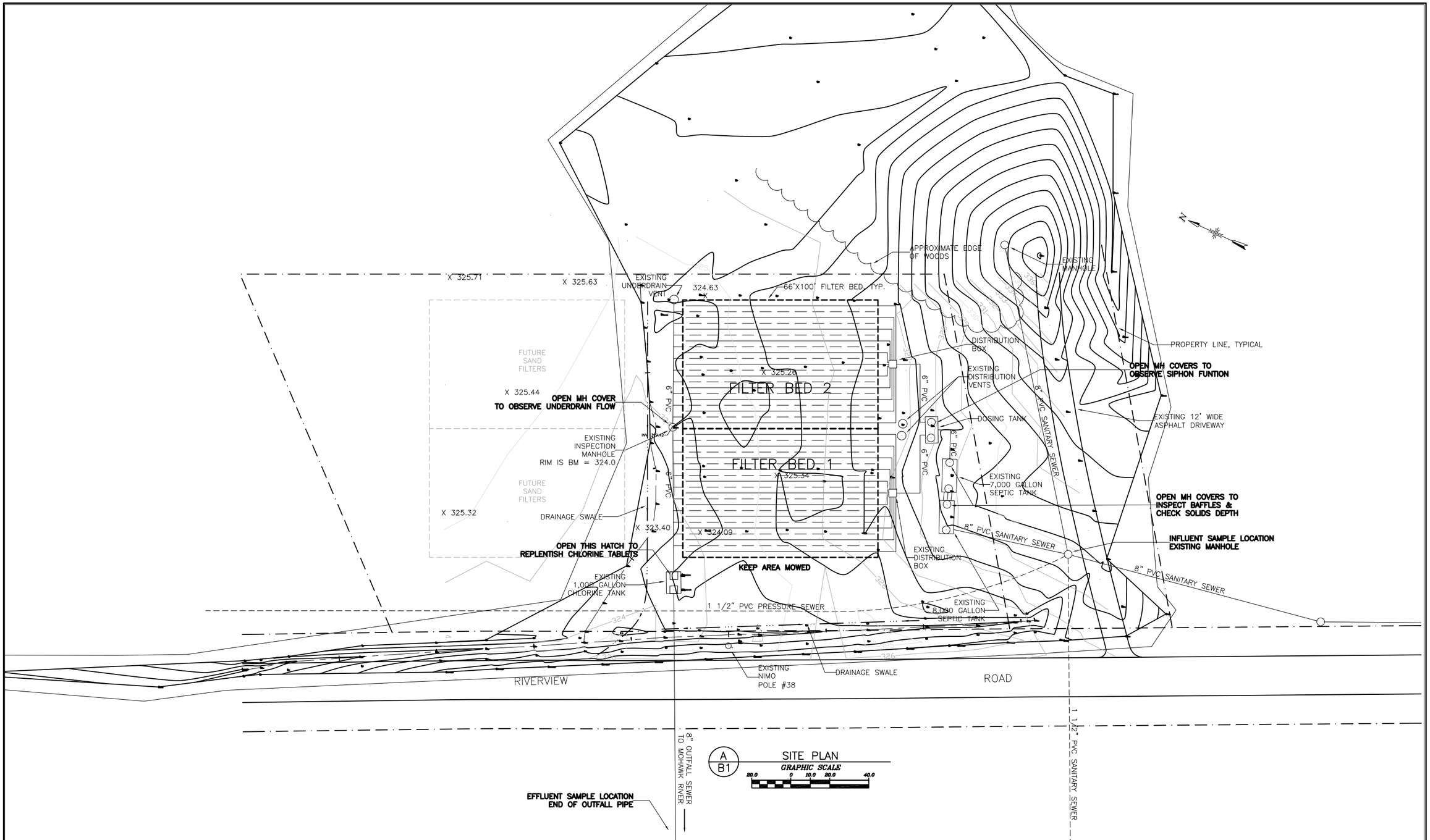
C. More frequent monitoring of the discharge(s), monitoring point(s), or waters of the State than required by the permit, where analysis is performed by a certified laboratory or where such analysis is not required to be performed by a certified laboratory, shall be included in the calculations and recording of the data on the corresponding DMRs.

D. Calculations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified in this permit.

E. Unless otherwise specified, all information recorded on the DMRs shall be based upon measurements and sampling carried out during the most recently completed reporting period.

F. Any laboratory test or sample analysis required by this permit for which the State Commissioner of Health issues certificates of approval pursuant to section 502 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 directed to the New York State Department of Health, Environmental Laboratory Accreditation Program.

EXHIBIT 2
EXISTING WWTP SITE PLAN & COLLECTION SYSTEM MAP



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TOWN OF CLIFTON PARK
SARATOGA COUNTY

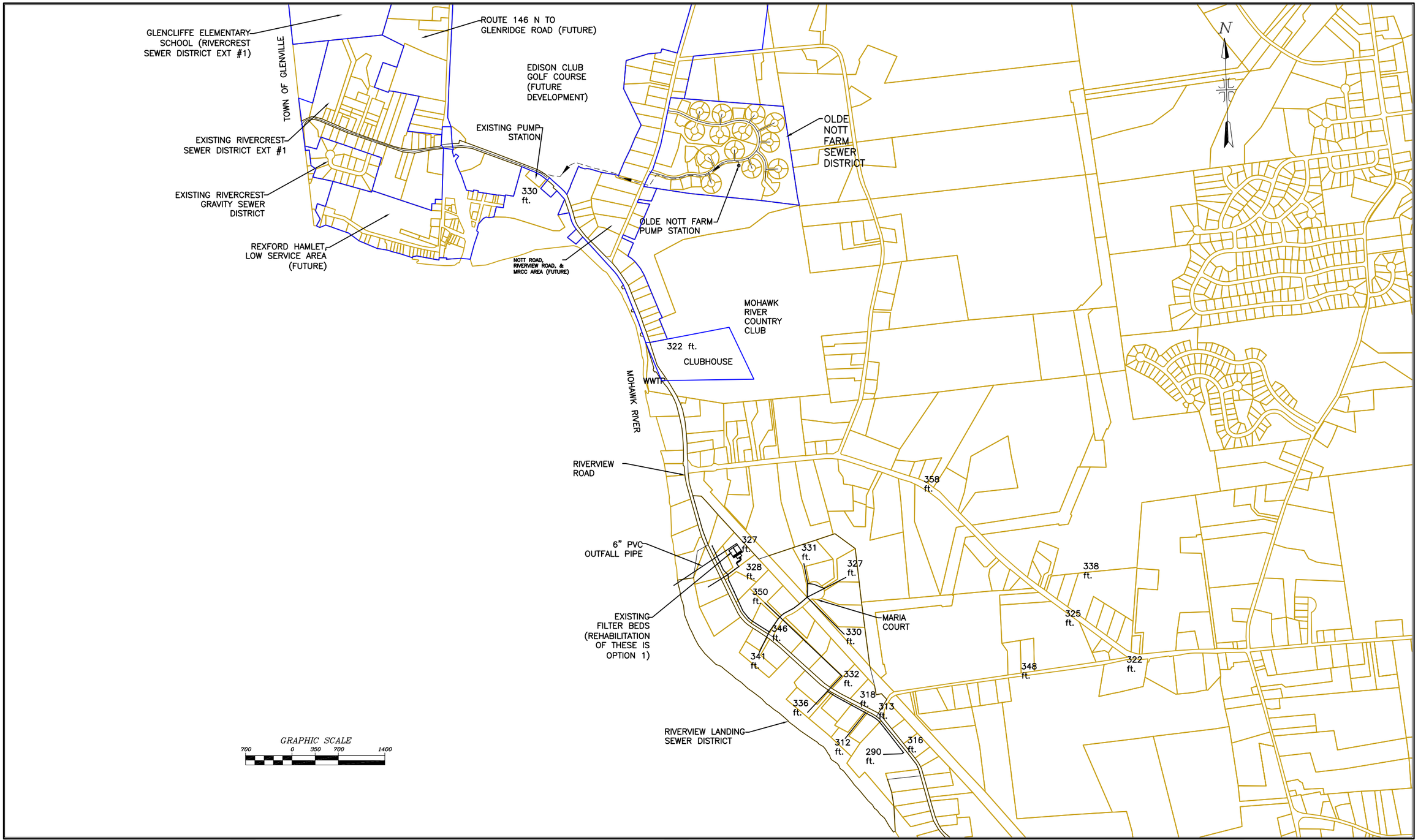
RIVERVIEW WWTP STUDY

SHEET TITLE:

EXISTING TREATMENT PLANT SITE PLAN

SCALE: AS SHOWN
FILE NO.: 04-9101-P4-000
DATE: JANUARY 2019

SHEET NO.: 2A



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TOWN OF CLIFTON PARK
SARATOGA COUNTY

RIVERVIEW LANDING WWTP STUDY

SHEET TITLE:

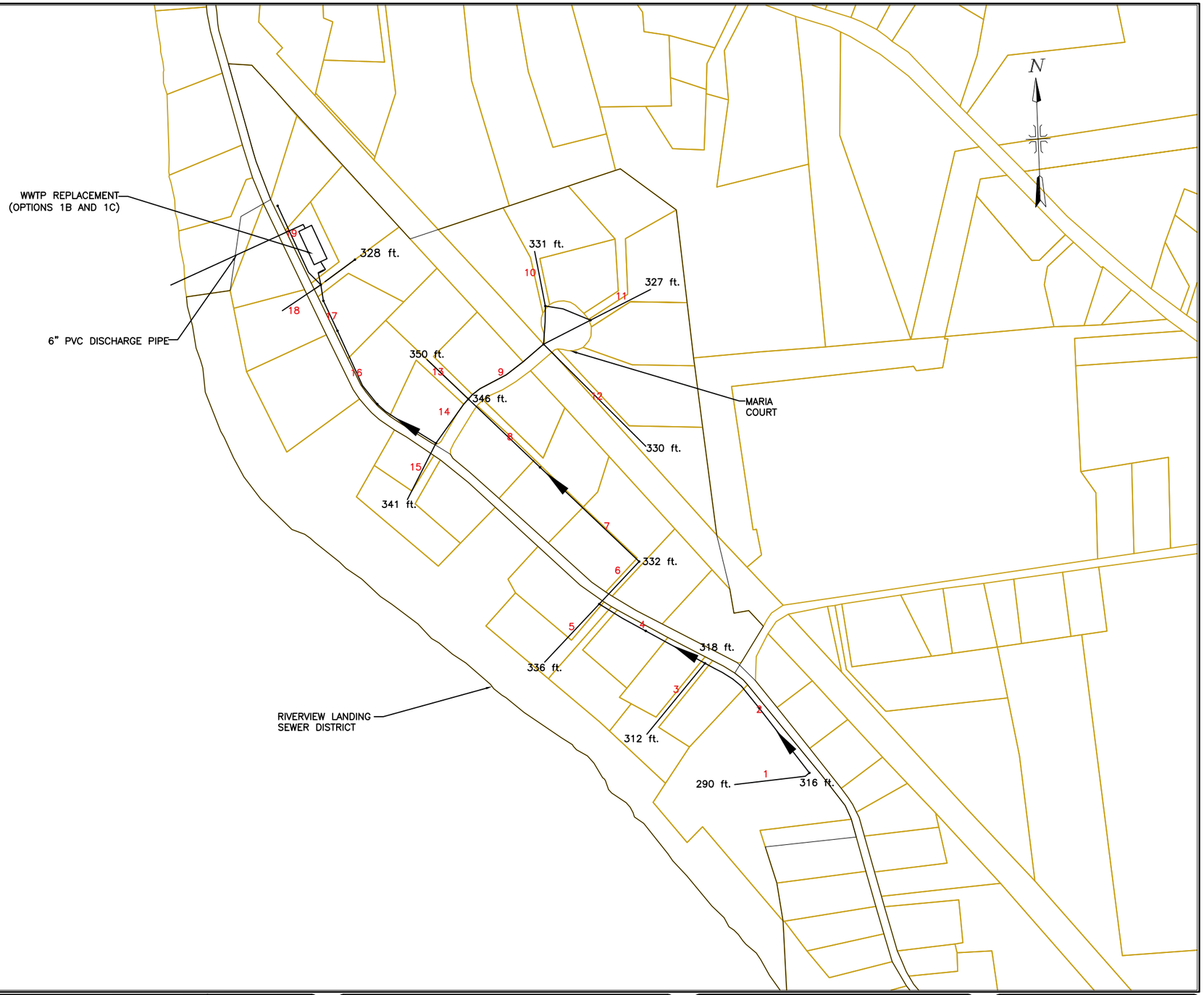
REHABILITATION (OPTION 1A)

SCALE: AS SHOWN

FILE NO.: 04-9101-P4-110

DATE: JANUARY 2019

SHEET NO.: 2B



GRAPHIC SCALE
300 0 150 300 600

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TOWN OF CLIFTON PARK
SARATOGA COUNTY

RIVERVIEW LANDING WWTP STUDY

SHEET TITLE:

PROPOSED WASTEWATER TREATMENT REPLACEMENT PLANT (OPTIONS 1B AND 1C)

SCALE: AS SHOWN

FILE NO.: 04-9101-P4-120

DATE: JANUARY 2019

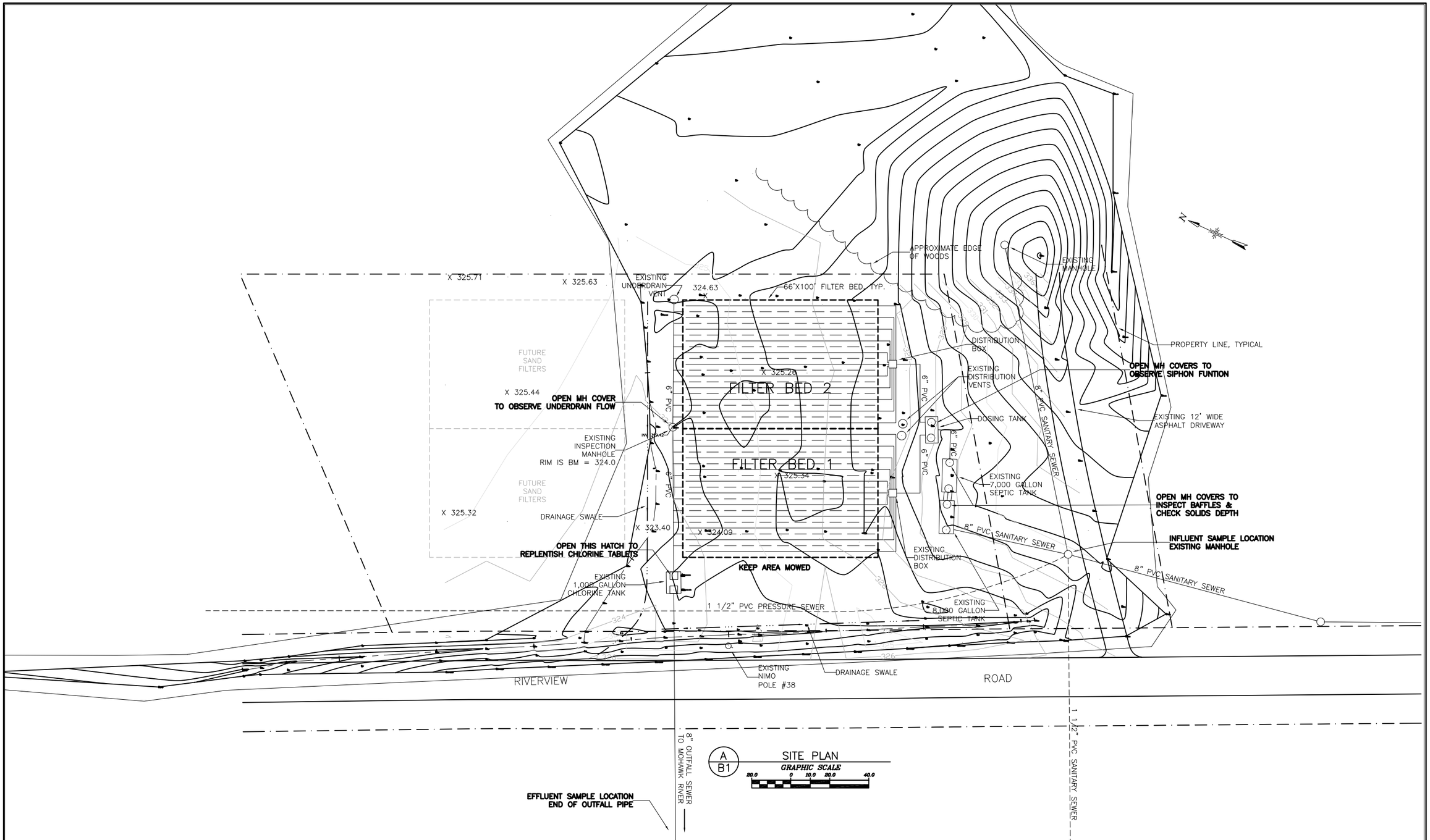
SHEET NO.: 2C

EXHIBIT 3
WWTP DATA

Exhibit 3
Riverview Landing WWTP Data

Riverview Landing Wastewater Treatment Plant Influent Data																			
Parameter	Year	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	**Avg.**	Max	Min
TSS (mg/l)		1580	1445	319.5	1630	956	3047.5	5575	1910	1100.7	370	1023.65	406.5	354.5	1594	96	**1427**	5575	96
BOD (mg/l)		1040	2115	787.5	1460	677	1525	1246.5	1770	892	341.5	451	304	341.5	370	219.5	**903**	2115	220
Flow (gpd)		4834	6548	5400	6120	7155	6390	6975	7200	8235	8010	8100	7265	6975	6840	9180	**7015**	9180	4834

EXHIBIT 4
SITE PLANS FOR EACH ALTERNATIVE



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TOWN OF CLIFTON PARK
SARATOGA COUNTY

RIVERVIEW WWTP STUDY

SHEET TITLE:

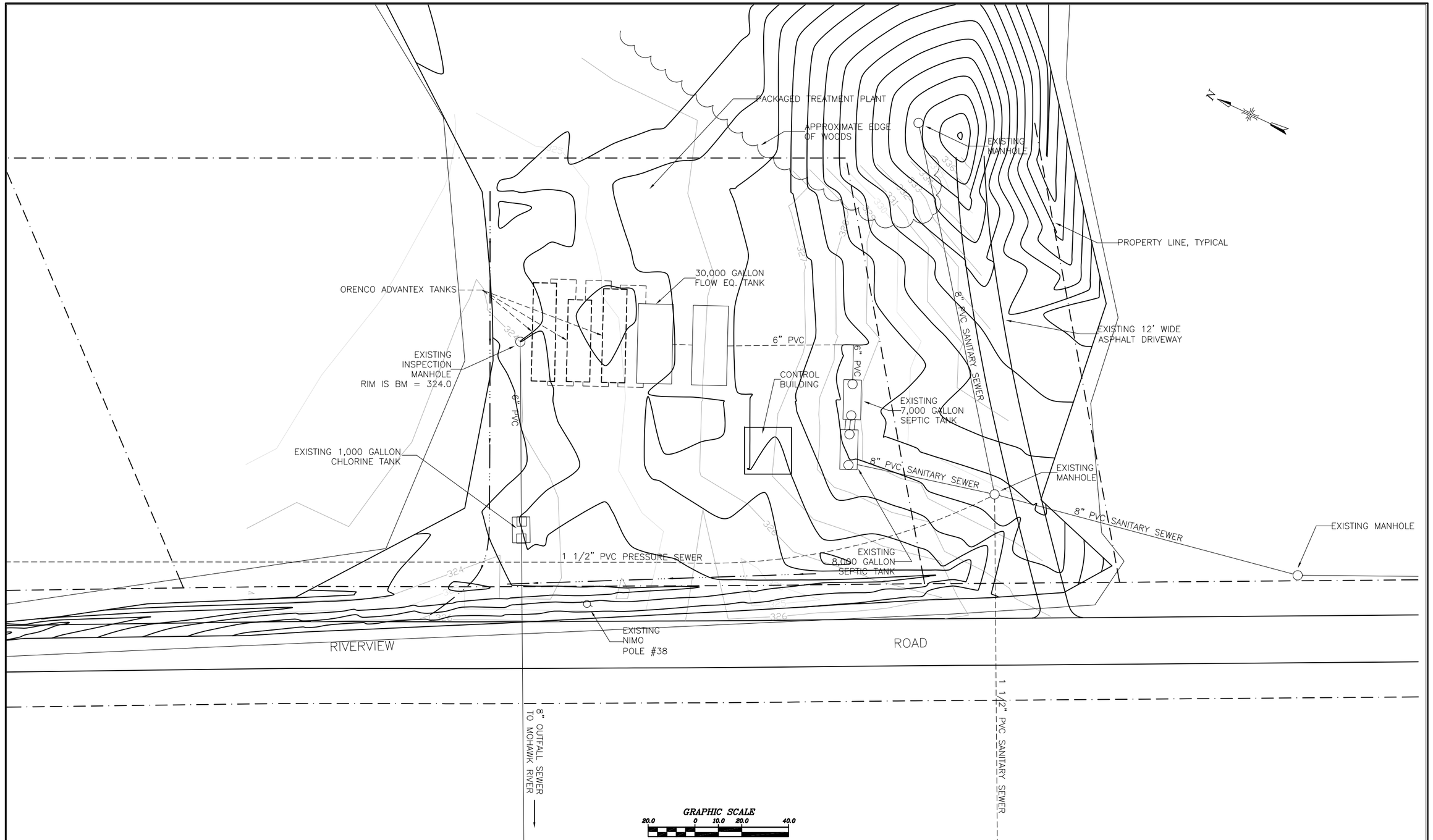
FILTER BED REHABILITATION OPTION 1A

SCALE: AS SHOWN

FILE NO.: 04-9101-P4-000

DATE: JANUARY 2019

SHEET NO.: 4A



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SARATOGA COUNTY

RIVERVIEW WWTP STUDY

SHEET TITLE:

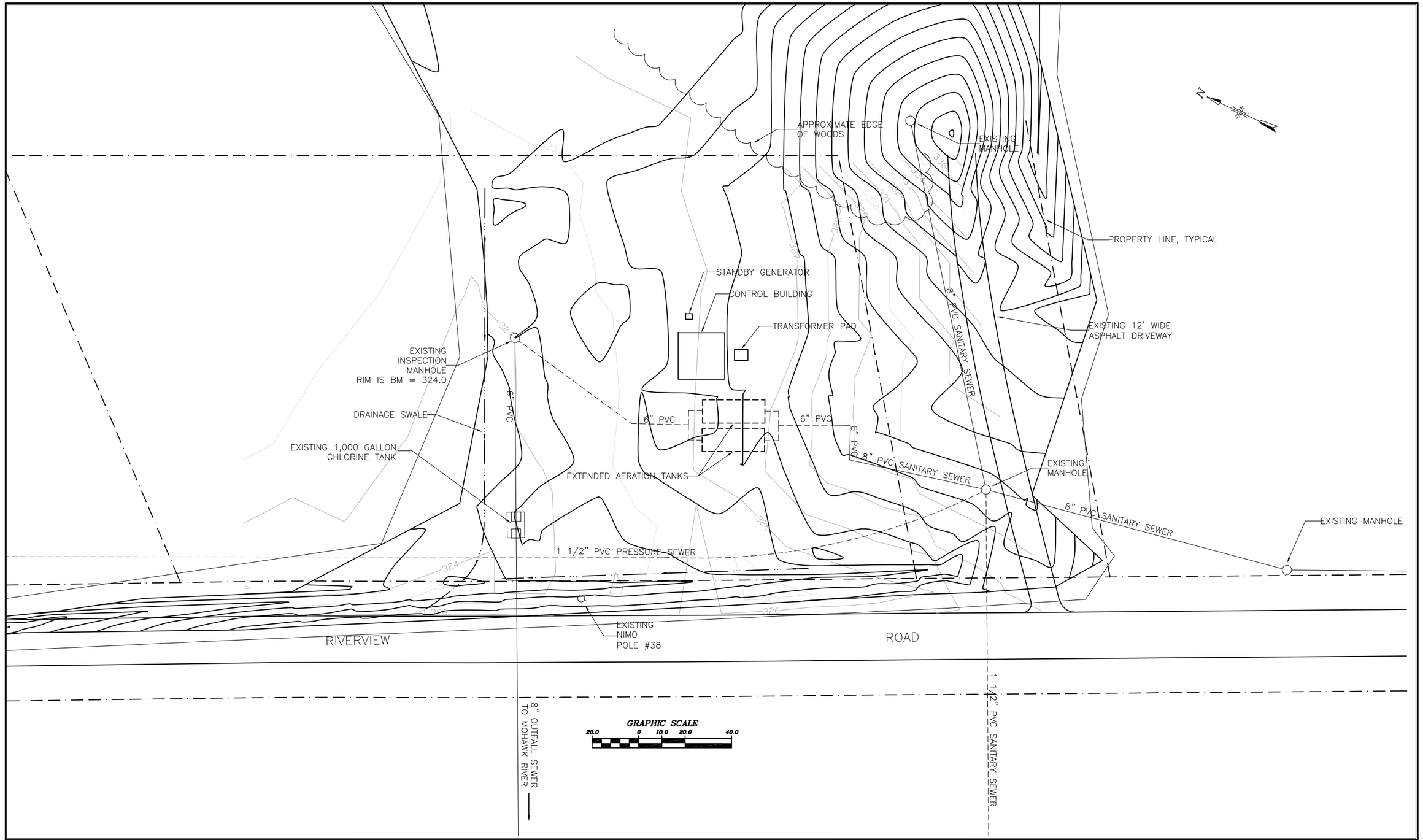
ORENCO ADVANTEX TREATMENT PLANT SITE PLAN (OPTION 1B)

SCALE: AS SHOWN

FILE NO.: 04-9101-P4-010

DATE: JANUARY 2019

SHEET NO.: 4B



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SARATOGA COUNTY

RIVERVIEW WWTP STUDY

SHEET TITLE:

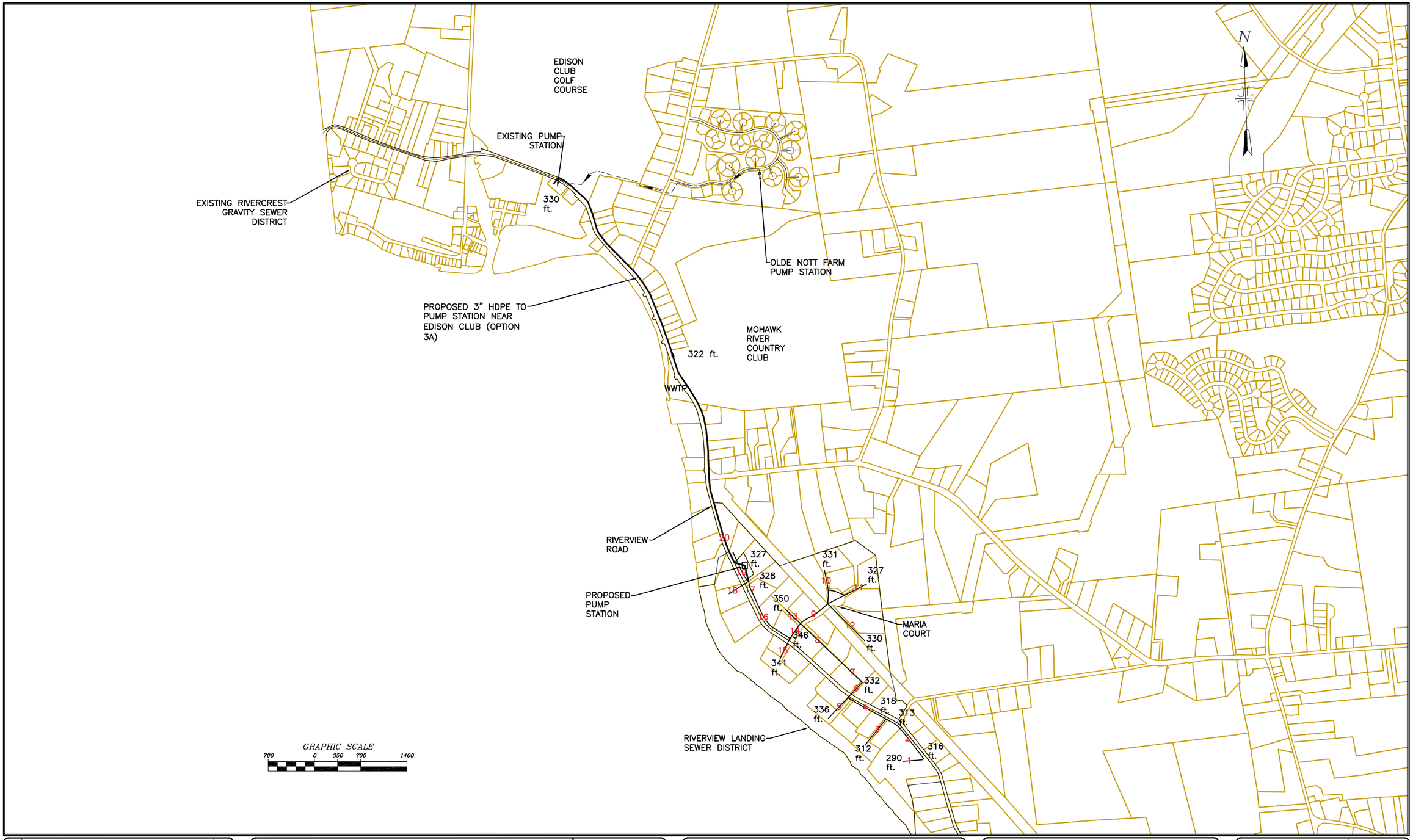
EXTENDED AERATION TREATMENT PLANT SITE PLAN (OPTION 1C)

SCALE: AS SHOWN

FILE NO.: 04-9101-P4-020

DATE: JANUARY 2019

SHEET NO.: 4C



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SARATOGA COUNTY

RIVERVIEW LANDING WWTP STUDY

SHEET TITLE:

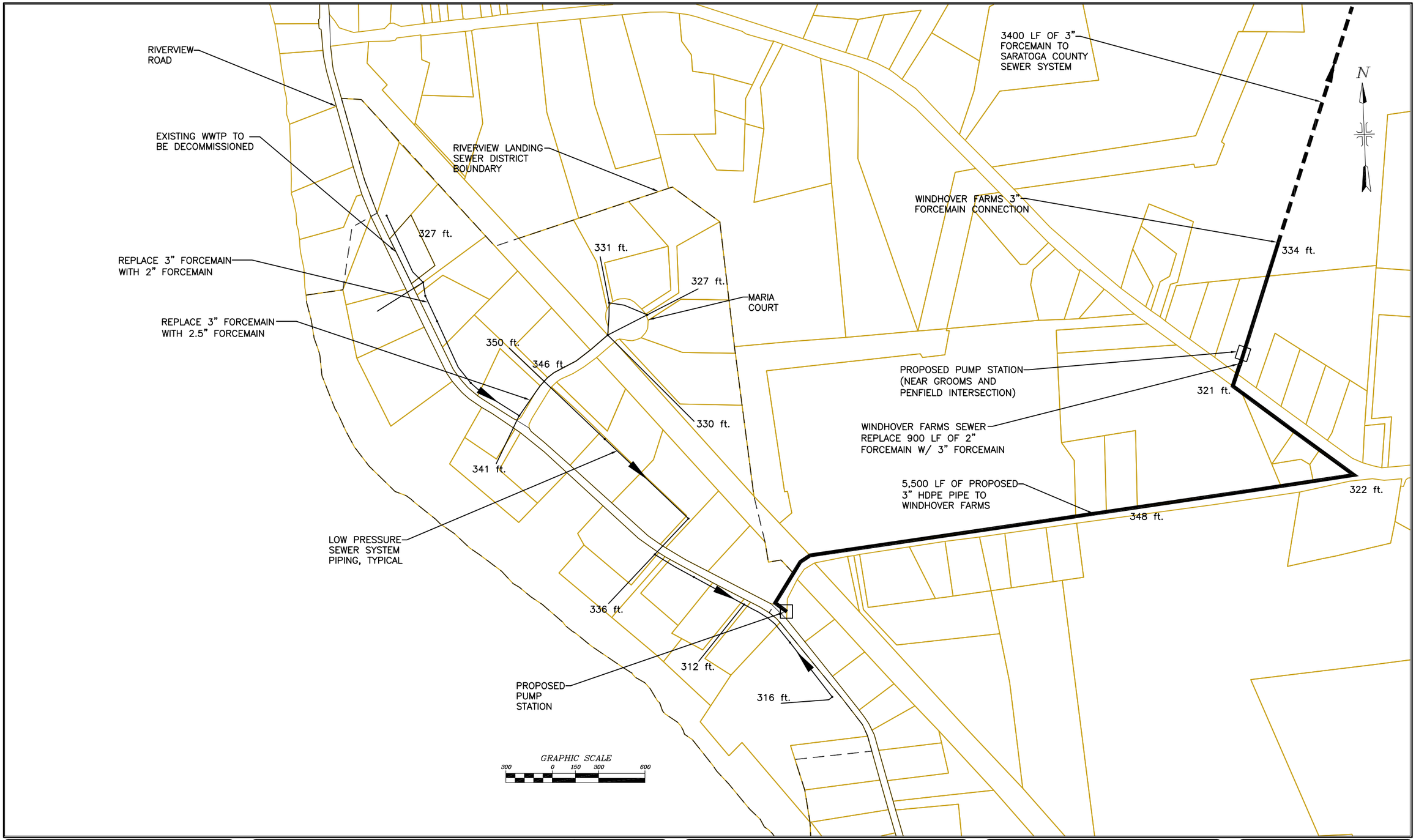
PROPOSED PUMP STATION TO EDISON CLUB PUMP STATION (OPTIONS 2A)

SCALE: AS SHOWN

FILE NO.: 04-9101-P4-130

DATE: JANUARY 2019

SHEET NO.: 4D



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SARATOGA COUNTY

RIVERVIEW LANDING WWTP STUDY

SHEET TITLE:

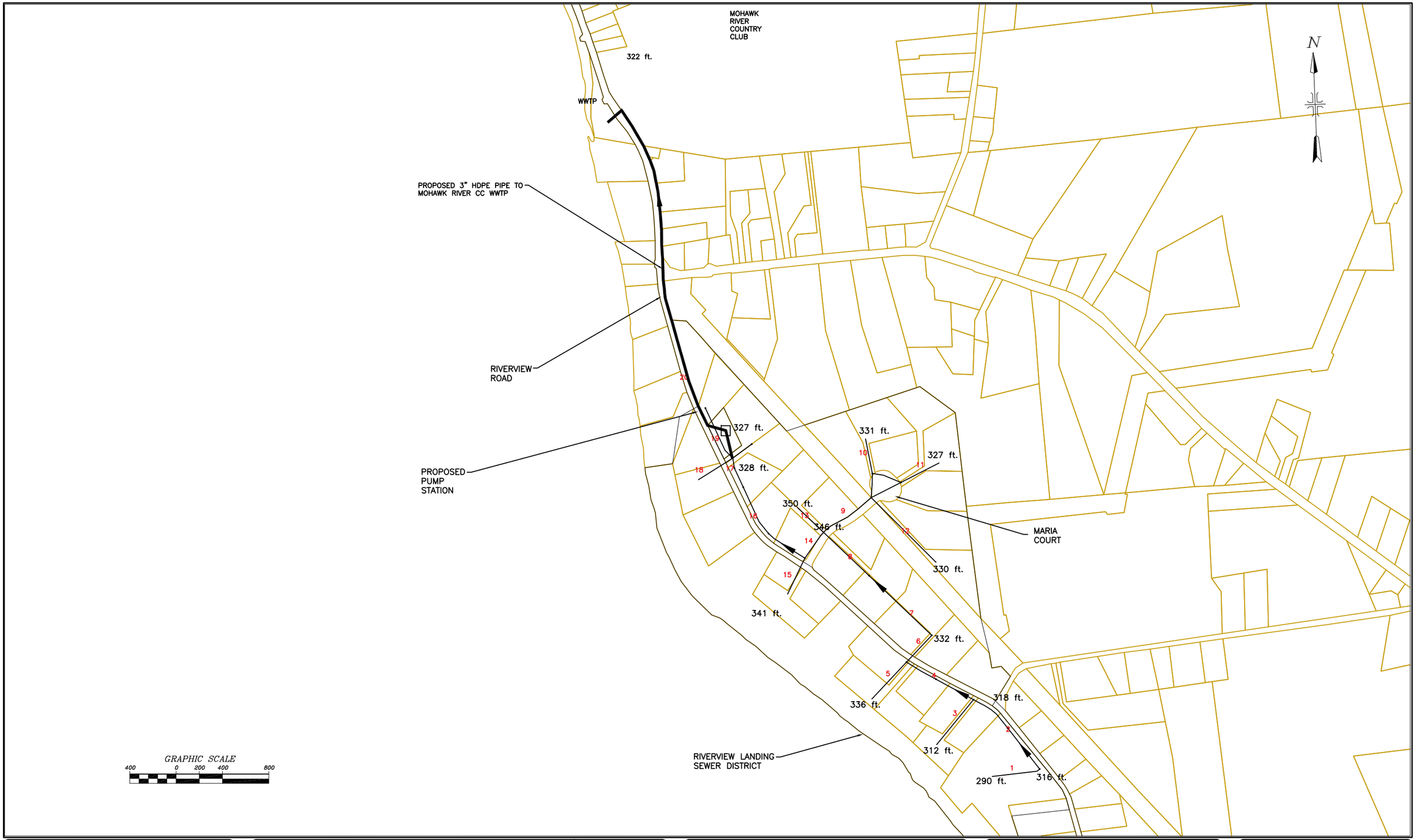
PROPOSED PUMP STATION TO WINDHOVER FARMS (OPTION 2B)

SCALE: AS SHOWN

FILE NO.: 04-9101-P4-040

DATE: FEBRUARY 2019

SHEET NO.: 4E



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SARATOGA COUNTY

RIVERVIEW LANDING WWTP STUDY

SHEET TITLE:

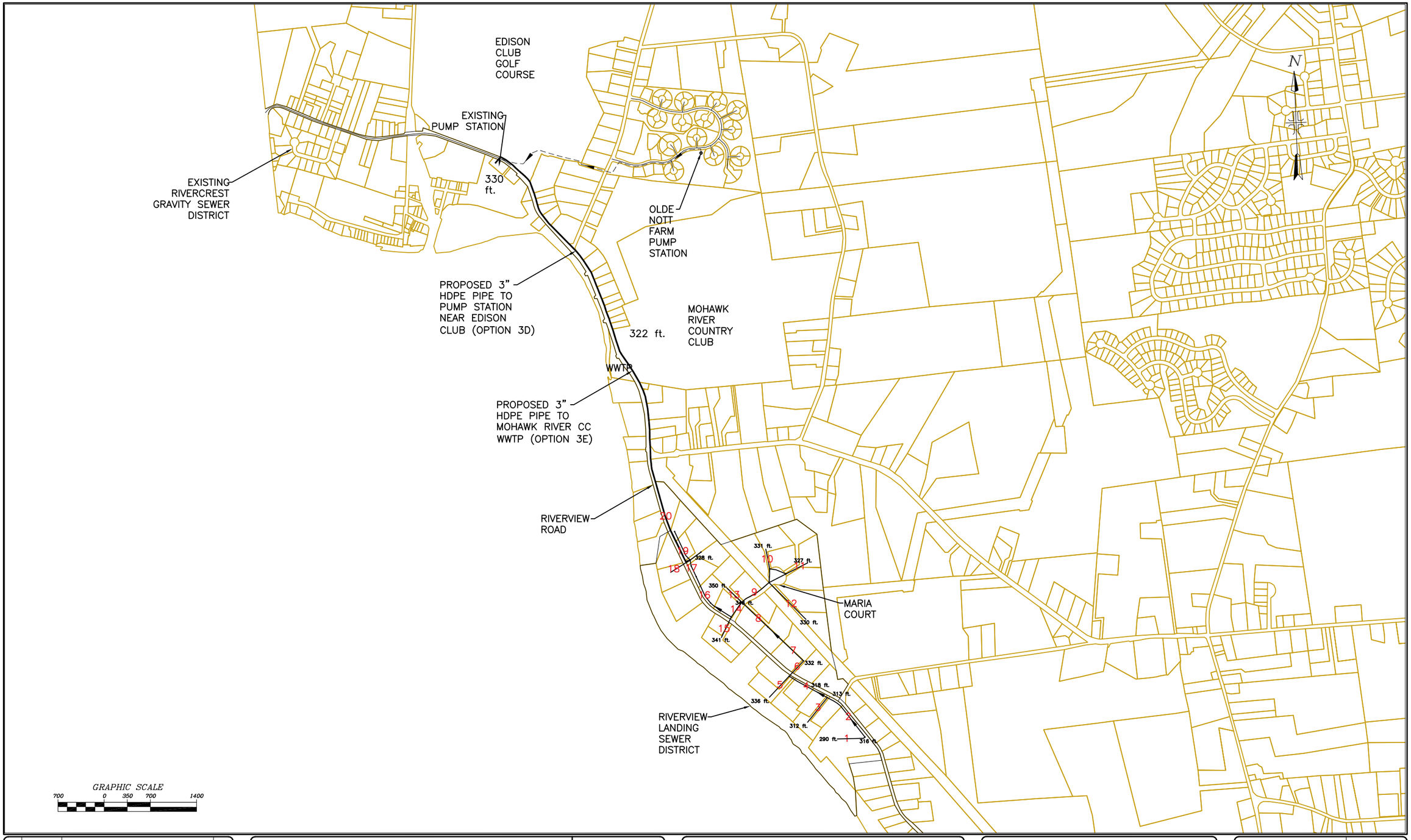
PROPOSED PUMP STATION TO MOHAWK RIVER CC WWTP SITE MAP (OPTION 2C)

SCALE: AS SHOWN

FILE NO.: 04-9101-P4-150

DATE: JANUARY 2019

SHEET NO.: 4F



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SARATOGA COUNTY

RIVERVIEW LANDING WWTP STUDY

SHEET TITLE:

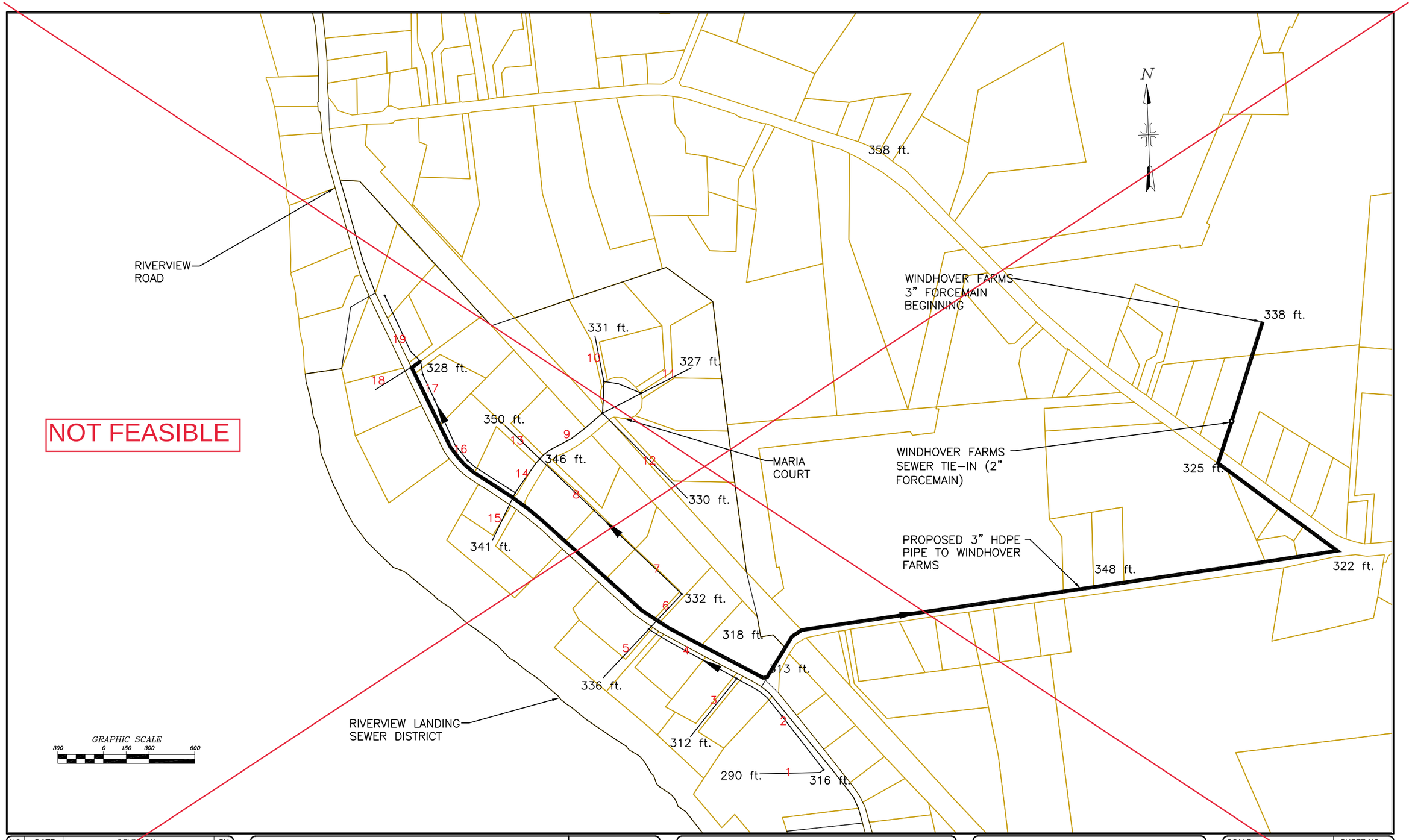
PROPOSED LOW PRESSURE SEWER TO EDISON CLUB PUMP STATION (OPTIONS 3A)

SCALE: AS SHOWN

FILE NO.: 04-9101-P4-160

DATE: JANUARY 2019

SHEET NO.: 4G



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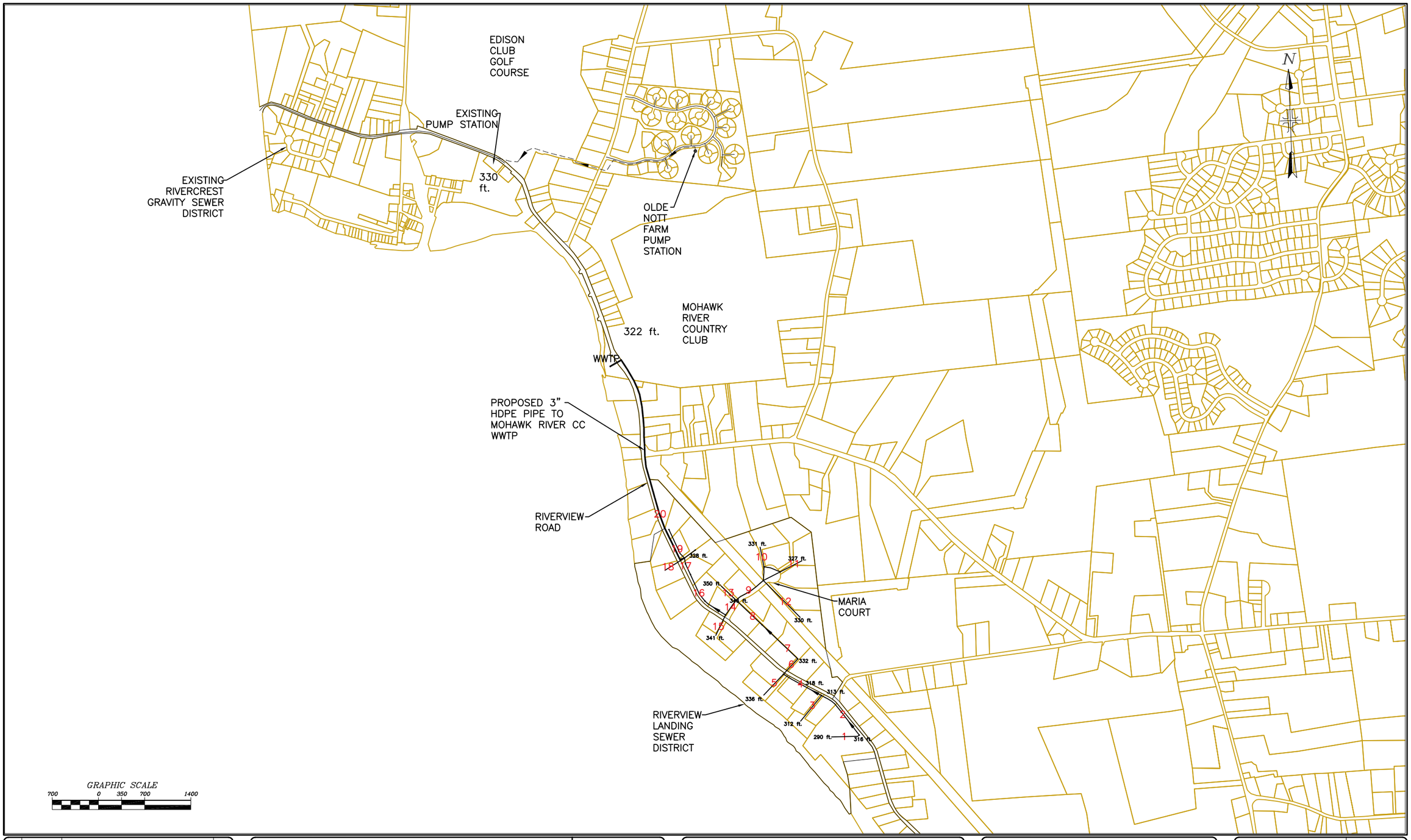
RIVERVIEW LANDING WWTP STUDY

SHEET TITLE:

PROPOSED LOW PRESSURE SEWER TO WINDHOVER FARMS SITE PLAN (OPTION 3B)

SCALE: AS SHOWN
FILE NO.: 04-9101-P4-170
DATE: JANUARY 2019
SHEET NO.: 4H



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SARATOGA COUNTY

RIVERVIEW LANDING WWTP STUDY

SHEET TITLE:

PROPOSED LOW PRESSURE SEWER TO MOHAWK RIVER CC WWTP SITE MAP (OPTION 3C)

SCALE: AS SHOWN

FILE NO.: 04-9101-P4-180

DATE: JANUARY 2019

SHEET NO.: 4I

EXHIBIT 5
EDU LIST

Town of Clifton Park
Riverview Landing Sewer District
Exhibit 5 - EDU List

KB Group of NY, Inc. dba PRIME AE Group of NY

PARCEL ID	PROP ADDRESS	OWNER1	PRP_CLS_CO	PROP_CLASS	**EDUs**
					EDUs
275.-1-47	778 Riverview Road	Louise Straney	314	Rural Vac<10	V
275.-1-86	781 Riverview Road	Michael J. and Judith T. Hylan	210	1 Family Res	1
275.-1-87	785 Riverview Road	B. Carucci and S. Miller	210	1 Family Res	1
275.-1-46	776 Riverview Road	Steven R. and Helen Hagen	210	1 Family Res	1
275.-1-63	Riverview Road	C & C Lending	314	Rural Vac<10	V
275.-1-64	773 Riverview Road	W. Ting Ting and W. Hsin Pang	210	1 Family Res	1
275.-1-65	771 Riverview Road	Inivas R. Sr. & S. Mitta	210	1 Family Res	1
275.-1-99	768 Riverview Road	Danuta and Piotr Olkowska	210	1 Family Res	1
275.-1-91	758 Riverview Road	Margaret Dunster	210	1 Family Res	1
275.-1-50	752 Riverview Road	Paula Gargiulo	210	1 Family Res	1
275.-1-51	730 Riverview Road	Robert and Angela Chichester	210	1 Family Res	1
275.-1-52	728 Riverview Road	Miro J and Volk Maida Skrlg	210	1 Family Res	1
275.-1-53	722 Riverview Road	Bruce and Christene Thurston	210	1 Family Res	1
275.-1-54	720 Riverview Road	Amy and John Goodell Vanslyke	210	1 Family Res	1
275.-1-55	718 Riverview Road	Robert and Cynthia Romano	210	1 Family Res	1
275.-1-56	716 Riverview Road	Brian and Anne Marie Daley	210	1 Family Res	1
275.-1-57	712 Riverview Road	Donald and Georgia Desimone	210	1 Family Res	1
275.-1-101	708 Riverview Road	Power Angels LLC	250	Estate	3
275.-1-85	713 Riverview Road	Robert P Weiss	210	1 Family Res	1
275.-1-84	727 Riverview Road	Kenneth and Judith Drum	210	1 Family Res	1
275.-1-83	733 Riverview Road	Robert and Donna Drum	210	1 Family Res	1
275.-1-82	731 Riverview Road	Richard and Linda Clingerman	210	1 Family Res	1
275.-1-80.1	735 Riverview Road	Beverly and Richard P Messmer	210	1 Family Res	1
275.-1-102	1 Maria Court	Christopher J Marsh	210	1 Family Res	1
275.-1-79	7 Maria Court	Jack and Judith Dodd	210	1 Family Res	1
275.-1-78	5 Maria Court	Scott S and Catherine W Pollard	210	1 Family Res	1
275.-1-66	2 Maria Court	R. Moran and S. Nikravan	210	1 Family Res	1
275.-1-67	4 Maria Court	Anita Dematteo	210	1 Family Res	1
275.-1-68	8 Maria Court	Mark and Eileen Kassner	210	1 Family Res	1
275.-1-69	6 Maria Court	Michael L and Susan M Burke	210	1 Family Res	1
275.-1-70	10 Maria Court	Louise Straney	314	Rural Vac<10	V
275.-1-71	12 Maria Court	Brian John and Kelsi Lynn Clark	210	1 Family Res	1
275.-1-72	14 Maria Court	James Chen	210	1 Family Res	1
275.-1-73	Maria Court	Louise Straney	314	Rural Vac<10	V
275.-1-74	15 Maria Court	Roya and Miramjan Aioby	210	1 Family Res	1
275.-1-75	13 Maria Court	Carolyn and Leonard Montorio	210	1 Family Res	1
275.-1-76	11 Maria Court	Joanne de Oliveira	210	1 Family Res	1
275.-1-77	9 Maria Court	Christine and Kevin Petronis	210	1 Family Res	1
				Total Residential:	36
				Total Vacant:	4
V - Vacant Lot (0.5 Sewer Units)				**Total Debt Units:**	38

EXHIBIT 6
COST ESTIMATES

Town of Clifton Park
Riverview Landing WWTP Study
Cost Estimates

PRIME AE®
KB Group of NY, Inc. dba PRIME AE Group of NY

1A. Rehabilitate Current WWTP

Item	Description	Qty.	Unit	Unit Price	Extension
1	General Requirements	1	LS	$60,000	$60,000
2	Filter Media & Gravel Removal	1,305	CY	$31	$40,455
3	Filter Media & Gravel Disposal	1,770	TON	$31	$54,870
4	4" Distribution Piping Replacement	2,200	LF	$26	$57,200
5	4" Underdrain Piping Replacement	2,100	LF	$26	$54,600
6	6" Underdrain Collection Header Replacement	500	LF	$35	$17,500
7	Distribution Chamber replacement	2	EA	$1,200	$2,400
8	Filter Media Replacement	1,305	CY	$51	$66,555
9	Fill (to raise the entire site)	4,000	CY	$51	$204,000
10	New Dosing Chamber	1	LS	$20,000	$20,000
11	Septic Tank and Baffles	2	EA	$8,000	$16,000
12	Chlorine Tank Rehabilitation	1	LS	$3,250	$3,250
13	Liner installation	16,520	SF	$10	$165,200
14	Sand bedding under Liner	130	CY	$52	$6,760
15	Restoration & Miscellaneous	1	LS	$42,000	$42,000
	TOTAL				$810,790
	CONTINGENCIES (10%)				$81,080
	ESTIMATED CONSTRUCTION COST				**$891,870**
	ENGINEERING, ADMINISTRATIVE & LEGAL (20%)				$178,380
	TOTAL PROJECT COST (2020$)				**$1,070,250**
				Say	**$1,071,000**

1B. Orenco Packaged Treatment Plant

Item	Description	Qty.	Unit	Unit Price	Total
1	General Requirements	1	LS	$130,000	$130,000
2	Orenco Primary Treatment Tank	1	LS	$165,000	$165,000
3	Orenco Advantex Treatment Plant	1	LS	$500,000	$500,000
4	Concrete Foundations	1	LS	$50,000	$50,000
5	Control Building	1	LS	$82,000	$82,000
6	Well	1	EA	$21,000	$21,000
7	Site Work	1	LS	$31,000	$31,000
8	New Septic Tank, Baffles, and Effluent Filters	2	EA	$3,300	$6,600
9	Chlorine Tank Rehab	1	LS	$3,200	$3,200
10	Mission Communications system	1	EA	$5,000	$5,000
11	Standby Generator (35 kW) + ATS	1	EA	$20,000	$20,000
12	Gas Service to Generators	1	EA	$5,000	$5,000
13	National Grid Service	1	LS	$10,000	$10,000
14	Stormwater Controls	1	LS	$25,000	$25,000
15	Electrical work	1	LS	$32,000	$32,000
16	Chlorine Tank Rehab	1	EA	$16,000	$16,000
17	Restoration & Miscellaneous	1	LS	$40,000	$40,000
18	Existing WWTP Decommisioning	1	LS	$150,000	$150,000
19	Chain Link Fence	1	LS	$5,000	$5,000
	TOTAL				$1,296,800
	CONTINGENCIES (10%)				$129,680
	ESTIMATED CONSTRUCTION COST				$1,426,480
	ENGINEERING, ADMINISTRATIVE & LEGAL (20%)				$285,300
	TOTAL PROJECT COST (2020$)				**$1,711,780**
				Say	**$1,711,800**

1C. Extended Aeration Packaged Treatment Plant

Item	Description	Qty.	Unit	Unit Price	Total
1	General Requirements	1	LS	$110,000	$110,000
2	Extended Aeration Plant	2	LS	$185,000	$370,000
3	Site Work & Installation	1	LS	$100,000	$100,000
4	Concrete Foundations	1	LS	$50,000	$50,000
5	Control Building	1	LS	$82,000	$82,000
6	Well	1	EA	$21,000	$21,000
7	Mission Communications system	1	EA	$5,000	$5,000
8	Standby Generator (35 kW) + ATS	1	EA	$20,000	$20,000
9	Gas Service to Generators	1	EA	$5,000	$5,500
10	Dosing Chamber Rehabilitation	2	EA	$11,000	$22,000
11	National Grid Service	1	LS	$10,000	$10,000
12	Stormwater Controls	1	LS	$25,000	$25,000
13	Electrical work	1	LS	$35,000	$35,000
14	Chlorine Tank Rehab	1	EA	$16,000	$16,000
15	Restoration & Miscellaneous	1	LS	$45,000	$45,000
16	Existing WWTP Decommisioning	1	CY	$150,000	$150,000
17	Chain Link Fence	1	LS	$5,000	$5,000
18	Commissioning & Operator Training	1	LS	$22,000	$22,000
	TOTAL				$1,093,500
	CONTINGENCIES (10%)				$109,350
	ESTIMATED CONSTRUCTION COST				$1,202,850
	ENGINEERING, ADMINISTRATIVE & LEGAL (20%)				$240,570
	TOTAL PROJECT COST (2020$)				**$1,443,420**
				Say	**$1,443,500**

Notes:
1. Cost of Advantex Treatment System equipment provided by Orenco.
2. Cost of EA plant provided by Fluence.

Town of Clifton Park
Riverview Landing WWTP Study
Cost Estimates

PRIME AE®
KB Group of NY, Inc. dba PRIME AE Group of NY

2A. Pump Station to Edison Club Pump Station

Item	Description	Qty.	Unit	Unit Price	Total
1	General Requirements	1	LS	$105,000	$105,000
2	Force Main Cleanout Structure	15	EA	$6,900	$103,500
3	Air/Vacuum Relief Valves	3	EA	$3,500	$10,500
4	Air/Vacuum Relief Vaults	3	EA	$17,500	$52,500
5	Precast Concrete Manholes incl. frame & cover	1	EA	$6,000	$6,000
6	3" HDPE Sewer Forcemain, directional drilled, in soil	3,700	LF	$40	$148,000
7	3" HDPE Sewer Forcemain, directional drilled, in rock	3,700	LF	$115	$425,500
8	Connection to existing pump station	1	EA	$6,000	$6,000
9	Duplex Grinder Pump Station (incl. electrical)	1	EA	$110,000	$110,000
10	National Grid Service	1	LS	$10,000	$10,000
11	Mission Communications system	1	EA	$3,000	$3,000
12	Standby Generator (35 kW) + ATS	1	EA	$20,000	$20,000
13	Gas Service to Generators	1	EA	$5,000	$5,000
14	Asphalt Pavement Replacement	10	TON	$200	$2,000
15	Gravel Subbase for Roads	10	CY	$40	$400
16	Existing WWTP Decommisioning	1	LS	$150,000	$150,000
	TOTAL				$1,157,400
	CONTINGENCIES (10%)				$115,740
	ESTIMATED CONSTRUCTION COST				$1,273,140
	ENGINEERING, ADMINISTRATIVE & LEGAL (20%)				$254,630
	TOTAL PROJECT COST (2020$)				$1,527,770
				Say	**$1,527,800**

2B. Pump Station to Windhover Farms

Item	Description	Qty.	Unit	Unit Price	Total
1	General Requirements	1	LS	$95,000	$95,000
2	Land Acquisition	1	LS	$20,000	$20,000
3	Force Main Cleanout Structure	13	EA	$6,900	$89,700
4	Air/Vacuum Relief Valves	1	EA	$3,500	$3,500
5	Air/Vacuum Relief Vaults	1	EA	$17,500	$17,500
6	Precast Concrete Manholes incl. frame & cover	1	EA	$6,000	$6,000
7	2" PVC Sewer Pipe, incl. excavation & backfill	1,600	LF	$35	$56,000
8	2.5" PVC Sewer Pipe, incl. excavation & backfill	170	LF	$40	$6,800
9	3" HDPE Sewer Forcemain, directional drilled	6,400	LF	$40	$256,000
10	Connection to existing gravity manhole	1	EA	$6,000	$6,000
11	Duplex Grinder Pump Station (incl. electrical)	2	EA	$120,000	$240,000
12	National Grid Service	2	LS	$10,000	$20,000
13	Mission Communications system	2	EA	$3,000	$6,000
14	Standby Generator (35 kW) + ATS	2	EA	$20,000	$40,000
15	Gas Service to Generators	2	EA	$5,000	$10,000
16	Asphalt Pavement Replacement	10	TON	$200	$2,000
17	Gravel Subbase for Roads	10	CY	$40	$400
18	Existing WWTP Decommissioning	1	LS	$150,000	$150,000
19	Replace Pumps at Settler's Hill Pump Station	1	LS	$80,000	$80,000
	TOTAL				$1,104,900
	CONTINGENCIES (10%)				$110,490
	ESTIMATED CONSTRUCTION COST				$1,215,390
	ENGINEERING, ADMINISTRATIVE & LEGAL (20%)				$243,080
	TOTAL PROJECT COST (2020$)				$1,458,470
				Say	**$1,458,500**

2C. Pump Station to Mohawk River CC WWTP

Item	Description	Qty.	Unit	Unit Price	Total
1	General Requirements	1	LS	$90,000	$90,000
2	Force Main Cleanout Structure	9	EA	$6,900	$62,100
3	Extended Aeration Plant	1	LS	$230,000	$230,000
4	Air/Vacuum Relief Valves	2	EA	$3,500	$7,000
5	Air/Vacuum Relief Vaults	2	EA	$17,500	$35,000
6	Precast Concrete Manholes incl. frame & cover	1	EA	$6,000	$6,000
7	3" HDPE Sewer Forcemain, directional drilled, in soil	2,050	LF	$40	$82,000
8	3" HDPE Sewer Forcemain, directional drilled, in rock	2,050	LF	$115	$235,750
9	Connection to existing gravity manhole	1	EA	$6,000	$6,000
10	Duplex Grinder Pump Station (incl. electrical)	1	EA	$110,000	$110,000
11	National Grid Service	1	LS	$10,000	$10,000
12	Mission Communications system	1	EA	$3,000	$3,000
13	Standby Generator (35 kW)	1	EA	$11,000	$11,000
14	Gas Service to Generators	1	EA	$5,000	$5,000
15	Asphalt Pavement Replacement	10	TON	$200	$2,000
16	Gravel Subbase for Roads	10	CY	$40	$400
17	Existing WWTP Decommissioning	1	LS	$150,000	$150,000
	TOTAL				$1,045,250
	CONTINGENCIES (10%)				$104,530
	ESTIMATED CONSTRUCTION COST				$1,149,780
	ENGINEERING, ADMINISTRATIVE & LEGAL (20%)				$229,960
	TOTAL PROJECT COST (2020$)				$1,379,740
				SAY	**$1,379,800**

Town of Clifton Park
Riverview Landing WWTP Study
Cost Estimates

PRIME AE®
KB Group of NY, Inc. dba PRIME AE Group of NY

3A. Grinder Pump Network to Edison Club

Item	Description	Qty.	Unit	Unit Price	Total
1	General Requirements	1	LS	$115,000	$115,000
2	Force Main Cleanout Structure	8	EA	$6,900	$55,200
3	2.5" PVC Sewer Pipe, incl. excavation & backfill	700	LF	$40	$28,000
4	Air/Vacuum Relief Valves	3	EA	$3,500	$10,500
5	Air/Vacuum Relief Vaults	3	EA	$17,500	$52,500
6	Precast Concrete Manholes incl. frame & cover	1	EA	$6,000	$6,000
7	3" PVC Sewer, incl. excavation & backfill	1,870	LF	$45	$84,150
8	3" HDPE Sewer Forcemain, directional drilled, in soil	3,700	LF	$40	$148,000
9	3" HDPE Sewer Forcemain, directional drilled, in rock	3,700	LF	$115	$425,500
10	Pipe Bedding Material	140	CY	$35	$4,900
11	Pipe Zone Backfill Material	570	CY	$30	$17,100
12	Gravel Subbase for Roads	10	CY	$40	$400
13	Surface / Miscellaneous Restoration	2,570	LF	$2	$5,140
14	Connection to existing gravity manhole	1	EA	$6,000	$6,000
15	Asphalt Pavement Replacement	10	TON	$200	$2,000
16	Replace Grinder Pumps	36	EA	$1,800	$64,800
17	Existing WWTP Decommissioning	1	LS	$150,000	$150,000
	TOTAL				$1,175,190
	CONTINGENCIES (10%)				$117,519
	ESTIMATED CONSTRUCTION COST				$1,292,709
	ENGINEERING, ADMINISTRATIVE & LEGAL (20%)				$258,550
	TOTAL PROJECT COST (2020$)				$1,551,259
				SAY	**$1,551,300**

3B. Grinder Pump Network to Windhover Farms

NOT FEASIBLE

Item	Description	Qty.	Unit	Unit Price	Total
1	General Requirements	1	LS	$112,000	$112,000
2	Force Main Cleanout Structure	13	EA	$6,900	$89,700
3	2.5" PVC Sewer Pipe, incl. excavation & backfill	700	LF	$40	$28,000
4	Air/Vacuum Relief Valves	1	EA	$3,500	$3,500
5	Air/Vacuum Relief Vaults	1	EA	$17,500	$17,500
6	Precast Concrete Manholes incl. frame & cover	1	EA	$6,000	$6,000
7	3" PVC Sewer, incl. excavation & backfill	1,870	LF	$45	$84,150
8	3" HDPE Sewer Forcemain, directional drilled	6,400	LF	$40	$256,000
9	Pipe Bedding Material	140	CY	$35	$4,900
10	Pipe Zone Backfill Material	570	CY	$30	$17,100
11	Gravel Subbase for Roads	10	CY	$40	$400
12	Surface / Miscellaneous Restoration	2,570	LF	$2	$5,140
13	Connection to existing gravity manhole	1	EA	$6,000	$6,000
14	Asphalt Pavement Replacement	10	TON	$200	$2,000
15	Replace Grinder Pumps	36	EA	$1,800	$64,800
16	Existing WWTP Decommissioning	1	LS	$150,000	$150,000
	TOTAL				$847,190
	CONTINGENCIES (10%)				$84,720
	ESTIMATED CONSTRUCTION COST				$931,910
	ENGINEERING, ADMINISTRATIVE & LEGAL (20%)				$186,390
	TOTAL PROJECT COST (2020$)				$1,118,300
				SAY	**$1,118,300**

3C. Grinder Pump Network to Mohawk River CC WWTP

Item	Description	Qty.	Unit	Unit Price	Total
1	General Requirements	1	LS	$90,000	$90,000
2	Force Main Cleanout Structure	5	EA	$6,900	$34,500
3	Extended Aeration Plant	1	LS	$230,000	$235,000
4	Air/Vacuum Relief Valves	2	EA	$3,500	$7,000
5	Air/Vacuum Relief Vaults	2	EA	$17,500	$35,000
6	Precast Concrete Manholes incl. frame & cover	1	EA	$6,000	$6,000
7	3" HDPE Sewer Forcemain, directional drilled, in soil	2,050	LF	$40	$82,000
8	3" HDPE Sewer Forcemain, directional drilled, in rock	2,050	LF	$115	$235,750
9	Gravel Subbase for Roads	10	CY	$40	$400
10	Connection to existing gravity manhole	1	EA	$6,000	$6,000
11	Asphalt Pavement Replacement	10	TON	$200	$2,000
12	Replace Grinder Pumps	36	EA	$1,800	$64,800
13	Existing WWTP Decommissioning	1	LS	$150,000	$150,000
	TOTAL				$948,450
	CONTINGENCIES (10%)				$94,850
	ESTIMATED CONSTRUCTION COST				$1,043,300
	ENGINEERING, ADMINISTRATIVE & LEGAL (20%)				$208,660
	TOTAL PROJECT COST (2020$)				$1,251,960
				SAY	**$1,252,000**

EXHIBIT 7
30-YEAR COST ANALYSIS

Town of Clifton Park
Riverview Landing WWTP Study
30-Year Cost Analysis

Alternative #1A - Rehabilitation

Year of Proposed Construction (year X):	2022
Life Cycle (years):	30
Horsepower (total @ plant):	0
Yearly Power Cost Increase (12-Month % Change, 30-Yr Avg):	2.00%
Yearly Labor Increase:	2.70%
Discount Rate (CPI 12-Month % Change, 30-Year Average):	2.50%

Initial Rehabilitation Costs

General Requirements	$60,000
Filter Media & Gravel Removal	$40,455
Filter Media & Gravel Disposal	$54,870
4" Distribution Piping Replacement	$57,200
4" Underdrain Piping Replacement	$54,600
6" Underdrain Collection Header Replacement	$17,500
Distribution Chamber replacement	$2,400
Filter Media Replacement	$66,555
Fill (to raise the entire site)	$204,000
New Dosing Chamber	$20,000
Septic Tank and Baffles	$16,000
Chlorine Tank Rehabilitation	$3,250
Liner installation	$165,200
Sand bedding under Liner	$6,760
Restoration & Miscellaneous	$42,000
Sum	$810,790
Contingencies (10%)	$81,079
Estimated Construction Cost	$891,869
Engineering, Administrative, & Legal (20%)	$178,380
Total Project Cost	$1,070,249
Total Project Cost (2022)	$1,128,830

Maintenance Costs

Labor	$12,500
Sludge Disp., Chlorine Tablets, & Misc.	$8,500
Equipment	$2,800
Engineering	$500
Sum:	$24,300
Annual Costs, 1st year of operation (2022)	$25,630
Yearly P/A Factor with Geometric Gradient:	30.11
Yearly Maintenance 30-year Cost	$771,762

Debt Reduction Costs

Debt and Interest	$10,200
Annual Cost, 1st year of operation (2022)	$10,000
Yearly P/A Factor with Geometric Gradient:	3.87
Yearly Debt Reduction 30-Year Cost	$38,740

Capital Improvement Costs

Replacement of Filter Media	$160,000

Replacement Schedule

Years after Construction	Item	2022 Cost	F/P Factor	Future Dollars	P/F Factor	2022 30-Year Cost
15	Filter Media	$160,000	2.22	$355,830	0.48	$169,640
				Capital Improvements 2022 30-Year Cost:		$169,640

Total WWTP 30-Year Cost (2022)

WWTP Initial Construction Cost (2022):	$1,128,830
WWTP Debt Reduction (2022):	$38,740
WWTP Yearly Maintenance 30-Year Cost (2022):	$771,762
WWTP Capital Improvements 30-Year cost (2022):	$169,640
Total WWTP 30-Year Cost (2022):	$2,108,971
Say	$2,109,000

*Total is equal to the sum of the costs accumulated over the useful life (30 years) of the facility in terms of 2022 dollars.

Town of Clifton Park
Riverview Landing WWTP Study
30-Year Cost Analysis

Alternative #1B - ORENCO WWTP

Year of Proposed Construction (year X):	2022
Life Cycle (years):	30
Horsepower (total @ plant):	0
Yearly Power Cost Increase (12-Month % Change, 30-Yr Avg):	2.00%
Yearly Labor Increase:	2.70%
Discount Rate (CPI 12-Month % Change, 30-Year Average):	2.50%

Notes:
1. Power costs calculated using estimated hours of operation and $0.18/KWH.

Power Costs

KW hours/year:	9,497
Cost/KWH:	$0.18
Power Cost/year:	$1,710
Power cost/year in 2022:	$1,779
Power P/A Factor with Geometric Gradient:	27.29
Power 30-Year Cost:	$48,536

Initial Construction Costs

General Requirements	$130,000
Orenco Primary Treatment Tank	$165,000
Orenco Advantex Treatment Plant	$500,000
Concrete Foundations	$50,000
Control Building	$82,000
Well	$21,000
Site Work	$31,000
New Septic Tank, Baffles, and Effluent Filters	$6,600
Chlorine Tank Rehab	$3,200
Mission Communications system	$5,000
Standby Generator (35 kW) + ATS	$20,000
Gas Service to Generators	$5,000
National Grid Service	$10,000
Stormwater Controls	$25,000
Electrical work	$32,000
Chlorine Tank Rehab	$16,000
Restoration & Miscellaneous	$40,000
Existing WWTP Decommisioning	$150,000
Chain Link Fence	$5,000
Sum	$1,296,800
Contingencies (10%)	$129,680
Estimated Construction Cost	$1,426,480
Engineering, Administrative, & Legal (20%)	$285,300
Total Project Cost	$1,711,780
Total Project Cost (2022)	$1,805,465

Maintenance Costs

Primary Tank Pump-Out Cost	$7,800
Proactive Preventative Maintenance	$60
Unscheduled Service Calls	$2,000
Advantex Component Maintenance	$1,500
Cellular Data	$125
AX-MAX Pump-Out Cost	$250
Labor (Operators, Admin, Benefits)	$12,500
Fees (Insurance, legal, SPDES)	$2,000
Sewers (cleaning & TV)	$500
1st-year SCADA Fee	$260
Annual Costs, 1st year of operation (2022)	$26,995
Yearly P/A Factor with Geometric Gradient:	30.11
Yearly Maintenance 30-Year Cost	$812,859

Capital Improvement Costs

Replacement of tank equipment, textiles, pumps, floats, and contractors	$105,000

Replacement Schedule

Years after Construction	Item	2022 Cost	F/P Factor	Future Dollars	P/F Factor	2022 30-Year Cost
15	Pumps & Controls	$105,000	2.22	$233,508	0.48	$111,323
			Capital Improvements 2022 30-Year Cost:			$111,320

Debt Reduction Costs

Debt and Interest	$10,200
Annual Cost, 1st year of operation (2022)	$10,000
Yearly P/A Factor with Geometric Gradient:	3.87
Yearly Maintenance 2022 30-Year Cost	$38,740

Total WWTP 30-Year Cost (2022)

WWTP Initial Construction Cost (2022):	$1,805,465
WWTP Electricity 30-Year Cost (2022):	$48,536
WWTP Debt Reduction Costs (2022):	$38,740
WWTP Yearly Maintenance 30-Year Cost (2022):	$812,859
WWTP Capital Improvements 30-Year Cost (2022):	$111,320
Total WWTP 30-Year Cost (2022):	$2,816,920
Say	$2,817,000

Note: Some of annual operating costs provided by Orenco.

*Total is equal to the sum of the costs acculated over the useful life (30 years) of the facility in terms of 2022 dollars

Town of Clifton Park
Riverview Landing WWTP Study
30-Year Cost Analysis

Alternative #1C - Extended Aeration WWTP

Year of Proposed Construction (year X):	2022
Life Cycle (years):	30
Horsepower (total @ plant):	5.125
Yearly Power Cost Increase (12-Month % Change, 30-Yr Avg):	2.00%
Yearly Labor Increase:	2.70%
Discount Rate (CPI 12-Month % Change, 30-Year Average):	2.50%

Notes:
1. Power costs calculated using estimated hours of operation and $0.18/KWH.

Power Costs

KW hours/year:	9,673
Cost/KWH:	$0.18
Power Cost/year:	$1,742
Power cost/year in 2022:	$1,813
Power P/A Factor with Geometric Gradient:	27.29
Power 30-Year Cost:	$49,480

Initial Construction Costs

General Requirements	$110,000
Extended Aeration Plant	$370,000
Site Work & Installation	$100,000
Concrete Foundations	$50,000
Control Building	$82,000
Well	$21,000
Mission Communications system	$5,000
Standby Generator (35 kW) + ATS	$20,000
Gas Service to Generators	$5,500
Dosing Chamber Rehabilitation	$22,000
National Grid Service	$10,000
Stormwater Controls	$25,000
Electrical work	$35,000
Chlorine Tank Rehab	$16,000
Restoration & Miscellaneous	$45,000
Existing WWTP Decommisioning	$150,000
Chain Link Fence	$5,000
Commissioning & Operator Training	$22,000
Sum	$1,093,500
Contingencies (10%)	$109,350
Estimated Construction Cost	$1,202,850
Engineering, Administrative, & Legal (20%)	$240,570
Total Project Cost	$1,443,420
Total Project Cost (2022)	$1,522,420

Maintenance Costs

1st Year SCADA Fee	$260
General equipment	$1,600
Maintenance contracts	$400
Labor (Operators, Admin, Benefits)	$31,000
Sewers (cleaning & TV)	$500
Fees (Insurance, legal, SPDES)	$2,000
Sewage Treatment (sludge disposal, chemicals, equipment, testing, fuel, & telephone)	$10,500
Sum:	$46,260
Annual Costs, 1st year of operation (2022)	$48,800
Yearly P/A Factor with Geometric Gradient:	30.11
Yearly Maintenance 30-Year Cost	$1,469,450

Capital Improvement Costs

Replacement of pumps, blowers & Controls	$16,000

Replacement Schedule

Years after Construction	Item	2022 Cost	F/P Factor	Future Dollars		2022 30-Year Cost
20	Pumps & Controls	$16,000	2.22	$35,590	P/F Factor	$16,970
					0.48	
				Capital Improvements 2022 30-Year Cost:		$16,970

Debt Reduction Costs

Debt and Interest	$10,200
Annual Cost, 1st year of operation (2022)	$10,000
Yearly P/A Factor with Geometric Gradient:	3.87
Yearly Maintenance 2022 30-Year Cost	$38,740

Total WWTP 30-Year Cost (2022)

WWTP Initial Construction Cost:	$1,522,420
WWTP Electricity 30-Year Cost:	$49,480
WWTP Debt Reduction Costs (2022):	$38,740
WWTP Yearly Maintenance 30-Year Cost (2022):	$1,469,450
WWTP Capital Improvements 30-Year Cost (2022):	$16,970
Total WWTP 30-Year Cost (2022):	$3,097,060
Say	$3,097,100

*Total is equal to the sum of the costs acculated over the useful life (30 years) of the facility in terms of 2022 dollars

Town of Clifton Park
Riverview Landing WWTP Study
30-Year Cost Analysis

Alternative #2A - Pump to EC PS

Year of Proposed Construction (year X):	2022
Life Cycle (years):	30
Horsepower:	2
Yearly Power Cost Increase (12-Month % Change, 30-Yr Avg):	2.00%
Yearly Labor Increase:	2.70%
Discount Rate (CPI 12-Month % Change, 30-Year Average):	2.50%
Length of Forcemain (ft)	7400
Air Release Valves & Cleanouts	15

General Requirements	$105,000
Force Main Cleanout Structure	$103,500
Air/Vacuum Relief Valves	$10,500
Air/Vacuum Relief Vaults	$52,500
Precast Concrete Manholes incl. frame & cover	$6,000
3" HDPE Sewer Forcemain, directional drilled, in soil	$148,000
3" HDPE Sewer Forcemain, directional drilled, in rock	$425,500
Connection to existing pump station	$6,000
Duplex Grinder Pump Station (incl. electrical)	$110,000
National Grid Service	$10,000
Mission Communications system	$3,000
Standby Generator (35 kW) + ATS	$20,000
Gas Service to Generators	$5,000
Asphalt Pavement Replacement	$2,000
Gravel Subbase for Roads	$400
Existing WWTP Decommisioning	$150,000
Sum	$1,157,400
Contingencies (10%)	$115,740
Estimated Construction Cost	$1,273,140
Engineering, Administrative, & Legal (20%)	$254,630
Total Project Cost	$1,527,770
Sale Price for Part of Current WWTP Lot not needed for Pump Station	$30,970
Net Project Cost	$1,496,800
Net Project Cost (2022)	$1,557,280

Pump Station Power Costs

Horsepower hours/year:	2,552
KW hours/year:	1,904
Cost/KWH:	$0.18
Power Cost/year:	$343
Power cost/year in 2022:	$350
Power P/A Factor with Geometric Gradient:	27.29
Power 30-Year Cost:	$9,547

Notes:
1. Power costs calculated using estimated hours of operation and $0.18/KWH.

Pump Station Maintenance Costs

1st Year SCADA Fee	$260
1st Year Maintenance Cost	$530
1st Year Odor Control Cost	$310
1st Year Labor Cost	$9,500
Annual Costs, 1st year of operation (2022)	$10,600
Yearly P/A Factor with Geometric Gradient:	30.11
Yearly Maintenance 30-Year Cost	$319,187

Capital Improvement Costs

Rebuild Pumps & Controls	$10,500

Replacement Schedule

Years after Construction	Item	2022 Cost	F/P Factor	Future Dollars	P/F Factor	2022 30-Year Cost
20	Pumps & Controls	$10,500	2.22	$23,351	0.48	$11,132
			Capital Improvements 2022 30-Year Cost:			$11,130

Forcemain Maintenance Costs

Maintenance Costs

Yearly Maintenance Cost	$3,700
Annual Costs, 1st year of operation	$3,800
Maint P/A Factor with Geometric Gradient:	30.11
Yearly Maintenance 2022 30-Year Cost	$114,425

Capital Improvement Costs

Replacement of Air Release & Cleanout Valves	$850

Replacement Schedule

Years after Construction	Item	2022 Cost	F/P Factor	Future Dollars	P/F Factor	2022 30-Year Cost
15	ARV & CO	$12,750	1.49	$19,014	0.69	$13,129
			Capital Improvements 2022 30-Year Cost:			$13,130

Debt Reduction Costs

Debt and Interest	$10,200
Annual Cost, 1st year of operation (2022)	$10,000
Yearly P/A Factor with Geometric Gradient:	3.87
Yearly Maintenance 2022 30-Year Cost	$38,740

Sewer System Costs

Glenville Trans Fee	$12,160
Schenectady Trans Fee	$7,290
Annual Costs (2022)	$19,450
Sewer System Fee P/A Factor with Geometric Gradient:	30.11
Yearly Sewer System Fee 30-Year Cost	$585,672

Pump Station Total 30-Year Cost (2022)

PS Initial Construction Cost (minus property sale):	$1,557,280
PS Electricity 30-Year Cost:	$9,547
PS Maintenance 30-Year Cost (2022):	$319,187
PS Capital Improvement 30-Year Cost (2022):	$11,130
PS Sewer Maintenance 30-Year Cost (2022):	$114,425
PS Sewer Capital Improvement 30-Year Cost (2022):	$13,130
Current WWTP Debt Reduction 30-Year Cost (2022):	$38,740
PS Sewer System Costs (Glenville, Schenectady):	$585,672
Total PS 30-Year Cost (2022):	$2,649,111
Say	$2,649,200

*Total is equal to the sum of the costs accumulated over the useful life (30 years) of the facility in terms of 2022 dollars.

Town of Clifton Park
Riverview Landing WWTP Study
30-Year Cost Analysis

Alternative #2B - Pump Station to Windhover Farms

Year of Proposed Construction (year X):	2022
Life Cycle (years):	30
Horsepower:	2
Yearly Power Cost Increase (12-Month % Change, 30-Yr Avg):	2.00%
Yearly Labor Increase:	2.70%
Discount Rate (CPI 12-Month % Change, 30-Year Average):	2.50%
Length of Forcemain (ft)	6400
Air Release Valves & Cleanouts	15

General Requirements	$95,000
Land Acquisition	$20,000
Force Main Cleanout Structure	$89,700
Air/Vacuum Relief Valves	$3,500
Air/Vacuum Relief Vaults	$17,500
Precast Concrete Manholes incl. frame & cover	$6,000
2" PVC Sewer Pipe, incl. excavation & backfill	$56,000
2.5" PVC Sewer Pipe, incl. excavation & backfill	$6,800
3" HDPE Sewer Forcemain, directional drillec	$256,000
Connection to existing gravity manhole	$6,000
Duplex Grinder Pump Station (incl. electrical)	$240,000
National Grid Service	$20,000
Mission Communications system	$6,000
Standby Generator (35 kW) + ATS	$40,000
Gas Service to Generators	$10,000
Asphalt Pavement Replacement	$2,000
Gravel Subbase for Roads	$400
Existing WWTP Decommissioning	$150,000
Replace Pumps at Settler's Hill Pump Station	$80,000
Sum	$1,104,900
Contingencies (10%)	$110,490
Estimated Construction Cost	$1,215,390
Engineering, Administrative, & Legal (20%)	$243,078
Total Project Cost	$1,458,468
Sale Price for Part of Current WWTP Lot not needed for Pump Station	$30,970
Net Project Cost	$1,427,498
Net Project Cost (2022)	$1,485,169

Pump Station Power Costs

Horsepower hours/year:	2,279
KW hours/year:	1,700
Cost/KWH:	$0.18
Power Cost/year:	$307
Power cost/ year in 2022:	$313
Power P/A Factor with Geometric Gradient:	27.29
Power 2022 30-Year Cost:	$8,545

Notes:
1. Power costs calculated using estimated hours of operation and $0.18/KWH.

Pump Station Maintenance Costs

1st Year SCADA Fee	$260
1st Year Mainenance Cost	$530
1st Year Odor Control Cost	$310
1st Year Labor Cost	$9,500
Annual Costs, 1st year of operation (2022)	$10,600
Yearly P/A Factor with Geometric Gradient:	30.11
Yearly Maintenance 2022 30-Year Cost	$319,187

Capital Improvement Costs

Rebuild Pumps & Controls	$10,500

Replacement Schedule		2022 Cost	F/P Factor	Future Dollars	P/F Factor	2022 30-Year Cost
Years after Construction	Item	$10,500	2.22	$23,351	0.48	$11,132
20	Pumps & Controls	Capital Improvements 2017 30-Year Cost:				$11,130

Forcemain Maintenance Costs

Maintenance Costs

Yearly Maintenance Cost	$4,560
Annual Costs, 1st year of operation	$4,800
Maint P/A Factor with Geometric Gradient:	30.11
Yearly Maintenance 2022 30-Year Cost	$144,536

Capital Improvement Costs

Replacement of Air Release & Cleanout Valves	$860

Replacement Schedule		2022 Cost	F/P Factor	Future Dollars	P/F Factor	2022 30-Year Cost
Years after Construction	Item	$12,900	1.49	$19,238	0.69	$13,284
15	ARV & CO	Capital Improvements 2022 30-Year Cost:				$13,280

Debt Reduction Costs

Debt and Interest	$10,200
Annual Cost, 1st year of operation (2022)	$10,000
Yearly P/A Factor with Geometric Gradient:	3.87
Yearly Maintenance 2022 30-Year Cost	$38,740

Sewer System Costs

Annual Costs (2022)	$10,600
Sewer System Fee P/A Factor with Geometric Gradient:	30.11
Yearly Sewer System Fee 2022 30-Year Cost	$319,184

Pump Station Total 30-Year Cost (2022)

PS Initial Construction Cost (minus property sale):	$1,485,169
PS Electricity 30-Year Cost (2022):	$8,545
PS Maintenance 30-Year Cost (2022):	$319,187
PS Capital Improvements 30-Year Cost (2022):	$11,130
Forcemain Maintenance 30-Year Cost (2022):	$144,536
Forcemain Capital Improvements 30-Year Cost (2022):	$13,280
Current WWTP Debt Reduction 30-Year Cost (2022):	$38,740
Sewer System Costs 30-Year Cost (2022):	$319,184
Total PS 30-Year Cost (2022):	$2,339,771
Say	$2,339,800

*Total is equal to the sum of the costs accumulated over the useful life (30 years) of the facility in terms of 2022 dollars.

Town of Clifton Park
Riverview Landing WWTP Study
30-Year Cost Analysis

Alternative #2C: Pump Station to MRCC WWTP

Year of Proposed Construction (year X):	2022
Life Cycle (years):	30
Horsepower:	1
Yearly Power Cost Increase (12-Month % Change, 30-Yr Avg):	2.00%
Yearly Labor Increase:	2.70%
Discount Rate (CPI 12-Month % Change, 30-Year Average):	2.50%
Length of Forcemain (ft)	4100
Air Release Valves & Cleanouts	15

General Requirements	$90,000
Force Main Cleanout Structure	$62,100
Extended Aeration Plant	$230,000
Air/Vacuum Relief Valves	$7,000
Air/Vacuum Relief Vaults	$35,000
Precast Concrete Manholes incl. frame & cover	$6,000
3" HDPE Sewer Forcemain, directional drilled, in soil	$82,000
3" HDPE Sewer Forcemain, directional drilled, in rock	$235,750
Connection to existing gravity manhole	$6,000
Duplex Grinder Pump Station (incl. electrical)	$110,000
National Grid Service	$10,000
Mission Communications system	$3,000
Standby Generator (35 kW)	$11,000
Gas Service to Generators	$5,000
Asphalt Pavement Replacement	$2,000
Gravel Subbase for Roads	$400
Existing WWTP Decommissioning	$150,000
Sum	$1,045,250
Contingencies (10%)	$104,530
Estimated Construction Cost	$1,149,780
Engineering, Administrative, & Legal (20%)	$229,960
Total Project Cost	$1,379,740
Sale Price for Part of Current WWTP Lot not needed for Pump Station	$30,970
Net Project Cost	$1,348,770
Net Project Cost (2022)	$1,403,270

Pump Station Power Costs

Horsepower hours/year:	1,456
KW hours/year:	1,086
Cost/KWH:	$0.18
Power Cost/year:	$196
Power cost/ year in 2022:	$197
Power P/A Factor with Geometric Gradient:	27.29
Power 2022 30-Year Cost:	$5,364

Notes:
1. Power costs calculated using estimated hours of operation and $0.18/KWH.

Pump Station Maintenance Costs

1st Year SCADA Fee	$260
1st Year Maintenance Cost	$530
1st Year Odor Control Cost	$310
1st Year Labor Cost	$9,500
Annual Costs, 1st year of operation (2022)	$10,600
Yearly P/A Factor with Geometric Gradient:	30.11
Yearly Maintenance 2022 30-Year Cost	$319,187

Capital Improvement Costs

Rebuild/Replace pumps, blowers, & controls (Pump Station and WWTP)	$42,000

Replacement Schedule

Years after Construction	Item	2022 Cost	F/P Factor	Future Dollars	P/F Factor	2022 30-Year Cost
20	Pumps & Controls	$42,000	2.22	$93,403	0.48	$44,529
				Capital Improvements 2017 30-Year Cost:		$44,530

Forcemain Maintenance Costs

Maintenance Costs

Yearly Maintenance Cost for Cleaning	$2,200
Annual Costs, 1st year of operation	$2,321
Maint P/A Factor with Geometric Gradient:	30.11
Yearly Maintenance 2022 30-Year Cost	$69,890

Capital Improvement Costs

Replacement of Air Release & Cleanout Valves	$860

Replacement Schedule

Years after Construction	Item	2022 Cost	F/P Factor	Future Dollars	P/F Factor	Year Cost
15	ARV & CO	$12,900	1.49	$19,238	0.69	$13,284
				Capital Improvements 2022 30-Year Cost:		$13,290

Debt Reduction Costs

Debt and Interest	$10,200
Annual Cost, 1st year of operation (2022)	$10,000
Yearly P/A Factor with Geometric Gradient:	3.87
Yearly Maintenance 2022 30-Year Cost	$38,740

WWTP Power Costs (Riverview Landing Portion)

KW hours/year:	7,127
Cost/KWH:	$0.18
Power Cost/year:	$1,283
Power cost/year in 2022:	$1,335
Power P/A Factor with Geometric Gradient:	27.29
Power 2022 30-Year Cost:	$36,440

WWTP Maintenance Costs

1st Year SCADA Fee	$260
General equipment	$2,000
Maintenance contracts	$400
Labor (Operators, Admin, Benefits)	$31,000
Sewers (cleaning & TV)	$500
Fees (Insurance, legal, SPDES)	$2,000
Sewage Treatment (sludge disposal, chemicals, equipment, testing, fuel, & telephone)	$5,500
Sum:	$41,660
Annual Costs, 1st year of operation (2022)	$43,210
Annual Costs, 1st year, allocated to RLSD	$31,839
Yearly P/A Factor with Geometric Gradient:	30.11
Yearly Maintenance 2022 30-Year Cost	$958,723

Pump Station Total 30-Year Cost (2022)

PS Initial Construction 30-Year Cost (2022):	$1,403,270
PS Electricity 30-Year Cost (2022):	$5,364
PS Maintenance 30-Year Cost (2022):	$319,187
PS Capital Improvements 30-Year Cost (2022):	$44,530
Forcemain Maintenance 30-Year Cost (2022):	$69,890
Forcemain Capital Improvements 30-Year Cost (2022):	$13,290
Current WWTP Debt Reduction 30-Year Cost (2022):	$38,740
MRCC WWTP Power Cost 30-Year Cost (2022):	$36,440
MRCC WWTP Maintenance Costs 30-Year Cost (2022):	$958,723
Total PS 30-Year Cost (2022):	$2,889,433
Say	$2,889,500

*Total is equal to the sum of the costs accumulated over the useful life (30 years) of the facility in terms of 2022 dollars.

Town of Clifton Park
Riverview Landing WWTP Study
30-Year Cost Analysis

Alternative #3A - LPSS to EC PS

Year of Proposed Construction (year X):	2022
Life Cycle (years):	30
Number of Simmplex Stations:	37
Length of forcemain, ft (all sizes)	7400
Air Release Valves & Cleanouts	15
Yearly Power Cost Increase (12-Month % Change, 30-Yr Avg):	2.00%
Yearly Labor Increase:	2.70%
Discount Rate (CPI 12-Month % Change, 30-Year Average):	2.50%

Low Pressure Sewer Initial Construction Costs

General Requirements	$115,000
Force Main Cleanout Structure	$55,200
2.5" PVC Sewer Pipe, incl. excavation & backfill	$28,000
Air/Vacuum Relief Valves	$10,500
Air/Vacuum Relief Vaults	$52,500
Precast Concrete Manholes incl. frame & cover	$6,000
3" PVC Sewer, incl. excavation & backfill	$84,150
3" HDPE Sewer Forcemain, directional drilled, in soi	$148,000
3" HDPE Sewer Forcemain, directional drilled, in roc	$425,500
Pipe Bedding Material	$4,900
Pipe Zone Backfill Material	$17,100
Gravel Subbase for Roads	$400
Surface / Miscellaneous Restoration	$5,140
Connection to existing gravity manhole	$6,000
Asphalt Pavement Replacement	$2,000
Replace Grinder Pumps	$64,800
Existing WWTP Decommissioning	$150,000
Sum	$1,175,190
Contingencies (10%)	$117,519
Estimated Construction Cost	$1,292,709
Engineering, Administrative, & Legal (20%)	$258,550
Total Project Cost	$1,551,260
Current WWTP Property Value	$31,700
Net Project Cost	$1,519,560
Net Project Cost (2022)	$1,580,960

Power Costs

Average Pump Run Time/year:	183
Horsepower hours/year:	6,570
KW hours/year:	4,901
Cost/KWH:	$0.18
Power Cost/year:	$883
2022 Power Cost	$919
Power P/A Factor with Geometric Gradient:	27.29
Power 2022 30-Year Cost:	$24,096

Notes:
1. Power costs calculated using estimated hours of operation and $0.18/KWH.

Low Pressure Sewer Maintenance Costs

Maintenance Costs

1st Year Maintenance Cost	$3,700
1st Year Odor Control Cost	$310
Annual Costs, 1st year of operation	$4,010
Maint P/A Factor with Geometric Gradient:	30.11
Yearly Maintenance 2022 30-Year Cost	$120,748

Capital Improvement Costs

Replacement of Air Release & Cleanout Valves	$860

Replacement Schedule

Years after Construction	Item	2022 Cost	F/P Factor	Future Dollars	P/F Factor	2022 30-Year Cost
15	ARV & CO	$12,900	1.49	$19,238	0.69	$13,284
			Capital Improvements 2022 30-Year Cost:			$13,290

Debt Reduction Costs

Debt and Interest	$10,200
Annual Cost, 1st year of operation (2022)	$10,000
Yearly P/A Factor with Geometric Gradient:	3.87
Yearly Maintenance 2022 30-Year Cost	$38,740

Sewer System Costs

Glenville Trans Fee	$12,160
Schenectady Trans Fee	$7,290
Annual Costs (2022)	$19,450
Sewer System Fee P/A Factor with Geometric Gradient:	30.11
Yearly Sewer System Fee 2022 30-Year Cost	$585,672

LPSS 30-Year Cost (2022):

LPSS Initial Construction 30-Year Cost (2022):	$1,580,960
LPSS Electricity 30-Year Cost (2022):	$24,096
LPSS Sewer Maintenance 30-Year Cost (2022):	$120,748
LPSS Pump Replacement 30-Year Cost (2022):	$13,290
Current WWTP Debt Reduction 30-Year Cost (2022):	$38,740
External Sewer System Usage Costs (2022):	$585,672
Total LPSS 30-Year Cost (2022):	$2,363,506
Say	$2,363,600

*Total is equal to the sum of the costs accumulated over the useful life (30 years) of the facility in terms of 2022 dollars

Town of Clifton Park
Riverview Landing WWTP Study
30-Year Cost Analysis

Alternative #3B - LPSS to Windhover Farms

Year of Proposed Construction (year X):	2022
Life Cycle (years):	30
Number of Simmplex Stations:	36
Length of forcemain, ft (all sizes)	7400
Air Release Valves & Cleanouts	15
Yearly Power Cost Increase (12-Month % Change, 30-Yr Avg):	2.00%
Yearly Labor Increase:	2.70%
Discount Rate (CPI 12-Month % Change, 30-Year Average):	2.50%

Low Pressure Sewer Initial Construction Costs

General Requirements	$112,000
Force Main Cleanout Structure	$89,700
2.5" PVC Sewer Pipe, incl. excavation & backfill	$28,000
Air/Vacuum Relief Valves	$3,500
Air/Vacuum Relief Vaults	$17,500
Precast Concrete Manholes incl. frame & cover	$6,000
8" PVC Sewer, incl. excavation & backfill	$84,150
3" HDPE Sewer Forcemain, directional drillec	$256,000
Pipe Bedding Material	$4,900
Pipe Zone Backfill Material	$17,100
Gravel Subbase for Roads	$400
Surface / Miscellaneous Restoration	$5,140
Connection to existing gravity manhole	$6,000
Asphalt Pavement Replacement	$2,000
Replace Grinder Pumps	$64,800
Existing WWTP Decommissioning	$150,000
Sum	$847,190
Contingencies (10%)	$84,720
Estimated Construction Cost	$931,910
Engineering, Administrative, & Legal (20%)	$186,390
Total Project Cost	$1,118,300
Current WWTP Property Value	$31,700
Net Project Cost	$1,086,600
Net Project Cost (2022)	$1,130,500

Power Costs

Average Pump Run Time/year:	183
Horsepower hours/year:	6,570
KW hours/year:	4,901
Cost/KWH:	$0.18
Power Cost/year:	$883
2022 Power Cost	$919
Power P/A Factor with Geometric Gradient:	27.29
Power 2022 30-Year Cost:	$24,097

Notes:
1. Power costs calculated using estimated hours of operation and $0.18/KWH.

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Maintenance Costs

Yearly Maintenance Cost	$4,720
1st Year Odor Control Cost	$310
Annual Costs, 1st year of operation	$5,010
Maint P/A Factor with Geometric Gradient:	30.11
Yearly Maintenance 2022 30-Year Cost	$150,859

Low Pressure Sewer Maintenance Costs

Capital Improvement Costs

Replacement of Air Release & Cleanout Valves	$860

Replacement Schedule

Years after Construction	Item	2022 Cost	F/P Factor	Future Dollars	P/F Factor	2022 30-Year Cost
15	ARV & CO	$12,900	1.49	$19,237	0.69	$13,283
			Capital Improvements 2022 30-Year Cost:			$13,290

Debt Reduction Costs

Debt and Interest	$10,200
Annual Cost, 1st year of operation (2022)	$10,000
Yearly P/A Factor with Geometric Gradient:	3.87
Yearly Maintenance 2022 30-Year Cost	$38,740

Sewer System Costs

Annual Costs (2022)	$10,410
Sewer System Fee P/A Factor with Geometric Gradient:	30.11
Yearly Sewer System Fee 2022 30-Year Cost	$313,463

LPSS 30-Year Cost (2022):

LPSS Initial Construction 30-Year Cost (2022):	$1,130,500
LPSS Electricity 30-Year Cost (2022):	$24,097
LPSS Sewer Maintenance 30-Year Cost (2022):	$150,859
LPSS Sewer Capital Improvement 30-Year Cost (2022):	$13,290
Current WWTP Debt Reduction Costs (2022):	$38,740
External Sewer System Usage Costs (2022):	$313,463
Total LPSS 30-Year Cost (2022):	$1,670,949
Say	$1,671,000

*Total is equal to the sum of the costs accumulated over the useful life (30 years) of the facility in terms of 2022 dollars

Town of Clifton Park
Riverview Landing WWTP Study
30-Year Cost Analysis

Alternative #3C - LPSS to MRCC WWTP

Year of Proposed Construction (year X):	2022
Life Cycle (years):	30
Number of Simmplex Stations:	37
Length of forcemain, ft (all sizes)	4100
Air Release Valves & Cleanouts	9
Yearly Power Cost Increase (12-Month % Change, 30-Yr Avg):	2.00%
Yearly Labor Increase:	2.70%
Discount Rate (CPI 12-Month % Change, 30-Year Average):	2.50%

Low Pressure Sewer Initial Construction Costs

General Requirements	$90,000
Force Main Cleanout Structure	$34,500
Extended Aeration Plant	$235,000
Air/Vacuum Relief Valves	$7,000
Air/Vacuum Relief Vaults	$35,000
Precast Concrete Manholes incl. frame & cover	$6,000
3" HDPE Sewer Forcemain, directional drilled, in soi	$82,000
3" HDPE Sewer Forcemain, directional drilled, in roci	$235,750
Gravel Subbase for Roads	$400
Connection to existing gravity manhole	$6,000
Asphalt Pavement Replacement	$2,000
Replace Grinder Pumps	$64,800
Existing WWTP Decommissioning	$150,000
Sum	$948,450
Contingencies (10%)	$94,850
Estimated Construction Cost	$1,043,300
Engineering, Administrative, & Legal (20%)	$208,660
Total Project Cost	$1,251,960
Current WWTP Property Value	$31,700
Net Project Cost	$1,220,260
Net Project Cost (2022)	$1,269,560

Grinder Pump Maintenance Costs

Grinder Pump Power Costs

Average Pump Run Time/year:	183
Horsepower hours/year:	6,570
KW hours/year:	4,901
Cost/KWH:	$0.18
Power Cost/year:	$883
Power Cost/year (2022):	$919
Power P/A Factor with Geometric Gradient:	27.29
Power 2022 30-Year Cost:	$24,097

Notes:
1. Power costs calculated using estimated hours of operation and $0.18/KWH.

Maintenance Costs

1st Year Maintenance Cost	$2,200
1st Year Odor Control Cost	$310
Annual Costs, 1st year of operation	$2,510
Maint P/A Factor with Geometric Gradient:	30.11
Yearly Maintenance 2022 30-Year Cost	$75,580

Capital Improvement Costs

Replacement of Air Release & Cleanout Valves	$860

Replacement Schedule

Years after Construction	Item	2022 Cost	F/P Factor	Future Dollars	P/F Factor	2022 30-Year Cost
15	ARV & CO	$7,740	1.49	$11,542	0.69	$7,970
				Capital Improvements 2022 30-Year Cost:		$7,970

Debt Reduction Costs

Debt and Interest	$10,200
Annual Cost, 1st year of operation (2022)	$10,000
Yearly P/A Factor with Geometric Gradient:	3.87
Yearly Maintenance 2022 30-Year Cost	$38,740

WWTP Power Costs (Riverview Landing Portion)

KW hours/year:	9,673
Cost/KWH:	$0.18
Power Cost/year:	$1,742
Power cost/year in 2022:	$1,813
Power P/A Factor with Geometric Gradient:	27.29
Power 2022 30-Year Cost:	$49,480

WWTP Maintenance Costs

1st Year SCADA Fee	$260
General equipment	$2,000
Maintenance contracts	$400
Labor (Operators, Admin, Benefits)	$31,000
Sewers (cleaning & TV)	$500
Fees (Insurance, legal, SPDES)	$2,000
Sewage Treatment (sludge disposal, chemicals, equipment, testing, fuel, & telephone	$5,500
Sum:	$41,660
Annual Costs, 1st year of operation (2022)	$43,210
Annual Costs, 1st year, RLSD	$31,839
Yearly P/A Factor with Geometric Gradient:	30.11
Yearly Maintenance 2022 30-Year Cost	$958,723

LPSS 30-Year Cost (2022):

LPSS Initial Construction 30-Year Cost (2022):	$1,269,560
LPSS Electricity 30-Year Cost (2022):	$24,097
LPSS Sewer Maintenance 30-Year Cost (2022):	$75,580
LPSS Sewer Capital Improvement 30-Year Cost (2022):	$7,970
Current WWTP Debt Reduction Costs (2022):	$38,740
MRCC WWTP Power Cost 30-Year Cost (2022):	$49,480
MRCC WWTP Maintenance 30-Year Cost (2022):	$958,723
Total LPSS 30-Year Cost (2022):	$2,424,150
Say	$2,424,200

*Total is equal to the sum of the costs accumulated over the useful life (30 years) of the facility in terms of 2022 dollars

EXHIBIT 8
ANNUAL COSTS TO A TYPICAL PROPERTY

EXHIBIT 8

ANNUAL COSTS TO A TYPICAL PROPERTY - 2022

ANNUAL COST FOR OPTION 1A;	
DEBT SERVICE UNIT COST OPTION 1A;	
Option 1A Cost	$1,128,830
Annual Debt Service	$73,374
Riverview Landing Units	38
Annual DEBT SERVICE COST/UNIT	$1,931
OPERATION AND MAINTENANCE COSTS	
Labor	$12,500
Maintenance	$8,500
Equipment	$2,800
Engineering	$500
Total O&M	$24,300
Riverview Landing Units	36
Annual O&M COST/UNIT	$675
Annual DEBT REDUCTION COST/UNIT	$263
Annual COST/UNIT (2022)	$2,869

ANNUAL COST FOR OPTION 1B;	
DEBT SERVICE UNIT COST OPTION 1B;	
Option 1B Cost	$1,805,465
Annual Debt Service	$117,355
Riverview Landing Units	38
Annual DEBT SERVICE COST/UNIT	$3,089
OPERATION AND MAINTENANCE COSTS	
Labor & Lab Testing	$12,500
Maintenance	$12,110
Fees (inc. cellular data)	$2,125
Power & SCADA	$2,042
Total O&M	$28,777
Riverview Landing Units	36
Annual O&M COST/UNIT	$800
Annual DEBT REDUCTION COST/UNIT	$263
Annual COST/UNIT	$4,152

ANNUAL COST FOR OPTION 1C;	
DEBT SERVICE UNIT COST OPTION 1C;	
Option 1C Cost	$1,522,420
Annual Debt Service	$98,957
Riverview Landing Units	38
Annual DEBT SERVICE COST/UNIT	$2,605
OPERATION AND MAINTENANCE COSTS	
SCADA & Equipment	$260
Maintenance & Contracts	$13,000
Labor	$31,000
Fees	$2,000
Power	$1,816
Total	$48,076
Riverview Landing Units	36
Annual O&M COST/UNIT	$1,336
Annual DEBT REDUCTION COST/UNIT	$263
Annual COST/UNIT	$4,204

ANNUAL COST FOR OPTION 2A;	
DEBT SERVICE UNIT COST OPTION 2A;	
Option 2A Cost	$1,557,280
Annual Debt Service	$101,223
Riverview Landing Units	38
Annual DEBT SERVICE COST/UNIT	$2,664
OPERATION AND MAINTENANCE COSTS	
SCADA	$260
Station & Sewer Maintenance	$14,133
Power	$350
Subtotal:	$14,743
SEWER COSTS	
Schenectady ($2.85/1000 gallons)	$7,290
Glenville ($320/unit)	$12,160
Subtotal:	$19,450
O&M / Sewer Total	$34,193
Riverview Landing Units	36
Annual O&M & SEWER COST/UNIT	$950
Annual DEBT REDUCTION COST/UNIT	$263
Annual COST/UNIT	$3,877

ANNUAL COST FOR OPTION 2B;	
DEBT SERVICE UNIT COST OPTION 2B;	
Option 2B Cost	$1,485,169
Annual Debt Service	$96,536
Riverview Landing Units	38
Annual DEBT SERVICE COST/UNIT	$2,541
OPERATION AND MAINTENANCE COSTS	
SCADA	$260
Station & Sewer Maintenance	$15,140
Power	$313
Total	$15,713
SEWER COSTS	
Saratoga County ($250/unit)	$10,600
O&M / Sewer Total	$26,313
Riverview Landing Units	36
Annual O&M & WWTP COST/UNIT	$731
Annual DEBT REDUCTION COST/UNIT	$263
Annual COST/UNIT	$3,535

ANNUAL COST FOR OPTION 2C;	
DEBT SERVICE UNIT COST OPTION 2C;	
Option 2C Cost	$1,403,270
Annual Debt Service	$91,213
Riverview Landing Units	38
Annual DEBT SERVICE COST/UNIT	$2,401
OPERATION AND MAINTENANCE COSTS	
SCADA	$520
Power	$1,535
Station & Sewer Maintenance	$12,652
WWTP Maintenance	$31,839
Total	$46,546
Riverview Landing Units	36
Annual O&M COST/UNIT	$1,293
Annual DEBT REDUCTION COST/UNIT	$263
Annual COST/UNIT	$3,957

ANNUAL COST FOR OPTION 3A;	
DEBT SERVICE UNIT COST OPTION 3A;	
Option 3A Cost	$1,580,960
Annual Debt Service	$102,762
Riverview Landing Units	38
Annual DEBT SERVICE COST/UNIT	$2,710
OPERATION AND MAINTENANCE COSTS	
Sewer Maintenance	$4,010
Power	$921
Subtotal	$4,931
SEWER COSTS	
Schenectady ($2.85/1000 gallons)	$7,290
Glenville ($320/unit)	$12,160
Subtotal	$19,450
Riverview Landing Units	36
ANNUAL O&M & SEWER COST/UNIT	$642
Annual DEBT REDUCTION COST/UNIT	$263
Annual COST/UNIT	$3,615

ANNUAL COST FOR OPTION 3B;	
DEBT SERVICE UNIT COST OPTION 3B;	
Option 3B Cost	$1,130,500
Annual Debt Service	$73,483
Riverview Landing Units	38
Annual DEBT SERVICE COST/UNIT	$1,940
OPERATION AND MAINTENANCE COSTS	
Sewer Maintenance	$5,010
Power	$921
Subtotal	$5,931
SEWER COSTS	
Saratoga County ($250/unit)	$9,500
Riverview Landing Units	36
Annual O&M & SEWER COST/UNIT	$429
Annual DEBT REDUCTION COST/UNIT	$263
Annual COST/UNIT	$2,632

NOT FEASIBLE

ANNUAL COST FOR OPTION 3C;	
DEBT SERVICE UNIT COST OPTION 3C;	
Option 3C Cost	$1,269,560
Annual Debt Service	$82,521
Riverview Landing Units	38
Annual DEBT SERVICE COST/UNIT	$2,180
OPERATION AND MAINTENANCE COSTS	
Sewer Maintenance	$2,510
Power	$2,737
WWTP Maintenance	$31,839
Total	$37,086
Riverview Landing Units	36
Annual O&M COST/UNIT	$1,031
Annual DEBT REDUCTION COST/UNIT	$263
Annual COST/UNIT	$3,474

EXHIBIT 8

ANNUAL COSTS TO A TYPICAL PROPERTY - 2024

ANNUAL COST FOR OPTION 1A;	
DEBT SERVICE UNIT COST OPTION 1A;	
Option 1A Cost	$1,128,830
Annual Debt Service	$73,374
Riverview Landing Units	38
Annual DEBT SERVICE COST/UNIT	$1,931
OPERATION AND MAINTENANCE COSTS	
Labor	$13,190
Maintenance	$8,970
Equipment	$2,950
Engineering	$520
Total O&M	$25,630
Riverview Landing Units	36
Annual O&M COST/UNIT	$712
Annual COST/UNIT (2024)	$2,643

ANNUAL COST FOR OPTION 1B;	
DEBT SERVICE UNIT COST OPTION 1B;	
Option 1B Cost	$1,805,465
Annual Debt Service	$117,355
Riverview Landing Units	38
Annual DEBT SERVICE COST/UNIT	$3,089
OPERATION AND MAINTENANCE COSTS	
Labor & Lab Testing	$13,190
Maintenance	$12,780
Fees (inc. cellular data)	$2,240
Power & SCADA	$2,120
Total O&M	$30,330
Riverview Landing Units	36
Annual O&M COST/UNIT	$843
Annual COST/UNIT	$3,932

ANNUAL COST FOR OPTION 1C;	
DEBT SERVICE UNIT COST OPTION 1C;	
Option 1C Cost	$1,522,420
Annual Debt Service	$98,957
Riverview Landing Units	38
Annual DEBT SERVICE COST/UNIT	$2,605
OPERATION AND MAINTENANCE COSTS	
SCADA & Equipment	$280
Maintenance & Contracts	$13,580
Labor	$32,700
Fees	$2,120
Power	$1,900
Total	$50,580
Riverview Landing Units	36
Annual O&M COST/UNIT	$1,405
Annual COST/UNIT	$4,010

ANNUAL COST FOR OPTION 2A;	
DEBT SERVICE UNIT COST OPTION 2A;	
Option 2A Cost	$1,557,280
Annual Debt Service	$101,223
Riverview Landing Units	38
Annual DEBT SERVICE COST/UNIT	$2,664
OPERATION AND MAINTENANCE COSTS	
SCADA	$280
Station & Sewer Maintenance	$14,330
Power	$370
Subtotal:	$14,980
SEWER COSTS	
Schenectady ($2.85/1000 gallons)	$7,290
Glenville ($320/unit)	$12,160
Subtotal:	$19,450
O&M / Sewer Total	$34,430
Riverview Landing Units	36
Annual O&M & SEWER COST/UNIT	$957
Annual COST/UNIT	$3,621

ANNUAL COST FOR OPTION 2B;	
DEBT SERVICE UNIT COST OPTION 2B;	
Option 2B Cost	$1,485,169
Annual Debt Service	$96,536
Riverview Landing Units	38
Annual DEBT SERVICE COST/UNIT	$2,541
OPERATION AND MAINTENANCE COSTS	
SCADA	$280
Station & Sewer Maintenance	$15,410
Power	$330
Total	$16,020
SEWER COSTS	
Saratoga County ($250/unit)	$10,600
O&M / Sewer Total	$26,620
Riverview Landing Units	36
Annual O&M & WWTP COST/UNIT	$740
Annual COST/UNIT	$3,281

ANNUAL COST FOR OPTION 2C;	
DEBT SERVICE UNIT COST OPTION 2C;	
Option 2C Cost	$1,403,270
Annual Debt Service	$91,213
Riverview Landing Units	38
Annual DEBT SERVICE COST/UNIT	$2,401
OPERATION AND MAINTENANCE COSTS	
SCADA	$540
Power	$1,600
Station & Sewer Maintenance	$12,780
WWTP Maintenance	$33,590
Total	$48,510
Riverview Landing Units	36
Annual O&M COST/UNIT	$1,348
Annual COST/UNIT	$3,749

ANNUAL COST FOR OPTION 3A;	
DEBT SERVICE UNIT COST OPTION 3A;	
Option 3A Cost	$1,580,960
Annual Debt Service	$102,762
Riverview Landing Units	38
Annual DEBT SERVICE COST/UNIT	$2,710
OPERATION AND MAINTENANCE COSTS	
Sewer Maintenance	$4,030
Power	$970
Subtotal	$5,000
SEWER COSTS	
Schenectady ($2.85/1000 gallons)	$7,290
Glenville ($320/unit)	$12,160
Subtotal	$19,450
Riverview Landing Units	36
ANNUAL O&M & SEWER COST/UNIT	$644
Annual COST/UNIT	$3,354

ANNUAL COST FOR OPTION 3B;	
DEBT SERVICE UNIT COST OPTION 3B;	
Option 3B Cost	$1,130,500
Annual Debt Service	$73,483
Riverview Landing Units	38
Annual DEBT SERVICE COST/UNIT	$1,940
OPERATION AND MAINTENANCE COSTS	
Sewer Maintenance	$5,290
Power	$970
Subtotal	$6,260
SEWER COSTS	
Saratoga County ($250/unit)	$9,500
Riverview Landing Units	36
Annual O&M & SEWER COST/UNIT	$438
Annual COST/UNIT	$2,378

NOT FEASIBLE

ANNUAL COST FOR OPTION 3C;	
DEBT SERVICE UNIT COST OPTION 3C;	
Option 3C Cost	$1,269,560
Annual Debt Service	$82,521
Riverview Landing Units	38
Annual DEBT SERVICE COST/UNIT	$2,180
OPERATION AND MAINTENANCE COSTS	
Sewer Maintenance	$2,650
Power	$2,820
WWTP Maintenance	$33,590
Total	$39,060
Riverview Landing Units	36
Annual O&M COST/UNIT	$1,085
Annual COST/UNIT	$3,265

EXHIBIT 9
PUMP STATION DESIGN CALCULATIONS

Town of Clifton Park
Riverview Landing WWTP Study
Exhibit 9
Option 2A - Pump Station Design

SECTION	ITEM	VALUE	UNITS		
FLOW					
RESIDENTIAL USERS					
Based on population served	<INPUT> Number of Houses Served	36	EACH		
Assume 3 people/household if no data given	<INPUT> Number of People Per House	3.00	EACH		
	Residential Population Served	108	EACH		
	<INPUT> Per Capita Wastewater Flow	100	GPD		
	Total Residential Flow	7,000	GPD		
COMMERCIAL AND INDUSTRIAL METERED USERS					
Average Daily Flow and Peak Flow should be based on actual water use records and operating shift durations where possible	<INPUT> User #1 Average Meter Value	0	GPD	Name	Name
	<INPUT> User #2 Average Meter Value	0	GPD	Name	Name
	<INPUT> User #3 Average Meter Value	0	GPD	Name	Name
	<INPUT> User #4 Average Meter Value	0	GPD	Name	Name
	<INPUT> User #5 Average Meter Value	0	GPD		
	<INPUT> User #6 Average Meter Value	0	GPD	Name	Name
	<INPUT> User #7 Average Meter Value	0	GPD	Future Allowance	Future Allowance
	Total Daily Commercial Flow	0	GPD		
Total Average Daily Flow	Average Daily Flow Rate	7,000	GPD		
	Average Daily Flow Rate	4.86	GPM		
	<INPUT>Peak Hr. Flow Factor	Peak hour flow estimate provided by manufacturer			
	Peak Hr. Flow	66.00	GPM		
LIFT STATION DESIGN					
	Design Flow	66.00	GPM		
	Design Pump Capacity	70.00	GPM		
DESIGN STORAGE VOLUME					
(DESIGN FOR 30 MIN ADF STORAGE CAPACITY)					
	Min. Volume (Required)	145.83	GAL		
	Volume (Required)	19.49	FT^3		
Wetwell Sizing	<INPUT>Diameter	4.00	FT		
Note: Suction inlet pipe mouth should be submerged at least 12".	<INPUT>Depth Below Inlet Inv. (Inv. In - Lowest Pump Off)	4.50	FT	Grade	Grade
	Storage Vol. Per Vert. Ft.	12.57	FT^3		
	Total Storage Volume Below Inv.	56.55	FT^3		
	Total Storage Volume(Gals.)	422.98	GAL		
	Is Proposed Volume Adequate?	YES			
CYCLE TIME					
	<INPUT> Pump Drawdown Depth	2.00	FT		
	Drawdown Volume (No Inflow)	187.99	Gals.		
	<INPUT> Pump Discharge Rate	70.00	GPM		
	Pump Run Time (No Inflow)	2.69	MIN		
Min. pump run time should be >1 minute	Pump Run Time (With Inflow)	2.89	MIN		
	Pump Off Time (With Inflow)	38.67	MIN		
	Average Cycle Time	41.56	MIN		
	Avg. Cycles Per Hr.	1.44	CYCLES/HR		
	Avg. Cycles Per Day	34.65	CYCLES/DAY		
	Avg. Cycles Per Year	12,647.13	CYCLES/YR		
	Avg. Pump Run Time/Year	608.33	HRS.		
STATIC HEAD					
	<INPUT>Lowest Suction WS Elev.	317.00	FT		
	<INPUT>Highest Disch. WS Elev.	336.00	FT		

Town of Clifton Park
Riverview Landing WWTP Study
Exhibit 9
Option 2A - Pump Station Design

	Computed Static Head	19.00	FT		
FORCE MAIN LENGTH	<INPUT> Actual Length	7,400	FT		
	<INPUT> Equiv. Length Ftgs.	740	FT		
	Total Equival. Length	8,140	FT		
FORCE MAIN EVALUATION					
Try a minimum of three (3) sizes	<INPUT> Diameter of Pipe, Inches	**1.50**	**2.00**	**3.00**	**4.00**
	Area of Flow (A)	0.012	0.022	0.049	0.087
	Gal./Ft of Pipe	0.092	0.163	0.367	0.653
	Force Main Volume, Gals.	679.271	1207.593	2717.085	4830.373
Maximum horsepower is calculated using a Hazen-Williams	Pump Discharge Rate, GPM	70.00	70.00	70.00	70.00
Coefficient of 120	Velocity, Ft/Sec	12.71	7.15	3.18	1.79
Actual horsepower is calculated using a Hazen-Williams	<INPUT>Hazen-Wms. "C" Factor	140.00	140.00	140.00	140.00
Coefficient of 140	Hydraulic Radius, Ft.	0.0313	0.0417	0.0625	0.0833
	Friction Loss, Ft/1,000	408.79	100.70	13.98	3.44
Check Motor HP Using	Total FM Friction Loss, Ft	3327.51	819.72	113.79	28.03
Coeff. of 140 on pump curve	Static Head, Ft.	19.00	19.00	19.00	19.00
	Total Dynamic Head, Ft	3346.51	838.72	132.79	47.03
	<INPUT> Wire to Water Effic., E	0.60	0.60	0.60	0.60
	Computed HP Req'd.	98.55	24.70	3.91	1.39
	HP-Hrs/Yr.	59,953	15,026	2,379	843
	Kw-Hrs/Yr	44,725	11,209	1,775	629
	<INPUT> Cost/Kw-hr, $	0.17	0.17	0.17	0.17
	Power Cost/Year	$7,603	$1,906	$302	$107
	Is Velocity > 2FPS	Yes	Yes	Yes	No
	FM Detention Time @ Flow, Min.	9.70	17.25	38.82	69.01
	Is Pump On Time > FM Det. Time	No	No	No	No
Riverview Landing PS					
Pump Design:	**70 gpm @ 140' TDH**				

Town of Clifton Park
Riverview Landing WWTP Study
Exhibit 9
Option 2B - Pump Station Design

SECTION	ITEM	VALUE	UNITS		
FLOW					
RESIDENTIAL USERS					
Based on population served	<INPUT> Number of Houses Served	36	EACH		
Assume 3 people/household if no data given	<INPUT> Number of People Per House	3.00	EACH		
	Residential Population Served	108	EACH		
	<INPUT> Per Capita Wastewater Flow	100	GPD		
	Total Residential Flow	7,000	GPD		
COMMERCIAL AND INDUSTRIAL METERED USERS					
Average Daily Flow and Peak Flow should be based on actual water use records and operating shift durations where possible	<INPUT> User #1 Average Meter Value	0	GPD	Name	Name
	<INPUT> User #2 Average Meter Value	0	GPD	Name	Name
	<INPUT> User #3 Average Meter Value	0	GPD	Name	Name
	<INPUT> User #4 Average Meter Value	0	GPD	Name	Name
	<INPUT> User #5 Average Meter Value	0	GPD		
	<INPUT> User #6 Average Meter Value	0	GPD	Name	Name
	<INPUT> User #7 Average Meter Value	0	GPD	Future Allowance	Future Allowance
	Total Daily Commercial Flow	0	GPD		
Total Average Daily Flow	Average Daily Flow Rate	7,000	GPD		
	Average Daily Flow Rate	4.86	GPM		
	Peak Hr. Flow	66.00	GPM		
LIFT STATION DESIGN					
	Design Flow	66.00	GPM		
	Design Pump Capacity	80.00	GPM		
DESIGN STORAGE VOLUME					
(DESIGN FOR 30 MIN ADF STORAGE CAPACITY)					
	Min. Volume (Required)	145.83	GAL		
	Volume (Required)	19.49	FT^3		
Wetwell Sizing	<INPUT>Diameter	4.00	FT		
Note: Suction inlet pipe mouth should be submerged at least 12".	<INPUT>Depth Below Inlet Inv. (Inv. In - Lowest Pump Off)	4.50	FT	Grade	Grade
	Storage Vol. Per Vert. Ft.	12.57	FT^3		
	Total Storage Volume Below Inv.	56.55	FT^3		
	Total Storage Volume(Gals.)	422.98	GAL		
	Is Proposed Volume Adequate?	YES			
CYCLE TIME					
	<INPUT> Pump Drawdown Depth	2.00	FT		
	Drawdown Volume (No Inflow)	187.99	Gals.		
	<INPUT> Pump Discharge Rate	80.00	GPM		
	Pump Run Time (No Inflow)	2.35	MIN		
Min. pump run time should be >1 minute	Pump Run Time (With Inflow)	2.50	MIN		
	Pump Off Time (With Inflow)	38.67	MIN		
	Average Cycle Time	41.17	MIN		
	Avg. Cycles Per Hr.	1.46	CYCLES/HR		
	Avg. Cycles Per Day	34.97	CYCLES/DAY		
	Avg. Cycles Per Year	12,765.11	CYCLES/YR		
	Avg. Pump Run Time/Year	532.29	HRS.		
STATIC HEAD					
	<INPUT>Lowest Suction WS Elev.	301.00	FT		
	<INPUT>Highest Disch. WS Elev.	348.00	FT		
	Computed Static Head	47.00	FT		

Town of Clifton Park
Riverview Landing WWTP Study
Exhibit 9
Option 2B - Pump Station Design

FORCE MAIN LENGTH	<INPUT> Actual Length	6,400	FT	<INPUT> Actual Length	3,400
	<INPUT> Equiv. Length Ftgs.	640	FT	<INPUT> Equiv. Length Ftgs.	340
	Total Equival. Length	7,040	FT	Total Equival. Length	3,740
FORCE MAIN EVALUATION				Section A to 2" on Penfield Drive	Section B to existing Settler's Hill P.S.
Try a minimum of three (3) sizes	<INPUT> Diameter of Pipe, Inches	**1.50**	**2.00**	**3.00**	**3.00**
	Area of Flow (A)	0.012	0.022	0.049	0.049
	Gal./Ft of Pipe	0.092	0.163	0.367	0.367
	Force Main Volume, Gals.	587.478	1044.405	2349.911	1248.390
Maximum horsepower is calculated using a Hazen-Williams	Pump Discharge Rate, GPM	70.00	70.00	70.00	125.00
Coefficient of 120	Velocity, Ft/Sec	12.71	7.15	3.18	5.67
Actual horsepower is calculated using a Hazen-Williams	<INPUT>Hazen-Wms. "C" Factor	140.00	140.00	140.00	140.00
Coefficient of 140	Hydraulic Radius, Ft.	0.0313	0.0417	0.0625	0.0625
	Friction Loss, Ft/1,000	408.79	100.70	13.98	40.86
Check Motor HP Using	Total FM Friction Loss, Ft	2877.85	708.95	98.41	152.83
Coeff. of 140 on pump curve	Static Head, Ft.	47.00	47.00	47.00	8.00
	Total Dynamic Head, Ft	2924.85	755.95	**145.41**	**160.83**
	<INPUT> Wire to Water Effic., E	0.60	0.60	0.60	0.60
	Computed HP Req'd.	86.14	22.26	4.28	8.46
	HP-Hrs/Yr.	45,849	11,850	2,279	4,502
	Kw-Hrs/Yr	34,203	8,840	1,700	3,358
	<INPUT> Cost/Kw-hr, $	0.17	0.17	0.17	0.17
	Power Cost/Year	$5,815	$1,503	$289	$571
	Is Velocity > 2FPS	Yes	Yes	Yes	Yes
	FM Detention Time @ Flow, Min.	8.39	14.92	33.57	9.99
	Is Pump On Time > FM Det. Time	No	No	No	No
Riverview Landing PS					
Pump Design:	Additional head in Windhover mains equals 96 feet				
	70 gpm @ 310' TDH				

Town of Clifton Park
Riverview Landing WWTP Study
Exhibit 9
Option 2C - Pump Station Design

SECTION	ITEM	VALUE	UNITS		
FLOW					
RESIDENTIAL USERS					
Based on population served	<INPUT> Number of Houses Served	36	EACH		
Assume 3 people/household if no data given	<INPUT> Number of People Per House	3.00	EACH		
	Residential Population Served	108	EACH		
	<INPUT> Per Capita Wastewater Flow	100	GPD		
	Total Residential Flow	7,000	GPD		
COMMERCIAL AND INDUSTRIAL METERED USERS					
Average Daily Flow and Peak Flow should be based on actual	<INPUT> User #1 Average Meter Value	0	GPD	Name	Name
water use records and operating shift durations where possible	<INPUT> User #2 Average Meter Value	0	GPD	Name	Name
	<INPUT> User #3 Average Meter Value	0	GPD	Name	Name
	<INPUT> User #4 Average Meter Value	0	GPD	Name	Name
	<INPUT> User #5 Average Meter Value	0	GPD		
	<INPUT> User #6 Average Meter Value	0	GPD	Name	Name
	<INPUT> User #7 Average Meter Value	0	GPD	Future Allowance	Future Allowance
	Total Daily Commercial Flow	0	GPD		
Total Average Daily Flow	Average Daily Flow Rate	7,000	GPD		
	Average Daily Flow Rate	4.86	GPM		
	<INPUT>Peak Hr. Flow Factor	Peak hour flow from grinder pump manufacturer			
	Peak Hr. Flow	66.00	GPM		
LIFT STATION DESIGN					
	Design Flow	66.00	GPM		
	Design Pump Capacity	70.00	GPM		
DESIGN STORAGE VOLUME					
(DESIGN FOR 30 MIN ADF STORAGE CAPACITY)					
	Min. Volume (Required)	145.83	GAL		
	Volume (Required)	19.49	FT^3		
Wetwell Sizing	<INPUT>Diameter	4.00	FT		
Note: Suction inlet pipe mouth should be submerged at least 12".	<INPUT>Depth Below Inlet Inv. (Inv. In - Lowest Pump Off)	4.50	FT	Grade	Grade
	Storage Vol. Per Vert. Ft.	12.57	FT^3		
	Total Storage Volume Below Inv.	56.55	FT^3		
	Total Storage Volume(Gals.)	422.98	GAL		
	Is Proposed Volume Adequate?	YES			
CYCLE TIME					
	<INPUT> Pump Drawdown Depth	2.00	FT		
	Drawdown Volume (No Inflow)	187.99	Gals.		
	<INPUT> Pump Discharge Rate	70.00	GPM		
	Pump Run Time (No Inflow)	2.69	MIN		
Min. pump run time should be >1 minute	Pump Run Time (With Inflow)	2.89	MIN		
	Pump Off Time (With Inflow)	38.67	MIN		
	Average Cycle Time	41.56	MIN		
	Avg. Cycles Per Hr.	1.44	CYCLES/HR		
	Avg. Cycles Per Day	34.65	CYCLES/DAY		
	Avg. Cycles Per Year	12,647.13	CYCLES/YR		
	Avg. Pump Run Time/Year	608.33	HRS.		
STATIC HEAD					
	<INPUT>Lowest Suction WS Elev.	317.00	FT		
	<INPUT>Highest Disch. WS Elev.	328.00	FT		

Town of Clifton Park
Riverview Landing WWTP Study
Exhibit 9
Option 2C - Pump Station Design

	Computed Static Head	11.00	FT		
FORCE MAIN LENGTH	<INPUT> Actual Length	4,200	FT		
	<INPUT> Equiv. Length Ftgs.	420	FT		
	Total Equival. Length	4,620	FT		
FORCE MAIN EVALUATION					
Try a minimum of three (3) sizes	<INPUT> Diameter of Pipe, Inches	**1.50**	**2.00**	**3.00**	**4.00**
	Area of Flow (A)	0.012	0.022	0.049	0.087
	Gal./Ft of Pipe	0.092	0.163	0.367	0.653
	Force Main Volume, Gals.	385.532	685.391	1542.129	2741.563
Maximum horsepower is calculated using a Hazen-Williams	Pump Discharge Rate, GPM	70.00	70.00	70.00	70.00
Coefficient of 120	Velocity, Ft/Sec	12.71	7.15	3.18	1.79
Actual horsepower is calculated using a Hazen-Williams	<INPUT>Hazen-Wms. "C" Factor	140.00	140.00	140.00	140.00
Coefficient of 140	Hydraulic Radius, Ft.	0.0313	0.0417	0.0625	0.0833
	Friction Loss, Ft/1,000	408.79	100.70	13.98	3.44
Check Motor HP Using	Total FM Friction Loss, Ft	1888.59	465.25	64.58	15.91
Coeff. of 140 on pump curve	Static Head, Ft.	11.00	11.00	11.00	11.00
	Total Dynamic Head, Ft	1899.59	476.25	75.58	26.91
	<INPUT> Wire to Water Effic., E	0.60	0.60	0.60	0.60
	Computed HP Req'd.	55.94	14.03	2.23	0.79
	HP-Hrs/Yr.	34,031	8,532	1,354	482
	Kw-Hrs/Yr	25,387	6,365	1,010	360
	<INPUT> Cost/Kw-hr, $	0.17	0.17	0.17	0.17
	Power Cost/Year	$4,316	$1,082	$172	$61
	Is Velocity > 2FPS	Yes	Yes	Yes	No
	FM Detention Time @ Flow, Min.	5.51	9.79	22.03	39.17
	Is Pump On Time > FM Det. Time	No	No	No	No
Riverview Landing PS					
Pump Design:	**70 gpm @ 80' TDH**				

EXHIBIT 10
HEADLOSS CALCULATIONS

Riverview Landing WWTP Study
Exhibit 10
Headloss Calculations (West to East: Windhover Farms)

Grinder Pump Network from west to east using existing pipes

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Pipe Diameter	**1.50**	**1.50**	**8.00**	**3.00**	**1.50**	**3.00**	**1.50**	**2.00**	**1.50**	**1.50**	**1.50**	**3.00**	**2.50**	**2.50**	**1.50**	**2.50**	**1.50**	**2.50**	**2.00**	**2.50**	**3.00**	**3.00**	**3.00**
Pipe Area	0.012	0.012	0.349	0.049	0.012	0.049	0.012	0.022	0.012	0.012	0.012	0.049	0.034	0.034	0.012	0.034	0.012	0.034	0.022	0.034	0.049	0.049	0.049
Gal/ft	0.092	0.092	2.611	0.367	0.092	0.367	0.092	0.163	0.092	0.092	0.092	0.367	0.255	0.255	0.092	0.255	0.092	0.255	0.163	0.255	0.367	0.367	0.367
Force main volume	45.897	22.948	1697.158	342.940	32.128	62.420	27.538	114.232	55.076	45.897	73.435	183.587	254.982	68.845	41.307	152.989	41.307	66.295	81.594	229.484	1468.695	550.760	1578.847
Pump Discharge Rate, GPM	22.00	11.00	22.00	22.00	22.00	33.00	22.00	33.00	22.00	22.00	22.00	55.00	55.00	55.00	22.00	66.00	11.00	66.00	22.00	22.00	66.00	66.00	66.00
Velocity, Ft/Sec	3.99	2.00	0.14	1.00	3.99	1.50	3.99	3.37	3.99	3.99	3.99	2.50	3.60	3.60	3.99	4.31	2.00	4.31	2.25	1.44	3.00	3.00	3.00
<INPUT>Hazen-Wms. "C" Factor	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
Hydraulic Radius, Ft.	0.0313	0.0313	0.1667	0.0625	0.0313	0.0625	0.0313	0.0417	0.0313	0.0313	0.0313	0.0625	0.0521	0.0521	0.0313	0.0521	0.0313	0.0521	0.0417	0.0521	0.0625	0.0625	0.0625
Friction Loss, Ft/1,000	42.28	11.73	0.01	1.45	42.28	3.06	42.28	22.05	42.28	42.28	42.28	7.88	19.14	19.14	42.28	26.82	11.73	26.82	10.42	3.51	11.03	11.03	11.03
Total FM Friction Loss, Ft	21.14	2.93	0.01	1.35	14.80	0.52	12.68	15.44	25.37	21.14	33.82	3.94	19.14	5.17	19.03	16.09	5.28	6.97	5.21	3.16	44.14	16.55	47.45
Static Head, Ft.	2.00	8.00	10.00	13.00	5.00	0.00	0.00	17.00	0.00	0.00	0.00	0.00	19.00	6.00	3.00	0.00	7.00	0.00	26.00	0.00	35.00	3.00	17.00
Total Dynamic Head, Ft	23.14	10.93	10.01	14.35	19.80	0.52	12.68	32.44	25.37	21.14	33.82	3.94	38.14	11.17	22.03	16.09	12.28	6.97	31.21	3.16	79.14	19.55	64.45
<INPUT> Wire to Water Effic., E	0.60	1.60	1.60	0.60	1.60	0.60	1.60	2.60	3.60	4.60	5.60	0.60	0.60	0.60	1.60	0.60	1.60	0.60	0.60	0.60	0.60	0.60	0.60
Computed HP Req'd.	0.21	0.02	0.03	0.13	0.07	0.01	0.04	0.10	0.04	0.03	0.03	0.09	0.88	0.26	0.08	0.45	0.02	0.19	0.29	0.03	2.20	0.54	1.79

TOTAL HEAD (Farthest House) = 287.47 ft

total volumetric flow rate = 11700 11700 11700

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Pipe lengths (ft)	500	250	650	934	350	170	300	700	600	500	800	500	1000	270	450	600	450	260	500	900	4000	1500	4300
# of houses using pipe	2	1	2	2	2	7	2	6	2	2	2	21	25	25	2	32	1	34	3	4	36	36	36
Static head (ft)	2	8	10	13	5	0	0	17	0	0	0	0	19	6	3	0	7	0	26	0	35	3	17
Max # of pumps operating simultaneously	2	1	2	2	2	3	2	3	2	2	2	5	5	5	2	6	1	6	2	2	6	6	6

Grinder Pump Network from farthest house to Windhover Acres with replacement pipes

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Pipe Diameter	**1.50**	**1.50**	**2.00**	**2.00**	**1.50**	**2.50**	**1.50**	**2.50**	**1.50**	**1.50**	**1.50**	**3.00**	**3.00**	**3.00**	**1.50**	**3.00**	**1.50**	**3.00**	**2.00**	**2.00**	**3.00**	**3.00**	**3.00**
Pipe Area	0.012	0.012	0.022	0.022	0.012	0.034	0.012	0.034	0.012	0.012	0.012	0.049	0.049	0.049	0.012	0.049	0.012	0.049	0.022	0.022	0.049	0.049	0.049
Gal/ft	0.092	0.092	0.163	0.163	0.092	0.255	0.092	0.255	0.092	0.092	0.092	0.367	0.367	0.367	0.092	0.367	0.092	0.367	0.163	0.163	0.367	0.367	0.367
Force main volume	45.897	22.948	106.072	152.418	32.128	43.347	27.538	178.487	55.076	45.897	73.435	183.587	367.174	99.137	41.307	220.304	41.307	95.465	81.594	146.869	1468.695	550.760	1578.847
Pump Discharge Rate, GPM	22.00	11.00	22.00	22.00	22.00	33.00	22.00	33.00	22.00	22.00	22.00	55.00	55.00	55.00	22.00	66.00	11.00	66.00	22.00	22.00	66.00	66.00	66.00
Velocity, Ft/Sec	3.99	2.00	2.25	2.25	3.99	2.16	3.99	2.16	3.99	3.99	3.99	2.50	2.50	2.50	3.99	3.00	2.00	3.00	2.25	2.25	3.00	3.00	3.00
<INPUT>Hazen-Wms. "C" Factor	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
Hydraulic Radius, Ft.	0.0313	0.0313	0.0417	0.0417	0.0313	0.0521	0.0313	0.0521	0.0313	0.0313	0.0313	0.0625	0.0625	0.0625	0.0313	0.0625	0.0313	0.0625	0.0417	0.0417	0.0625	0.0625	0.0625
Friction Loss, Ft/1,000	42.28	11.73	10.42	10.42	42.28	7.44	42.28	7.44	42.28	42.28	42.28	7.88	7.88	7.88	42.28	11.03	11.73	11.03	10.42	10.42	11.03	11.03	11.03
Total FM Friction Loss, Ft	21.14	2.93	6.77	9.73	14.80	1.26	12.68	5.21	25.37	21.14	33.82	3.94	7.88	2.13	19.03	6.62	5.28	2.87	5.21	9.37	44.14	16.55	47.45
Static Head, Ft.	2.00	8.00	10.00	13.00	5.00	0.00	0.00	17.00	0.00	0.00	0.00	0.00	19.00	6.00	3.00	0.00	7.00	0.00	26.00	0.00	35.00	3.00	17.00
Total Dynamic Head, Ft	23.14	10.93	16.77	22.73	19.80	1.26	12.68	22.21	25.37	21.14	33.82	3.94	26.88	8.13	22.03	6.62	12.28	2.87	31.21	9.37	79.14	19.55	64.45
<INPUT> Wire to Water Effic., E	0.60	1.60	1.60	0.60	1.60	0.60	1.60	2.60	3.60	4.60	5.60	0.60	0.60	0.60	1.60	0.60	1.60	0.60	0.60	0.60	0.60	0.60	0.60
Computed HP Req'd.	0.21	0.02	0.06	0.21	0.07	0.02	0.04	0.07	0.04	0.03	0.03	0.09	0.62	0.19	0.08	0.18	0.02	0.08	0.29	0.09	2.20	0.54	1.79

TOTAL HEAD (farthest house) = 275.47 ft

total volumetric flow rate = 11700 11700 11700

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Pipe lengths (ft)	500	250	650	934	350	170	300	700	600	500	800	500	1000	270	450	600	450	260	500	900	4000	1500	4300
# of houses using pipe	2	1	2	2	2	7	2	6	2	2	2	21	25	25	2	32	1	34	3	4	36	36	36
Static head (ft)	2	8	10	13	5	0	0	17	0	0	0	0	19	6	3	0	7	0	26	0	35	3	17
Max # of pumps operating simultaneously	2	1	2	2	2	3	2	3	2	2	2	5	5	5	2	6	1	6	2	2	6	6	6

Riverview Landing WWTP Study
Exhibit 10
Headloss Calculations
(East to West: All Options)

Grinder Pump Network with Current Pipes and Proposed Forcemains

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20A	20B	20C	20D	20E	20F
Pipe Diameter	**2.00**	**2.50**	**1.50**	**2.50**	**1.50**	**2.50**	**2.50**	**3.00**	**2.00**	**1.50**	**1.50**	**1.50**	**1.50**	**3.00**	**1.50**	**3.00**	**8.00**	**1.50**	**1.50**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**
Pipe Area	0.022	0.034	0.012	0.034	0.012	0.034	0.034	0.049	0.022	0.012	0.012	0.012	0.012	0.049	0.012	0.049	0.349	0.012	0.012	0.049	0.049	0.049	0.049	0.049	0.049
Gal/ft	0.163	0.255	0.092	0.255	0.092	0.255	0.255	0.367	0.163	0.092	0.092	0.092	0.092	0.367	0.092	0.367	2.611	0.092	0.092	0.367	0.367	0.367	0.367	0.367	0.367
Force main volume (gal)	81.59	295.78	41.31	152.99	41.31	68.85	254.98	183.59	114.23	55.08	45.90	73.43	27.54	62.42	32.13	345.14	1697.16	22.95	45.90	2717.08	1505.41	1542.13	1174.96	422.25	73.43
Pump Discharge Rate, GPM	22.00	22.00	11.00	44.00	22.00	44.00	44.00	44.00	33.00	22.00	22.00	22.00	22.00	55.00	22.00	66.00	66.00	11.00	11.00	66.00	66.00	66.00	66.00	66.00	66.00
Velocity, Ft/Sec	2.25	1.44	2.00	2.88	3.99	2.88	2.88	2.00	3.37	3.99	3.99	3.99	3.99	2.50	3.99	3.00	0.42	2.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00
<INPUT>Hazen-Wms. "C" Factor	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
Hydraulic Radius, Ft.	0.0417	0.0521	0.0313	0.0521	0.0313	0.0521	0.0521	0.0625	0.0417	0.0313	0.0313	0.0313	0.0313	0.0625	0.0313	0.0625	0.1667	0.0313	0.0313	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625
Friction Loss, Ft/1,000	10.42	3.51	11.73	12.67	42.28	12.67	12.67	5.21	22.05	42.28	42.28	42.28	42.28	7.88	42.28	11.03	0.09	11.73	11.73	11.03	11.03	11.03	11.03	11.03	11.03
Total FM Friction Loss, Ft	5.21	4.08	5.28	7.60	19.03	3.42	12.67	2.61	15.44	25.37	21.14	33.82	12.68	1.34	14.80	10.37	0.06	2.93	5.86	81.66	45.24	46.35	35.31	12.69	2.21
Static Head, Ft.	26.00	0.00	7.00	15.00	3.00	0.00	0.00	3.00	17.00	0.00	0.00	0.00	0.00	2.00	5.00	5.00	0.00	8.00	0.00	12.00	12.00	23.00	35.00	3.00	3.00
Total Dynamic Head, Ft	31.21	4.08	12.28	22.60	22.03	3.42	12.67	5.61	32.44	25.37	21.14	33.82	12.68	3.34	19.80	15.37	0.06	10.93	5.86	93.66	57.24	69.35	70.31	15.69	5.21
<INPUT> Wire to Water Effic., E	0.60	0.60	1.60	0.60	1.60	0.60	0.60	0.60	2.60	3.60	4.60	5.60	1.60	0.60	1.60	0.60	1.60	1.60	0.60	1.60	1.60	0.60	0.60	0.60	0.60
Computed HP Req'd.	0.29	0.04	0.02	0.42	0.08	0.06	0.23	0.10	0.10	0.04	0.03	0.03	0.04	0.08	0.07	0.43	0.00	0.02	0.03	0.98	0.60	1.93	1.95	0.44	0.14
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20A	20B	20C	20D	20E	20F
Pipe lengths (ft)	500	1160	450	600	450	270	1000	500	700	600	500	800	300	170	350	940	650	250	500	7400	4100	4200	3200	1150	200
# of houses using pipe	3	2	1	12	2	14	16	18	6	2	2	2	2	31	2	34	34	1	1	37	37	37	37	37	37
Static head (ft)	26	0	7	15	3	0	0	3	17	0	0	0	0	2	5	5	0	8	0	12	12	23	35	3	3
Max # of pumps operating simultaneously	2	2	1	4	2	4	4	4	3	2	2	2	2	5	2	6	6	1	1	6	6	6	6	6	6

TOTAL HEAD to MRCC WWTP =
155.59 ft

TOTAL HEAD to EC PS =
192.00 ft

TOTAL HEAD to Windhover =
258.90 ft

Grinder Pump Network with Replacement Pipes and Proposed Forcemains

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20A	20B	20C	20D	20E	20F
Pipe Diameter	**2.00**	**2.50**	**1.50**	**3.00**	**1.50**	**3.00**	**3.00**	**3.00**	**2.50**	**1.50**	**1.50**	**1.50**	**1.50**	**3.00**	**1.50**	**3.00**	**8.00**	**1.50**	**1.50**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**
Pipe Area	0.022	0.034	0.012	0.049	0.012	0.049	0.049	0.049	0.034	0.012	0.012	0.012	0.012	0.049	0.012	0.049	0.349	0.012	0.012	0.049	0.049	0.049	0.049	0.049	0.049
Gal/ft	0.163	0.255	0.092	0.367	0.092	0.367	0.367	0.367	0.255	0.092	0.092	0.092	0.092	0.367	0.092	0.367	2.611	0.092	0.092	0.367	0.367	0.367	0.367	0.367	0.367
Force main volume (gal)	81.59	295.78	41.31	220.30	41.31	99.14	367.17	183.59	178.49	55.08	45.90	73.43	27.54	62.42	32.13	345.14	1697.16	22.948	45.897	2717.08	1505.41	1542.13	1174.96	422.25	73.43
Pump Discharge Rate, GPM	22.00	22.00	11.00	44.00	22.00	44.00	44.00	44.00	33.00	22.00	22.00	22.00	22.00	55.00	22.00	66.00	66.00	11.00	11.00	66.00	66.00	66.00	66.00	66.00	66.00
Velocity, Ft/Sec	2.25	1.44	2.00	2.00	3.99	2.00	2.00	2.00	2.16	3.99	3.99	3.99	3.99	2.50	3.99	3.00	0.42	2.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00
<INPUT>Hazen-Wms. "C" Factor	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
Hydraulic Radius, Ft.	0.0417	0.0521	0.0313	0.0625	0.0313	0.0625	0.0625	0.0625	0.0521	0.0313	0.0313	0.0313	0.0313	0.0625	0.0313	0.0625	0.1667	0.0313	0.0313	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625
Friction Loss, Ft/1,000	10.42	3.51	11.73	5.21	42.28	5.21	5.21	5.21	7.44	42.28	42.28	42.28	42.28	7.88	42.28	11.03	0.09	11.73	11.73	11.03	11.03	11.03	11.03	11.03	11.03
Total FM Friction Loss, Ft	5.21	4.08	5.28	3.13	19.03	1.41	5.21	2.61	5.21	25.37	21.14	33.82	12.68	1.34	14.80	10.37	0.06	2.93	5.86	81.66	45.24	46.35	35.31	12.69	2.21
Static Head, Ft.	26.00	0.00	7.00	15.00	3.00	0.00	0.00	3.00	17.00	0.00	0.00	0.00	0.00	2.00	5.00	5.00	0.00	8.00	0.00	12.00	12.00	23.00	35.00	3.00	3.00
Total Dynamic Head, Ft	31.21	4.08	12.28	18.13	22.03	1.41	5.21	5.61	22.21	25.37	21.14	33.82	12.68	3.34	19.80	15.37	0.06	10.93	5.86	93.66	57.24	69.35	70.31	15.69	5.21
<INPUT> Wire to Water Effic., E	0.60	0.60	1.60	0.60	1.60	0.60	0.60	0.60	2.60	3.60	4.60	5.60	1.60	0.60	1.60	0.60	1.60	1.60	0.60	1.60	1.60	0.60	0.60	0.60	0.60
Computed HP Req'd.	0.29	0.04	0.02	0.34	0.08	0.03	0.10	0.10	0.07	0.04	0.03	0.03	0.04	0.08	0.07	0.43	0.00	0.02	0.03	0.98	0.60	1.93	1.95	0.44	0.14
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20A	20B	20C	20D	20E	20F
Pipe lengths (ft)	500	1160	450	600	450	270	1000	500	700	600	500	800	300	170	350	940	650	250	500	7400	4100	4200	3200	1150	200
# of houses using pipe	3	2	1	12	2	14	16	18	6	2	2	2	2	31	2	34	34	1	1	37	37	37	37	37	37
Static head (ft)	26	0	7	15	3	0	0	3	17	0	0	0	0	2	5	5	0	8	0	12	12	23	35	3	3
Max # of pumps operating simultaneously	2	2	1	4	2	4	4	4	3	2	2	2	2	5	2	6	6	1	1	6	6	6	6	6	6

TOTAL HEAD to MRCC WWTP =
141.65 ft

TOTAL HEAD to EC PS =
178.07 ft

TOTAL HEAD to Windhover =
244.96